

Sustainable Mediterranean

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The Role of Universities in Supporting UNESCO Designated Sites as Drivers for Sustainable Development at Local and Regional Levels

Exploring how ESD in Higher Education could contribute in achieving the SDGs

This issue of Sustainable Mediterranean is co-produced by the UNESCO Regional Bureau for Science and Culture in Europe, Venice (Italy); the University of Athens; and MIO-ECSDE.



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The meeting and this special issue are regional / Mediterranean contributions to the overall global discussions and trends calling for synergies and collaboration Universities, UNESCO designated sites and different institutions in addressing the complex issues faced by modern societies and encapsulated in the SDGs.

Universities have a primary mission to serve science and the society within which they operate by generating, consolidating and disseminating knowledge by preparing students, providing them with competences and skills to effectively address issues of today and challenges of the future. Obviously Universities are not expected to address all our global social issues, even though they are affected by them. Today's societies face a number of global and regional (e.g. Euro-Mediterranean) problems such as the economic crisis, the high unemployment rates especially of youth, and war conflicts resulting in unprecedented refugee fluxes across the Mediterranean to Europe. At the same time, the international community has recently reached important global agreements, such as the Sustainable Development Goals (SDGs, Oct 2015), and the Paris 2015 Agreement on Climate Change. In the Mediterranean, the 19th Meeting of the Contracting Parties to the Barcelona Convention adopted the Mediterranean Strategy for Sustainable Development (MSSD 2016-2025) of which the Mediterranean Strategy on Education for Sustainable Development (MSESD) was accepted as an integral part. This fulfils one of the key tasks of the Flagship programme under the Global Action Programme (GAP) of UNESCO.

Within this setting, Universities are called to urgently adjust their culture, curricula and operation and propose long term innovative approaches to very complex issues. Simultaneously, they need to strengthen their links with society -local, national and global- and undertake a more active role as change agents toward sustainable development. An appropriate pilot way to answer to some of the aforementioned challenges could be by effectively linking Universities with the function of certain UNESCO Designated Sites, and specifically World Heritage (WH) sites, Biosphere Reserves (BRs) and Geo Parks. This relationship could generate beacons of sustainability and "education laboratories" offering a "win-win" sustainable interaction model between people, ecosystems and heritage –both cultural and natural.

What could Universities gain from interacting with nearby designated sites' experiences? And vice versa what could the designated sites gain from the Universities in their region? These were some of the questions debated during a two-day meeting in Athens on 18-19 January 2016 that

was co-organised with the UNESCO Regional Bureau for Science and Culture in Europe and kindly hosted by the National and Kapodistrian University of Athens, in the Senate Hall of its legendary premises. The meeting was attended by 38 invited experts from 9 countries, comprising an interesting diverse and representative mix of professors, researchers and administrators, as well as managers of sites hosting or closely related to universities.

The meeting pointed out that Sustainable Development is a core issue that universities need to urgently and in-depth incorporate in all their functions including teaching, research and in all their operations and relationships with society in order to promote more responsible behaviours to their university-specific communities as well as to the wider public. The various designated sites both rural, and, especially urban ones, can provide universities with concrete cases to address many of the vital issues directly related to the efforts for achievement of the 17 Sustainable Development Goals (SDGs) and their 169 targets. In most of these goals the role of Education, and particularly of Education for Sustainable Development (ESD) is recognised since the latter is a prerequisite for almost all intervention and management options in addressing the problem. Furthermore, the knowledge, research, science and technology that Universities provide are fundamental for achieving the SDGs.

The meeting also identified a series of challenges in effectively linking Universities and UNESCO Designated Sites and Networks, and recommended a number of concrete ideas to overcome them. The meeting was an activity of the Network of Mediterranean Universities for Sustainable Development focusing on ESD (MedUnNET) aiming at generating useful input not only to its members but to the entire Academic community of the Euro-Mediterranean region and beyond, but also to effectively involve the UNESCO Networks of MAB BRs, WHs and UNESCO Chairs following the recommendations of the Nagoya Declaration.

This special issue of Sustainable Mediterranean is dedicated to the abovementioned meeting and aims to contribute to the overall global discussions and trends calling for synergies and collaboration between Universities, UNESCO designated sites and different institutions in addressing the complex issues encapsulated in the SDGs, faced by modern societies. I do hope that readers will find useful not only reading the individual contributions (case studies) but also the collectively drafted and agreed document which summaries the main outcomes and recommendations.



Prof. Michael J. Scoullos

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Scope, Structure and Agenda of the meeting

The overall aim of the meeting was to explore the role of Universities and related UNESCO Designated Sites of the Euro-Mediterranean region, in promoting Education for Sustainable Development and Sustainable (ESD) Practices within recent global and regional contexts and initiatives.

The meeting's specific objectives were to:

- Demonstrate the role of universities as places of conceptual development and application of Sustainable;
- Development principles and Education for Sustainable Development methodology;
- Focus on the role of universities as incubators of change and drivers of sustainability in their local/urban context;
- Strengthen the possible synergies between universities and the managers of UNESCO designated sites (with special focus on WH sites and BRs connected to or surrounding cities) in designing and implementing actions contributing to Sustainable Development;
- Explore possibilities for further involvement of youth in SD issues;

- Exchange experiences on the role of universities in improving the interpretation, communication and sustainable management of UNESCO designated sites.

The meeting had the form of an intensive workshop for a selected number of experts that included university educators, researchers and administration staff, mostly from the Mediterranean Universities Network on Sustainable Development and Education for Sustainable Development (MedUnNET), as well as managers from UNESCO designated sites hosting or being closely related to universities.

It combined a few key lectures on fundamental themes related to SDGs and ESD, with interactive sessions (workshops) during which participants presented and reflected on examples (case studies) they brought from their own experiences. All four workshops generated a series of outcomes and recommendations that were combined in a single document (page 8).

Agenda

Day 1: Monday 18 January 2016

09.00-09.15:	Welcome Greetings <i>Prof. Meletios Athanasios Dimopoulos, Rector, NKUA</i> <i>Mrs. Aikaterini Tzitzikosta, President Hellenic National Commission for UNESCO</i>
09.15 - 10.30:	Introductory session Prof. Michael Scoulllos - Agenda presentation and updates on the Mediterranean Universities Network on SD and ESD (MedUnNET) - The role of Universities in applying SD and ESD, in light of recent international developments (SDGs, COP-21, UNESCO GAP, etc.) Mr. Philippe Pypaert - The role of Universities as incubators of change and drivers of sustainability in their local/urban context, especially within UNESCO designated sites
10.30 - 11.00:	Reflections, Discussion
11.00 – 11.30:	Coffee Break
11.30 – 13.30:	Workshop 1 – Universities enhancing sustainability in World Heritage Sites The WH site Venice and its Lagoon is a complex system, facing today many sustainability challenges related to its tourist overexploitation, its transportation system, wastes management or energy efficiency in historical buildings, among others. The workshop will explore possible fields of improvement ideally inspired by the sustainability experiences under development within the Cà Foscari University of Venice, as well as the EU funded EFFESUS project focused on the energy efficiency of buildings and city districts. Facilitator: P. Pypaert Presenters: K. Basili (Management Office of the WH Site of Venice and its Lagoon, Venice Municipality), F. Pranovi (Cà Foscari University), A. Egusquiza Ortega (Tecnalia, EFFESUS project).

13.30 – 14.30	Lunch Break
14.30 – 16.00:	Workshop 2 – The Universities as showcases of Sustainable Development The workshop will shed light on various examples of HEIs that are based on the principle of the Whole Institute Approach (WIA) and put emphasis on aspects such as, green infrastructure, links with the society, function of a dedicated sustainability office at the HEI, etc. Opportunities, challenges and ideas to address them will be discussed. Facilitator: A. Grau (Polytechnic University of Catalonia) Presenters: G. Angelopoulos (University of Patras), E. Sartsetakis (University of Macedonia), A. Popovic (University of Belgrade), N. Koprivanac (University of Zagreb).
16.00 – 16.15:	Coffee Break
16.15 – 18.00:	Workshop 3 – Linking between cultural, environmental and landscape heritage The workshop highlights the inseparable links between cultural, environmental and landscape heritage using as a main case the example of the WH site of Mantua and Sabbioneta. A proper design of the future of the city requires that more attention be paid to both sustainable development issues and the management of cultural heritage: building territorial networks (Cultural Districts and “diffused” WH site), promoting the usability and accessibility of public spaces and the reuse of abandoned buildings, also offering new social and economic opportunities to citizens, giving them access to new services and experiences. Facilitator: E. Mussinelli Presenters: G. Michielin (WH Site Mantua and Sabbioneta, Municipality of Mantua), E. Mussinelli and A. Tartaglia (Politecnico, Milan), M. Qytyku (urban regeneration projects in municipality of Berat), D. Michelogiannis (Gorge of Samaria MAB in Crete, Greece).
19.00	Social Event

Day 2: Tuesday 19 January 2016

09.00 – 12.30:	Workshop 4 - SD principles and participatory approaches integrated in BR design The workshop will share the experience of integrating SD and ESD dimensions and the local communities' needs in the process of initial stage design of a potential Biosphere Reserve in Greece, Italy and other sites from the Mediterranean, allowing ideas to be shared in order to enhance them. Facilitator: M. Scoulllos Presenters: E. Pappas (Monemvasia – Parnon BR in Greece), A. Theodosiou (Akamas site in Cyprus), A. Malcevski (the newly established Appennino Tosco-Emiliano BR), P. Petridis (the process of establishing a BR in Samothraki, Greece), T. Neyişçi (Akdeniz University).
12.30 – 13.30:	Information Session on engaging youth on SD issues The participants will be asked to reflect on the preliminary findings of the “Mediterranean Youth Survey on Sustainable Development” (2015). The results of this survey will lead to the further elaboration of elements of an “Action Plan” complementary to the “Mediterranean Strategy on ESD” (endorsed in May 2014). Facilitator: M. Scoulllos Presenter: E. Touli (University of Athens)
13.30 – 14.45	Lunch Break
14.45 – 16.00	Workshop to draft the outcomes of the meeting and the way forward Participants will work in groups guided by the Workshop facilitators to summarise the main findings of the workshops and finally elaborate possible joint follow-up actions involving Universities of the MedUnNET and UNESCO Designated Sites in the region.
16.00 – 16.15:	Coffee Break
16.15 – 17.00:	Evaluation of the meeting Facilitators: M. Scoulllos and P. Pypaert
17.00	Closing of the meeting <i>Prof. Napoleon Maravegias, Deputy Rector, NKUA</i>
17.15	Departure of participants.

Prof. Athanasios Dimopoulos

Dear Mrs. Tzitzikosta, President of the Greek National Commission of UNESCO,
Dear Mr. Pypaert, Representative of UNESCO,
Dear Prof. Scoullos, Director of the UNESCO Chair and Network of the University of Athens,
Dear Participants,

I am very pleased that this important strategic meeting is taking place in the University of Athens and in the Senate Hall of this landmark building which is a witness of the evolution of modern history in our country.

The University of Athens, which is very big, with hundreds of premises and many thousands of students and professors, despite the difficult times experienced by everyone in Greece due to the economic crisis, maintains its dedication to Environmental work carried out in many departments and laboratories, and has a very good record in introducing environmental and sustainable development courses into its programme. In an exercise of 2014 it was found that the UoA had 13 Post-graduate courses and some 50 undergraduate courses, which address sustainable development issues.¹ The University was instrumental in the achievement of the "Charter of Greek Universities for Sustainable Development"². It has a Permanent Committee on Environment and Sustainable Development³ and participates in a number of relevant networks and unions, including the "University Educators for Sustainable Development" (UE4SD).⁴

Of particular importance to us is the "Network of Mediterranean Universities for Sustainable Development with emphasis on Education for Sustainable Development" (MedUnet), in which many of you belong, that was launched in 2008 with the support of the UNESCO Venice Office, in close collaboration with the Greek National Commission of UNESCO. It is coordinated

"The University of Athens, despite the difficult times experienced by everyone in Greece due to the economic crisis, maintains its dedication to environmental work carried out in many departments and laboratories, and has a very good record in introducing environmental and sustainable development courses into its programme."



Prof. Dimopoulos during his welcome address.

by Prof. Scoullos and his UNESCO Chair & Network on Sustainable Development Management and Education in the Mediterranean and is administratively facilitated by the "Mediterranean Information Office for Environment, Culture and Sustainable Development" (MIO-ECSDE).

MedUnet already has considerable work to show and the UoA is eager to continue to support it in the coming years because Universities can act as showcases of sustainability, cohesion pillars for their local communities, but also as open, extrovert agencies willing to collaborate in science and innovation projects and share good practices with their counterparts from all around the Mediterranean. This exchange and collaboration is of particular importance to Greek institutions, as our country is faced also with an unprecedented wave of thousands of refugees moving to Europe.

With these thoughts I would like to welcome you all and wish you success in your works.

1 Ref: Mapping exercise within a European project, where NKUA is a partner (<http://www.ue4sd.eu/>)

2 The charter was signed in 2012. It can be found in English [here](#) and in the Greek language [here](#).

3 Chaired by Prof. Scoullos, that needs to be revitalised

4 <http://www.ue4sd.eu/>

Ms Ekaterini Tzitzikosta

Dear Prof. Scoullos, Chairman of MIO-ECSDE,
Dear Mr. Pypaert, Programme Specialist of the UNESCO Regional Bureau for Science and Culture in Europe,
Distinguished Professors,
Esteemed Participants,

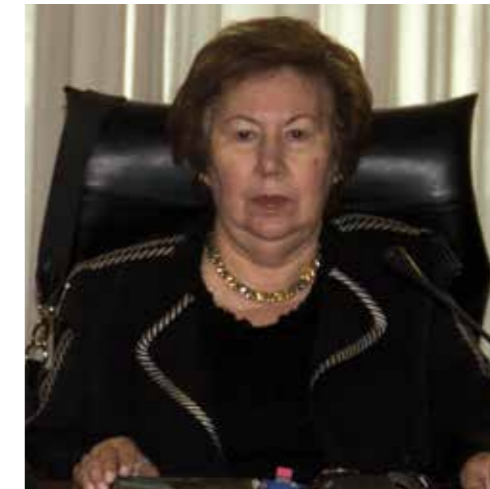
It is with great honour that I would like to greet you all, as President of the Hellenic National Commission for UNESCO, to today's Regional Meeting, which is co-organised by UNESCO's Regional Bureau for Science and Culture in Europe, MIO-ECSDE and the Network of Mediterranean Universities for Sustainable Development with emphasis on Education for Sustainable Development.

This important initiative aims to support the Mediterranean Universities' Network to exchange and disseminate sustainable practises applied in World Heritage sites today, to engage youth and to influence decision making processes at local and regional level.

UNESCO, the United Nations lead agency for Education, Culture, Sciences and Communication, is focusing among others, on technical advice, standard setting, innovative projects and capacity-building for promoting multicultural dialogue, fostering freedom of expression, protecting cultural heritage, building knowledge societies and diffusing education for sustainable development, as vehicles for establishing worldwide peace.

Moreover, the role of Universities lies at the heart of UNESCO's vision, mainly through the UNITWIN/UNESCO Chairs Programme, established in 1992 involving over 700 institutions in 126 countries. The Programme supports the establishment of Chairs and Networks in key priority areas, aiming to enhance institutional capacities through knowledge sharing and collaborative work. Through it Higher Education Institutions all over the globe make use of their resources to address pressing challenges and contribute to the development, acting as think tanks and as bridge builders between academia, civil society, local communities, research and policy-making. Additionally, UNESCO Chairs have proven useful in establishing new teaching initiatives, generating innovation, contributing to the enrichment of existing university programmes and promoting cultural diversity.

"This meeting offers a unique opportunity to strengthen synergies between Universities and to promote the sustainable management of UNESCO's designated sites, therefore contributing to the balanced development of contemporary cities and societies."



Ms Tzitzikosta during her welcome address.

The Hellenic National Commission for UNESCO has, since its inception, supported the establishment of 10 UNESCO Chairs in Greece in the fields of human rights, multicultural education, education for sustainable development, adolescent health and medicine, management of water resources, natural disasters, information technologies, solid earth physics and geohazards' risk reduction.

Furthermore, Universities can function as platforms where sustainable development and education for sustainable development is applied and as key drivers of sustainability at a local and urban context, promoting new competencies and building on behavioral models which encourage a more globally responsible action. Last but not least, biosphere reserves and world heritage sites, integrating the notions of culture and nature, can also promote sustainable management, raise awareness, contribute to meaningful change and sensitise youth.

