



I.S.L.E.

INNOVATION IN THE TEACHING  
OF SUSTAINABLE DEVELOPMENT IN LIFE SCIENCES IN EUROPE

**Sustainable Development in Higher Education in Europe**  
**INNOVATIVE PRACTICE COMPENDIUM**

**Edited by Vesna Weingerl**

Erasmus Networks project  
N°177267-LLP-1-2010-1-FR-ERASMUS-ENWA  
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With the support of  
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# **Sustainable Development in Higher Education in Europe**

## **INNOVATIVE PRACTICES COMPENDIUM**

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## **Innovative Practices Compendium** (Final report on Work Package 6)

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## ABSTRACT

The ISLE project's (Innovation in the teaching of Sustainable Development within Life Sciences in Europe) objective was to implement the concept of Sustainable Development in Higher Education. Higher Education Institutions from amongst all educational structures have an enormous impact on knowledge discovery and transfer, as well as the promotion of Sustainable Development within the society and business world. The transformation of Higher Education Institutions according to the principles of Sustainable Development is a non-technological process requiring invention, innovation, and diffusion. By the linking educational activities, teaching, scientific research, various projects as well as examples of good practices, the discovery of new knowledge and the modernisation of values, cultures, ethics and norms would be activated.

The Innovation Practices Compendium was the final product of Work Package 6 (WP6) entitled "Innovative Practices". The objective was within the spirit of the possible and the identification of existing Innovative Practices concerned with Education for Sustainable Development within Higher Education Institutions. The topic is discussed with a requisitely holistic approach describing formal and informal learning experiences within Higher Education Institutions and highlighting some important directions for the future vision of Higher Education.

18 Innovation Practices are discussed and presented in form of indicators and descriptors. The following indicators and descriptors were used:

Indicators: New technologies, Holistic approach, Collaboration, Critical thinking, Project-based learning, Creativity, Network building capacity, Internationalisation, Interdisciplinarity, Motivation aspects, Transferability, Innovation activities (present)

Descriptors: Content, Tools, Method, Outcome

The Innovative Practices were mostly selected from a Compendium of Good Practices emerging from the previous work package WP3 analysis, carried out within the ISLE project, and from the research of the project partners. The selection was done in accordance with the criteria of innovation.

An innovative way to encourage students to actively learn the knowledge syllabus of sustainable development was the video challenge. Within the framework of WP6 a Facebook video challenge for student groups was carried out.

The (requisitely) holistic and interdisciplinary approaches to ESD, the attention to achieving tangible results, the involvement of local communities and the bottom-up approaches, the importance of partnerships and networking, the capacity building, the innovation of the initiatives, the attention given to building a framework favourable to SD, tutoring (tutor as mediator) and VCEN (values/culture/ethics/norms) was the common thread during the formation of an Innovative Practices Compendium.





## ***Theorem***

Education is the ability to perceive the hidden connections between phenomena.  
*Vaclav Havel*



# 1. INTRODUCTION

The Innovative Practices Compendium was the final product of Work Package 6 (WP6) entitled “Innovative Practices” which was carried out within the framework of the **ISLE** Erasmus Thematic Network (Innovation in the teaching of the Sustainable Development of Life Sciences in Europe) which was co-financed by the European Community within the framework of the Lifelong Learning Programme.

ISLE was a 36-month project that started in October 2010. Its consortium consisted of 38 partners from 32 European countries representing Higher Education Institutions (HEIs), Research Institutes, and Enterprises that focus on life sciences.

The project's objective was to implement the concept of Sustainable Development within Higher Education. The project approached the topic in a comprehensive way, analysing the different aspects concerning the implementation of SD in higher education and developing both research activities and specific tools and devices that could be utilised by the wider sector for facilitating ESD.

The main activities of the project were to bring together stakeholders from Europe who had already introduced the concept of SD into their curricula and wished to transfer their knowledge to the other partners of the network or wished to introduce the concept of SD into the curricula of their institutions; to acquire new knowledge on ESD and develop the necessary tools for knowledge transfer, to increase awareness in European HEIs of the urgency of ESD, and to provide the instruments for facilitating and supporting ESD.

The objective of this report is the extraction of existing and other ideas for possible innovative practices in the area of Sustainable Development education within Higher Education Institutions (HESD).

The topic of HESD is considered in a broader sense, on the one hand by considering the characterisations of the political and institutional frameworks, and on the other hand by describing the formal and informal learning experiences within HE Institutions. In the opinion of the authors of the Good Practices Compendium (Chiodo, 2013), to maximise the effectiveness of HESD requires taking into account all these elements. The Good Practices were classified into 4 areas: *Policies, Institutional activities, Teaching, and Practical experiences*.

Different project activities used to address Innovative Practices. In Work Package 2 (WP2) “State of the art: information collection concerning SD in life sciences in Europe” information on good practices was collected through the collation of countries’ reports and the responses to direct surveys within the member Institutions. Surveys were completed by students, academic staff and individual institutions for each partner of the ISLE network.

In WP3 all the ISLE partners were involved in identifying and describing those Good Practices considered most representatives of each country, and by integrating the State of the art results with personal knowledge and direct surveys.

During WP5 the collected good practices were evaluated and the most suitable ones were selected for publication within the Good Practices Compendium (Chiodo, 2013). The criteria used for evaluation was taken into consideration regarding different aspects: Transferability, Pertinence, Capacity Building, User Friendly, Innovation, Partial/Global Approach, Networking and Interdisciplinarity.



The selected Good Practices covered a wide range of activities and geographical origins, with the aim to maximise the replications of these practices in other institutions, both within and outside the ISLE consortium.

The planned continuation of ISLE project activities was WP6 – Innovative Practices. Working on the basis of the different diagnostics collected in WP5, in WP6 end concerned itself with the innovative contents and pedagogical methods for sustainable development in the teaching of life sciences by setting-up and distributing a questionnaire to partner members and HEI's non-members of the consortium. The lead partner responsible for coordinating the contents of the deliverables and updating the ISLE web-site concerning WP6 was the University of Maribor, Faculty of Agriculture and Life Sciences, Slovenia.

The first step of the WP6 Innovation Practices work-group was taken-up by the preparation of an Innovative Practices Questionnaire (deliverable nr. 6.1).

During the 6<sup>th</sup> ISLE meeting in March 2013 at the University of Maribor, Faculty of Agriculture and Life Sciences, in Slovenia, an Innovation Practices workshop was formulated. During the WP6 workshop, the work groups responsible for WP6 started by selecting their chosen Innovative Practices categories from the Compendium of selected Good Practices. Armed with all the materials available, the work groups focused on the transfer and possible innovations in terms of content, practices and approaches, by addressing the question in a trans-disciplinary fashion.

After extraction of the Good Practices Compendium, 14 innovation practices were discussed and presented in form of a questionnaire, composed from 12 indicators and 4 descriptors. The following indicators and descriptors were used:

Indicators: New technologies, Holistic approach, Collaboration, Critical thinking, Project-based learning, Creativity, Network building capacity, Internationalisation, Interdisciplinarity, Motivation aspects, Transferability, Innovative activities (present)

Descriptors: Content, Tools, Method, Outcome

In addition to the 14 extracted innovation practices we selected three more innovative practices that were not mentioned in the Good Practices Compendium.

Facebook VIDEO challenge for student groups was carried out in May 2013. The winners were invited to the 7<sup>th</sup> ISLE meeting in Varna, Bulgaria, in June 2013.

The Innovative Practices compendium, as presented here, is the written result of WP6 activities. Please do enjoy the reading!



**The Innovative Practices Compendium was structured as follows:**

- Chapter 1 acquaints the reader with the basics of WP6 involvement in the ISLE project, as well as with content of WP6
- Chapter 2 inspires with creating the mind-set
- Chapter 3 provides a general overview of the selected Innovative Practices
- Chapter 4 presents the results of the 1<sup>st</sup> and 2<sup>nd</sup> Workshops Innovative Practices
- Chapter 5 presents the questionnaires' formats
- Chapter 6 presents the winning video challenge for student groups, as spread over the social network
- Chapter 7 introduces the selected Innovative Practices, and comments on their contents. The selected innovative practices are presented with the indicators and descriptors used in a transferrable way
- Chapter 8 presents any gaps, and the future directions
- Chapter 9 presents the report's conclusions and recommendations



## 2. CREATING THE MINDSET

We have the good fortune of inhabiting a wonderful miracle of nature. Nature, the environment in which we live, is not haphazard, but has order and purpose. From the smallest single-celled organism to mankind, there is a purpose and a place for everything and everything has its place and purpose. As you gain an understanding and appreciation of life, you discover that there is no need for mankind's intervention. Only when mankind disrupts this balance and then proceeds to circumvent and overrule natural laws, does there appear to be chaos and brutality in nature. Nature will triumph in the end, whether mankind cooperates in harmony with it or plunders it away into oblivion.

However, mankind does have the capability of helping nature to regenerate. This is a marvellous wonder to observe. Nature will more than take care of mankind if he/she simply allows nature to do so. She will also protect mankind, if left to her own devices. Nature, the environment in which we live, is everything around us, and within us. Everything is connected with everything. Every action results in a reaction. Every cause has a consequence. This is called the law of action and reaction. When respecting nature all our actions must be sustainable.

Academic society today has the privilege of lauding and showing the sustainable path.

In times of crisis, societies need universities capable of providing innovative solutions and opening up new horizons. As Einstein put it, "problems cannot be solved by the same level of thinking that created them". Therefore, effective solutions must be sought at a higher level. Universities play a key role in raising the awareness of social responsibility and that sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs.

Please do allow me to introduce to you some citations of Fritjof Capra, from the book *The Hidden Connections*:

"Our academic disciplines have been organized in such a way that the natural sciences deal with material structures, while the social sciences deal with social structures, which are understood to be, essentially, rules of behaviour. In the future, this strict division will no longer be possible, because the key challenge of this new century - for social scientists, natural scientists and everyone else - will be to build ecologically sustainable communities, designed in such a way that their technologies and social institutions - their material and social structures - do not interfere with nature's inherent ability to sustain life."

The design principles of our future social institutions must be consistent with the principles of organisation that nature has evolved to sustain the web of life.

A unified conceptual framework for the understanding of material and social structures will be essential for this task.



## Authority - power – empowering others

From the earliest times, human communities have chosen men and women as their leaders when they recognised their wisdom and experience as a firm basis for collective action. These leaders were then invested with power, which meant originally that they were given ritual vestments as symbols of their leadership, and their authority became associated with the power to command. The origin of power, then, lies in culturally defined positions of authority on which the community relies for the resolution of conflicts and for decisions about how to act wisely and effectively. In other words, true authority consists in empowering others to act.

However, it often happens that the vestment that gives the power to command - the piece of cloth, crown, or other symbol - is passed on to someone without true authority. This invested authority; rather than the wisdom of a genuine leader is now the only source of power, and in this situation its nature can easily change from empowering others to the advancement of an individual's own interests. This is when power becomes linked to exploitation.

A further stage of exploitation is reached when power is pursued for its own sake. It is well-known that for most people the exercise of power brings high emotional and material rewards, conveyed by elaborate symbols and rituals of obeisance - from standing ovations, fanfares, and military salutes to office suites, limousines, corporate jets, and motorcades.

As a community grows and increases in complexity; its positions of power will also increase. In complex societies, resolutions of conflicts and decisions about how to act will be effective only, if authority and power are organised within administrative structures. In the long history of human civilization, numerous forms of social organisation have been generated by this need to organise the distribution of power.

Power plays a central role in the emergence of social structures.

Corporations seem to be more powerful than ever; business is clearly dominating politics; and the profits and shareholder values of most companies are rising to unprecedented heights. Things seem to be going very well indeed for business, so why is there so much talk about fundamental change?