In this respect, I believe that this meeting is particularly important as it offers a unique opportunity to strengthen synergies between Universities and to promote the sustainable management of UNESCO's designated sites, therefore contributing to the balanced development of contemporary cities and societies.

Concluding, I would like to congratulate Mr. Philippe Pypaert, Prof. Michael Scoullos, MIO-ECSDE and all of the staff of these organizations that have worked eagerly in undertaking this important initiative.

Prof. Napoleon Maraveyas

Ladies and Gentlemen,
Dear Colleagues,

I believe that we have concluded a very important and successful meeting. Significant elements for obtaining this success was, of course, the importance of the theme itself: the examination of the Role of Universities in a rapidly changing world where the various crises (social, cultural, personal) have only one antidote: the fundamental revision, re-orientation and change of production and consumption patterns, and therefore, the new competences (involving values, knowledge and the necessary skills) to drive and maintain this change.

The elements you brought into the discussion by capitalizing on the existing UNESCO Networks of Biosphere Reserves, of World Heritage Sites as well as the UNESCO Chairs, were very important.

You made also very interesting presentations with original results and significant discussions on the best way to share this knowledge, in order to establish or improve the operation of Biosphere Reserves and World Heritage Sites, which among other functions, are ideal to promote also Education for Sustainable Development. In this attempt the universities need to explore all different means, projects and programmes.

It is noteworthy that the University of Athens, through Prof. Scoullou, has been the Team Leader of the Capacity Building component of the "Horizon2020 Initiative to De-pollute the Mediterranean" for the period 2010 – 2014, and we are happy to announce that he will be again the Team Leader for the second phase of the Programme from February 2016 to 2019.

The meeting indicated also the usefulness of the Mediterranean Network of Universities (MedUnNET) which has already considerable achievements. The University of Athens is committed to continue to service it and strengthen it in the coming years, particularly because the role of Universities in the promotion of Sustainable Development in Society is gaining recognition from both, inside the Academic Community and outside, in the wider local and national communities within which Universities operate.



Prof. Maraveyas during his closing address.

Let me repeat what has been already mentioned and should remain with us and take back: The recent worldwide re-confirmation of the role of Education and Universities, in particular in the framework of major current developments, such as the post 2015 Agenda and the Sustainable Development Goals (SDGs), as well as the UNESCO Global Action Programme on Education for Sustainable Development (ESD).

The role of Universities is critical, as they can be, on one hand showcases of sustainability and Education for Sustainable Development, and on the other, they may act as drivers or co-drivers of sustainability together with the local authorities of cities or regions where they operate.

In concluding I would like to thank all the Participants for your valuable contributions,

the UNESCO Venice Office and, in particular, Mr Philippe Pypaert,

the Mediterranean Information Office for the impeccable organisation of the meeting,

the Greek National Committee of the Man and the Biosphere Programme of UNESCO, and the UNESCO Chair on Sustainable Development Management and Education in the Mediterranean under Prof. Michael Scoullou.

I wish you a safe return home, thank you.

The role of Universities in Supporting UNESCO Designated Sites as Drivers for Sustainable Development at Local and Regional Levels

Exploring how ESD in Higher Education could contribute in achieving the SDGs
18-19 January 2016, National and Kapodistrian University of Athens

During the two-day long intensive working Conference hosted at the University of Athens, thirty eight (38) experts from nine (9) European and Mediterranean countries debated on the role of universities as catalysts of sustainability, and in supporting UNESCO Designated Sites in promoting Sustainable Development (SD) and Education for Sustainable Development (ESD), within recent global and regional frameworks and initiatives. The meeting was intended for a relatively small number of Professors, researchers and administrators, mostly from the 'Mediterranean Universities Network on Sustainable Development and Education for Sustainable Development' (MedUnNET), as well as managers from UNESCO designated and candidate MAB Biosphere Reserves (BRs) and World Heritage (WH) sites, hosting or closely related to these universities.

The meeting was designed as a substantial contribution of ESD at High Education level and of UNESCO networks to the UNESCO Global Action Programme (GAP) and its Flagship project; and also as an input to the finalisation of the Action Plan of the Mediterranean Strategy on ESD. The following text has been prepared, debated and agreed in principle collectively and after receiving comments circulated to all participants asking for their second set of comments and agreement. It is therefore an agreed by consensus document to be used for all the aforementioned purposes and as guidance to Universities and UNESCO designated sites.

Outcomes and Recommendations

The meeting emphasised that sustainable development is a core issue that universities need to urgently and in-depth incorporate in all their functions through the Whole Institute / Sustainable University Approach, in order to promote more responsible behaviours and ethical choices in developing and applying knowledge not only among their staff and students but in the entire society. Such a mission should therefore involve all their primary teaching and research functions, but also be seeded in all their operations. All stakeholders - professors, students, researchers, suppliers, administration, managers and the general public - need to be engaged in actions aiming at putting sustainable development into practice, within the Universities themselves as well as in the surrounding communities and territories within which the universities operate. The collaboration of Universities, UNESCO designated sites and local authorities in the same area provide formidable opportunities for win-win-win actions, which constitute practical and substantial contribution towards achieving most of the SDGs.



Snapshot of the meeting

During the meeting participants highlighted some existing good practices and experiences in areas such as curricula reforms and the implementation of cooperation and networking schemes between universities and other stakeholders involved in the management of designated sites. However, there are still several challenges for universities to become more effective drivers and supporters of sustainable development in designated sites. In this regard, the participants discussed in depth, in plenary and group sessions and made a number of observations and recommendations which are summarised herewith:

In many cases universities themselves have not fully embraced the notion of sustainable development. This understanding is a prerequisite in order for them to be catalysts of change and bring forward SD concerns and practices. Sustainable development should not be considered as an external and specialized topic to be added to programs and courses. On the contrary, it should be a pervading and shared “cultural approach” in all education and training activities of a university, targeting also behavioral changes of individuals. This transformative “cultural approach” should be extended at all educational levels within the university: at Bachelor, Master, PhD level; and outside the university: at preschool, primary and secondary level, but also in life-long learning and non-formal and informal educational schemes where Universities may have a role. University staff needs facilitation in being convinced about the significance of SD, properly comprehend its concepts and approaches and acquire the necessary competences to implement the needed transformation.

The starting point for each university may be different, so the tools in each case may also differ: adopting a clear road-map (to establish a common understanding and ‘language’ of SD); improving coordination vertically (within the university) and horizontally (outside the university) and/or having a permanent Secretariat/ Sustainability Office dedicated to the sustainability agenda. Employing Environmental Management Systems and measurable evaluation indexes within each institution is strongly recommended, on the basis of a series of excellent experiences documented and discussed. The applied SD models should be practical, solid and effective, ideally tested through pilot projects and then widely shared to demonstrate their efficiency and transferability. Attention should be given to the link between formally accepted Commitments and to the institutionalization of the process in such a way that the sustainability agenda could be kept ongoing in the long run, regardless of changes in leadership, staff, etc.

An indicative set of actions suitable to be undertaken by Universities, individually or in collaboration, preferably within MedUnNET may include inter alia calculating the carbon and water footprint; waste and wastewater management systems; energy conservation practices; sustainable “near zero” building emissions; creation of Innovation Hubs; establishment of a Forum for consultation and radical re-thinking on SD; creation of organic farms within campuses, etc.

The **integration of the Sustainability Development Goals (SDGs)** should be actively promoted and embraced by all institutions, regardless of legal status (public or private) and faculty (education, health, law, business, agriculture, etc.). The challenging, yet inspirational, task is not to “select” goals that are close to one’s field in isolation of the others, but to find ways to introduce all 17 SDGs and elaborate on the connections and operational ways to contribute towards achieving them all, applying a systems thinking approach! In redefining and reforming university curricula and new operational standards, it is important to guarantee their coherence with the 17 SDGs and the 169 targets.

In many cases there is **limited connection between universities’ agendas and designated sites’** priorities, needs, or day-to-day operation difficulties. Natural and cultural heritage are living, ever-changing systems where time management is a decisive variable of SD. In light of this, a number of ideas have been proposed to overcome cooperation barriers between universities and designated sites when programming, designing and monitoring interventions. These are:

- joint undertaking of specific SD demonstration projects that could be used as models for wider application in the site; In this process the most suitable actions for both sustainability and preservation in each designated site need to be identified. This cooperation can take place both in the planning and in the operation/execution phase. In both cases it is necessary to develop each action in accordance with the local socio-economic context and accompany the general ideas with feasibility checks. Issues such as the recovery of degraded and abandoned areas, the preservation of cultural goods, the effort to improve urban policies, the management and care of public spaces, should be dealt in synergy with and by combining the high standards developed by universities with pragmatic solutions, usually promoted by public administration;
- joint organisation of intensive capacity-building initiatives (workshops, summer schools, etc.), but also awareness-raising events open to the public and schools for the promotion of a culture of sustainability among key stakeholders (promoting a common ground and common understanding through art, readings, festivals, celebrations, happenings, theatre, open door events and participative workshops);
- joint publications (guidelines on particular managerial/technical aspects, best practices, didactic material, visitors’ guides, etc.);
- the cooperation and joint undertaking in writing proposals and submission of applications to raise funds (e.g. Tempus, Erasmus+ and other EU Programmes, national and regional projects, etc.), submitting site designation dossiers or official periodic reports about the proper functioning of designated sites, etc.;
- orientating research in fields relevant to a site’s monitoring and operation, such as carrying capacity, new and innovative methods of visitor management, and management schemes of the site itself;

- enrichment of the universities’ curricula with subjects relevant to the designated sites such as management, territorial marketing, branding, products’ certification, biodiversity protection, ecotourism, governance, regional development goals, etc.;
- joint preparation of consolidated guidelines on particular managerial/technical aspects (support to the formulation of appropriate rules).
- involvement of universities in monitoring, management and governance schemes of designated sites;
- encouragement and provisioning for students’ internships/practical work in designated sites. Through hands on training, the site can help bridge the gap between the theoretical approach being taught in universities and the professional expertise required in the workplace.
- making use of belonging to “cross-cutting networks” (universities and sites) to cooperate beyond each one’s borders and have a greater impact in society;
- giving priority to cities and trying to achieve sustainable cities since after all this is where most of the world population lives and almost all universities are located;
- focus on projects which strengthen traditional knowledge taking advantage in a pro-active way of old and new technologies in an environmental, social and economic sustainable manner.
- information exchange and knowledge transfer is important in issues related to ESD, but also in issues related to management and fundraising;
- defining an agenda of thematic meetings (e.g. peri-urban areas, rural development, education, etc.) to encourage exchange of experiences and cooperation for SD and ESD in relation to the SDGs among UNESCO, Universities, designated and candidate sites;
- setting up local SD Boards involving all relevant stakeholders (local administration and institutions, management bodies of WH and BR sites, UNESCO

representative and, of course, Universities) to promote the SDGs and develop locally specific actions.

The various UNESCO designated sites (World Heritage sites, MAB Biosphere Reserves, Geoparks), both rural and urban, are increasingly called to actively contribute to sustainable development across its various dimensions: not only in preserving unique natural and cultural assets of the world and in providing ecological services (e.g. by reducing natural disaster risks, floods, etc.) but also in alleviating poverty, generating decent green jobs, promoting justice and equity, tolerance and respect, strengthening traditional knowledge, empowering women, and preventing conflicts. Designated sites should not be considered just as protected spaces or museums to be visited by a few, but drivers of SD and this is possible only if inhabitants of all ages can prosper in these sites - not just survive - in mutual coexistence. These sites, being potential beacons of sustainability, can certainly support and be supported in a dynamic way by universities in their respective sustainability agendas. Through their daily operations and an appropriate management, these sites can finally become effective showcases for raising awareness and educating people on the many interlinked aspects of sustainability.

This would imply that the principle of open and transparent participation of all relevant stakeholders, including universities, should be adopted at all levels of decision making in designated sites. This is a way to overcome the “resistance to change” that is often observed inside the governance or management structures and to increase stakeholders’ ownership.

It was acknowledged that, to cultivate the so much needed “culture of sharing” knowledge and benefits and to build trustful relationships between universities and designated sites could take time and require many meetings and repeated efforts. Without discouraging any



Groupwork during the meeting.



side to take initiative, it could be recommended to start with local and small scale activities and gradually scale up. It has been demonstrated that when trust is established, things run smoothly.

Designation by UNESCO should be perceived by local communities as important opportunity for development and promotion rather than as a constraint and control mechanism. This should be promoted systematically by Universities. To this end, it could be useful to cooperate directly with the UNESCO system offices in the selection and communication of good sustainability and preservation practices, allowing also the local councils of municipalities included or cooperating with designated sites to gain recognition for their ideas and efforts.

Obtaining a site's certification or designation should not be seen as an end in itself for any site or monument. Site designation is demanding in terms of time investment for the submission, and even more so for the monitoring and reporting obligations, and applicants need to be prepared to undertake such efforts in the long run. In this undertaking local and other Universities may play an important support role. During the meeting it was stressed that the greatest difficulty is not to obtain the designation, but to maintain it, keeping high sustainability standards. Still, the process of submission (file preparation) of a site can be a valuable exercise for managers to re-consider what sustainability aspects can be incorporated in the management and daily operations, and to build trust among stakeholders. This process is also a highly educational one.

Tourism is growing worldwide and becoming more specialised (focused e.g. on religion, gastronomy, sport, etc.). While some popular sites suffer from millions of people "invading" them regardless of their carrying capacity, others, being less popular, are in the process of incorporating touristic activities and attractions in their management plans, in order to increase their economic sustainability through tourism. Admittedly there are limits in what universities and management bodies can do to influence or control tourist flows and the related impacts. In any case tourism should not be seen either as an "enemy" nor a "panacea", but as an important potential source of revenue, as well as an opportunity for cultural exchanges, which have become so important for today's life. In this context, the responsible authorities should monitor the way tourism develops in their territory and take actions to "divert" it to more sustainable paths, to the extent possible. For example, visitors could be informed in advance about the sensitivity of a particular site, and be provided with practical tips and ideas on how to minimize their footprint. A series of good practices developed by local authorities, universities, NGOs and the private sector were presented. Within a sustainability perspective a "monoculture" of tourism, should never be encouraged as the only option for the economic development of any designated site.

Many job opportunities related to traditional occupations (cattle raising, agriculture, fishing, manufacturing, etc.) should be given more value and further supported with incentives and investments (e.g. educating farmers,

adapting crops, integrating and modernizing production), with a clear view to offer to residents, especially young people, the chance to earn a decent living, and an incentive to remain in the area, thereby counteracting the process of depopulation and abandonment which affects many of these sites. Preserving the accumulated experience and knowledge of older generations and transmitting it to the younger generations is also an important function of such sites that should be encouraged and explored by Universities. In this respect Universities could organise tailored made training modular programmes for interested SMEs and other target groups.

Designated sites sustain ecosystem services and provide public goods that despite their indisputable value for reducing risks, ensuring recreation and enhancing the quality of life and our wellbeing, are too often not properly compensated. Universities have a role in assessing the value of the ecological services of these sites also in order to demonstrate the need for public investment in them. Undisrupted funding for the core operations of designated sites should be safeguarded and supported by public funds. This does not mean that management bodies should not systematically engage in fund raising exercises themselves for certain important projects, etc. Capacity building of their staff is necessary and Universities can play a role in this.

Training and education of the stakeholders of the designated sites including decision makers should be supported, with an obvious role for the University.

Networking and cooperation within national MABs should be enhanced. Likewise, the potential creation/ mobilisation of a regional Mediterranean MAB coordination mechanism with the involvement of Universities should be considered.

Bottom line, there is no single way, or single model, or single type of designated site operation that can fit all needs. There are designated sites and universities successfully operating in totally different scales and in different natural and human settings, and there are poor examples as well. Each site and university needs to set its own benchmarks and goals to achieve sustainable development, but a clear need and will for closer cooperation was highlighted: universities and sites have much to learn from each other by engaging in meaningful collaborations that co-generate knowledge and enhance prosperity.

In light of this, participants expressed their high interest and availability to continue working and exchanging on their SD and ESD experiences. The Mediterranean Network of Universities on SD with emphasis on ESD (MedUnNET) and the MEDIES network, as well as other regional networks of related UNESCO Chairs, the MAB BRs and the WH sites should be encouraged and facilitated to work closer together for the implementation of the Global Action Programme of UNESCO (GAP) and the promotion of the SDGs.

Additional suggestions

Additional case-specific proposals were received in writing in the follow-up correspondence and are listed herewith:

The Olympus National Park would welcome support in research areas such as carrying capacity, new and innovative methods of visitor management, and management schemes of the site itself, and could provide a testing site wherein universities can implement and assess innovative research.

The University of Patras proposed to establish a Mediterranean Research Infrastructure which will act as a pole of excellence for applied research on Circular Economy with emphasis on Sustainability, Environment, Recycling and Reuse, emphasizing the presence of the Mediterranean Universities Network in the international research arena.

References

SDGs: Getting Started with the Sustainable Development Goals - A Guide for Stakeholders:

<https://sdg.guide/>

PARIS COP-21 Outcomes:

<http://newsroom.unfccc.int/unfccc-newsroom/finale-cop21/>

The Seville Strategy for Biosphere Reserves:

www.unesco.org/mab/doc/brs/Strategy.pdf

www.unesco.org/mab/doc/brs/Guid_princip.pdf

World Heritage and Sustainable Development:

<http://whc.unesco.org/en/sustainabledevelopment/>

Policy for the Integration of a SD perspective into the progress of the World Heritage Convention:

<http://whc.unesco.org/document/139146>

Global Action Programme (GAP) on ESD:

www.unesco.org/new/en/unesco-world-conference-on-esd-2014/esd-after-2014/global-action-programme/

The Education 2030 Framework for Action:

www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-all/education-2030-framework-for-action/

<http://unesdoc.unesco.org/images/0024/002432/243278e.pdf>

The Mediterranean Strategy on ESD (MSESD)

<http://ufmsecretariat.org/wp-content/uploads/2014/05/Mediterranean-Strategy-on-Education-for-sustainable-development.pdf>



Group photo of the meeting participants.

Universities enhancing sustainability in World Heritage Sites: The case of the World Heritage Site “Venice and its Lagoon”



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Introduction

The Site “Venice and its Lagoon”, inscribed to the World Heritage List (WH) in 1987, is facing many challenges in implementing its Management Plan, adopted in 2012 as the result of a lengthy and complex process of consultation and agreement among authorities in charge and relevant stakeholders. This paper will illustrate the perspective of the management authority of the World Heritage Site (WHS) “Venice and its Lagoon” (the City of Venice) for the definition of an efficient cooperation and knowledge sharing with universities and research centres to help and improve decision-making and coordination by the various actors involved in the management of the Site’s resources.

Before entering more deeply into the issues raised by the workshop, it is necessary to provide readers with some preliminary information and considerations.

The Management Plan for the WH site “Venice and its Lagoon”

With the signature of the Agreement Act in July 19th 2007 among the 21 bodies in charge of the Site’s protection, the City of Venice was indicated as the promoting and coordinating authority of the Management Plan, a tool



Fig 1. Venice and its Lagoon World Heritage Site © City of Venice.

requested in 2005 by the World Heritage Committee for WHSs protection (see *Operational Guidelines for the Implementation of the World Heritage Convention*, <http://whc.unesco.org/en/guidelines/>).¹

In spring 2010 the City of Venice decided to undertake a more systematic consultation with relevant stakeholders, intending not only to meet that obligation, but rather to consider the drafting of the Management Plan as an opportunity to define and share the main challenges to face in order to balance protection and sustainable development.

Given the Site’s complexity and the number of different players, the drafting of the Management Plan actively involved the authorities responsible for its management in the identification of the issues, and criticalities of the Site as well as the definition of objectives and actions to set forth to achieve them. Many preliminary difficulties have been identified and progressively faced by the City of Venice, such as:

1. Assessing roles and responsibilities within a complex and fragmented governance system;
2. Awareness raising about the Site values and significance of the designation for the territory’s protection and development;

“If at the beginning one of the main concerns was to define the system of knowledge available, now there is the need to define an efficient knowledge sharing system to help and improve decision-making and coordination by the various actors.”

1 The Management Plan is a dynamic tool aimed at “ensuring the identification, protection, conservation, enhancement and transmission of the Site’s outstanding universal value to future generations” (World Heritage Convention, 1972).

3. Engaging stakeholders and developing consensus on so delicate and complex issues;
4. Lack of financial resources;
5. Huge knowledge and research but of difficult access.

In such a complex situation, the City of Venice decided to undertake a more complex and inclusive decision-making process. A series of “Thematic Working Tables” was organised between October and December 2010, with the support of the UNESCO Venice Office and a team of facilitators. In 8 meetings organised within 50 days, more than 135 relevant stakeholders participated in the consultation phase and shared their views and proposals on issues identified as the 5 most urgent issues: Territorial Planning and Governance, Conservation and Restoration of Cultural Heritage, Sustainable Use and Management of the WH Site, Communication, Promotion and Training, and Knowledge Sharing. The meetings’ reports were discussed, finalised and used to elaborate the Management Plan with all involved institutions of the Steering Committee. The Management Plan was finally adopted in December 2012 thanks to the collaborative, proactive and pluralistic approach used making it a document that evolves and is adaptable to new circumstances, a flexible instrument capable of implementing actions and incorporating updates and adjustments that are necessary as situations change and as the overall system evolves.

The consultation/participatory approach enabled the discussion on major critical issues of the lagoon tackled by the various competent authorities operating on the Site’s territory for the safeguard of the environmental and architectural heritage of Venice and its lagoon. (For more details on the Management Plan macroemergencies, strategic objectives, action plans and projects, see www.veniceandlagoon.net).

It is noteworthy that the participatory approach used by the City of Venice, in actively involving the 21 authorities in charge, has laid the foundation for a co-management governance of the Site which is intended as a laboratory/learning platform for achieving sustainability in a world heritage context.



Fig. 2. Consultation process and working groups for drafting the Management Plan at the City of Venice © Andrea Bonato.



Fig. 3. The Management Plan of the World Heritage Site “Venice and its Lagoon” © City of Venice.

Knowledge and Research in World Heritage Management & Sustainable Development

Knowledge and research are relevant issues for the Site’s management. One of the main priorities on which the City of Venice initiated the discussions with all the authorities involved was the assessment of the existing knowledge within the Site territory. The needs evolved over time from the Management Plan’s drafting to its implementation. If at the beginning one of the main concerns was to define the system of knowledge available, now there is the need to define an efficient knowledge sharing system to help and improve decision-making and coordination by the various actors. Three main needs are guiding the actual phase: to obtain an overall picture of updated research and data related to Site resources (environmental assessments, cultural heritage conservation and enhancement issues, tourism impact studies, economic and social data, etc.), to monitor the state of conservation of the property, and evaluate the effectiveness of actions undertaken to achieve strategies and objectives of the Management Plan.

The huge and high level of knowledge and research assets developed within the universities, however, is not often easily accessible and integrated with the data available by the competent authorities involved in the management process. This is the main aspect WHS managers have to face when promoting sustainable development as a general approach to heritage assets’ protection and management. The main issue to be addressed and assessed is: how and to what extent is it possible to benefit from research and education as concrete tools for supporting decision making processes. In the framework of WH sites, sustainable development is to be tackled also by strengthening links/agreements with universities on two levels: 1) acquire research and knowledge, and 2) benefit from education programmes for developing specific competencies and skills.

Some experience is already ongoing within the World Heritage “Venice and its Lagoon”. Many projects of the Management Plan have been developed with the

support of universities (see *Venezia Fragile, VeSiplan, Velaria, etc.*²).

More recently, the involvement of the City of Venice as *site manager* of the WH "Venice and its Lagoon" in many EU projects' initiatives is representing a great opportunity to acquire and share knowledge and experiences on sustainable energy and climate change mitigation policies (see EFFESUS EU project: www.fffesus.eu, IMPRESSIONS EU project: www.impressions-project.eu).

Such synergies are promoting comprehensive, integrated approaches to energy, climate change and global sustainability and strengthening the relationships of site management authorities with universities and research institutions in identifying tools and methods needed to make decisions on complex and uncertain issues, and to make long-term plans based on a full awareness of climate risks, adaptation limits and mitigation opportunities.

Conclusions

Designated UNESCO sites are laboratories/ learning platforms for Sustainability. Only through the consolidation of the relationships between decision-makers and universities is it possible to benefit from the knowledge available and create spaces for dialogue, exchange and mutual learning.

New perspectives and *hands-on* experiences are needed for the use of knowledge as a tool for active protection and conscious use of heritage.

It is essential to develop a greater culture of sharing information and knowledge, not only among institutions and universities, but also with individual citizens and communities, making more productive relationships, building bridges for knowledge availability and platforms for mutual trust, collaboration and learning.

Only by consolidating knowledge and integrating it with experience, is it possible to be concrete catalysts for change and adopt new cultural approaches to world heritage management, more integrated with sustainable development and closer to the needs of communities.

This concept is well represented in the extraordinary *fresco* painted by Rapahel between 1509 and 1511 in the Vatican Palace (Stanza della Segnatura): the School of Athens, where two famous ancient philosophers talk to each other, within an imaginary classical building. Plato, representing pure speculative knowledge, and Aristotle, representing practical experience, are walking together and looking to the future while their dialogue inspire as a mandate for others.

References and links

K. Basili, G. De Vettor (edited by), "*Venice and its Lagoon*" *World Heritage Site. The Management Plan 2012-2018*, 3b Press, Venice 2014. The document can be downloaded at: www.veniceandlagoon.net

Operational Guidelines for the Implementation of the World Heritage Convention, <http://whc.unesco.org/en/guidelines/>

"New perspectives and hands-on experiences are needed."



Fig 4. *The School of Athens, Rapahel, 1509–1511, Vatican City.*

2 For more details see www.veniceandlagoon.net/web/en/ongoing_projects/management_plan_projects

EFFESUS – Energy Efficiency for EU Historic District's Sustainability



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Introduction

Commercial and residential buildings account for 42% of the total energy consumption in Europe and produce about 35% of all greenhouse emissions. In order to meet Europe 2020 and 2050 energy, carbon and economic goals, 3% of the total EU building stock would need to be deep-renovated each year for the next 40 years (BPIE 2011). In Europe, more than 40% of our residential buildings have been constructed before the 1960s when energy building regulations were very limited. The Housing Statistics in the European Union (Ministry of the Interior and the Kingdom relations, 2010) shows that 24% of the residential building stock is pre 1945 and about half of these are of historic value. Then, sustainable updating of our historic cities is not only important from the cultural point of view; it is also important from the global goals perspective and requires specific compatible solutions.

The EFFESUS project



Fig. 1. *The EFFESUS project logo.*

EFFESUS (Energy Efficiency for EU Historic Districts' Sustainability) is a research project funded by the European Commission under its Seventh

Framework Programme. The goal is to investigate the energy efficiency of European historic districts and develop technologies and systems for its improvement. The main outcome of the EFFESUS project is the Decision Support System (DSS), an expert system that aids users to identify and prioritise retrofit measures for buildings and urban districts to improve their energy performance.

The selection of actions suitable for each district depends upon the specific characteristics and restrictions of each historic district, the properties and limitations of the solutions proposed, and the criteria that these actions will serve. Consequently, the decision-making process has to be fed with data about those three aspects: data about the historic district; data about the technologies; and

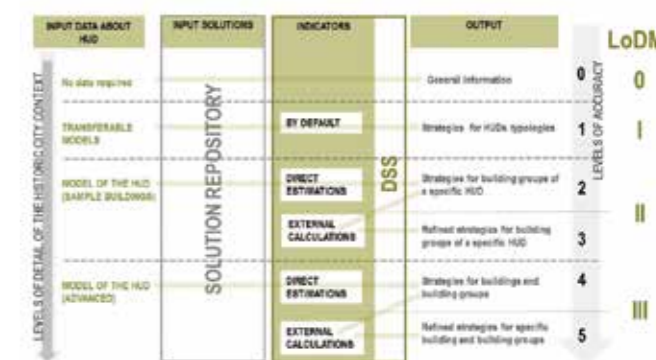


Fig. 2. *Different levels of decision making of the DSS.*

solutions and indicators that will allow the selection of the best retrofit strategies.

To support professionals in the strategic decision-making processes for retrofitting historic districts the DSS requires two types of data inputs: location-specific data about the district, and technical data about available retrofit measures and associated assessment indicators. The retrofit measure data are not location-specific and are stored in the technical repository. As the availability, completeness and quality of district data can vary significantly, the DSS has been developed so that it can perform assessments at four different detail levels.

Where hardly any suitable district data is available, the DSS will base its assessment solely on the geographic location of the districts (level 0 assessments). The outputs of the DSS will be basic information about building retrofits suitable for the climatic region in which the districts are located. Where the software user is able to provide at least some minimum information about the district, a level 1 assessment can be performed, by assigning a district type to the district and comparing it against standard typologies saved in a transferable model together with suitable retrofit guidance. This way, the DSS output is based on the district's climatic region and its typology. The DSS will guide its users, through a set of questions and predefined answers, as to what parameters are required to allow it to identify the district type. For both level 0 and level 1 assessment, no district data model is required.

“The preservation of our urban heritage requires the protection of the social context as well as the preservation of the authenticity and integrity of its physical materiality.”

Only where sufficient data is available to generate a data model, can the more advanced assessments of detail levels 2 and 3 be performed by the DSS. Where datasets are of low completeness, a level 2 assessment will be used, based on an analysis of the building stock using the associated categorization tool. The district will be reduced to a suitably small number of typical buildings, for which sufficient data is either already available or can be obtained reasonably easily. The DSS assessment will base its assessment on these typical buildings and extrapolate its assessment results to the whole district. Only where complete or near complete district datasets are available can a level 3 assessment be conducted. In this assessment case, the DSS uses data straight from the multiscale spatial district data model. For level 2 and 3 assessments, the DSS will analyse the impact of the various retrofit measures catalogued in the Technical Repository as if they were to be installed in the district. First multiscale heritage significance impact will be assessed to see the applicability of the different solutions. After different scenarios will be generated using

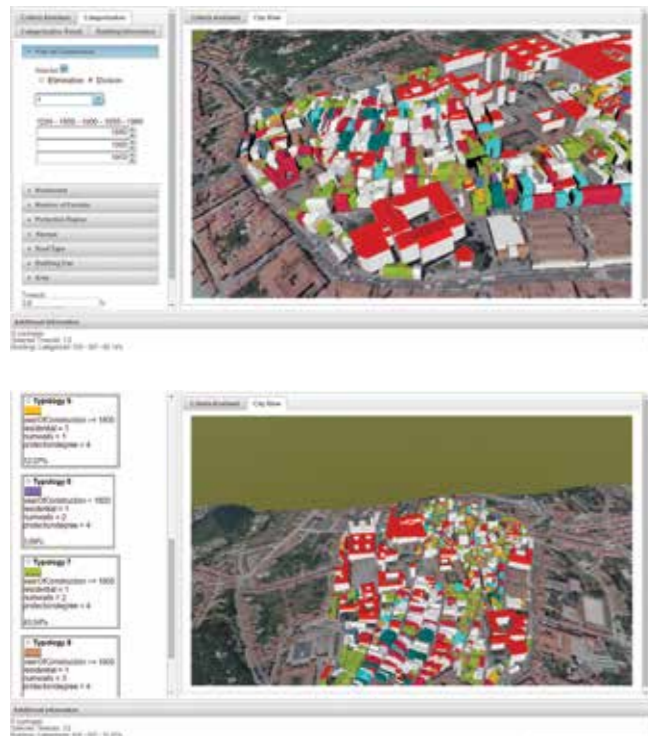


Fig. 3. Screenshots of the categorization tool.

the user preferences and the energy consumption, the indoor environment, the cost and the carbon emissions will be estimated.

Santiago de Compostela has been selected as the case study for the implementation and validation of the

EFFESUS methodology and DSS. Santiago de Compostela is a city located in the north-west of Spain with around 100.000 inhabitants, whose historic district was declared a World Heritage Site by UNESCO in 1985. The area selected as the case study for the EFFESUS project is the area corresponding with the Historic District of the city of Santiago de Compostela.



Fig. 4. The historic district of Santiago de Compostela.

Conclusions

The preservation of our urban heritage requires the protection of the social context as well as the preservation of the authenticity and integrity of its physical materiality. That means to improve the quality of life of their inhabitants as well as the sustainability of the historic districts. The sustainable retrofitting of districts is about managing the change in a sustainable way and this can only be done through comprehensive strategies based on a multiscale approach. The selection and implementation of these strategies can highly benefit from proper management of information and Decision Support Models and Tools.