Listening to the conversations among business executives makes it clear, that the situation is not really searching for innovative solutions. Top executives are under enormous stress today. They work longer hours than ever before, and many of them complain that they have no time for personal relationships and experience little satisfaction in their lives in spite of increasing material prosperity. Their companies may look powerful from outside, but they themselves feel pushed around by global market forces and insecure in the face of turbulence they can neither predict nor fully comprehend.

Today, the business environments of most companies change with incredible speed. Markets are rapidly being deregulated, and never-ending corporate mergers and acquisitions impose radical cultural and structural changes on the organisations that involve changes that go beyond people's learning capabilities and overwhelm both individuals and organisations. As a result, there is a deep and pervasive feeling amongst managers that, no matter how hard they work, things are out of control.



The root cause of this deep malaise amongst business executives seems to be the enormous complexity that has become one of the foremost characteristics of present-day industrial society. At the beginning of this new century, we are surrounded by massively complex systems that increasingly permeate almost every aspect of our lives. These complexities would have been difficult to imagine only half a century ago, with their global trading and broadcast systems, instant worldwide communication via ever more sophisticated electronic networks, giant multinational organisations, automated factories, and so on.

The amazement we feel when contemplating these wonders of industrial and informational technologies is tinged by a sense of uneasiness, if not outright discomfort. Even though these complex systems continue to be hailed for their increasing sophistication, there is a growing recognition that they have brought with them a business and organisational environment that is almost unrecognisable from the point of view of traditional management theory and practice.

As if this were not alarming enough, it is becoming ever more apparent that our complex industrial systems, both organisational and technological, are the main driving force of global environmental destruction, and the main threat to the long-term survival of humanity.

To build a sustainable society for our children and future generations, we need to fundamentally redesign many of our technologies and social institutions so as to bridge the wide gap between human design and the ecologically sustainable systems of nature.

Organisations need to undergo fundamental changes, in order to both adapt to the new business environment and to become ecologically sustainable. This double challenge is urgent and real, and the recent extensive discussions of organisational change are fully justified.

This situation seems to be paradoxical. When we look around our natural environment, we see continuous change, adaptation, and creativity; and yet, our business organisations seem to be incapable of dealing with change. The roots of this paradox lie in the dual nature of human organisations.

## **Dual nature of human organisations**

On the one hand, they are social institutions designed for specific purposes, such as making money for their shareholders, managing the distribution of political power, transmitting knowledge, or spreading religious faith. At the same time, organisations are communities of people, who interact with one another to build relationships, help each other, and make their daily activities meaningful on a personal level.

These two aspects of organisations correspond to two very different types of change. Many CEOs are disappointed about their efforts to achieve change in large part because they see their companies as well-designed tools for achieving specific purposes, and when they attempt to change their designs they want predictable, quantifiable change within the entire structures. The designed structure of an organisation always intersects with the organisation's living individuals and communities, for who change cannot be designed.

It is common to hear that people within organisations resist change. In reality, people do not resist change; they resist having change imposed on them. Being alive, individuals and their



communities are both stable and subject to change and development, but their natural change processes are very different from the organisational changes designed by "re-engineering" experts and mandated from the top.

To resolve the problem of organisational change, we first need to understand the natural change processes that are embedded within all living systems. Once we have that understanding, we can begin to design the processes of organisational change accordingly and to create human organisations that mirror life's adaptability, diversity, and creativity.

Sustainability is not an individual property but is a property of an entire web of relationships.

Understanding human organisations in terms of living systems, i.e. in terms of complex non-linear networks, is likely to lead to new insights into the nature of complexity, and thus help us deal with the complexities of today's business environment.

Moreover, it will help us design business organisations that are ecologically sustainable, since the principles of organising ecosystems that are the basis of sustainability, are identical to the principles of organising all living systems.

Understanding human organisations as living systems is one of the critical challenges of our time.

There is an additional reason why the systemic understanding of life is of paramount importance in the management of today's business organisations. Over the last few decades we have seen the emergence of a new economy that is shaped decisively by information and communication technologies, and in which the processing of information and the creation of scientific and technical knowledge are the main sources of productivity. According to the classical economic theory, the key sources of wealth are natural resources (land in particular), capital, and labour.

Productivity results from the effective combination of these three sources through management and technology. In today's economy, both management and technology are critically linked to knowledge creation.

Increases in productivity do not come from labour but from the capacity to equip labour with new capabilities, based on new knowledge.

Knowledge management, Intellectual capital and Organisational learning have become important new concepts in management theory.

According to the system's view of life, the spontaneous emergence of order and the dynamics of structural coupling, which result in the continual structural changes that are characteristic of all living systems, are the basic phenomena underlying the process of learning.

Moreover, we have seen that the creation of knowledge within social networks is a key characteristic of the dynamics of culture.





Combining these insights and applying them to organisational learning enables us to clarify the conditions under which learning and knowledge creation take place and derive at important guidelines for the management of today's knowledge-oriented organisations.

The task is to make the process of change meaningful to people right from the start, to obtain their participation, and to provide an environment in which their creativities can flourish.

Offering impulses and guiding principles rather than strict instructions evidently amounts to significant changes in power relations, from domination and control to cooperation and partnerships. This, too, is a fundamental implication of the new understanding of life.

Over recent years, biologists and ecologists have begun to shift their metaphors from hierarchies to networks and have come to realise that partnership - the tendency to associate, establish links, cooperate, and maintain symbiotic relationships - is one of the hallmarks of life.

With the critical importance of information technology in today's business world, the concepts of knowledge management and organisational learning have become a central focus of management theory. The exact nature of organisational learning has been the subject of an ardent debate.

## Learning as a social phenomenon

Is a learning organisation a social system capable of learning or is it a community that encourages and supports the learning of its members? In other words, is learning only an individual or also a social phenomenon?

In every human organisation there is a tension between its designed structures, which embody relationships of power, and its emergent structures that represent the organisation's liveliness and creativity.

Finding the right balance between design and emergence seems to require the blending of two different kinds of leadership. The traditional idea of a leader is that of a person who is able to hold a vision, to articulate it clearly and to communicate it with passion and charisma. It is also a person whose actions embody certain values that serve as a standard for others to strive for. The ability to hold a clear vision of an ideal form, or state of affairs, is something that traditional leaders have in common with designers.

The other kind of leadership consists of facilitating the emergence of novelty. This means creating conditions rather than giving directions, and using the power of authority to empower others. Both kinds of leadership have to do with creativity. Being a leader means creating a vision; it means going where nobody has gone before. It also means enabling the community as a whole to create something new. Facilitating emergence means facilitating creativity.

Since power is embodied in all social structures, the emergence of new structures will always change power relationships; the process of emergence within communities is also a process of collective empowerment.



Leaders who facilitate emergence use their own power to empower others.

The result may be an organisation in which both power and the potential for leadership are widely distributed. This does not mean that several individuals assume leadership simultaneously, but that different leaders step forward when they are needed to facilitate various stages of emergence. Experience has shown that it usually takes years to develop this kind of distributed leadership.

Breathing life into human organisations by empowering their communities of practice not only increases their flexibility, creativity, and learning potential, but also enhances the dignity and humanity of that organisation's individuals, as they connect with those qualities within themselves. In other words, focusing on life and self-organisation empowers the self. It creates mentally and emotionally healthy working environments within which people feel that they are supported in striving to achieve their own goals and do not have to sacrifice their integrity to meet the goals of the organisation.

Despite new environmental regulations, the increasing availability of eco-friendly products and many other encouraging developments championed by the environmental movement, the massive loss of forests and the greatest extinction of species over millions of years has not been reversed.

By depleting our natural resources and reducing the planet's biodiversity we damage the very fabric of life on which our well-being depends, including the priceless "ecosystem services" that nature provides for free-processing waste, regulating; the climate, regenerating the atmosphere, and so on. These vital processes are emergent properties of non-linear living systems that we are only beginning to understand, and they are now seriously endangered by our linear pursuits of economic growth and material consumption.

More stringent environmental regulations, better business practices, and more efficient technologies are all necessary, but they are insufficient. We need a deeper systemic change.

Such deep systemic change is already under way. Scholars, community leaders, and grassroots activists around the world are forming effective coalitions and are raising their voices, not only to demand that we must "change the game" but also to suggest concrete ways of doing so.

## The ethics

There is a huge difference between making politically correct statements and actually changing corporate behaviour, but agreeing on the basic values that are needed to reshape globalisation would be a critical first step. What are these basic values? What are the ethical dimensions of globalisation?

Ethics refers to a standard of human conduct that flows from a sense of belonging. When we belong to a community, we behave accordingly.

In the context of globalisation, there are two relevant communities to which we all belong. We are all members of humanity, and we all belong to the global biosphere. We are members of Oikos, which is the Greek root of the word Ecology, and as such we should behave as the other members



of the household behave - the plants, animals, and micro-organisms that form the vast network of relationships that we call the web of life.

This global living network has unfolded, evolved, and diversified for the last three billion years without ever being broken. The outstanding characteristic of the Earth household is its inherent ability to sustain life. As members of the global community of living beings, it behoves us to behave in such a way that we do not interfere with this inherent ability: this is the essential meaning of ecological sustainability.

What is sustained in a sustainable community is not economic growth or development, but the entire web of life on which our long-term survival depends.

It is designed so that its ways of life, businesses, economy, physical structures, and technologies do not interfere with nature's inherent ability to sustain life.

As members of the human community, our behaviour should reflect a respect for human dignity and basic human rights. Since human life encompasses biological, cognitive, and social dimensions, human rights should be respected in all three of these dimensions. The biological dimension includes the right to a healthy environment and to secure and healthy food; honouring the integrity of life also includes the rejection of the patenting of life-forms.

Human rights within the cognitive dimension include the right of access to education and knowledge, as well as the freedom of opinion and expression. In the social dimension, finally, the first human right - in the words of the UN Declaration of Human Rights - is "the right to life, liberty, and security of person." There is a wide range of human rights within the social dimension - from social justice to the right of peaceful assembly, cultural integrity, and self-determination.

In order to combine respect for these human rights with the ethics of ecological sustainability, we need to realise that sustainability - in ecosystems as well as in human society - is not an individual property but a property of an entire web of relationships: it involves a whole community. A sustainable human community interacts with other living systems - human and non-human - in ways that enable those systems to live and develop according to their natures. In the human realm sustainability is fully consistent with the respect of cultural integrity, cultural diversity, and the basic right of communities to self-determination and self-organisation.

Since the outstanding characteristic of the Earth household is its inherent ability to sustain life, a sustainable human community is one designed in such a manner that its ways of life, businesses, economy, physical

No charismatic leader led.  
No religious figure engaged in direct action.  
No movie star starred.  
There was no alpha group.  
The Ruckus Society, Rainforest Action Network, Global Exchange, and hundreds more were there, coordinated primarily by cell phones, e-mails, and the Direct Action Network. They were organized, educated, and determined. They were human rights activists, labour activists, indigenous people, people of faith, steel workers, and farmers. They were forest activists, environmentalists, social justice workers, students, and teachers. They wanted the World Trade Organization to listen. They were speaking on behalf of a world that has not been made better by globalization. Their main concern is to stem the tide of a global trading system where everything is for sale, even our biological heritage, or access to seeds, food, air, and water - elements of life that were once considered sacred.

*Paul Hawken*

Try not to become a man of success, but try instead to become a man of value.  
*Albert Einstein*



structures, and technologies do not interfere with nature's inherent ability to sustain life.

The key to an operational definition of ecological sustainability is the realisation that we do not need to invent sustainable human communities from scratch but can model them after nature's ecosystems, which are sustainable communities of plants, animals, and microorganisms.