References and web links

www.fffesus.eu

BPIE (ed.) 2011, Europe's buildings under the micro-scope: a country by country review of the energy performance of buildings. Brussels: Buildings Performance Institute (BPI)

Ministry of the Interior and the Kingdom relations, "Housing Statistics in the European Union" 2010, The Hague

STEP, a new Program for Excellence in Sustainability at the Technical University of Catalonia UPC



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Nowadays, society needs a change of paradigm towards a sustainable society. It is an urgent change that requires a commitment by all the involved agents. To achieve this change, higher education plays an important role and, specifically, scientific and technological education has a huge responsibility with its transformative role. Graduates in technology must contribute with effective solutions to the present environmental problems and with new means of production to cover present and future needs for humankind, means that allow to reach and to maintain a fair and sustainable society [1].

The scenario and methodologies that inspired the Bologna Process in Higher Education should present a deep renovation: the integration of transversal competences together with the generic competences, as well as to advocate for an education focused on the student's autonomy. Regarding the European Higher Education Area (EHEA) and in front of the environmental crisis, the Technical University of Catalonia, UPC, has included in all the Engineering Degrees' curricula the competence of "Sustainability and Social Commitment". In fact, in the frame of the 2nd International Conference on Engineering Education in Sustainable Development, held in Barcelona in 2004, experts in education, faculty, researchers and students that attended the conference approved the 'Declaration of Barcelona' [2], that enhances the importance of sustainable development in Technological Education and, at the same time, stimulates Higher Education institutions in the engineering field to progressively adopt its objectives for sustainable development in concrete actions.

In a fragment of the "Declaration of Barcelona" it is stated that today's engineers must be able to:

- Understand how their work interacts with society and the environment, locally and globally, in order to identify potential challenges, risks and impacts.
- Work in multidisciplinary teams, in order to adapt current technology to the demands imposed by sustainable lifestyles, resource efficiency, pollution prevention and waste management.
- Apply a holistic and systemic approach to solving problems and the ability to move beyond the tradition of breaking reality down into disconnected parts.
- Participate actively in the discussion and definition of economic, social and technological policies, to

“The scenario and methodologies that inspired the Bologna Process in Higher Education should present a deep renovation: the integration of transversal competences together with the generic competences, as well as to advocate for an education focused on the student's autonomy.”

help redirect society towards more sustainable development.

- Apply professional knowledge according to deontological principles and universal values and ethics.
- Listen closely to the demands of citizens and other stakeholders and let them have a say in the development of new technologies and infrastructures.

In view of the need of educating engineers with this profile of excellence in sustainability, the UPC established the Sustainable Plan 2015 [3]. This plan has two main objectives: first, a new approach to a sustainable University administration (campus life, education and research) and, second, the need to reinforce the sustainable role of the University. This strategy was oriented towards a deadline, year 2015, the same year that the United Nations had set to achieve the Millennium Development Goals, as well as the end of the UN Decade on ESD (2005-2014). It allowed a long enough time period to introduce deep changes in education, but it was also short enough to bear witness to the results. In order to include Sustainability and Social Commitment competence in faculties' organizational forms (master classes, practices, autonomous students work...), some pedagogical resources had to be provided.

Embedding sustainability within the curriculum does not only mean including new content. If engineers are

to contribute truly to Sustainable Development (SD), sustainability must become part of their paradigm and affect everyday thinking. This, on the other hand, can only be achieved if SD becomes an integral part of engineering education programs, not a mere 'add-on' to the 'core' parts of the curriculum.

There are many drivers and barriers identified [4] when trying to embed sustainability within the curriculum, and many attempts have been carried out at technological universities in order to achieve this goal. There are mainly four strategies applied: First, a compulsory course for all graduates at the 1st Cycle (Bachelor) level. Second, a minor or track on SD in both the 1st and 2nd Cycle studies; assuring the introduction of SD in the final thesis project of graduation and finally, and most challenging, intertwining sustainability in all the subjects/courses of the curriculum.

Despite all these barriers, UPC Sustainable 2015 Plan, seeks for the excellence in sustainability education in its degrees, and a new program has been developed: Sustainable Technology Excellence Program 2015 "STEP 2015". This program is supported by the strong commitment from the university board in Sustainability education (a new competence in "Sustainability and Social Commitment" is compulsory to all degrees at UPC), and takes advantage of the great opportunity that the "European Higher Education Area" framework offers (all courses must be redesigned in order to fulfil the EHEA requirements).

The STEP 2015 main goals were:

- To design compulsory courses in each degree.
- To develop the conceptual base and identify reference models in sustainability for all specialties at UPC.
- To create an internal interdisciplinary network of faculty and students from all the schools.
- To initiate new transdisciplinary research activities in technology-sustainability-education.
- To spread the practical knowledge attained.
- To achieve international scientific excellence

in technology-sustainability-education and to graduate the first engineers/architects of the new EHEA bachelors with sustainability as a generic competence.

The STEP program had four phases: design (2009), pilot plan (2010), spreading phase (2011-2013) and consolidation (2014-2015). To design such a program, first the situation in the university was analysed in order to identify the internal drivers and barriers, and the abovementioned objectives were set for the program. There would be a Coordination team responsible for stimulating and encouraging the network, to ensure coherence of actions promoted and always have an overview of context, both internal and external, that allows evaluating the progress of the program based on the goals previously established. The members are the Vice-rector of Sustainability, and four experts on engineering and sustainability education, one leading the team. Then, the goal of the STEP network is to generate a critical mass of people interested and qualified, who can positively influence the consolidation of knowledge networks, to stimulate the intellectual capacity and to promote interdisciplinary dialogue. In this network each school is represented by two members, one from the school board and the other an interested and qualified teacher/professor. They would be responsible for stimulating, promoting, and/or organising activities within their school. Moreover, two interns would support the activities and open possibilities of active participation of the students of the school.

The pilot plan relied on creating internal networks of sustainability education at the schools, which deal with the short term goals of the program. At this stage it was decided to reduce the number of participating schools in the program in order to have a closer supervision and assessment of the process. A call to all UPC schools was made and finally there were five schools selected taking into account their application and trying to have a diverse spectrum of schools from UPC (our University has 17 schools and 6 associate schools with similar degrees but placed in different cities).

From the lessons learnt in the five pilot schools, during the upcoming phases all the know-how attained in the process would be spread out to all schools in order to ensure that all UPC graduates acquire the competence in sustainability and social commitment. The expansion phase started in January 2011 selecting new schools to participate in the program while keeping the pilot phase schools. In total in this phase there were ten schools. Finally, in the consolidation stage all 26 UPC schools are involved. Figure 1 shows the internal structure of the network and the relationship among Schools and the Coordination team: at the pilot phase (left) and at the consolidation phase (right).

The STEP program itself is finished but the actions are developing [5]. After the consolidation phase, we are currently increasing and correcting the know-how developed within all the University schools of engineering and architecture. From the conclusions collected from each school some lessons learn can be stated:

- Leadership from the university board is necessary to support and to fund this kind of program.
- Leadership at each school has shown to be very important in order to involve faculty in the networks.
- The strategy of not applying a top-down approach and let the schools to organise themselves and propose their own activities proved successful (once a school was engaged it never gave up the program).
- The creation of internal networks linked to an overall network has facilitated the communication and spread of information.
- Students get really involved in the program, creating their own programs.
- At all the schools there were already some faculties teaching sustainability concepts, although basically

related to soft sustainability: environment protection and energy efficiency.

- Some faculty would find the program very interesting and were eager to participate: The main barrier is to involve the non-interested faculty, due to lack of incentives.
- There is still a lack of transdisciplinarity within the schools to be overcome in future actions.

The STEP program has been very successful in terms of making sustainability comprehensive to the faculty and to catalyze the introduction of the compulsory competence of Sustainability and Social Commitment to all UPC degrees.

References

Blaze, P. et al., "Introduction: Higher education for sustainable development", Higher education Policy, 2002.

Declaration of Barcelona, 2004, <https://www.upc.edu/eesd-observatory/who/declaration-of-barcelona>

The Plan Sustainable UPC 2015. Available at: http://www.upc.edu/sostenible2015/upc-sustainable-2015/upc-sustainable-plan-2015?set_language=en&cl=en

<accessed 7th June 2011>

Holmberg J., and Samuelsson B. (Eds.), Drivers and Barriers for Implementing Sustainable Development in Higher Education, UNESCO, Paris.

STEP program, <http://www.upc.edu/sostenible2015/step> <accessed February 2016, in catalan>

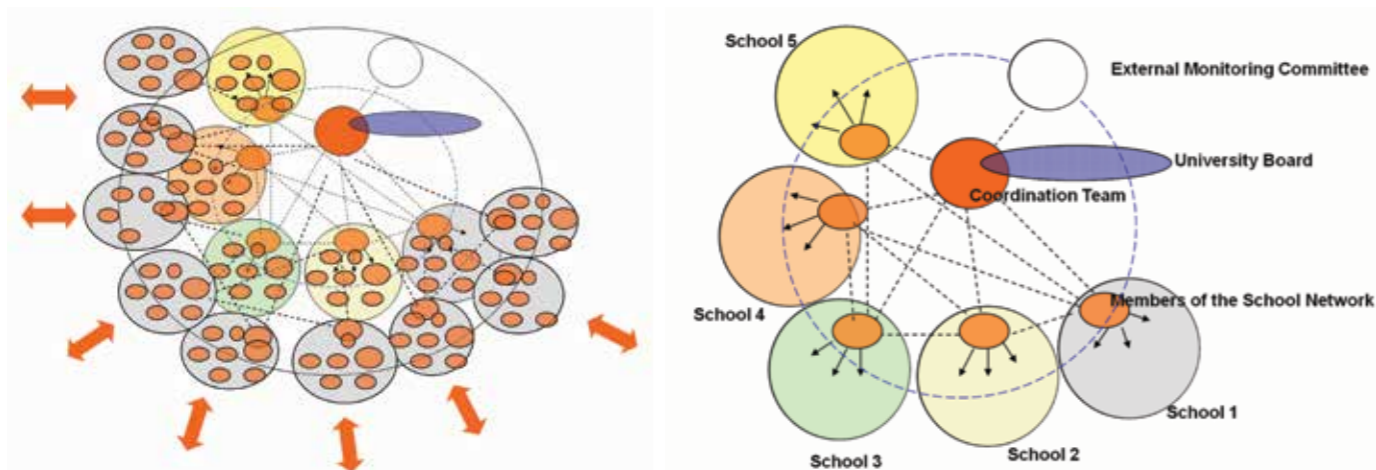


Fig 1. Initial structure of schools in the STEP pilot phase 1 (Left) and consolidated structure of schools in phase 3 (right).

The University of Patras towards Sustainability

George N. Angelopoulos

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The University Campus

The University of Patras was founded in the city of Patras in 1964 and currently has a two-city campus, situated in Patras and Agrinion respectively. The campus in Patras covers a vast area of 2.656 acres. It is a self-contained campus located at the foot of Mount Panachaico with a view over the Patraikos gulf, the gulf of Corinth and the mountains of Central Greece across the sea. It is the third largest University in Greece regarding the size of student potential, the Faculty Members, Administrative Personnel, number of departments, and accredited student titles. It includes 24 Departments, which operate 112 laboratories and 14 fully equipped clinics. The members of the academic community account 30.254 Undergraduate and 3,959 Postgraduate students, a total of 738 faculty members, 164 Teaching and Technical staff and 372 Administrative Personnel (August 2015).

Innovation Transfer

In order to capitalise on campus research momentum, the University of Patras operates the Unit "Knowledge Transfer & Entrepreneurship". Its main activities focus on transferring knowledge generated by research groups towards the productive sector, while detecting private sector needs, and also stimulating an entrepreneurial spirit in all academic community members. Furthermore, it co-organises the Patras Innovation Quest (PATRASIQ) which is focused on technology transfer, innovation, entrepreneurship and the dissemination of the research activities.

The Green University

The University of Patras established in 2010 the Committee of "Environmental Management" with the following key Focus Areas:

- Environmental education and awareness
- Energy conservation
- Recycling and Waste Management-Waste Disposal
- Water and wastewater management
- Green space, volunteering

A main result of this committee is the "UPatras Green Campus" activity. The activity, which is solely based on

volunteers, concerns actions for the improvement of the campus' sustainability. The scope and activities can be summarised as follows:

- G Goal:** to transform the Patras University into a more sustainable institution. One of the first steps in accomplishing this goal is the establishment of the Office of Campus Sustainability. Its scope is to set goals and to identify opportunities for sustainable operations.
- R Recycle-Reduce-Reuse:** recycling of paper, plastic, batteries, ink cartridges, light bulbs, hazardous wastes and e-waste are well organised in various areas of the campus. Reduction of waste can be attained through people's awareness (related leaflets and posters have been created). Recently, the re-use of paper, old furniture and equipment has been introduced.
- E Education and Research:** Postgraduate Programs and Undergraduate Courses, seminars and lectures are taking place, and high-value and pioneer research is performed on bio-fuels, waste valorisation, renewable energy sources, fuel cells, bio-hydrogen production and greenhouse gases.
- E Environmental awareness:** Calculation of the carbon footprint of the University Campus is regularly performed. Tree-planting and volunteer activities have been organized. The groups of Undergraduate and Postgraduate students voluntarily disseminate



Fig. 1: "UPatras Green Campus" Volunteers. <http://green.upatras.gr/>, www.facebook.com/green.upatras.gr

the information to the campus. The reduction of energy consumption is anticipated through management schemes and people's awareness.

- N Next steps:** Setting up of an Environmental Management System. Actions in order to inspire people to undertake energy saving and sustainable actions.

Educational Activities

Concerning the Environment and Sustainability, the following actions are taking place:

- Postgraduate programs (more than 500 students and 100 PhD)
- Undergraduate courses
- Seminars and Lectures
- Schools seminars
- Cooperation with other Institutions and Organizations

Applications

Applications have been developed that enhance the environmental and sustainable profile of the University. Picked up examples are presented in the following figures:

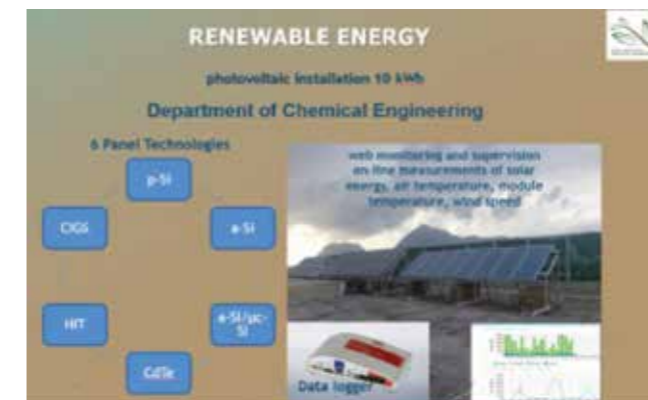


Fig. 2: The UPatras Photovoltaic Park



Fig. 3: The solar car and the SEATRAC

Industrial Applications

Within the collaborative schemes between University and Industry, sustainable processes have been developed



Fig. 4: Management of disposal and Red Mud valorization in Al-Hellas

The Vision

Our vision is to transform the University Campus into a suburban Park of Knowledge, Culture and Sustainability.



Fig. 5: The envisaged Science-Culture Park and Sustainable Biosphere Reserve

"Our vision is to transform the University Campus into a suburban Park of Knowledge, Culture and Sustainability."

The Circular Economy Concept on ESD



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An important driver and societal challenge in Europe, and in the world in general, present circular economy approaches 'design out' waste and typically involve innovation throughout the value chain, rather than relying solely on solutions at the end of life of a product. Turning waste into a resource is part of 'closing the loop' in circular economy systems.

Circular economy (CIRC) is a generic term for an industrial economy that is producing no waste and pollution, by design or intention, and in which material flows are of two types, biological nutrients, designed to re-enter the biosphere safely, and technical nutrients, which are designed to circulate at high quality in the production system without entering the biosphere. (MacArthur, 2013)

On December 2nd 2015, the European Commission adopted an ambitious new Circular Economy Package to help European businesses and consumers make the transition to a stronger and more circular economy where resources are used in a more sustainable way. Circular Economy is a unique opportunity to create sustainable growth and jobs. Moving towards a more circular economy is essential to deliver the resource efficiency agenda established under the Europe 2020 Strategy for smart, sustainable and inclusive growth.