Sustainable communities evolve their patterns of living over time by continual interaction with other living systems, both human and non-human. Sustainability does not mean that things do not change: it is a dynamic process of co-evolution rather than a static state.

The operational definition of sustainability implies that the first step in our endeavour to build sustainable communities must be to become "ecologically literate," i.e., to understand the principles of organisation, common to all living systems, that ecosystems have evolved to sustain the web of life. Living systems are self-generating networks, organisationally closed within boundaries, but open to continual flows of information, energy and matter.

This systemic understanding of life allows us to formulate a set of principles of organisation that may be identified as the basic principles of ecology and used as guidelines for building sustainable human communities.

There are six principles of ecology that are critical for sustaining life: networks, cycles, solar energy, partnership, diversity, and dynamic balance. These principles are directly relevant to our health and well-being.

Because of our vital need to breathe, eat, and drink, we are always embedded in the cyclical processes of nature. Our health depends upon the purity of the air we breathe and the water we drink, and it depends on the health of the soil from which our food is produced.

In the coming decades the survival of humanity will depend on our ecological literacy - our ability to understand the basic principles of ecology and to live accordingly. Thus, ecological literacy, or "eco-literacy," must become a critical skill for politicians, business leaders, and professionals within all spheres, and should be the most important part of education at all levels - from primary and secondary schools to colleges, universities, and the continuing education and training of professionals.

It should be a centre for ecological studies with philosophical and spiritual roots in deep ecology, where students from all parts of the world gather to learn, live, and work together whilst being taught by an international faculty.



## **Nature's ecosystems are cyclical**

The first principle of Eco-design is that "waste equals food." Today, a major clash between economics and ecology derives from the fact that nature's ecosystems are cyclical, whereas our industrial systems are linear.

In nature, matter cycles continually, and thus ecosystems generate no overall waste. Human businesses, by contrast, take natural resources, transform them into products plus waste, and sell the products to consumers, who discard more waste when they have used the products.

The principle "waste equals food" means that all products and materials manufactured by industry, as well as the wastes generated in the manufacturing processes, must eventually provide nourishment for something new.

A sustainable business organisation would be embedded within an "ecology of organisations," in which the waste of any one organisation would be a resource for another. In such a sustainable industrial system, the total outflow of each organisation - its products and wastes - would be perceived and treated as resources cycling through the system.

In a sustainable industrial society, all products, materials, and wastes would either be biological or technical nutrients. Biological nutrients would be designed to re-enter ecological cycles to be consumed by micro-organisms and other creatures in the soil. In addition to organic waste from our food, most packaging (which makes up about half the volume of our solid-waste stream) should be composed of biological nutrients. With today's technologies, it is quite feasible to produce packaging that can be tossed into the compost bin to biodegrade." (Fritjof Capra, *The Hidden Connections*)

## **The biggest problems nowadays start with our education**

When talking about the holistic approach we must set clear dimensions of the really holistic view.

In the next section, some citations from the most comprehensive study of nutrition ever conducted *The China Study* by T. Colin Campbell and Thomas M. Campbell:

"Sustainable medical system can't be paid for by the drug industry, from the education to research. In that case it is clear that sustainability may just knock on the doctor's door and no one will open it. The problem with doctors starts with our education. It starts the day medical student enter medical school. All the way through medical school everything is supported by the drug industry. In this environment it is not possible for nutrition to be given fair and honest consideration.

The biggest innovation practice in medical area will be to hear it from our doctors that our leading killers can be prevented and even reversed using good nutrition.

As long as the conventional drug supported environment persist in our medical schools and hospitals there will be no place for such innovation practices.



Unless your doctor has decided that conventional medical practice as it is taught does not work, and decides to spend a significant amount of time educating him or herself about good nutrition, you will not hear about this simple sustainable solution. This takes a rare individual.

Another problem is challenged by the question: what is the good nutrition? What do you know about good nutrition, what do you learn at school about it, what do you hear about it from your doctor and what really is good nutrition, are mostly quite different answers. When talking about innovation in education practices we really need a sustainable education system that is innovative in that way, that is prepared to accept and raise a truly holistic view.

Never before in our history had such large percentages of the population died from diseases of “affluence”.

Is this the affluence that Socrates predicted 2500 years ago - society full of doctors and lawyers wrestling with the problems caused by people living luxuriously and eating cattle?

Never before have so many people suffered such high levels of obesity and diabetes. Never before has the financial strain of healthcare distressed every sector of our society, from business to education, government and to families with inadequate insurance. If we have to decide between health insurance for our teachers and textbooks for our children, which will we choose? Never before have we affected the natural environment to such an extent that we are losing our topsoil, our massive aquifers, and our world's rainforests.

Never before has there been such a mountain of empirical research supporting whole foods, plant-based diet. We can obtain images of the arteries in the heart and show conclusively that a whole food, plant-based diet reverses heart disease.

Never before have we had such a depth of understanding of how diet affects cancer both on a cellular level as well as a population level. Published data show that animal protein promotes the growth of tumours. Never before have we had technology to measure the biomarkers associated with diabetes, and the evidence to show that blood sugar, blood cholesterol and insulin levels improve more with a whole foods, plant-based diet than with any other treatment. Intervention studies show that Type 2 diabetics treated with a whole foods, plant-based diet may reverse their disease and go off their medications. A broad range of international studies shows that Type 1 diabetes, a serious autoimmune disease, is related to cow's milk consumption and premature weaning. We now know how our autoimmune system

Robbins, 2001, in *The Food Revolution*, convincingly details the connection between our diet and the environment:

“We are changing our climate so rapidly that many of the world's best informed scientists fear the future.

Never before have had we been eliminating plant and animal species from the face of the earth as we are doing now.

Never before have we introduced on such a large scale genetically altered varieties of plants into the environment without knowing what the repercussions will be.

All of these changes in our environment are strongly affected by what we choose to eat.”

We shall require a substantially new manner of thinking if mankind is to survive.

*Albert Einstein*

"Nothing will benefit human health and increase the chances for survival of life on earth as much as the evolution to a vegetarian diet."

*Albert Einstein*



can attack our own bodies through a process of molecular mimicry induced by animal proteins that find their way into our bloodstream. We also have tantalising evidence linking multiple sclerosis with animal food consumption, and especially dairy consumption. We now have a deep and broad range of evidence showing that a whole food plant-based diet is best for diabetes and autoimmune diseases.

Never before, there has been such a broad range of evidence showing that diets containing excess animal protein can destroy our kidneys. Kidney stones arise because the consumption of animal protein creates excessive calcium and oxalate in the kidney.

More research can and should be done but the idea that whole foods, plant-based diets can protect against and even treat a wide variety of chronic diseases can no longer be denied. There are hundreds of detailed, comprehensive, well-done research studies that point towards the same direction.

History can repeat itself. This time, however, instead of the message being forgotten and confined to library shelves, I believe that the world is finally ready to accept it. More than that, I believe that the world is finally ready to change. We have reached a point in our history where our bad habits can no longer be tolerated. We, as a society, are on the edge of a great precipice: we can fall to sickness, poverty and degradation, or we can embrace health, longevity, and bounty. And all it takes is the courage to change. “

If we truly seek a sustainable, peaceful world and prosperity, then there is simply no way we can circumvent veganism as a key to the future. The vegan ideal embodies the highest of spiritual and ethical aspirations – non-violence, harmlessness, reverence for life and the cultivation of compassion towards the innocent. With the elimination of support for all products and practices that exploit animals, people can greatly lessen their ecological footprint, take their health into their own hands, play a part in eliminating world hunger and experience the peace of mind that comes from making such a powerful personal contribution towards the beginning of peace on earth.

Humans, please try to be finally a human to the human being.

*Pulchra res est homo, si homo est.*

A human is a good thing, if it is a human.

Survival of our species depends on learning the very lessons of empathy, responsibility, self-control, humbleness and humility that the vegan ideal embodies, and which our society seems so reluctant to embrace.

With our society and our world within sight of a major breakdown from resource scarcity and subsequent political conflict, it has become crucial that we face up to the need for a radical shift, beginning with a change of perception inside each one of us.

One of the more important innovations in the teaching of SD within life sciences in Europe seems to be the acceptance of a whole food, plant-based diet model for all programmes taught at universities. The vegan ideal represents nothing less than the next evolutionary step for humankind.



## Another point of view: our connection with God

When talking about the holistic approach we should mention another point of view: our connection to the God (if this infringes upon your belief system, insert Creator, Universal Life Force, or whatever you are comfortable with).

The basis of life is God. He/she supplies the life force energy.

Everything is energy, whether it is soil, water, air or something else. What makes each thing different is the energy pattern and frequency at which it resonates. Some patterns and frequencies are detrimental to biological life and some are beneficial. Our goal is to minimise the detrimental ones and maximise the beneficial ones.

Those people who do not see the God, who do not see the things themselves with open eyes and just get things from books or from hearsay or their imagination etc., they have made the spiritual aspect of life, spirituality, such an amalgamation of different ideas and all controversies etc. They have made it a battlefield of quarrels; a battlefield of quarrelling through ideas, quarrelling through social factions and political factions, and they even create wars between people. Talking about our connection with God we must be clear, that this has nothing to do with the religion.

God has not created any nation, East nor West, Muslim nor Christian, Buddhist nor Hindu nor Sikh, nor any other religion. God has created only one humanity. (Sant Thakar Singh, 2005)

More than ever nowadays we must be aware that all people are of the same humanity. More than ever we need to include contents of spirituality within the education system. Only this may be called a holistic approach.

Mind and intellect are only meant to understand something of this way of destruction of this world, in which we are to be ruined. The human being is very, very powerful. If there is a higher power than the existence of God it is the human being. But the human beings' powers need to be directed in some direction so that they all help each other, so that no-one is to disturb anyone else and so that they may all be very useful and happy. But it is very hard, because everyone has his/her own mind, his/her own thinking, his/her own likings, his/her own disliking, and they generally collide with each other, strike against each other. This is the criterion of life in this world. Everyone is independent. And everyone thinks: "I am right, I am true. All others are false. All others know nothing. I know the best. And my will should be done. What I say should be done. Everyone should accept my authority. Everybody should consider me to be a great, wise one, a controlling one; all should be subordinated to me. I should be the ruler of everybody." So we cannot live without the help of each other and also we cannot accommodate each other. This is the great difficulty that has been in this world and will still be there. (Sant Thakar Singh, 2006)

Precisely because of man power control it is very important to speak up about spiritual topics with students and educate them to be specialists who are skilled in handling power and influence in their professional activities.

"Step into the wide open cosmos and start a new way of life. Lose yourself in the love of God and become enchanted with him. There is only one purpose in life. Once you absorb yourself





in his love you will have no reason to leave his lap. The truth is within, not outside.” *Sant Baljit Singh*

The law of karma is a law of action and reaction. All the actions we commit – feeding a hungry person, taking a life, eating apple, gossiping, praying, having prideful thoughts, are like seeds that we are sowing. Once sown, the seed will bring a harvest yielding similar seeds. The reactions (the harvest) that come must be allowed to have their effect on us in order to clear our karmic debts and free us to progress to higher states of existence.

Called karma or others, we all are witnesses of nature’s reactions to human actions. Are we really too proud, too egoistic, too blinded by power to admit our mistakes and to start to live in connection with God?

Real Masters never charge for their services, nor do they accept payment neither in any form nor in any sort of material benefits for their instructions. This is a universal law among Masters, and yet amazingly, it is a fact that thousands of eager seekers in America and elsewhere, go on paying large amounts of money for "spiritual instruction." Masters are always self-sustaining and are never supported by their students or by public charity. (Johnson, 1985)

### **Ranking universities – who is the best? What is the measure?**

When ranking universities we usually use the Western model of development. The dominant Western model of development is unsustainable and we need to find other development paths towards sustainable well-being. Most measures of national progress are actually just measures of economic activity. It seems that when ranking sustainable universities we need a much more appropriate model.

Universitas Indonesia initiated UI GreenMetric World University Ranking, based on information provided by universities around the world on criteria that demonstrate commitment to going green and sustainability, such as space, energy efficiency, water use, and transport and so on.

The leading global measure of sustainable well-being is The Happy Planet Index (HPI). The HPI measures what matters: the extent to which countries deliver long, happy, sustainable lives for the people who live in them. This Index uses global data on life expectancy, experienced well-being, and Ecological Footprint to calculate this. The index is an efficiency measure; it ranks countries on how many long and happy lives they produce per unit of environmental input.

Rebeka Lukman and co-authors introduced a model that enables a comparison between universities regarding research, educational, and environmental performances; the mission of a university fits the sustainability idea. The purpose was to improve the methodology and indicators of the existing ranking tables. Their three-dimensional index was developed that provides simplified information about the qualities of universities. It enables quick detection of the weaknesses, strengths, and opportunities for universities. The weights of the indicators are determined using the analytic hierarchy process. The results of the mentioned process



have shown that the most important are the research-oriented indicators, followed by the social and environmental ones. (Lukman et al, 2010)

### **Motivation – inspiration – useful knowledge**

The desire and motivation of the students to organise themselves within healthy and self-sufficient life, forces them to be creative. Experiential education of the individual is very important. With experiences and new knowledge students develop creative solutions. With the help of experimental work students can come to new useful knowledge, which can be transferred to their living environment.

Linking experience and achieving new knowledge with experiential learning encourage people to engage in creative thinking, in particular if the new knowledge can be transferred to their home environments and with that they can improve their living environments. Living within a healthy environment, where they can achieve a natural balance and the functions of ecosystem functions and services is motivating for everyone.

Students in the natural classroom learn about these possibilities, how they can by themselves provide such an environment by preserving natural resources and producing healthy food. Eco-remediation and permaculture allow this. These are natural approaches that can affect every single person even with minimal financial resources, and have big effects. This self-independence regulation of a healthy environment raises motivation for learning and practical work. Outdoor and experiential education is happening in the classroom regarding nature. There learners learn from concrete examples. They do some tests on them and experiments. With this they learn by themselves and come alone to new skills that can be transferred to their home environments. With this experiential and experimental work they also learn to be critical and responsible at the same time. Experiential education is based on experiments and experience. It also encourages teamwork, where learners are trained how to work within a team and they can realize that a group can do more than an individual. Self-learning in the classroom in nature, which is happening at different places within different environmental or social problems, is guided and so the learners have the opportunity to learn new skills by themselves through their own work (experiment, test). In this way learners can achieve some skills for life and can see that this knowledge is useful. So they have the possibilities to transfer this knowledge and skills to their environment. (Innovation practice nr. 13 – Learning regions in Slovenia with polygons regarding nature)

Innovation in the teaching of SD would allow the younger generation to stay open-minded and to use this open-mindedness to research their environment and just to tutor them to reach their own (requisitely) holistic points of view. It seems to be a reasonable way of teaching this younger generation how to acquire useful knowledge and also about things that we, their teachers, don't understand, and thus to let them teach us. This seems to be the most important innovation in the teaching of SD, especially in life sciences. The time that teachers at the Universities spend with their students is the most appropriate time for realising such innovations. The best thing about innovation is that an innovation is something new and beneficial. Something that you didn't realize yesterday but has today become an innovative practice and you must be aware that this means that tomorrow will also be the time for new innovative practices. This is the nature - the wheel of changes. We must not be afraid of changes.



## It is important today to understand scarcity?

Nature is durable, sensitive, tolerant, and unpredictable.

Ecological scarcity is an all-embracing concept that encompasses all the various limits to growth and the costs attached to continued growth. It includes not only the Malthusian scarcity of food but also impending shortages of mineral resources, bio-spheric or eco-systemic limitations on human activities, and limits the human capacity for using technology to expand resource supplies ahead of exponentially increasing demands.

Environmental scarcity refers only to non-renewable resources.

Paradox: in an affluent society people complain about scarcity the most.

We are faced with the tyranny of materialism. There is a dictatorship of consumerism.

Innovations within teaching are needed that provide participants with knowledge that could change their lives. This is urgent for the preparation of students for the future.

## Future laws and regulations

As a society we certainly need laws and regulations to work properly.

There are two types of laws: physical and human laws.

To further extend our mind-set the next 12 laws may serve as a basis and chance to think about it: (from the lecture of Alicia Valero Delgado, University of Zaragoza, Spain)

1 <sup>st</sup>	law	the law of entropy (energy is not lost but degraded)
2 <sup>nd</sup>	law	the law of intelligent control maintaining the quality required with the total irreversibility as low as possible
3 <sup>rd</sup>	law	the law of Zidane (if one player plays badly it harms the whole team)
4 <sup>th</sup>	law	the R law: recover, reuse, recycle, and recognise (eco-design)
5 <sup>th</sup>	law	the law of supply and demand (storing energy is inefficient, expensive)
6 <sup>th</sup>	law	Aristotle's law (every system is a part of a bigger system)
7 <sup>th</sup>	law	Nature does not produce waste (biomimicis – mimics nature)
8 <sup>th</sup>	law	the Notarys law (the most we pay for the services of people, the less for the services provided to nature)
9 <sup>th</sup>	law	the law of the Eleph-Ant (Efficiency + Robustness = Eleph – Ant)



10<sup>th</sup> law Efficacy is Efficiency (time is unnatural limitation)

11<sup>th</sup> law the law of dematerialisation (less material, less water, less energy and a longer lifetime = better product). Simplify: small is beautiful.

12<sup>th</sup> law the law of replacement

If you respect nature, it will work for you. We can't trick nature.

We need green, generative, political – researching high schools and universities for the makeover of economy and society.

Exiting from the existing situation is impossible by revolution, but not by evolution!

We must take care that our students become leaders and intellectuals, who can see the light, not the twilight, or even the darkness. The twilight or the darkness doesn't exist. It is only the lack or the absence of light. Nowadays crisis is such twilight.

### **The teacher's mind-set is a key to the education of SD**

The problem is not what we see in front of us. The problem is not the strategies of teaching on paper. The problem is not the money. The problem is always within us! We need solutions, not the mentioned problems!

The perception of social challenges is needed such as sustainable transformation that encourages partnership, and engagement in situations.

The UNESCO-UNEP International Environmental Education Programme described the preparation of teachers as the 'priority of priorities'. This paper also suggests that the teacher's mind-set is a key to ESD.

We need new teaching methods that make students proactive with many questions, aspirations, and consciousness. We must introduce new methods and tools of social technology that permit learning for raising future aspirations.

In spite of a number of SD initiatives and an increasing number of universities having become engaged in SD, most HEIs continue to be traditional, and rely upon Newtonian and Cartesian reductionist and mechanistic paradigms. As a result many universities are still lagging behind companies in helping societies become more sustainable. Lozano and co-authors analysed the texts of eleven declarations, charters, and partnerships developed for HEIs, which could be considered to represent university leaders' intentions for helping to improve the effectiveness of ESD. The analysis was done against two sets of criteria: (1) the university system, including curricula, research, physical plant operations, outreach and engagement with stakeholders, and assessment and reporting; and (2) the texts' complexity, number of bullet points, and number of words. The analysis was done continuously; whenever a new element was found in a text it was added to the university system (first criteria set) and applied to the analyses of the other texts. In this way, the system was augmented with the following elements: collaborating with other



universities; fostering transdisciplinarity; making SD an integral part of the institutional framework; creating on-campus life experiences; and ‘Educating-the-Educators’. The authors of the paper proposed that for universities to become sustainability leaders and change drivers, they must ensure that the needs of present and future generations are better understood and built upon, so that professionals who are well versed in SD can effectively educate students of ‘all ages’ to help make the transition to ‘sustainable societal patterns’. In order to do so, university leaders and staff must be empowered to catalyse and implement new paradigms, and ensure that SD is the ‘Golden Thread’ throughout the entire university system. (Lozano et al, 2013)

## Social responsibility

A good decade ago, the United Nations (UN), various entrepreneurs’ associations and other stakeholders decided that society must discover new ways of overcoming the socio-economic crisis – by means of social responsibility (SR) and by building a sustainable present and future. A series of documents on SR was followed by ISO 26000, which was adopted in November 2010.

ISO 26000 incorporates environmental protection as one of the seven core subjects, ensuring that socially responsible behaviour leads to SD. It is no coincidence that all seven core subjects are linked by interdependence and a (requisitely) holistic approach. The current crisis is a result of ignoring these two principles. Human survival depends on them, and neither governments nor the market would be able to replace them.

In 2005, the decade of education for SD began under the auspices of UNESCO. Such an orientation requires new teaching methods, provides new opportunities for addressing social challenges, and promotes practical applications of SD. For this reason, leading European politicians prompted the discussion on promoting sustainability education (Glavič and Lukman 2006). The integration of SD into the European higher education area was also encouraged by the Bologna Process and the statement from the 2005 Bergen Ministerial Conference: “Our contribution to achieving education for all should be based on the principle of SD and be in accordance with the ongoing international work on developing guidelines for the quality provision of cross-border higher education. The 2009 Communiqué of the Conference of European Ministers Responsible for Higher Education, which took place in Leuven, states “We call upon European higher education institutions to further internationalise their activities and to engage in global collaboration for SD” (The Bologna process 2020).

The usual enterprises tend to be governed by specialists of single professions, whose education for interdisciplinary creative cooperation is very rare, rather than by persons with knowledge of systems theory. Ludwig von Bertalanffy (1979: VII) explicitly stated that he had created his General Systems Theory against over-specialization, i.e. to support interdisciplinary creative cooperation as the best way toward the necessary holism of approach and wholeness of outcomes of human activity. But he did not support his intention methodologically a lot. Mulej did it with his Dialectical Systems Theory (DST). Narrow specialization is still necessary, but equally so is the other specialists’ capacity: cooperation helps humans prevent oversights and resulting failures, because it enables more holistic thinking/behaviour. The role of the narrow specializations is so strong that people hardly see that holistic thinking/behaviour – enabled by interdisciplinary creative cooperation, backed by (ethics of) interdependence – makes specialization of any profession much more beneficial than any operation inside a specialization alone. Nobody, whatever their profession, can live well without co-operation with people of other professions. De Bono’s ‘6 Thinking Hats’ support it, so does DST from the same period of time. Both of them



have been fruitfully applied all four decades since. A new support was recently offered: social responsibility (SR) with its all-linking concepts of (1) interdependence and (2) holistic approach is close to DST and (liberal rather than neo-liberal) economics, as authors understand the essence of the recently published ISO 26000 on social responsibility and European Union's (2011) support to it. Here, the authors aim to address use of DST (via SR) in solving the current crisis; owners, managers and staff are supposed to be interested in social responsibility as a source of their benefit, but need knowledge and values to work on implementation of SR, perhaps with a specialized professional team support. Government and other influential entities should support them with the model suggested here. The suggested findings should help humans find their way out from the current crisis, but in synergy; this crisis results from obsolete management and governance style, in which the (dialectical) systemic behaviour/thinking is neglected. (Ženko et al, 2013)

Universities are unique institutions with both direct and indirect impacts on the local and national environments, graduates, and their future decisions. The European Union adopted a similar attitude towards SR.

When transforming our Universities into sustainable and socially responsible institutions, all four dimensions of SD (environmental, economic, social, and ethical), all seven principles (accountability, transparency, ethical behaviour, respect for stakeholders, rule of law, international norms, and human rights) and core subjects of social responsibility (organisational management, human rights, labour practices, environment, consumer issues, fair operating practices, community involvement and development) as well as both related terms (interdependence and holistic approach) addressed in ISO 26000, will be taken into account.