In the circular economy concept, materials from products at the end of their lifecycle should be recovered through dismantling and recycling. Re-injecting these materials into the beginning of the product lifecycle reduces the environmental impact and costs of production, and at the same time improves the need for the higher recycling rates of raw materials.

An important starting point is the design of production processes, products and services. Products can be redesigned to be used longer, repaired, upgraded, remanufactured or eventually recycled, instead of being thrown away. Production processes can be based more on the reusability of products and raw materials, and the restorative capacity of natural resources, while innovative business models can create a new relationship between companies and consumers.

In most countries current linear economy models use natural or other resources, raw materials and turn them into products that are mostly disposed after use. A circular economy concept is a new economic model based on waste-free production and consumption. Designing the economy in a way that is restorative of ecosystems is ambitious with its innovation, and impactful for society.¹

Education for Sustainable Development (ESD) is based on the principles and values that underlie sustainable development and deals with the well-being of all four dimensions of sustainability: environment, society, culture and economy; based on knowledge, skills, attitudes and values necessary to shape a sustainable future. ESD means including key sustainable development issues into teaching and learning; for example, climate change, cultural diversity, disaster risk reduction, biodiversity, poverty reduction, and sustainable consumption. It also requires participatory teaching and learning methods that motivate and empower learners to change their behaviour and take action for sustainable development. Education for Sustainable Development consequently promotes competencies like critical thinking, imagining future scenarios and making decisions in a collaborative way.

Cultural diversity exerts strong influence on ESD and requires intercultural understanding if people are to live together peacefully, tolerating and accepting differences amongst cultural and ethnic groups. (UNESCO, Education, 2016).

Globalisation has made consumers powerful actors in our world economy. Sustainable consumption means buying goods and services that do not harm the environment, society, and the economy. Consumption can be an excellent entry point for teaching about sustainable development. Consumer education is practical, touching the daily lives of people near and far away. Together with UNEP, UNESCO has been active in raising awareness and providing educational resources in relation to sustainable consumption. Learning to live together sustainably in cities is one of the most important educational challenges of our time.

Acknowledging that the world's resources are finite and that the consequences of unmanaged and unsustainable growth has increased poverty, unemployment, degradation of environment as biosphere reserves and climate change, it could be a significant moment to recognise some intersecting issues of the circular economy concept and ESD principles.

"Globalisation has made consumers powerful actors in our world economy... Consumption can be an excellent entry point for teaching about sustainable development."

A strategy on plastics is in the circular economy concept, addressing issues of recyclability, biodegradability, the presence of hazardous substances in plastics, and the sustainable development goals target for significantly reducing waste, particularly marine litter which pollutes beaches, causes harm to marine life and creates a longterm waste problem expensive to clean up.

The European Resource Efficiency Platform (OREP, 2014) has identified significant opportunities for business at different stages in the "loop", feeding materials back into the production process in various segments of the supply chain of origin or in other supply chains. This is based on the experience of successful initiatives that could be scaled up and applied more widely.

Within CIRC are a series of actions on water reuse include a legislative proposal on minimum requirements for the reuse of wastewater, maintenance of municipal infrastructure for energy, water, discarded materials, transportation, and communications. New raw materials recovered and produced from waste could be used for renewable energy sources. Development of urban master planning, including transportation infrastructure and open space for ecological services.

Attention is given to Food waste for which it has been estimated that up to 30% of all food produced around the world is lost or wasted. The European Commission is considering presenting specific proposals to reduce food waste by 2030.

Development and implementation of quality standards for secondary raw materials, obtained from waste, voluntary schemes led by industry and retailers to increase the confidence of operators in the single market need to be implemented too.

Measures in the Ecodesign working plan for 2015-2017 to promote reparability, durability and recyclability of products, in addition to energy efficiency. A revised Regulation on fertilizers, to facilitate the recognition of organic and waste-based fertilizers in the single market support the role of bio-nutrients.

The Green Employment Communication creates the framework for unlocking the job creation opportunities of a more circular and resource-efficient economy (COM, 2014).

Moving to a new circular economic concept together with the sustainable development methodology and particularly the implementation of ESD in the knowledge process worldwide, promises an increase in prosperity and wellbeing.

References

Circular Economy Strategy, Closing the loop - An EU action plan for the Circular Economy, http://ec.europa.eu/environment/circular-economy/index_en.htm

Communication from the commission to the European parliament, the Council, the European Economic and Social Committee and Committee of the Regions, Green Employment Initiative: Tapping into the job creation potential of the green economy, COM, 2014, 446.

Environment Online Resource Efficiency Platform (OREP) http://ec.europa.eu/environment/resource_efficiency/re_platform/index_en.htm

Global Action Programme on ESD, <http://www.unesco.org/new/en/unesco-world-conference-on-esd-2014/esd-after-2014/global-action-programme/>

MacArthur, E. (2013) – Towards the Circular Economy: Economic and business rationale for an accelerated transition, Ellen MacArthur Foundation

¹ Read more: http://ec.europa.eu/environment/circular-economy/index_en.htm

The University of Belgrade as showcase of Sustainable Development

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The University of Belgrade is a state-owned university. Its activities, higher education and scientific research are strictly defined by applicable laws. Its main source of financing is the budget of the Republic of Serbia, although the University and its departments may also gain additional, non-budgeted income, by working within their core activities. Its origins can be tracked down to the beginning of the 19th century, when the College was founded in 1808. Thirty years later, the Lyceum was founded in the city of Kragujevac. Transferred to Belgrade in 1841, the Lyceum opened its Law Department, in addition to the existing Philosophy Department. On September 24, 1863, the Law on the Advanced School Founding was adopted, by which the Lyceum was transformed into a Higher School.

Nowadays the active University Departments, the science institutes and centres are separate legal entities, i.e. they have their own management bodies, whose responsibilities are regulated by the Law on Universities, as well as business and financial independence from the University. Today, the University of Belgrade has 31 faculties (organised in 4 groups: social sciences and humanities, medical sciences, sciences and mathematics and technology and engineering sciences), 11 science institutes, a University library and 8 Centres. Belgrade University was alma mater to nearly all state-owned universities throughout Serbia, Montenegro, Bosnia-Herzegovina and Former Yugoslav Republic of Macedonia. It currently enrolls over 90.000 students, has around 4.200 teaching staff, with its activities being spread in more than 100 buildings, all over the city of Belgrade, without a classical campus-type of organization. It was ranked among the 400 best universities in the "Shanghai ranking list".

It is our role to explain and persuade our students about the necessity for future economic and social development to evolve in a sustainable way that will be of crucial importance for their lives.

Belgrade University certainly represents the concentration of knowledge about a broad number of issues, including those that are substantially or less connected, but still important, with sustainable development. There is a widespread effort at the University – of course differing from department to department – to play the leading role in raising the issue of sustainable development in the country.

There are, in the opinion of the author, four major points, when it comes to the role of the University of Belgrade in sustainable development in Serbia. These are: a) the educational role of the University itself; b) the scientific role; c) the impact on different real-life actions the University may have on the sustainable development at local and country level, and finally d) the influence on public opinion on issues connected with awareness about sustainable development.

The role of professors as educators, and of the University as an energizer of the new generations about different issues, including sustainable development, shouldn't be undermined. The new generations, those that are currently being educated, will lead the scientific, economic and institutional capacities of the country in the coming decades. Only if we, professors connected in our educational and scientific work with sustainable development can gain students' trust (passion is maybe too difficult and optimistic to be won) in our lectures, when it comes to the explanation of changes in the environment as well as other important points in the concept of sustainable development, can we raise generations of students that will truly have in mind that their future role, could be decisive in the struggle for the survival of the Planet. So, environmental changes above all, but also other connected topics should not be the boring part of our lecture and textbooks, we should reshape them with new, up-to-date examples presenting the pulse of the Earth, the way we are influencing it, and how things will develop if the concept of sustainable development doesn't prevail. Finally, it is our role to explain and persuade our students about the necessity for future economic and social development to evolve in a sustainable way that will be of crucial importance for their lives. If we win this educational 'battle' a generation of responsible leaders could evolve. If not, however, our educational roles and university careers may be pointless.

In its scientific research, both within the scopes of different bilateral or EU projects, as well as nationally granted scientific projects, there is an effort to increase research devoted to sustainable development. It is done using both the top-down approach (research of this type is increasingly supported by Governmental funds), and the bottom-up approach (especially, having in mind the educational role of scientific research, through portions of experimental work at graduation and master works). Considering the well-developed departmental policy that, always when possible, university professors of the Department of Chemistry are actually teaching courses connected with their research, we believe that scientific research, at the level appropriate for students, is very often more important for their understanding of scientific concepts than lectures themselves. In an effort to increase the number of student research works connected to sustainability, at the Chemistry Department, the part of graduation and master works devoted to this topic increased from 8% to 13 % of the total number of this type of experimental works between 2009 and 2014.

Apart from working with students, the role of Belgrade University is to make a real-life, objective, visible impact, and lead by example. There is an ad-hoc interdisciplinary committee at University level, that initiates various projects, such as recycling (2/3 of University institutions participate and it is estimated that 89% of paper, 76% of plastic and metal, almost all electronic waste and a certain amount of batteries are recycled), chemical sharing and re-usage project, replacement of coal as energy source by central heating system in all institutions (certain portion of the institutions are located downtown, and substantial effort, including financial, has been made to reconstruct their heating systems and thus reduce pollution and emission of greenhouse gases).

Certain energy efficiency projects, however, were, in a lot of cases, failures. A substantial number of pre-WWI or pre-WWII buildings that are protected by law as cultural heritage are hosting University Departments, thus making impossible most of the construction work that is necessary to substantially increase energy efficiency. Also, restrictive national budget, including the part devoted to education and science is making it impossible to construct new, state-of-the-art buildings, and move University institutions there. Serious improvement and savings were made with the lightening systems, while

some of the University institutions started the production of solar energy that is being sold to the national grid.

By initiative of the University Rectorate and an ad-hoc Interdisciplinary committee, sustainable development topics were introduced in the curricula in a number of institutions. It is worth noting that "non-environmental" sustainable development projects were also initiated. For example, a number of institutions built approaches for disabled students and personnel, there is a guaranteed number of state-financed scholarships for minorities and the underpowered, etc.

In order to influence the public opinion and go beyond its "regular" educational and scientific role within the borders of its premises, the Belgrade University is trying to increase the media coverage of environmental and sustainable development issues. Although it is not simple, by careful work with printed and electronic media, we are

trying to raise the important issues, but also to provide the best possible experts who could debate on the right questions and offer the clarifications that would be scientifically accurate and understandable to the wider public.

The University of Belgrade is also trying, with more or less success, to lobby about sustainable development issues with policy makers, members of the Parliament and important city assemblies. Due to the well-organized lobbying and clear arguments and media coverage, experts from the University did

play a crucial role in some important projects, such as the project on the use of coal ash produced by power plants (due to a large share of energy being obtained from low-quality coal, Serbia is one of the largest producers of coal ash per capita in the world), the recultivation of Vinca communal dump in Belgrade, the project on the use of textile waste throughout the country, development of sustainable tourism in the Viminacium (capital of Moesia Superior and, later, Moesia Prima) archaeological site, the change of the traffic scheme in downtown Belgrade, etc.

Despite the positive initiatives described in this paper the situation is far from perfect, both at national level and at University level. We should, as the site of the largest quantity of knowledge in the country, try to be more persistent and more proactive, to continue to play an active role within the academic community and the wider society in all the issues connected with sustainable development.

"In order to influence the public opinion and go beyond its "regular" educational and scientific role within the borders of its premises, the Belgrade University is trying to increase the media coverage of environmental and sustainable development issues".

The case of Mantua city



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Introduction

Mantua and Sabbioneta are little, great cities in Lombardy, Northern Italy, whose historical and cultural importance and beauty has been proclaimed as World Heritage by UNESCO in 2008. The two towns are associated for the significant heritage left them by the noble Gonzaga family that envisioned and realized their magnificent Renaissance downtowns: the ideals of the Renaissance are present in their urban morphology and architecture, their functional systems and traditional handicrafts, which have mostly been preserved over time. They represent two aspects of the Renaissance town planning: Mantua is a constantly-evolving model of the Renaissance city, renewed on a regular basis between the 15th and 16th centuries, while Sabbioneta is one of the key examples of the ideal city, as proposed by humanism.

Mantua

Aristocratic, cultured, and surrounded by an extraordinary natural environment, Mantua was transformed by the Gonzaga into a city-court of great splendour. The city bears strong traces of its prestigious history and rich traditions: Renaissance palaces and Medieval constructions (Palazzo Ducale and San Giorgio's Castle, Palazzo Te, Sant'Andrea's church, Palazzo Podestà, Pescherie of Giulio Romano, and more), several public and private prestigious buildings, widespread public spaces with enchanting piazzas, courtyards and porticoes.

It's a magnificent artistic and cultural heritage which challenges the entire town capability to promote and carry on actions aimed at preserving and taking care of it, involving public and private resources and know-how.

In this respect, even if the site exhibits a good state of conservation, there are some problematic areas. Concerning urban structure, the main problems are related to neighbourhoods, public areas and buildings desertion; unbalanced concentration of functions in some parts of town; public areas with different and sometimes conflictual function. Regarding social and economic features, the key problems are related to the decrease in the number of inhabitants between 1970 and 2000 (- 15000 inhabitants); increase of land consumption both concerning residential and industrial sites (+ 15%); decentralisation of services away from the old town; conflicting mobility demand and social and environmental issues; economic crisis.

For these reasons, the core sustainable development issues of the World Heritage site of Mantua are re-using abandoned buildings and neighbourhood; promoting the usability and accessibility of public areas; defining a homogeneous image of public spaces; managing many, sometimes conflicting, demands of mobility.

To face these challenges arising from urban, social and economic changes, the local government has been planning some actions which are summarised here as follows:

- *City plan of Mantua.* In 2012 the local government drew a new city plan of Mantua. In order to promote the revitalization of abandoned buildings and neighbourhoods and to shift investment from new buildings towards restoration, the plan has aborted around 1.300 ha of sites which the previous one allowed to build up.

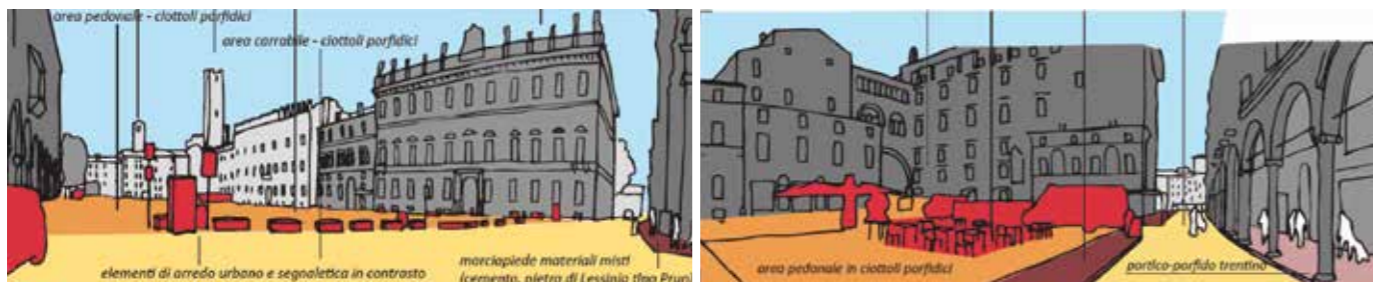


Fig. 1. Council of Mantua - Guidelines on managing the public space.



Fig. 2. Art-design lighting of the Pescherie by Giulio Romano (before-left, after-right) photo by Gaia Cambiaggi.