A new model of a sustainable and socially responsible university would contribute to a deeper understanding of the interaction between the environmental, economic, social and ethical dimensions of SD. It would have an important impact on public, private, governmental, non-governmental and industrial organizations, by encouraging them to implement these principles, develop synergies between the universities and the local communities and to comprehensively integrate SD into their day-to-day operations (through a (requisitely) holistic approach and the ethics of interdependence). Thus, organisations would be able to generate savings, protect the environment, improve the quality of life and promote wellbeing.

The transformation of a University according to the principles of SD and SR is a non-technological process requiring invention, innovation, and diffusion. All types of behaviour leading to the discovery of new knowledge and the modernisation of values/culture/ethics/norms (VCEN) would be activated by linking educational activities, teaching, scientific research, various programmes and related activities, as well as examples of good practice.

Universities have an enormous impact on knowledge discovery and transfer as well as on promotion of VCEN, thus contributing to the development of society – be it positive or negative, productive or disastrous, comprehensive or limited. Due to their specific characters, they also promote knowledge and know-how transfer and thus contribute to SD and SR.

It takes about 70 years or two generations for new VCEN to replace the previously prevailing ones. Signs of a visible change of VCEN have the form of crisis that means a break, troubles, and opportunities. From the 3-part world-wide crisis of 1914-1945, consisting of two world wars and the big recession between them, until the current (seemingly) only financial,



economic, and (really) also environmental and social crisis a 2-generations cycle has passed (Mulej, 2000).

SD, especially concerning the economic life, should be in line with nature and natural processes. Unfortunately, development in the 19th and 20th century was everything but that. SD and SR emphasises the importance of responsible and nature-friendly economic development that meets the needs of the present without compromising the ability of future generations to meet their own needs. In addition, such development implies maintaining and improving living conditions, maintaining vitality and preserving ecological diversity.

“Stop hating your children and grandchildren!” *Matjaž Mulej*

The public data about the crisis do not show the essence of the problem, but its visible consequences only. The problem did not grow on a tree; it results from human behaviour that lacks SR for humans to be less selfish for selfish reasons, i.e., less short-term and narrowly oriented in their behaviour so far – in order for the current human civilization to survive. The Planet Earth can live without humans, but humans cannot live without a healthy Planet Earth and hence without a healthy economy. (Mulej, 2010)

Sustainability and social responsibility incorporate economic, social and environmental goals, and require institutional, organisational and financial changes that occur under the influence of existing values/VCEN. Since universities play a key role along the path to SD and SR, their responsibilities and tasks must be precisely defined. This transition requires modified thought patterns, new values/VCEN, radical changes in politics, technologies, and management, new forms of cooperation, and especially new knowledge. SR as defined in ISO 26000, together with the principles of SD, represents the basis for sustainable and socially responsible behaviour. (Glavič et al, 2013)

### **The fourth pillar of SD: a convergence of perspectives**

There is a significantly growing concern that the three-pillar model of sustainability, consisting of environmental, economic, and social dimensions, may be overlooking something of fundamental importance. There have been several attempts to define this missing dimension as a fourth pillar of sustainability, but it has been variously described as a cultural-aesthetic, political-institutional, or religious-spiritual dimension.

Different approaches to this vital but missing pillar find common ground within the area of ethical values. Values and aspects based on them are tangible and measurable with indicators.

A well-established framing of the fourth pillar of sustainability is the cultural-aesthetic one. UNESCO has been active in promoting the cultural perspective, and many of its publications since the 1990s have highlighted the central role of culture (i.e. VCEN) in sustainability — either as a self-standing pillar of SD (UNESCO, 2013) or as a foundation underlying the other three pillars (De Leo, 2012). This has been particularly significant within the context of ESD, where the cultural pillar has a strong focus on acknowledging and respecting diverse worldviews, identities and local languages, and promoting open dialogue and debate. A cultural-aesthetic perspective can also be found amongst indigenous communities and their



advocates, including the UN Food and Agriculture Organization (FAO), who frame the missing pillar debate in terms of cultural integrity. This term is used to encompass shared values, beliefs and knowledge, as well as more tangible manifestations of culture such as ceremonies and objects. (Woodley et al, 2006; Nurse, 2006) Within this context, the United Nations Permanent Forum on Indigenous Issues (UN-PFII, 2013) has acknowledged the need for culturally appropriate indicators of well-being and sustainability that reflect true indigenous perspectives such as portraying approaches grounded in wholeness [sic] and unique values. These Indigenous understandings of well-being and sustainability may be rooted in epistemologies that are very different from those of mainstream sustainability discourses (Barkin and Lemus, 2012).

The concept of a political-institutional fourth pillar is also widely known. Institutional aspects of sustainability were explicitly addressed within the indicator system developed by the Commission on Sustainable Development (CSD) in 1995 to assess implementation of Agenda 21 (Pfahl, 2005; Spangenberg, 2002a and 2002b) as well as being the subject of a dedicated chapter in the Brundtland report, *Our Common Future* (World Commission on environment and development 1987). Institutions are the result of interpersonal processes, such as communication and cooperation, resulting in information and systems of rules governing the interaction of members of a society. The development of institutional sustainability indicators is rooted in an understanding of institutions which includes, but is not limited to, organisations: it also encompasses two other categories, namely institutional orientations (norms) and institutional mechanisms (formal systems of rules and procedures, whether administrative, social, political or legal) (Spangenberg, 2002a and 2002b). Beyond the initial Agenda 21 context, the use of the institutional dimension as a fourth pillar of sustainability has gained widespread acceptance within the European Commission and the United Nations. The United Nations Division for Sustainable Development also incorporates institutional indicators into its framework of SD indicators (UN Division for SD 1995, 1996 and 2000).

Religious-spiritual is a third, and much lesser-known, perspective on the missing pillar/dimension of sustainability, rooted in the concept of an awakening global ethical and spiritual consciousness that underpins sustainability transitions. (Clugston, 2011; ECI secretariat, 2010; Hedlund-de Witt, 2011)

In his keynote address at the 2010 Earth Charter conference *An Ethical Framework for a Sustainable World*, Steven Rockefeller described this emerging consciousness as “in truth the first pillar of a sustainable way of life”, on the grounds that ethical vision and moral courage are essential for generating the political will required for transitions to sustainability (Clugston, 2011). A similar sentiment is expressed through a slightly different metaphor in the *Inter-religious Statement to Rio + 20*, developed by religious and spiritual leaders from diverse traditions, which describes ethical/spiritual consciousness as “the foundation of the other three pillars” (Southern African Faith Communities Environment Institute, 2012).

The fourth pillar of sustainability/sustainable development can no longer be ignored on the grounds of intangibility. Different approaches to this vital but missing pillar (cultural-aesthetic, religious-spiritual, and political-institutional) find common ground in the area of ethical values. Values and aspects based on them are widely assumed to be intangible and immeasurable, but it is possible to operationalise them in terms of measurable indicators when they are inter-subjectively conceptualised within clearly defined practical contexts. These processes require contextual localisation of items, which can nonetheless fit into a generalizable framework. This allows for useful measurements, and removes barriers to





studying, tracking, comparing, evaluating and correlating values-related dimensions of sustainability. It is advocated that those involved in operationalising sustainability (especially within the context of creating post-2015 SD goals), should explore the potential for developing indicators to capture some of its less tangible aspects, especially those concerned with ethical values. (Burford et al, 2013)

It is theoretically and practically possible to assess processes and outcomes relating to the less tangible dimensions, consisting of human values, ethics and worldviews, which conceptualise the fourth pillar of sustainability. Institutions tasked with developing Sustainable Development Goals, targets and indicators should take time, especially at this critical juncture, to reframe the sustainability assessment process and incorporate an explicit acknowledgement of its ethical dimensions.

**Human values, ethics and worldviews – the basic and most important innovation in teaching of SD nowadays!**



## 3. SELECTION OF INNOVATIVE PRACTICES

### 3.1 Definition of innovative practices

This study carried out in Work Package 6 (WP6) “Innovative Practices” focused on Innovative Practices in education for Sustainable Development in Higher Education (HESD).

The topic of HESD is considered in a broader sense, on the one hand by considering the characterisation of the political and institutional framework, and on the other hand by describing the formal and informal learning experiences within HE Institutions. In the opinion of the authors, to maximise the effectiveness of HESD one must take into account all of these elements.

#### **Definition of Innovative Practices: innovation within the teaching of sustainable development in the life sciences**

Innovation within the teaching of sustainable development in the life sciences involves the creative process of combining up-to-date teaching methods, tools, and technologies recognising the opportunities and constraints inherent in the particular situation where learning is taking place in order to create new benefit for its users.

These methods are likely to include problem-based learning, teacher/experts as facilitators of learning, and to demonstrate the effective and efficient usages of all available resources, encouragement of critical thinking skills, and a focus on unleashing the creativities and talents of all learners and the teachers themselves, leading to the development of entirely new instructional content, tools, methods.

Intentional target audiences for programs typically include students, faculties, university administration, private sector enterprises, and civil society, either individually or in combination. The end results of these endeavours are to foster the principles and practices that result in changes in knowledge, attitudes, and behaviour that ultimately lead to progress in sustainable development principles and practices.

### 3.2 The extraction of Good Practices Compendium

Innovative practices were selected by extraction of them from the Good Practices Compendium, which was an outcome a previous work package within the ISLE project, WP3. A specific working group of project partners had worked on selecting of the existing innovative practices as represented in the Good Practices Compendium. All the different diagnostics collected in WP5 were analysed.

Finally 14 innovation practices were selected from 12 European countries: two examples of innovative practices from France and Portugal and one each from the Netherlands, Italy, Germany, Sweden, Bulgaria, Austria, Czech Republic, Estonia, Poland, and Slovenia.



The selected innovative practices were:

1. Green Pedagogy, Austria
2. Sunny Garden, Bulgaria
3. Czech University of Life Sciences Prague, Czech Republic
4. Talveakadeemia (Winter Academy), Estonia
5. Specific universities policies about SD, France
6. Tutored Project, France
7. E-Learning Academic Network (ELAN III), Germany
8. Master GESLOPAN, Italy
9. Fair Trade Management, Netherlands
10. Master of Science in agriculture, Poland
11. Botanical Gardens, Special places to involve special people, Portugal
12. “De Sol a Sol” – a sustainable day, Portugal
13. Learning regions in Slovenia with polygons in nature, Slovenia
14. Management of pests diseases and weeds, Sweden

We involved the following four cases of innovative practices separately in the selection, as they were not included within the Good Practices Compendium:

15. Green Academy, Bulgaria
16. Practical Questionnaire, Bulgaria
17. Practices MON BG – National project of BG Government, Bulgaria
18. Agro-environmental chemistry – a (requisitely) holistic view, Slovenia

### **3.3 Descriptions of the selected innovative practices**

The areas of interest amongst the selected innovative practices were mainly teaching, practical experience, and institutional activities (Table 1). Their main characteristics are shown in Table 2.