- *Guidelines on managing the public space.* The overall aim of this study is to provide guidance to help delivering the goal of improved streetscape and public spaces enhancing and coordinating the management of the public realm to promote integrated townscape management. The document focuses on urban usage, street furniture and physical elements clashing with the idea of urban quality we want to achieve. For example, the next picture exemplifies in red colour incoherent street use and furniture (parking places in the main square, outdoor dining areas, stalls in the arcaded street).
- *Sustainable Urban Mobility Plan.* To promote a high quality of the public space, the town needs to plan mobility, as well. Of course, there are also broader issues to be addressed, with regards to public health, climate change, oil dependency, noise and air pollution, etc. For these reasons in 2016 the local government decided to apply a Sustainable Urban Mobility Plan aimed to define a long-term vision with a participatory approach, propose balanced and integrated development of all transport modes encouraging a shift toward more sustainable attitudes and considering external costs for all transport means assessing current and future performance.
- *Art-design lighting of the Pescherie by Giulio Romano.* It's a low budget project co-funded by public and private companies aimed to: define via light a homogeneous image of the monumental complex of Pescherie, San Domenico's garden and tower; underline the presence of Rio, the old canal of the town which is today mostly unseen, with light itself and with a short tour by boat; let people temporarily get into a so far undisclosed and enchanting location. The main idea is to promote the rehabilitation of these public spaces to revive the feeling of belonging to a city that people have lost.
- *Old town's arcade.* According to the Guideline of public space, the project intends to restore the arcade, draw new street furniture and rationalize the use of urban spaces.
- *San Nicolò area.* The location is an abandoned military area next to Mantua's Lake. The aim is to acquire the property of the site from the State, open the place to the citizens and enlarge the park that surrounds the old town. The first draft of the project would concentrate on promoting sites of public function and public funds and the Administration is considering if it is economically sustainable. In fact, revitalization projects of buildings and public spaces do not have to remain highly dependent on public or external financing.

"We need cooperation and 'good ideas' in reaching out for funds to invest in the cultural heritage's conservation; defining functions appropriate to highlight quality and preserve the own character of the places; and ensuring high quality of living."

Conclusion

To ensure their inscription on the World Heritage List, Mantua and Sabbioneta have defined a management plan describing the measures aimed at preserving the property's outstanding universal value. According to this, the local administration, the relevant stakeholders and the citizens themselves need to forge alliances to ensure an effective preservation of the WH site by the next generations, reach a balance between conservation, sustainability and development, and improve the urban economy as a whole. At least, we need cooperation and 'good ideas' in reaching out for funds to invest in the cultural heritage's conservation; defining functions appropriate to highlight quality and preserve the own character of the places; and ensuring high quality of living.

Looking at it from a wider angle and more in depth, we believe that the mission of local authorities is that of taking care of the historical downtowns and promoting a management of the WH sites which is in line with the UNESCO parameters and whose functioning principles have to be shared by the public bodies with the population and the private sector. In this sense the transformation of the urban spaces would take place in line with the very essence and reason of a space existing and the concept of preservation would not necessarily encompass conflicting interests between conservation and development, between the freezing of the existing and productive growth. On the contrary, this would rather become an instrument of competitive growth and integrated development starting from the deeply rooted values which have themselves contributed to ensuring that the site is inscribed in the WH.

Links

<http://www.comune.mantova.gov.it>
www.mantovasabbioneta-unesco.it

Tools and projects for cultural, environmental and landscape heritage enhancement: *Didactic and research activities in the territorial pole of Mantova of Politecnico di Milano*



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A university that operates for sustainable development (SD) cannot fail to take action to ensure a future for its cultural and environmental landscape based on sound economics. In fact, heritage can be the lever for a more sustainable development by merging local resources and entrepreneurship to generate new economies and by committing all actors and local communities to generate new values and identities.

Natural and built environments are dynamic systems closely related and they are both subjected to different needs that push to modify the landscape, its components and uses. They are living systems and in a continuous process of change. So we have to manage these unfreezable transformations in a delicate, fragile balance between preservation and renewal, to meet the new demands of our society. The protection and restoration of cultural heritage are typically seen as a cost -and of course they are- but they are separated from the management of the economic development; and they are rarely linked to topics like education, trainings or tourism. Such lacks hamper both the availability and transmission of heritage, as well as its enhancement. Natural and cultural resources seem to be suffering from similar problems and they generate similar opportunities: sectorial management is confined to specialised approaches and administrative borders but -vice versa- the resources have multi-scalar shapes, interconnected patterns, and trans-boundary assets. Nature and culture form part of the landscape of our social habit and territorial capital: they require protection, conservation, active maintenance and investments -not just financial- in building the capability to coordinate public and private resources, to promote the involvement of local communities in taking back their heritage and contributing in its care. They require nonstop training/updating of the professional skills of those who, in various ways and roles, take part in programming, designing and managing the interventions.

Mantova is a perfect example of this scenario. The UNESCO site of Mantova and Sabbioneta offers an extraordinary testimony of the urban architectural and artistic production of the Renaissance, linked to the role of the Gonzaga family. The UNESCO declaration conforms not only the two towns, but also their relations with their settings (rural areas, the

Lakes and the Mincio river) and the global value of their environments. This is the context in which Politecnico di Milano - Territorial Pole of Mantova operates, hosting since 2012 an UNESCO Chair on "Architectural Preservation and Planning in World Heritage Cities", under the responsibility of the pro-rector Federico Bucci.

Hosting the UNESCO Chair has given a push to create an important international network of partners. Moreover, many newly born initiatives promote the world heritage by education, research and public awareness on the importance and values of heritage (www.polo-mantova.polimi.it/en/mantova-UNESCO-chair/). On September 2015 a new Master Course in "Architectural Design and History" was launched, with the involvement of Pritzker Price Eduardo Souto de Moura (www.polimi.it/master-of-science-in-architectural-design-and-history/); but Politecnico is hosting many other international architects as visiting professors, and it is promoting seminars, scholarships and a multitude of dissemination activities (workshops, summer schools, open lectures, etc.). The UNESCO Chair is also supporting research by funding Doctoral and Post-doctoral grants. In September 2016, the International Summer PhD School "Heritage and design, architectural preservation, design and planning in world heritage cities and landscape" will be organised. The future plans aim to strengthen the cooperation with the public administration, both in research and didactic activity, and new possibilities will surely derive by the fact that Mantua has been recently nominated Italian Capital of Culture 2016.

With regard to the research activity in the Pole of Mantova, it is carried out by a Research Laboratory (coordinated by Daniele Fanzini) (www.polo-mantova.polimi.it/mantua-research-laboratory/) with 3 sections, one of which, the Laboratory TEMa (Technology, Environment and Management) operates with regard to governance, design and enhancement of the built environment. Moreover the activity is supported by the "Competence Centre for the Preventive and Programmed Preservation of the historic-architectural heritage" directed by Stefano Della Torre (www.polo-mantova.polimi.it/conservazionepreventiva/).

University research is an important component for the SD of a territory, in particular to build a culture for SD through direct and operative actions, stressing

landscape qualities, sharing local identities: the knowledge of local resources is an essential element for the territorial competitiveness, for its ability to attract investors and for the economic development, also with regard to the improvement of touristic and social activities. In this sense, the central point of sustainable actions is the management of the usability, as creation of a territorial network, reuse of buildings, opportunity to access, integration of services and experiences. Following this view at the beginning of the new millennium, TEMa Laboratory started (without any budget) a preliminary activity of reading the territory with the aim of creating a system of relationships among different municipalities with homogeneous characteristics such as significant and diffused environmental and cultural values around the centrality of Mantova.

The idea was to put together different local municipalities to achieve the minimum critical mass necessary to start actions for the definition of shared views and to promote cultural, environmental and landscape resources as leverage for the local development, also involving local stakeholders and the enterprises in a process of construction of two Strategic Marketing Territorial Plans (one for the areas at the North of Mantova and one for the Oltrepò). The new shared development views created the conditions to success in the call launched by the Cariplo bank foundation, in 2010, for the feasibility studies of new Cultural Districts in the Lombardy Region. In the Mantova Province two of the three proposals presented were financed for the start-up phase, and concluded in 2015. As the cultural districts Dominus (www.oltrepomantova.it/dominus) and Regge dei Gonzaga (www.reggedeigonzaga.it) were able to collect 3,5 M€ each from the local system, they were cofounded by Cariplo with a similar amount; this has allowed to put into effect a wide program of interventions both in conservation and in culture. Currently we are supporting the two districts in developing their role in a view that can be defined as "toward a spread UNESCO city", also with an increased involvement of the Mantova municipality as barycentre of a territorial system that largely overpasses the boundaries of UNESCO site.

Simultaneously other more punctual actions and projects have been carried out at the local scale, also introducing participative tools. These experiences are characterised by operating always in strict connection with public Institutions, social innovators, enterprises, civil society. Some are related to the need of re-using and enhancing existing architectural and landscape heritage and public spaces, others to the regeneration and qualification of degraded or underused peri-urban areas, such as:

- the project for enhancing the rural properties of Fondazione Bonoris, finding new social and productive functions for these areas and for the related historic rural complexes;
- the census and monitoring of rural heritage in Local Action Group Oglio Po, also defining a strategy for its enhancement as part of the transnational cooperation project LANDsARE Landscape Architectures in European Rural Areas: a new approach to local development design;
- the project of the Centre of Mantova as a natural commercial centre to build a service network in which each cultural and retail operator had a specific role in promoting the town identity, selling its products but also promoting experiences and emotions;
- the project (O)URS Our Urban Regeneration Square 2.0 to promote and realise interventions of participative design of public spaces and their uses, assuming that squares, streets and green areas are a common asset. People had not only to give ideas, but also to declare what they were available to do to take care of the common space;
- the international workshop for PhD students to develop a proposal for the UNESCO buffer zone and peri-urban areas of south Mantova in a general master plan that coordinates by a multi-scalar strategy the environmental, cultural, social and economic dimensions; defining specific actions, projects and interventions on physical systems, landscape, buildings, cultural and economic activities;
- the project "CamminAmbiente" Actions for territorial enhancement among nature, sport and culture to enhance and qualify the south of Mantova that includes sport facilities, the Virgilio historic forest, the Vallazza Natural Reserve and the Pietole Fortress.

Coherently with the goals of the Area 2 of the UNESCO Roadmap for education for SD 2014 ("a holistic view of ESD, focused not only on transferring content about sustainable development, but also on participating in sustainable development practices"), all these projects involved the 63 PhD candidates (now Doctors) of the program "Design and technologies for cultural heritage", established in Mantova in 2005 to transfer contents and methods, but also to experiment new practices involving young researchers in effective local projects, also in partnership with our international referees. Professional master courses in "Management of cultural, environmental and landscape resources", "Preventive and programmed conservation and enhancement of cultural heritage" and "Management in local heritage and cultural tourism hospitality" have also been organised to contribute to build the local capacity in valorising the territorial resources.

The most significant researches presented here are described in the publication "Tecnologia Architettura e Territorio" edited by Elena Mussinelli and Fabrizio Schiaffonati (publisher Maggioli Editore, 2015).

"Heritage can be the lever for a more sustainable development by merging local resources and entrepreneurship to generate new economies and by committing all actors and local communities to generate new values and identities".

Proposed Biosphere Reserve Mount Parnon – Cape Malea



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The proposal for the designation of a new Biosphere Reserve in Southeast Peloponnese (Greece) is based on the coexistence of cultural characteristics and environmental elements of the area. The significance of this proposal focuses on the promotion and development of the area through the combination of the above within already existing institutional boundaries (municipalities, protected areas zonation, etc.)

The identity of the region – Anthropogenic Elements

The region of South-eastern Peloponnese is characterized by agricultural production, seaborne trade and some particular characteristics (architecture, language, customs) which survive to this day and are a major cultural chapter of a wider geographical unity.

The reference area is spread over six municipalities (Voria Kynouria, Notia Kynouria, Sparta, Evrota, Monemvasia, Elafonisos), including:

- Areas of agricultural production (farming and fishing)
- Areas of cultural interest e.g. monasteries, archaeological sites, citadels, the submerged city of Pavlopetri, Leonidio, Monemvasia
- Eighteen (18) Preserved traditional settlements e.g. Monemvasia, Agios Andreas, Kastanitsa, Tyros
- Six (6) Information Centres: Fabrica of Culture (Leonidio), Mount Parnon flora (Leonidio), Maritime Museum (Neapoli) - Information Centers of Agios Petros, Astros & Kastanitsa.

The identity of the region – Nature

The conservation of landscapes, ecosystems, species and biodiversity is a basic axis of this proposal. Therefore, the

management and the conservation of the landscape of these protected areas has an *active role* in configuring and promoting the conservation objectives and is a necessary condition for the development of the protected area. Within the boundaries of the proposed Biosphere Reserve, several forms of protected areas coexist. More specifically there are eight NATURA 2000 sites designated as Protected Areas for Habitats and Species, the Regional Ecological Park of Mount Parnon & Moustos wetlands, two Strict Nature Protection Areas, eight Nature Protection Areas, and seven Wildlife Refuges.

A Management Plan exists for the Regional Ecological Park of Mount Parnon & Moustos wetlands.

The Proposal

In accordance with the three functions that a Biosphere Reserve must have, i.e. Conservation of Biodiversity, Sustainable Development and Support for Logistics, the region of southeast Peloponnese qualifies for the designation of a new Biosphere Reserve in Greece. This

“The conservation of landscapes, ecosystems, species and biodiversity is a basic axis of this proposal”.

initiative is supported by plans of economic and human development based on the *Primary sector* (production, processing, marketing and final cultural imprint) and *Tourism* (Ecotourism, Alternative tourism).

Combined with the management and conservation of the landscape of the *Protected areas* and the preservation of diachronic *Cultural wealth* (local dialect, customs, local products etc.)

this coexistence of human culture and nature is ready to receive *international recognition* and become part of a network of similar important regions. The proposed Biosphere Reserve covers approximately 320000 ha and has about 45000 inhabitants.

Supplementary projects

COBWEB (Citizens Observatory WEB) is a project concentrating on Biosphere Reserves in Wales, Germany and Greece, and the main aim is to create a tested environment which will enable citizens living within or nearby Biosphere Reserves to collect environmental data using mobile devices. In the process, the project

aims to build up shared expertise in these new and developing technologies and understand how crowdsourcing/citizen science techniques combined with SDI-like (Spatial Data Infrastructure) initiatives can deliver both societal and commercial benefits.

The *Development Company of Region Parnon S.A.* (PARNONAS S.A.) which was established in 1995, is a local agreement between regional bodies for the strategy and content of integrated development, through a vibrant relationship. The Company, through its services, significantly contributes to the promotion of business, economic and sustainable development of the wider operation area, integrated rural development and the protection and management of the natural environment.

The main areas of the Company's activity is related to the implementation and management of national and community programs, providing technical support services to local authorities and regional bodies, preparation of studies, development programs and projects and services for local authorities and other public bodies.



Fig. 1. Reference area: Southeast Peloponnese.



Fig. 2. Boundaries of protected areas.

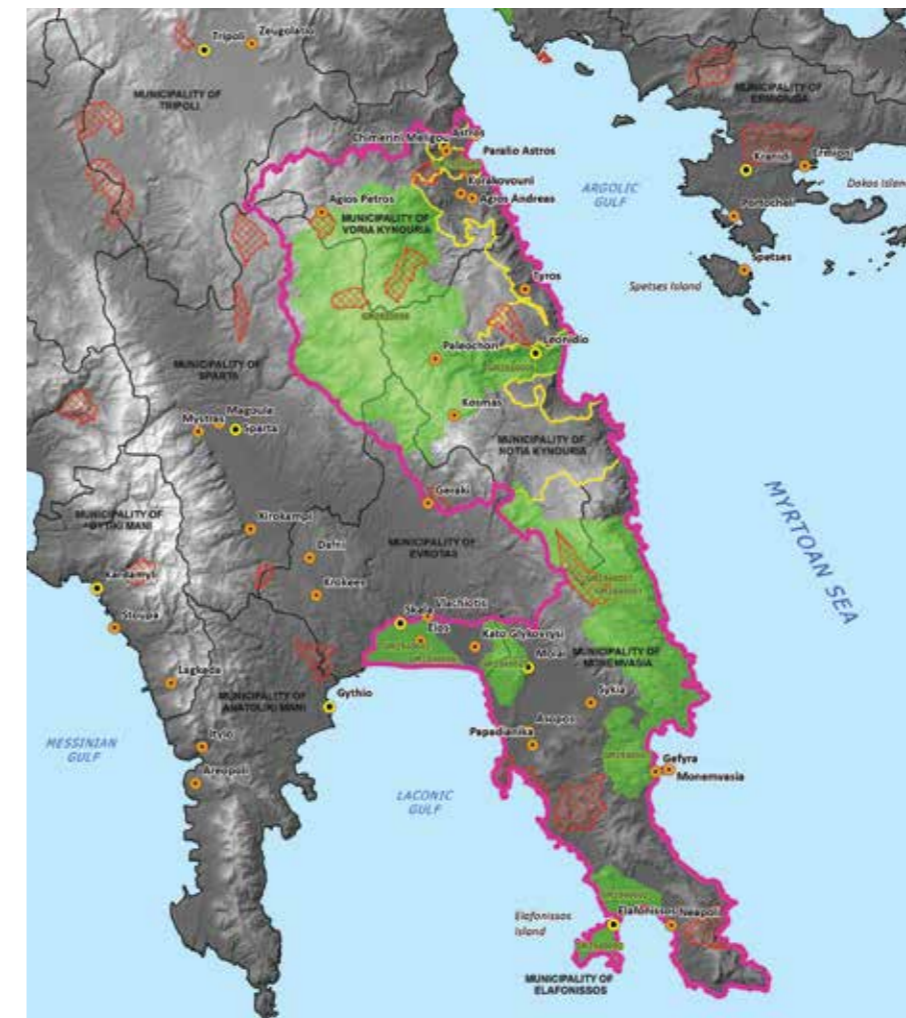


Fig. 3. Proposed Biosphere Reserve.



Fig 4. Logos of stakeholders and related projects.

The company constituted a key factor in the organization of the public dialogue and the consultancy support in the procedures that led to the establishment of the protection zones of the Ecological Park of Parnon - Moustos Wetland and finally in the creation of the Management Body of Mount Parno/Moustos Wetland in 2005. From 1997 until 2000, interventions were carried out as an initiative of the local communities; from 2000-2006 to the eco-development of the South Peloponnese, and from 2007 – 2013 to innovation and the eco-development of the Eastern Peloponnese. Today, in an attempt to promote the relationship between man and the biosphere, a new program has been designed until 2020, with central axis the Biosphere Reserves targeted in the eastern Peloponnese.

The new program includes four major areas including information and awareness raising, designing public infrastructure actions, private investments and local and transnational cooperation, with the necessary technical support for their implementation.

Useful links

Regional Development Company of Parionas SA: www.parnonas.gr
 Management Body of Mount Parnon and Moustos Wetland: www.fdparnonas.gr
 COBWEB project: <https://cobwebproject.eu/>

NATURA 2000 sites of the area:

Site code: GR2520003/ Sitename: LIMNOTHALASSA MOUSTOU

<http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=GR2520003>

Site code: GR2520005/ Sitename: MONI ELONAS KAI CHARADRA LEONIDIU

<http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=GR2520005>

Site code: GR2520006/ Sitename: OROS PARNONAS (KAI PERIOCHI MALEVIS)

<http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=GR2520006>

Site code: GR2540001 / Sitename: ORI GIDOVOUNI, CHIONOVOUNI, GAIDOUROVOUNI, KORAKIA, KALOGEROVOUNI, KOULOCHERA KAI PERIOCHI MONEMVASIAS

<http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=GR2540001>

Site code: GR2540002/ Sitename: PERIOCHI NEAPOLIS KAI NISOS ELAFONISOS

<http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=GR2540002>

Site code: GR2540007 / Sitename: ORI ANATOLIKIS LAKONIAS

<http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=GR2540007>

Site code: GR2540003/ Sitename: EKVOLES EVROTA

<http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=GR2540003>

Site code: GR2540006/ Sitename: YGROTOPOI EKVOLON EVROTA

<http://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=GR2540006>

www.fabbricaofculture.gr/en/the-building/parksprotection.eu/en/981/uncategorized-en/parnonas-a-great-place-to-be/

www.bioparnon.gr/history-of-mountain-parnon

www.shortmedstories.com/parnon/nature/

www.dragalevos.gr/en/En_the_area.htm

Establishing a Biosphere Reserve on the island of Samothraki, Greece: A transdisciplinary journey



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Introduction

On the Greek island of Samothraki an unconventional story unfolds, where under the rubric of UNESCO's Man and the Biosphere Programme, the Biosphere Reserve (BR) concept has been employed in order to propose and implement an alternative vision of local development from the bottom-up. After several years of research and communication efforts, an idea in the minds of regular visiting scientists was scrutinised by the local community and gradually shared with a wider group of inhabitants and the local authorities. The community council has endorsed an application to UNESCO and committed to pursue an operational plan in the direction of sustainability, inspired by and pertaining to the BR philosophy. From a policy perspective, this –still ongoing– process has generated a unique opportunity to pre-structure, observe and reflect on a process of evolving decision-making and management towards a sustainability transformation of an island.

A brief description of the research and institutional efforts

With an area of 178km² and 2,840 permanent residents, Samothraki is a mountainous island of the NE Aegean with numerous freshwater streams and unique natural beauty (Natura 2000 for the most part), as well as significant cultural heritage, and is “at the crossroads of development”. However, insistent ecological challenges, such as overgrazing, as well as impacts of the recent

Greek socio-economic and governance crisis jeopardize the viability of local services, so that crucial demographic tipping points may be reached.

Acknowledging those risks, since about 2007 a group of scientists started deliberating with local residents about the present and future state of the island. Point of departure and opinion convergence was a general wish to preserve the unique character of the island from potentially destructive pathways and come up with an alternative development model. The BR concept based on the pillars of nature protection, supporting local communities and fostering research, training and education seemed a suitable vision to pursue. A series of parallel processes had just been initiated!

The road to designation, so far, has been a truly transdisciplinary and open ended process, in which ownership has gradually shifted from scientists to local stakeholders. First, a feasibility study was performed (funded by the Austrian UNESCO-MAB Committee) to assess whether certain conditions are in place that would warrant Samothraki to become a BR; i.e. whether there are natural and cultural endowments worth preserving, and also rigorously monitored, and most importantly whether this vision is shared by the island's inhabitants and local authorities. A double positive answer gave the green light to continue. After a series of public presentations and



Fig. 1: The location of Samothraki in the NE Aegean Sea, © NASA, nasaimages.org.

“A perpetual two-way communication between science and the local community better informs both sides, identifies challenges and sets joint priorities, enhances citizen control and safeguards the plausibility of specific proposals”.



Fig. 2: Planned zonation for Samothraki BR. Note it includes a marine part, but excludes a recent extension of the Natura 2000 area to the west of the island, © Official Samothraki BR Nomination form, 2011.

open discussions that received encouraging feedback from most local stakeholder groups, the mayor, with unanimous support from the municipal council, decided to prepare an application to UNESCO, with support from the Vienna Institute of Social Ecology. The application was delivered in 2011 and resubmitted with amendments in 2013, endorsed by all relevant national and regional authorities. It was positively received by UNESCO and currently deferred solely due to lack of a management body for the proposed core zone, also a designated Natura 2000 area. The same issue is faced by several areas in Greece and is one the Ministry of Environment is trying to resolve. The process has reached a temporary halt; an institutional constraint to overcome...

While the designation process occurs in incremental steps, environmental challenges remain, awaiting solutions, and innovative ideas keep emerging. Therefore, in parallel we have started crafting detailed plans of intervention towards sustainable local development in key areas, namely the economy, natural resource management and infrastructure and focus on practical implementation of local projects. In line with the BR concept, scientific support and applied research on the island has intensified. There are currently several PhD and Master's students working on Samothraki on various

“An interesting, yet challenging insight is that we deal with simultaneous processes at various scales that all have different time frames and control factors”.

issues pertinent to social ecology, including agriculture, sustainable tourism, as well as material and energy metabolism. Moreover, a series of applied research projects have been initiated; a pilot experiment with grazing tolerant biodiverse pastures, the development of a custom made decision support tool for farmers, and the list keeps growing.

In addition, since the primary competence of universities is education, this has also been a core focus of our activities. In 2016 Samothraki will host the 3rd Summer School in Social and Aquatic Ecology, a collaboration of the Vienna Institute of Social Ecology with the Hellenic Centre for Marine Research and the University of Patras, following two successful versions in 2012 and 2014. Our past activities included two extensive rounds of explorative and visioning focus group interviews with different stakeholder groups, and the results were fed back to the people. These occasions bring researchers from several European Universities to the island, increase its visibility and also enhance alternative visitation in practice.

Yet another development in the last years was the birth of “Sustainable Samothraki”, a group of young locals sharing and promoting the BR vision on the island, advancing practical initiatives, organizing information meetings, but also getting trained in several international meetings (e.g. EuroMAB conference Canada; Training Course for Island and Coastal Area BR Managers, Jeju-Korea; EIP on ESD in Protected Areas, Amfissa, Greece), thus becoming operationally part of a “family” of practitioners committed to a vision of island sustainability.

Insights and lessons learned

What have we learned from this journey so far? Our approach follows the more recent trend of increased

public participation. A perpetual two-way communication between science and the local community better informs both sides, identifies challenges and sets joint priorities, enhances citizen control and safeguards the plausibility of specific proposals. It is not a panacea, and does not come without its limitations, e.g. when confronted with the top-down establishment of Natura 2000 areas. Still we believe that following a participatory model, as well as a holistic view of sustainability, of which sustainable local livelihoods especially for the young are an integral part, is essential for the success of any process.

An interesting, yet challenging insight is that we deal with simultaneous processes at various scales that all have different time frames and control factors. University research is constrained by available budget and required deliverables; social processes on the other hand usually take longer to unfold and can be more affected by socio-political factors and events. The designation procedure pertains to yet additional actors and institutions, and this can cause delays and disappointments, and increase uncertainty.

A way to tackle those imbalances has been to identify synergies at all scales. Focus groups, for example, were primarily used to generate data, but also provided a platform for locals to network and explore future opportunities for their island. This has enhanced the robustness of the local action group, which has in turn been instrumental in facilitating the local development process, but also attracted other scientists feeding back into research. Moreover, the summer schools

simultaneously provide education on socioecological methods and approaches, generate data that feed into current applied research and support and empower local sustainability initiatives.

A BR future for Samothraki, and any other place for that matter, is an open framework that invites participation, ideas and resources from all sides and will be filled with life to the degree the inhabitants and visitors of Samothraki invest their expectations and enthusiasm into this endeavour.

References and Links

Fischer-Kowalski, M., L. Xenidis, S.J. Singh and I. Pallua. 2011. Transforming the Greek Island of Samothraki into a UNESCO Biosphere Reserve: An experience in Transdisciplinarity. *Gaia* 20(3): 181-190.

Petridis P., R. Hickisch, M. Klimek, R. Fischer, N. Fuchs, G. Kostakiotis, M. Wendland, M. Zipperer and M. Fischer-Kowalski. 2013. *Exploring local opportunities and barriers for a sustainability transition on a Greek island*. Social Ecology Working Paper 142, Vienna, Austria. Available at: http://www.uni-klu.ac.at/socec/downloads/WP142_WEB.pdf

Petridis, P. 2012. Perceptions, attitudes and involvement of local residents in the establishment of a Samothraki Biosphere Reserve, Greece. *Eco.mont-Journal on Protected Mountain Areas Research* 4(1): 59-63.

Information hub of the Samothraki BR initiative: www.sustainable-samothraki.net



Fig. 3: An impression from the focus groups of 2012, © Sophia Bourdanou.

The case of the Golija-Studenica Biosphere Reserve: A new management model



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Introduction

Golija is the highest mountain in southwestern Serbia, extending over an "s" shaped area of 32 km in length. The highest peak is Jankov kamen (1833 m). Its beauty and diversity of landscape, as well as the preserved original natural and cultural values, make it one of the most attractive mountains in Serbia, which was placed under protection in 2001 as the Nature park "Golija", with an area of 75.183 ha. Nature Park "Golija" gained the status of a Biosphere Reserve (BR) under the name "Golija-Studenica" in 2001 and became the first Biosphere Reserve in Serbia. The conserved nature with a large number of plant and animal species, some of which are endemic and relict, and the Studenica monastery, which has been on the UNESCO World Cultural and Natural Heritage List since 1986, have contributed to the designation of the Reserve. The area of the BR "Golija-Studenica" is 53.804 hectares and includes part of the Nature Park "Golija" (forest governance units Ivanjica and Kraljevo).

Golija, together with the mountain Tara, is a refuge of tertiary flora in Serbia and is important as a center of genetic, species and ecosystem diversity in the Balkans and Europe. Floristic biodiversity of Golija consists of about 900 taxa of plants, of which 729 species are vascular fungi, 40 species are moss, 117 species and varieties are algae. Endemic and relict species and species that have become endangered are of special importance in the flora.

Among the preserved natural rarities, the relict and endemic tree species of maple (*Acer heldreichii*) stand out, which is a synonym for the flora of Golija.



Fig 2. View of the Golija Nature Park.



Fig 1. Logo of the Golija Nature Park.

Of special cultural and historical value of Golija is the Studenica monastery, founded in the late twelfth century, as a major endowment of the founder of the dynasty of Nemanjić, Stefan Nemanja. The monastery had in time become the most important cultural center of the new Serbian

medieval state with great impact on the social and cultural development of the country. It had been destroyed and rebuilt again many times. In the XII and XIII century the monastery complex included 13 churches with supporting facilities, the two of which remain well preserved till the present day: the Holy Virgin Church and the Church of St. Joachim and Anna. Studenica Monastery, undoubtedly, is one of the most valuable buildings of Serbian architecture and one of the most important centers of medieval life. More than 20 years ago its values have placed it beyond the borders of our country in the UNESCO World Cultural and Natural Heritage List (since 1986).

The Case Study

The International Advisory Committee for BRs in considering the first periodic review of the «Golija-Studenica» BR (ref.: SC/EES/MB/14/5864/536) has recommended that, in order to realise all functions of the BR in the coming period, a greater attention must be paid by the state authorities regarding the following: to improve the management, to create the conditions for greater community involvement in the management of the BR and to provide the conditions for rural development within its area.

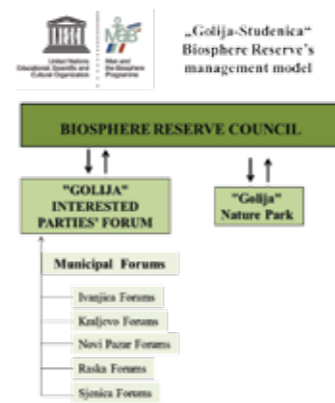


Fig 3. Management model of Golija-Studenica BR.

After receiving a report on objections to the 10-yr Periodic Review submitted for the "Golija-Studenica" BR (2006-2015), some institutions have launched specific activities aimed primarily at analysing everything

accomplished in the previous period, as well as removing objections identified by the Advisory Committee.

In order to strengthen the partnership in its further directing towards the development of the «Golija-Studenica» Biosphere Reserve, a meeting of the Interested Parties' Forum was held in the quarters of the Studenica Monastery. This meeting was organized by the representatives of the Ministry of Agriculture and Environmental Protection, the Institute for Nature Conservation of Serbia, SE «Srbijašume» and the World Wide Fund for Nature, Office for Serbia (WWF, Serbia). At a meeting held on 11th December 2014 in Studenica the following was concluded: that the "Golija" NP Manager (SE "Srbijašume") i.e. the Manager of the Work Unit (WU) "Golija Nature Park" is to report to the Council of "Golija-Studenica" BR; that WU "Golija Nature Park" is to participate in the implementation and revision of the Management Plan for "Golija-Studenica" BR; that WU "Golija Nature Park" is to cooperate with the Council and the Interested Parties' Forum of "Golija-Studenica" BR.

It was concluded that the Biosphere Reserve's management model should be as follows:

The **Biosphere reserve Council** is an executive, decision-making body which is responsible for the planning and management of the proposed biosphere reserve. It should have about 9-11 members, be efficient and effective in decision-making, the President of the Council should be elected among the members or, alternatively, should be an independent person. One Council member is the Chairman presiding over the "Golija" Interested parties' forum (hereinafter referred to as *the Forum*), whose role is to report on the attitudes of the Forum, but has no vote in the Council. Other members should represent the groups' main interests and the values for which the biosphere reserve was established. Key government institutions and civil society organizations, as well as local communities (population) and the private sector should all be represented.

The **"Golija" Interested parties' forum** is an advisory body composed of 15 members which presents a wide range of stakeholders' interests from all five municipalities. The President is an independent person appointed by the Council through a public process; he/she should be a respected citizen from the Golija area, strong-minded, skilled in conflict resolution, with the experience in achieving consensus and able to conduct meetings. Each municipal forum should nominate 3 members, who represent the range of interests and complement each other (no need to duplicate roles). It is crucial that the Forum meetings precede the Council meetings, so that the decision-makers in the Council are informed about the Forum's attitudes by the Chairman of the Forum.

The **Municipal forums** are open groups of members for each of the five municipalities composed of all the stakeholders (government agencies, NGOs, representatives of local population, private entrepreneurs, etc.) that have an interest in the Biosphere Reserve. Anyone from the municipality may attend and participate in meetings and

"After receiving a report on objections to the 10-yr Periodic Review submitted for the "Golija-Studenica" BR, some institutions have launched specific activities aimed primarily at analysing everything accomplished in the previous period, as well as removing objections identified by the Advisory Committee."

other gatherings. Each of the Municipal Forums - Ivanjica, Kraljevo, Novi Pazar, Raška and Sjenica is organized by the relevant municipality.