**Table 1: The list of selected Innovative Practices by Country and Area of interest**

TITLE	COUNTRY	TEACHING	INSTITUTIONAL ACTIVITIES	NATIONAL POLICIES	PRACTICAL EXPERIENCES
Green Pedagogy	AUSTRIA	X			
Sunny Garden	BULGARIA				X
Czech University of Life Sciences Prague	CZECH REP.	X	X		
Talveakadeemia (Winter Academy)	ESTONIA	X			
Specific universities policies about SD	FRANCE		X		
Tutored Project	FRANCE	X			
E-Learning Academic Network (ELAN III)	GERMANY	X			
Master GESLOPAN	ITALY	X			
Fair Trade Management	NETHERLANDS	X			X
Master of Science in Agriculture	POLAND	X	X		
Botanical Gardens, Special Places to Involve Special People	PORTUGAL		X		X
« De Sol a Sol? – a sustainable day	PORTUGAL				X
Learning regions in Slovenia with polygons in nature	SLOVENIA				X
Management of pests diseases and weeds	SWEDEN	X			
Green Academy	BULGARIA	X	X		
Practical Questionnaire	BULGARIA	X			X
Practices MON BG – National project of BG Government	BULGARIA			X	
Agro-environmental chemistry – a (requisitely) holistic view	SLOVENIA	X			

**Table 2: Main characteristics of the selected Innovative Practices**

TITLE	COUNTRY	LEVEL OF IMPLEMENTATION	LEADING ORGANISATION	MAIN TOPIC
Green Pedagogy	AT	International	University	Environmental Pedagogy
Sunny Garden	BG	National	University Farm	Organic Agriculture
Czech University of Life Sciences Prague	CZ	All	University	Research & Teaching
Talveakadeemia (Winter Academy)	EE	National	NGO	Conference on SD
Specific universities policies about SD	FR	Regional	University	Sustainability Strategy
Tutored Project	FR	Regional	University	Student training
E-Learning Academic Network (ELAN III)	DE	Regional	University	E-learning on SD
Master GESLOPAN	IT	National	University	Protected areas
Fair Trade Management	NL	Local	University	Agriculture
Master of Science in Agriculture	PL	International	University	Study programs Agroecology
Botanical Gardens, Special Places to Involve Special People	PT	National	University	Social Environmental Management
"De Sol a Sol" - a sustainable day	PT	Local	Students association	Cultural event
Learning regions in Slovenia with polygons in nature	SLO	National	University	Environmental Pedagogy
Management of pests diseases and weeds	SE	International	University	Teaching (Agriculture)
Green Academy	BG	National	University	Environmental Pedagogy
Practical Questionnaire	BG	National	University	Agriculture
Practices MON BG – National project of BG Government	BG	National	Government	Agriculture
Agro-environmental chemistry – a (requisitely) holistic view	SLO	International	University	Sustainable Pedagogy



### **3.4 The process of selecting the Innovative Practices**

The process of evaluating and selecting the Innovation Practices was defined during the 6<sup>th</sup> ISLE meeting that was held in March 2013 in Maribor, and was completed during the following ISLE meeting in Varna (June 2013).

The main criteria for selection was innovation: an activity can be innovative in the contents (innovative topics), in the methods (innovative ways in delivering educational processes, use of new technologies), or in building the institutional framework towards ESD.

The 45 collected Good Practices represented in the Compendium of Good Practices were discussed in the working group during the first WP6 workshop ‘Innovative Practices’ in Maribor. Referees were selected for analysing and voting on the proposed Innovative Practices. After this process of extraction of the Compendium of Good Practices, the innovative practices were selected by the referees.

The selection proposed by the referees was discussed amongst WP6 participants and the final selection of the Innovative Practices to include within the Compendium of Innovation Practices was defined. The selection was made by taking into account: innovation in teaching methods, social and economic impact, transferability, wide networking, sustainable results, opportunities for further expansion of the activity, e-learning possibility...

Finally 18 innovation practices were selected, belonging primarily to the area of teaching”.



## 4. INNOVATIVE PRACTICES WORKSHOP

Innovative Practices Workshops were held during the last two ISLE meetings in Maribor, Slovenia, and Balchik (near Varna), Bulgaria.

The Open-space moderating tool was used for the implementations of both events. The leader of both WP6 workshops was put in a position where he did not want to give guidance for further work, but rather led by trying to motivate a group to take over the reins of creative content creation in their own hands. It turned out that this was a great decision.

### 4.1. 1<sup>st</sup> Innovative Practices workshop (Maribor, March 2013)

Participants of the first section discussed a reasonable construction for a questionnaire. The results from this part of the Workshop Innovative Practices are condensed within the next table:

	Innovation Target group	Innovation Content	Learning outcomes	Tools	Resources/critical success factors
<b>Interdisciplinarity</b>	Students of Uni LS Bachelor + master	Global problem	Objectives: To be able to understand	You tube videos	»light« = fun to do
<b>Provocative</b>	2 students LS 2 students of other faculty  1	Interdisciplinary	To develop/propose solution to complex/global problem	Social media specially ISLE tools	Green
<b>Proactive</b>	Students LS + high school/primary education  2	Hot topics Real life problem +problem owner-s Human activities (people planet profit)	Learn how to work in an interdisciplinary team		Provocative (I have to join this game)
	Lifelong learning	Impact of human activities (to get the special attention)	Become aware of what you individually, socially, politically would give up for SD for all		Interaction with civil society
	Intentional/unintentional primary/secondary target groups 3		Know social change development works		Direct/indirect target groups
			Are able to invite others to change SD Behaviour		
			Know how to use social media network Facebook for change to SD behaviour		
			Have a working knowledge of SD issues		



Section two participants of 1<sup>st</sup> Innovation Practices workshop defined the focal point innovation in the teaching of SD in life sciences in Europe, described previously in Chapter 3.1.

#### 4.2. 2<sup>nd</sup> Innovation Practices Workshop (WP6) - Section 1 (June 2013, Varna, Bulgaria)

The results of an excellent discussion between the participants of the first section of the second Innovative Practices Workshop are condensed in the next table:

Descriptors	Content	Tools	Method	Outcomes
<b>Indicators</b>				
<b>New technologies</b>	Using modern technologies, suitable on the level of the education and the location	I phone, I pad, video, e - library	Stimulation of the interactivity of the learner and teaching staff, to choose the applicable idea	Lifelong learning generation by using suitable new technologies
<b>Holistic approach</b>	Capacity of disciplines to transcend their traditional boundaries Consultative approach interdisciplinary	Study visits, interdisciplinary seminars, workshops, group works	Problem based learning with actual solutions.	Capacity of disciplines to transcend their traditional boundaries Consultative approach interdisciplinary
<b>Collaboration</b>	Participants and lecturers discussed about the topic inside their group, they established a creative atmosphere	(respect each other, listening to others, participation to the discussion) Training of participants and teachers inside group works	Experience and outreach how to do something together Personal skill of the moderator to find a solution.	Discussion for acceptable and reliable topics. Consultative team learning to find easy and innovative solutions and to create synergetic effects
<b>Critical thinking</b>	The capacity to develop the problem looking for better solutions	The analysis of the critical point of the processed subject. The analysis of the case studies. Simulations and analysis of different scenarios	Through sustaining controversial discussion and irritations. Evaluation of analysis results	Participants present and represent individual ways of thinking
<b>Project base learning</b>	Participants from different disciplines work together in areas concerning the 4 pillars of ESD (ethics, society, ecology and economy)	Simulation games, case studies.	Evaluation of the results. Project working.	Adaptation of results and solutions
<b>Creativity</b>	The capacity to solve the problem in an innovative way. Mediating diverse opinions of all participants from different cultures and disciplines	Workshops, seminars, simulating games	Brainstorming, open space method	Participants present a new design to transfer the knowledge in unfamiliar situation
<b>Network building capacity</b>	Building contacts in a self-responsible way and estimating the importance of stakeholders	Internships and collaborations with civil society, NGO's and governmental institutions in local and global level	Informal learning, practical activities	Participants develop management skills and cooperative competencies
<b>Internationalization</b>	Ethical relationship with international	International exchanges, Video	Organizing international events.	Participants exchange experiences and best



	partners	conferencing or articles, proceedings, seminars, practical activities	Exchanging and joining programs. Using Alumni capacities.	practice results
<b>Interdisciplinarity</b>	To analyse, synthesizes and harmonize links among disciplines into a coordinated and coherent whole	Team-lectures	Team teaching, common design of programs and lectures	Participants are capable of presenting complex information and arguing controversial issues
<b>Motivation aspects</b>	Learning arrangements are designed to arouse curiosity and concern	Seminars, video challenges' as enterprise creation, projects elaboration, fundraising	Analysing authentic cases and models from real life - PBL, opinions pro and contra, students submit their opinions	Participants show interest in dealing flexibly with new challenges, ideas to increasing employment and self-employment
<b>Transferability</b>	Participants filter out appropriate variables in complex tasks of their work field and can use them in their environment	Can be applied in other countries	Applying knowledge and skills independently	Skills and competences concerning various subject matters are used for new problems
<b>Innovation activities (present)</b>	PBL, the network building capacity, interdisciplinarity, innovative pedagogical learning arrangements	Common events	Reflection of learning with various methods	Participants evaluate their personal and vocational development

### 4.3. 2<sup>nd</sup> Innovative Practices Workshop WP6 - Section 2 (June 2013, Varna, Bulgaria)

The participants of the second section of the Innovative Practices Workshop discussed motivation and inspiration topics. Their report was presented to all ISLE partners. Reporter was Jaromir Nemeč (CULS, Czech Republic).

#### Subjects for discussions:

1. How to motivate students to make a video or other cultural presentations
2. How to inspire students for securing funds for innovative practice

#### 4.3.1. How to motivate students to make a video or other presentation

1. Demotivation is a negative symptom that has been manifesting more over recent years. Thus, the motivation of students is a priority. Including a video or other cultural presentation in the course curricula on sustainable development is a good option.
2. If the subject of the video is connected to the experiences of the students (how to be sustainable, how to live a sustainable lifestyle), it is very good.
3. Motivation is related to the region. For example a university in Bratislava offers more international experience than in Nitra, and the students are more motivated to participate in mobility programmes.





4. Finding short themes is an option
5. Using Facebook/Twitter is very popular amongst students and should be used
6. Ecology has a similar meaning for students as does sustainability
7. A list of usable headings for promoting sustainability:
  - A safe and happy future for our children
  - Lifestyle
  - Live well and in accord with nature
  - Practical and responsible
  - Ecology
  - Greening – what else?
  - Live and let live
  - Green and let green
  - Only one planet
  - Save hard or die hard
  - Be cool - live sustainably
  - Don't be a coward – face the reality of climate change
  - Where will you be, without sustainability
8. We will be successful only when students / citizens become truly motivated from within.
9. Example is better than precept.
10. Start at the pre-elementary level.
11. Students could elaborate projects for the regional and/or local governments and then the governments could eventually commission a professional team of filmmakers to produce a video or a documentary.
12. Video conferencing is a good option and is an excellent option for preparing and implementing projects. Less travel = less CO<sub>2</sub> = more sustainability.
13. Always promote creativity.
14. Promote excellence.
15. Group initiative / pairing of students.
16. Local initiatives are very important.
17. Involving a student from a university media department (arts, film making, and documentary making) could be highly motivating for students who wish to produce a professional video.
18. Choosing a locally relevant theme – e.g. biodiversity, honey production, the problematic of monoculture – is very good.
19. We should assign students with a theme that is close to their life experiences.
20. Producers will welcome a student presentation – connect the need for solving a problem with professionals.
21. Motivating students' means giving them several options – more options make more possibilities for creativity.



22. Micro farming – student`s presentations about cultivation on their balcony or in their garden – is a motivating theme.
23. Teachers can learn from students – the attitude of students plays a key role in motivation.
24. Teachers as partners with students, and vice versa: this creates synergies and motivates all participants.

#### **4.3.2. How to inspire students to provide funds for innovative practice**

1. Practice by practice – cooperating with local authorities and getting the authorities to co-finance their project on innovative practice.
2. Local initiatives for the collecting of funds (fundraising):
  - Food for all (supported by London municipality) is a programme that distributes food to the needy. Vegetables and others are supplied free of charge by the vegetable market.
  - Communal soup project in Hungary – Stone soup.
  - Co-ops – barter – neighbour assistance – provide funds.
  - Local currency – blue francs in Hungary – community exchange value.
  - The Danish model of taxes: those who have fortunes can donate in part for useful social organisations/initiatives and do not have to pay high taxes on their fortunes.
  - The tax deduction for people who offer financial support to socially active or religious organisation is also implemented in other countries (e.g. 1% in Hungary).
  - Lobbying at the level of local /regional governments for support, assignments of funds from the budget.
3. Strengthening the popularity of funding the sustainable projects.
4. Producing values for the community is an example of good practice for potential donors.
5. Involving companies who are interested in investing in sustainable projects is crucial.
6. Identifying the needs of companies in the area of sustainable development is crucial.
7. Creating values over a long term makes companies more liable to donate towards sustainable projects is crucial.
8. Local “ecological fairs” endorsed by universities can raise funds for innovative projects.
9. Fundraising specialists must be approached for counselling and advise. Especially if ISLE is an association (in the case ISLE 2 that will not get financing from the EU), knowing how in the area of fundraising this is crucial for the financing of innovative projects.
10. Innovative projects can be financed directly by the users (e.g. local on-line information on weather forecasting in Greece).



11. Innovative projects must be sustainable in themselves in order to get support from external stakeholders
12. Contributing to the community must be demonstrated in practice.
13. Fundraising from university alumni (e.g. US Universities) is yet another untapped source for financing (fundraising).
14. Sometimes students can motivate their relatives, friends, and neighbours etc. to co-finance a project.
15. Local communities can contribute to fundraising by focusing on local innovative projects.
16. The public should be informed by the local media (press, TV, Radio) about innovative projects.
17. Nationwide media (press, TV, Radio) can also be informed; however this action should be endorsed by the university management.
18. Groups of universities can also become involved (clusters).
19. Crowd-funding.

**Authors:** all participants of the 1<sup>st</sup> and 2<sup>nd</sup> Innovation Practices Workshops.



## 5. QUESTIONNAIRE FORMS

Innovation on contents and pedagogical methods for SD within the teaching of life sciences was proposed by the setting-up and diffusion of a questionnaire to partner members and HEI's non-members of the ISLE consortium.

The team working on WP6 had carefully selected some innovative approaches from the case studies included in the Compendium of Good Practices in SD.

The following questionnaire was sent to selected partner members and HEIs non- members of the consortium. Addressed partners were kindly asked to modify their case studies with an accent on innovation by filling in the following grid.

### **WP6 Innovative motto: learning anytime, anywhere, anyplace**

Innovation is to be considered as a permanent process of beneficial renewal and adaptation.

<b>Indicators</b>	<b>Descriptors</b>	Content	Tools	Method	Outcomes
New technologies					
Holistic approach					
Collaboration					
Critical thinking					
Project base learning					
Creativity					
Network building capacity					
Internationalization					
Interdisciplinarity					
Motivation aspects					
Transferability					
Innovation activities (present)					

Author: Andreja Borec (University of Maribor, Faculty of Agriculture and Life Sciences, Slovenia)



## 6. VIDEO CHALLENGE FOR STUDENT GROUPS

The Facebook Video Challenge for student groups was planned to inspire students to be proactive in the area of good / innovative practices for the teaching of SD.

For the implementation of the video challenge, the following steps have been taken:

### Student group

- Maximum number of students per group: 4 students
- University BSc and MSc students

### Video

- Make a short video about the work of your student group: subject a good example of innovative sustainability good practice (related to lifestyle)
- Post the video on Facebook (FB) of ISLE
- Video length: 2 minutes
- Send a short description about the video and connected work
- Get your network to provide 'likes' to your video

The winning group of students would join the ISLE meeting in Varna and there they would give a short presentation about their work (15-20 minutes)

### Deadline

- 24th of May was the deadline for students to send the video or post on FB
- Judging of the videos before the 31st of May and the results announcement

### Judging the videos on

- Quality
- Is it about good / innovative practice?
- Sustainability (as lifestyle)?
- Number of Likes on FB



## Pripravi video posnetek z vsebino inovativne trajnostne prakse!

V okviru projekta **Erasmus I.S.L.E.** (inovacije v poučevanju trajnostnega razvoja na področju biosistemskih ved v Evropi) organiziramo nagradno tekmovanje za študente.

**4 študenti/šudentke**, ki bodo izdelali zmagovalni video posnetek bodo nagrajeni s potovanjem in udeležbo na

**7. srečanju partnerjev projekta I.S.L.E. v Bolgariji (Varna) med 10. in 15. 6. 2013**

Kriteriji za izbor video posnetka:

- inovativnost
- vsebina - trajnostni razvoj (gospodarski, socialni razvoj, varstvo okolja, etika) - primer dobre prakse
- kvaliteta posnetka
- število všečkov na Facebook-u

Zmagovalna ekipa študentov bo lahko sebe in svoje delo na omenjenem srečanju tudi predstavila (30 minut)



Univerza v Mariboru

Fakulteta za kmetijstvo in  
biosistemske vede

I.S.L.E.



# BOLGARIJA

Posnemi video in  
potuj v Bolgarijo

v terminu

10. do 15.6.2013

Sodeluj!

Rok za oddajo video posnetka je  
**24.5.2013!**

Video posnetek pošljite na naslov  
[vesna.weingerl@um.si](mailto:vesna.weingerl@um.si)

ali objavite na spletni strani:  
<http://www.facebook.com/ISLENetwork?fref=ts>

**Figure 1:** Example of a Slovenian flyer for the video challenge

### WINNING GROUP:

Anne Walker, Oli Davenport and Dale Webb, students from Harper Adams University Colleague, Shropshire, UK. Their mentor was Leticia Chico Santamarta.

The winning video, entitled "Saving the world's finite resources through pee recycling" can be seen on the following link:

<http://www.youtube.com/watch?v=3sWGjZmgELo>



## 7. PRESENTATIONS OF THE INNOVATIVE PRACTICES

### 7.1. Green Pedagogy

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#### University College for Agrarian and Environmental Pedagogy, Vienna

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Environmental Pedagogy as a bachelor degree study was implemented in 2008 as a new, innovative and unique curriculum at the University College in addition to the existing curricula of agrarian pedagogy.

**Country** Austria

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**Description** Green Pedagogy is a concept for learning, teaching and advising for SD in the university colleague

Green Pedagogy is not static, not a strictly defined program or agenda. The field of Green Pedagogy is like a plantlet, growing, changing, bearing fruit, manifesting itself over and over again, adapting to conditions.

The key-components are motivation to learn, learning situations, development of competences and reflections.

It is implemented on the one hand in all study programs for training teachers and advisors and on the other hand in courses of further and continuing education. Green Pedagogy is one major focus in the educational research of the university college.

**Focus** Development of human skills, social equity, health and quality of life, cultural diversity, local engagement in sustainability, Green Care. Students learn to develop innovations under the three dimensions of Sustainability and to reflect the learning process.

Green Pedagogy is the developing of community in the form of cooperation and participation in all processes at the University college and in the field of practice. Green Pedagogy gives a set of values for a sustainable life.

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Descriptors Indicators	Content	Tools	Method	Outcomes
New technologies	Evaluation of various products (e.g. press, online-media, videos, advertising)	Blended learning	New media analysis and production of wikis, flyers, articles and blogs	Learners become critical and reflective users
Holistic approach	Learners understand the Interdependence of different systems	Seminars	Learners develop hypotheses and new visions	Multiple perspectives of given tasks
Collaboration	Learners and lecturers work in a participatory way	Excursions	Expert-discussions prove and show diverse opinions and concepts	Elaborate knowledge and opinions, they lead to co-construction
Critical thinking	Through sustaining controversial discussion and irritations	Case studies	Interactive video methods	Learners acknowledge the complexity of processes in education for SD
Project base learning	Students from different disciplines work together in areas concerning the three pillars of ESD (society, ecology, economy)	Practice	Simulation Game	Learners produce their results for the community, for citizens in rural contexts
Creativity	Mediating diverse opinions of all participants from different cultures and disciplines	Workshop of arts	Artwork Creative arts (drama, music, film)	Learners present new ideas for the design of learning results
Network building capacity	Building contacts in a self-responsible way and estimating the importance of stakeholders	Internships with NGO's and governmental institutions	Independent observation or practical trainings	Learners develop management skills and cooperative competencies
Internationalization	Exchange with international partners	International projects	Video conferencing or articles in international journals/proceedings	Learners exchange experiences and best practice results
Interdisciplinarity	Learning across the curriculum	Team-lectures	Team teaching, common design of programs and lectures	Learners are capable of presenting complex information and arguing controversial issues
Motivation aspects	Learning arrangements are designed to arouse curiosity and concern	Seminar	Analysing authentic cases and models from real life (case vignettes)	Learners show interest for dealing flexibly with new challenges
Transferability	Learners filter out appropriate variables in complex tasks of their work field	Internships	Applying knowledge and skills independently	Skills and competences concerning various subject matters are used for new problems
Innovation activities (present)	Current issues of agriculture, ecology, sociology, health are integrated in innovative pedagogical learning arrangements	Common events	Reflection of learning with various methods	Learners evaluate their personal and vocational development





## Further Information

### Website

[www.agrarumweltpaedagogik.ac.at](http://www.agrarumweltpaedagogik.ac.at)

### Contacts

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### Authors

Beate Kralicek and Angela Forstner-Ebhart



## 7.2 Sunny Garden

### Agricultural University – Plovdiv

The Agricultural University was established in 1945. It is the only specialised state university in Bulgaria in the area of agricultural and related sciences. The University provides training for the three academic degrees – BSc, MSc and PhD. The research activities are completed on the training-and-experimental fields, spreading on 185 ha.

The Agro-ecological Centre is a structural unit of the Agricultural University – Plovdiv. It was founded in 1989 with the aim of coordinating the efforts of researchers, students, farmers and consumers for the development of organic agriculture in Bulgaria. Since 1994 it has been functioning as a Demonstration Centre for organic farming. The Centre has facilities to train students, teachers, farmers, and agricultural specialists in the field of organic crop production.

With the close academic and research contacts kept with more than 100 universities from all over the world and the implemented educational and research international projects, the Agricultural University won its recognition as a higher educational institution open to the rich experiences of its partners.

**Country** Bulgaria

<b>Description</b>	<p>The aim of the “Sunny Garden” organic farm is to contribute to the ecological education of children and to give knowledge to school-age children of sustainable production, especially organic farming, as a sustainable way of life and for the preservation of the environment.</p> <p>“Sunny Garden” unites the efforts of university researchers, local authorities, regional educational inspectorates, teachers, non-governmental organizations, etc. for the ecological upbringings of younger schoolgirls and schoolboys and for the formation of ecological culture</p>
<b>Focus</b>	<p>Pollution; Conservation of Natural Resources; Biodiversity; Development of clean technology. Sustainable consumption; Urban and local development; CSR practices. Development of human capital and skills; Health and quality of life; Ecological upbringing of children. Agriculture and organic farming in particular; Children’s upbringing and ecological culture, Practical training of university students who acquire pedagogical experience and methods of teaching life sciences.</p>

Ecological education of children; practical training of university students; promoting organic farming, raising consumers’ awareness of food safety



Descriptors Indicators	Content	Tools	Method	Outcomes
New technologies	<ul style="list-style-type: none"> <li>- Primary school children learn how to produce safe food, to get hands-on experience on the experimental organic farm 'Sunny Garden;</li> <li>- University students teach the schoolgirls and boys, gaining pedagogical experience in their work with children.</li> </ul>	<ul style="list-style-type: none"> <li>- On-site practical training;</li> <li>- Group discussions;</li> <li>- Pedagogical approach of the students to children;</li> </ul>	<ul style="list-style-type: none"> <li>- Practical training;</li> <li>- Development of soft skills;</li> <li>- Working in groups;</li> <li>- Analytical thinking;</li> <li>- Decision making.</li> </ul>	Innovative approach to student training and to upbringing children to be more concerned about ...
Holistic approach	<p>"Sunny Garden" unites the efforts of university researchers, local authorities, regional educational inspectorates, teachers, non-governmental organizations, etc. for ecological upbringing of younger schoolgirls and schoolboys and for the formation of ecological culture.</p>			<ul style="list-style-type: none"> <li>- Students put their theoretical knowledge into practice;</li> <li>- Children get their first lessons in organic farming, ecology and love to land</li> </ul>
Collaboration	Between primary, basic and higher education institutions			
Critical thinking				
Project base learning				
Creativity	<p>Creativity and challenge to students and to children</p> <p>Children are happy to have young people (students) as their tutors – they are glad to copy the behaviour and experience.</p>			
Network building capacity				
Internationalization				
Transferability	The innovative approach to children upbringing could be transferred to other study practices;			Sustainable way of life and preservation of environment.