Conclusions

According to the new Biosphere Reserve's management model, participation of the "Golija" Nature Park and «Golija-Studenica» Biosphere Reserve - management takes place through the «Golija Nature Park» Working Unit, which is responsible for managing the Nature Park. The Nature Park Manager reports to the Council and his/her working unit is responsible for the implementation of the management plan, as well as its preparation and revision. The Park Management is responsible to the Council and cooperates with the Forum, but not with the Municipal Forums.

It will be done through the exchange of knowledge and a dialogue among the representatives of local communities, professional institutions, the manager of the protected area, the non-governmental sector, municipal organizations and users of the protected area. Public participation models were presented in the field of finding effective responses to the development of the «Golija-Studenica» Biosphere Reserve in accordance with the socio-economic needs of local communities

The programme contained the establishing of a harmonious connection between man and nature as a basis for success of a biosphere reserve, as well as incentives to facilitate the sustainable development of local communities. To this end, in the framework of the Forum Programme, models for managing biosphere reserves allowing interested public participation were presented, as well as examples of good practice.

References

www.srbijasume.rs

Periodic review (2006-2015) for Biosphere Reserve "Golija-Studenica", submitted to the MAB Committee in Serbia prior to the submission to the UNESCO.

The Parma University strategy for managing UNESCO designated sites



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Parma and its territory have recently been awarded two UNESCO major recognitions: in June 2015 the Tuscan-Emilian Apennine National Park was included in the UNESCO World Network of Biosphere Reserves (WNBR) as a part of the Man and the Biosphere (MAB) Programme, then in December 2015 Parma entered the UNESCO Creative Cities Network gaining the qualification of creative city of gastronomy. The MAB reserve includes 38 municipalities encompassing the provinces of Modena, Reggio Emilia, Parma, Massa Carrara and Lucca for a total surface of 223,229 hectares, 4.5% of which is Core Area, 11.5% Buffer Area and 84% Transition Area (Fig. 1).

The mountain ridge present in this area marks the geographical and climatic boundary between Continental and Mediterranean Europe. The reserve contains 37 different habitats of ecological interest where nearly 70% of all the species present in Italy live in 37 different habitats of ecological interest, including species of birds, amphibians, reptiles, mammals, fish, the wolf and the Golden Eagle, but there is also great plant biodiversity, with at least 260 aquatic and terrestrial species, not to mention the great variety of landforms and climates which have influenced the way people have lived in this region for centuries. The area including the MAB site is renowned for its traditional, high quality mountain agriculture which produces worldwide famous products DOP (protected designation of origin) and IGP (protected geographical status) such as the parmesan cheese from red cows or the black pig breed. In this respect this territory is a perfect example of how conservation of biodiversity and a sustainable and skilled use of natural resources have co-existed successfully for centuries. In



Fig. 1. The Apennine Tuscan-Emilianan biosphere reserve.

addition to the MAB recognition, Parma has been officially proclaimed by UNESCO a "Creative City for gastronomy". It is the first time that an Italian city gets this prestigious official recognition that UNESCO accords to cities that demonstrate unique abilities in gastronomy as a result of tradition, talent and innovation (Fig. 2).

Parma is the capital of the Italian Food Valley whose economic development is closely linked to the agri-food industry covering not only the whole food chain but also creating and safeguarding its typical tradition products such as the Parmigiano-Reggiano cheese and Parma ham which are the base elements of its worldwide recognized gastronomic heritage. In this respect both the awards have in common the recognition of the importance of the interconnection of three key elements: quality of soil, food and human resources. Anyway, there is a current danger to the preservation of these unique natural and cultural assets due to the fact that in the last 50 years, depopulation hit the Apennines communities harshly (Table 1) especially in the mountain area.

Nowadays the progressive abandonment is putting at risk the maintenance of traditional knowledge and activities in this area such as forestry, farming and livestock raising which are not only the main source of the high quality food characterising Parma and its surroundings but also the means for improving and reinforcing the interaction between people and their natural environment. Actions have to be taken urgently to face the decline of birth rates, population aging, fragmentation affecting small municipalities and eventually the social relationships themselves.



Fig. 2. Parma: UNESCO city of gastronomy.

The solution is to invest on human resources and above all on young people who, living permanently in these territories, can protect and value the local excellences in a logic of a sustainable balance between human kind and nature. In order to do that it should be kept in mind that promoting a better life style and preserving at the same time natural reserves, like those present in MAB designated sites, is possible only if there is a clear understanding that biological and cultural realms are not separate entities but complex systems which interact in a co-evolutionary process which may be mutually beneficial or disruptive depending on how sustainable their link is. The contribution of the University of Parma in making it possible relies on the fact that a sustainable approach requires the ability of mastering simultaneously different competences including economic, environmental and social sciences within a holistic approach which is one of the pillars of the so called university third mission.

The University of Parma has three missions: Teaching, Research, and what it is called 'Communities Engagement'. The term "Communities" has been used to stress the various communities involved: not only business, but all communities present in the territory – e.g. artistic, religious, educational, sporting, charitable, indigenous, professional, associations, local councils and families. In other words the University of Parma is committed to make a solid contribution to civil society as well as the private sector, assisting not only with economic performance but also helping to improve quality of life and the effectiveness of the public service like a "civic" university.

In this respect the University of Parma has as his own goals both in supporting research and educating students for making them apt for the job market and in transferring valuable expertise, in this case the necessary interdisciplinary knowledge for implementing sustainable development in the territory and more specifically in the UNESCO designated sites. In order to make this contribution more efficient it is necessary to strengthen the synergy between the UNESCO designated sites managers and the academic world. This implies a more responsible and direct involvement of universities in the governance

	1951	2011	Var. %
Borgotaro	10862	7275	-33,0
Berceto	6210	2144	-65,5
Bedonia	7723	3617	-53,2
Neviano	7720	3691	-52,2
Corniglio	6112	1997	-67,3
Valmozzola	2411	567	-76,5

Table 1. Dynamics of depopulation in the Apennine area.

of the UNESCO sites in order to help the management in writing, implementing and assessing proposals, within EU Programmes, national and regional projects.

The aim is to create job opportunities based on green economy and sustainability concepts which can respond both to local needs and traditional activities and follow the double pyramid structure of sustainable development. Designated sites can survive and flourish only if people have a chance to find decent jobs so they can inhabit them all the year round. This means for instance that managing designated sites through a hit-and-run tourism can be not enough, and more targeted strategies need to be elaborated in order to balance tourism and heritage conservation, to define limits to protect the natural and cultural heritage and to mitigate negative impacts in the long run. Other job opportunities have to be found to incentivize young people to move back

to these sites. In this respect it is not strictly necessary to rely on striking new ideas for revitalizing these territories, sometimes it is enough to be aware that local knowledge and traditional occupations are more than sufficient to accomplish this task.

As far as the Apennine Tuscan-Emilian MAB reserve and Parma as creative city are concerned, a possible project based on a short chain and

valorization of residues from farming activities, already in progress, takes advantage of the close link between quality soil and quality food for stimulating the local agro economic system. In this respect, recently, a substance sparked attention that might very well contribute practically to the solution of not only soil problems but also many climate change related problems. This substance is called biochar (Fig. 3) which is a fine-grained charcoal-like material created by pyrolysis ('burning in absence of oxygen') of residual biomass from forestall and agricultural activities.

Biochar differs from charcoal primarily in the sense that its primary use is not for fuel, but as a soil amendment for carbon-sequestration and soil improvement. Biochar research has inspired the development of a revolutionary technology that can have tremendous impact not only on agriculture, but also on water use, energy disposal,

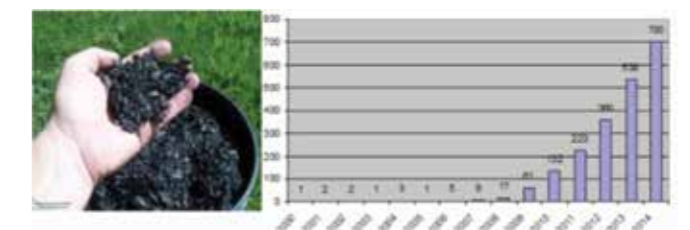


Fig. 3. Biochar manuscripts 2000-2014.

health, sanitation, livelihoods, environment, and carbon sequestration. Biochar is a recent term, but application of charcoal to the soil to improve the fertility originated in the Amazon basin and dates back to pre-Columbian times Terra Preta, or Amazonian Dark Earth (ADE) which, remains highly fertile until today, even with little or no application of fertilizers even in a region of the world known for its highly infertile soils.

The potential role of biochar in improving soil fertility is well documented (1) and is linked to the capacity of biochar in the soil to improve soil agronomic and physical properties. Fundamentally, biochar is believed to benefit crop production through three primary mechanisms: 1) direct modification of soil chemistry through its intrinsic elemental and compositional make up (e.g. availability of nutrients and light organic molecules and decrease in soil acidity); 2) providing chemically active surfaces that modify the dynamics of soil nutrients or otherwise catalyze useful soil reactions (e.g. increasing the cation exchange capacity of the soil); 3) modifying texture of the soil in a way that benefits root growth and/or nutrient and water holding capacity and acquisition e.g. reduction of soil bulk density, creation of stable macro-aggregates, which stabilize soil and promotes long term carbon sequestration and soil structural stability. In addition, the increasing interest in biochar is not only due to its quality as soil amendment, in fact biochar may also be involved in the process of renewable energy production.

Compared to fossil fuels, energy from the products of pyrolysis is carbon neutral or negative, making agricultural residues ideal energy sources for the future (2) being a technology easily adaptable to different local situations. In this respect the multiple possible uses of a sustainable technology based on biochar offers a means of boosting crop production, increasing on-farm income for subsistence farmers, promoting job creation through the use of local resources, developing systems for decentralized heat and power facilities using low-cost pyrolysis plants, reducing pressure on forest ecosystems and last but not least providing an incentive to young and old people to remain in the area (3).

The solution is to invest on human resources and above all on young people who, living permanently in these territories, can protect and value the local excellences in a logic of a sustainable balance between human kind and nature.

References

(1) Sohi S., Krull E., Lopez-Capel E. and Bol R., (2010), "A review of biochar and its use and function in soil", *Adv. Agron*, 105, 47-82

(2) Laird D.A., Brown R.C., Amonette J.E. and Lehmann J., (2009), "Review of the pyrolysis

platform for coproducing bio-oil and biochar" *Biofuels, bioproducts and biorefining*, 3, 547-562

(3) Reddy S. (2014), <http://www.biocharculture.com>

Mediterranean Youth Responses towards sustainable development and the current crisis



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Introduction

The article briefly presents the survey entitled "Mediterranean Youth Responses towards sustainable development and the current crisis" that took place from June 2015 until December 2015 and provides a "glimpse" on its first outcomes. The final results will be used to produce recommendations on how to enhance the role of youth in policies and strategies related to Sustainable Development and Education for Sustainable Development (ESD) at national and regional (Mediterranean) level.

Partners - scope - tool - process

The survey "Mediterranean Youth Responses towards sustainable development and the current crisis" was designed and coordinated by the University of Athens (Environmental Chemistry Laboratory, Dpt. of Chemistry) that holds the UNESCO Chair on Sustainable Development Management and Education in the Mediterranean¹, in cooperation with the Mediterranean Information Office for Environment, Culture and Sustainable Development² (through the MEDIES³ Network). It ran from June to December 2015 and targeted young people aged 15-35 years old from all the Mediterranean countries. Main scope of the survey was to capture youth's perceptions on current issues related to sustainable development in the Mediterranean region, as well as their visions for the future. Its findings will be used to inform strategies and policies related to youth, sustainable development and ESD.

More specifically, the objectives of the survey were:

- To outline youth's familiarity with the concept of sustainable development.
- To trace what issues related to sustainable development and education concern youth in the Mediterranean today.
- To highlight what the main causes and responsibilities related to sustainable development

- challenges are according to young people.
- To explore what practices related to sustainable development are in place in the educational institutions (school, university, etc.) and workspaces in the Mediterranean.
- To identify what ways youth considers as effective for enhancing their role in sustainability issues.
- To identify the practices that youth considers as effective for promoting ESD and the whole institute approach.
- To explore any similarities and differences in the aforementioned topics at the factors' level analysis: gender, age, country, education level, etc.

The research tool was a trilingual questionnaire (in English, French and Greek). The draft questionnaire was developed in English by a group of ESD experts from MIO-ECSDE, MEDIES and the UNESCO Chair on ESD in the Mediterranean/the University of Athens, under the scientific coordination of Prof. Michael Scoullas. The draft tool was validated through its evaluation by 15 international experts (external evaluators) and its pilot application. The final questionnaire includes 14 close-ended questions and one open-ended question, plus 16 demographic questions. The original English questionnaire was translated into French and Greek and all three versions were uploaded as Google forms. A wide audience was approached and informed about the survey throughout the Mediterranean region including schools, universities, students and youth associations, environmental education centres, NGOs, youth networks, etc.

"While 90% of participants replied that they have heard of the term 'sustainable development' about half correctly identified the components of the term".

1 <http://unescochair.chem.uoa.gr>

2 www.mio-ecsde.org

3 www.medies.net

Have you ever heard the term "sustainable development"?



Fig 1: Results to the question "Have you ever heard the term sustainable development?"

Preliminary Outcomes

The survey was done by 428 youths coming from 25 different countries (Mediterranean and non-Mediterranean) having the following demographic profiles:

- Almost two thirds were women (65%).
- In terms of age range the sample was spread as follows: 27% aged between 15 -18 years old; 29% between 24-29 years old, 19% were 19-25 years old and 25% were 30-35 respectively.
- Greek was the dominant nationality (72%) followed by Tunisian, Italian, Albanian, Lebanese and Jordanian.
- More than half of them were at the time studying at school or university level (58%) while 30% was working full time.
- Two thirds lived in an urban setting (68%).
- More than half (57%) had never taken part in voluntary actions nor NGO activities.
- About 21% had volunteered in environmental and sustainability issues.

Regarding the responses in the first questions of the survey, while 90% of participants replied that they have heard of the term "sustainable development" about half correctly identified the components of the term. Additionally, 42% considered that young people are 'a little' acquainted with the concept of sustainable development.

When asked to rank the components of sustainable development from a given list, from the most to the least important, "Environmental Protection" came up as their first choice followed by "Social Stability", "Fair Economic Development", "Democratic Governance", and "Cultural Diversity".

To what extent do you think that young people are acquainted with the concept of SD?

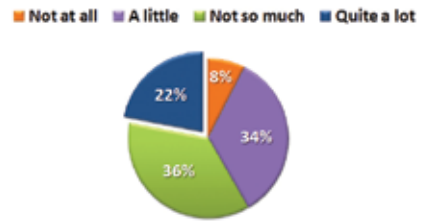


Fig 2: Results to the question "To what extent do you think that young people are acquainted with the concept of SD?"

When asked to rank the ways they themselves learn better (in a given list, from the most to the least effective way), the respondents ranked the choice "By doing" as the most effective, whereas "By reading" was their second choice with a small difference from the 3rd choice which was "By listening". The choice "Following social media" took the fourth place.

The overall analysis is expected to be completed by early summer of 2016. The outcomes will be considered in the finalization of the Action Plan of the Mediterranean Strategy on ESD and will be appropriately linked with the UNESCO Global Action Programme on ESD (GAP) and the Sustainable Development Goals (SDGs) to provide recommendations and proposals for enhancing the role of youth in addressing relevant challenges in the Mediterranean region.

References

- ASDA/A Burson- Marsteller Arab Youth Survey 2014 (and 2010).
- Business as Unusual Survey, survey by the NET IMPACT, oikos, 2014.
- UN System-wide Action Plan on Youth, survey results, 2012.
- General Secretariat for Youth Greece "National Report for Youth" 2012
- Michalos et al. "Measuring Knowledge, Attitudes and Behaviours towards Sustainable Development: Two Exploratory Studies" 2009.
- UNEP Global Survey "How do we live around the world" 2009.
- AEGEE Flagship Project "Youth's eye on Sustainability" 2008-09.
- Kaiser F., Wolfing S., Fuhrer U. (1999) "Environmental attitude and Ecological behaviour", Journal of Environmental Psychology, 19, pp 1-19, Academic Press 1999.