### Further Information

**Website:** <http://www.bioferma.org/>

**Publications:** [www.youtube.com/watch?v=m9ZFjKVIBtI](http://www.youtube.com/watch?v=m9ZFjKVIBtI)

**Author:** Hristina YANCHEVA, Agricultural University Plovdiv



### 7.3. Czech University of Life Sciences, Prague

#### Czech University of Life Sciences, Prague

##### Faculties:

- Agrobiology, Food and Natural Resources
- Economics and Management
- Environmental Sciences
- Forestry and Wood Sciences
- Engineering

##### Institutes:

- Tropics and Subtropics (the only educational and research institute of such kind in the Czech Republic)
- Education and Communication

CULS is situated on a spacious and modern campus in the north western outskirts of Prague, about 20 minutes from the city centre. In harmony with global trends, CULS is putting more and more emphasis on educating students in all crucial areas related to sustainability, i.e. sustainable use of natural resources, organic agriculture, safety and security in the food chain, protection of the biosphere, sustainable land and water management, sustainable rural development and economics (e.g. in the tropics and subtropics). We educate students in ecologically-sound waste management, environmentally friendly road vehicle management and alternative energy production (i.e. solar cell technology). We offer study programmes focusing on modern, up-to-date management of private and corporate, as well as state enterprises. Our university educates future leaders who will be mindful of the sustainable management of our planets' natural resources and of the related socio-economic and environmental issues.

#### Country Czech Republic

##### Description

- Study programmes focusing on sustainability
  - Basic and applied research in the area of sustainability
  - Communication and cooperation with relevant stakeholders from regional, national and international institutions (environmental agencies, NGOs) as well as with the industry (food industry, animal and plant production, rural tourism etc.)
  - Participation in relevant international programmes related to sustainability (e.g. ISLE programme within the framework of LLP ERASMUS)
  - Participating on National and International Boards and Commissions focusing on sustainability
- Cooperating within university networks, e.g. ICA (European Association



of Life Sciences Universities ([www.ica-europe.info](http://www.ica-europe.info)), ICA CASEE (ICA initiative for Central and South Eastern Europe)

<b>Focus</b>	<p>Waste management throughout the whole campus, innovations such as new rotation system for solar panels development, courses in organic farming and sustainable breeding methods in plant and animal sciences, education of sustainable development and organic farming in developing countries. Social metabolism (interactions between economic and environmental pillars) – a particular methodology for Material and energy flow accounting (MEFA) in rural areas.</p> <p>Health and quality of life; Ecological upbringing of children. Agriculture and organic farming in particular; Children’s upbringing and ecological culture, Practical training of university students who acquire pedagogical experience and methods of teaching life sciences.</p>
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Since 2000 CULS has been implementing a systematic policy of increasing subjects and courses focusing on sustainability. Furthermore, research and innovation in the area of sustainability has led to the development and implementation of several important international projects, e.g. Sustainable Palm Oil Production Plant in Indonesia, Sustainable Rural Projects in Angola, Sustainable Development Projects in Mongolia (in cooperation with the Czech Government Development Funds) etc. On campus sustainable projects include separation of waste and recycling at all Faculties (paper, plastic, PET, used batteries, organic waste), production of biomass at CULS Forestry Establishment and CULS Agriculture Farms, low energy constructions (new lecture halls) and encouraging students and staff to use public transport instead of private cars.

### Further Information

**Website:** [www.czu.cz](http://www.czu.cz)

#### Contacts:

- Contact person CULS International Relations Office - Jaromir Nemec, [nemecjaromir@rectorate.czu.cz](mailto:nemecjaromir@rectorate.czu.cz)
- Specialist in sustainable technology & environmental projects – David Herak, [herak@tf.czu.cz](mailto:herak@tf.czu.cz)
- Specialist in sustainable rural development – Michal Lostak, [lostak@pef.czu.cz](mailto:lostak@pef.czu.cz)
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**Author:** Jaromir Nemec, Head of International Relations Office



## 7.4. TalveAkadeemia (Winter Academy)

### TalveAkadeemia

TalveAkadeemia is a NGO that offers a network for students by organising an annual student science conference on SD. The overall aim of TalveAkadeemia is to inspire students to get involved in research and innovative projects in the different fields of SD.

Every year, the three-day conference tackles a different sustainability topic, giving participants new information, and allowing them to learn practical skills in workshops. The winners of the student science article competition get to present their work to a wider audience. Alternative ideas sessions create a supporting environment for people to meet, share ideas and develop new projects. Every year, about 150 students from all levels and disciplines from all Estonian universities take part in the conference.

TalveAkadeemia was founded by students from four of Estonia's larger universities in 2003.

While the organising team consists of approximately 20 students with different backgrounds every year, the strategic development of TalveAkadeemia is run by four student organisations from the Estonian University of Life Sciences, Tallinn University of Technology and Tallinn University.

### Country Estonia

**Description** The main aim of TalveAkadeemia is to encourage students to get involved in research and innovative projects in the different fields of SD. This can be broken up into the following objectives, to:

- Share the latest knowledge and information on SD topics among students
- Create student networks between different Estonian universities
- Encourage students to continue work in research in SD
- Give students practical skills and experiences in different SD cases
- Inspire students to share their ideas with others, find partners and start new projects on SD topics.

**Focus** The conference topic is different every year and it's tackled from different perspectives. The environmental side has been the strongest so far. The conference topics have been: biodiversity, Baltic Sea, energy, SD in general.

Besides the conference topic, the organisers try every year to keep the conference's ecological footprint as small as possible by including organic food in the menu, re-usable pens and nametags, printing on recycled paper, using trains instead of buses where possible, separating waste etc.



## Some examples of how to tackle different topics from the sustainability point of view

Every year the conference lasts 3 days with the 1st day for introductions and student presentations, the 2nd day for workshops and discussion and the 3rd day for practical solutions, and one young researcher presenting his/her work. Additionally participants have time on both evenings to hold open space discussion rounds themselves on topics they are interested in. At every conference a booklet is also issued with thematic articles.

### 2013 – Food

- Introduction presentations:
  - Global challenges of food production
  - Agriculture and the environment
  - Problems related to food production in developing countries (Fair Trade)
- Documentary film: „Taste the waste“
- Workshops (all had to have interactive parts in them – a game, role play, etc.) – each participant chose one, 5h:
  - Effective leadership – looking at leadership and management principles, so that production lines are more effective and problems are solved faster. Included simple simulation games about the production cycle.
  - Life-cycle assessment in food production – Principles of LCA and the challenges of it in food production. Doing LCA in groups for specific food products.
  - How does food get to Estonia and where does Estonian food go? – Overview on how food trends emerge and how food export Works, working on different business models.
  - Seafood and the Baltic Sea – what is the condition of fisheries and what fish are healthy for eating? The practical parts were the dissecting of fish and getting samples for heavy metals.
  - GMO – looking at different aspects of GMO, the science behind it, debate in 2 groups. Also separating plant DNA and looking at the mutations of plants.
  - Food science – focusing on meat and cheese and how different products are made, E-substances and what are they are used for. Practical tests with cheese and meat.
  - Global dimension of our food – overview of food production in the developing world, fair trade options, alternative ways how to make food consumption choices.
  - National cuisine – looking at the traditions of one national cuisine – Scottish – and cooking together with a real Scottish chef.
- Panel discussion: What feeds in the future? (Panellists: organic farmer, big producer, agricultural economist, head of Estonian Chamber of Agriculture and Commerce).
- Final presentations:
  - 5 macro food trends in the next 5 years (foreign speaker)
  - Permaculture and urban gardening
  - Young researcher: functional food

### 2012 – Green economy

- Introduction presentations
  - How to measure SD
  - Sustainability from the economic perspective
- Documentary film about a small tribe living in Papua New Guinea, totally cut-off from modern society and a discussion with a director about alternative primitive economies
- Workshops



- Rio+20 simulation – just before real Rio+20 took place, participants created a simulation game, where everyone represented a certain country with its interest, and they had to come to a common activity plan.
- Is Estonian higher education ready for a green economy? Overview of possible new skills and labour market needs in a green economy and a discussion whether Estonian HEI's are ready to meet those needs, mapping the more important skills according to students.
- Role of social entrepreneurship – giving examples of different social enterprises and mapping their influence, developing ideas and plans for social enterprises.
- Developing communities – looking into different communities and small models of societies and micro-economies, how to build and maintain a community. Watching a documentary about an urban community in the Estonian capital city.
- Nature tourism – overview on nature tourism and eco-tourism and entrepreneurship in rural areas. Participants created some tourism products taking into account all sustainability aspects.
- Potential of solar energy – overview of recent developments and potential for use in Estonia. Practical side: building a solar hot water collector.
- Ecological backpack of the clothing industry – looking into eco-innovation, focusing on fashion, developing practical ideas how clothes could be made in more environmentally and socially better way.
- How much costs an ecosystem service? – introducing different methods to assess the economic values of ecosystem services, developing some of their own methods, discussing what are the best ways to assess the values of ecosystems.
- Reuse of mining by-products – introducing methods regarding the by-product of Estonian energy industry – oil shale ash – can be used in other ways. The practical work was creating a small model for using a mixture of the ash.
- Panel discussion: Estonia – why not a green country? (Panelists: economics professor, founder of green printing company, social entrepreneur, head of green economy initiative of state development foundation)
- Final presentations:
  - Social enterprises (foreign speaker)
  - Options for circular economy
  - PhD student and young entrepreneur: combining energy saving in research and business

## 2011 – Biodiversity

- Introduction presentations
  - The highs and lows of biodiversity in Earth's history
  - The role of nature in SD (foreign speaker)
  - Nature in medieval art
- Documentary film about expedition to Siberian nature + discussion with director
- Workshops:
  - Protecting ecosystem services of wetlands – making suggestions to Estonian wetland use and protection plan draft, on how to preserve the ecosystem services, and not only from economic point.
  - How to make wasteland more diverse – creating plan for open mining area restoration, making a small model of the area and suggested changes.
  - Use of Estonian peat in SPA's – looking into the health benefits of peat and its use in clinical procedures and testing those procedures (making facial and body masks).
  - European Green Belt – information and discussions about the European Green Belt, that runs through Europe. Looking at the European dimension with workshop leaders from UK and Spain and creating posters as promotion for the Green Belt.
  - Health care with plants – getting to know Estonian medical plants and how to make herbal teas – making and testing different tea mixtures.





- Traditions and culture of Estonians' and other Finno-Ugric people – dealing with cultural diversity as part of biodiversity. Watching short films and listening to music from different Estonian neighbour cultures, getting to know their beliefs and traditions.
- Uses of biodiversity – mapping the everyday dependence on different species that we use in our daily life, and tracking them back to ecosystems and global scale.
- Nature sounds – listening to different sounds and how they change in time, what influences that etc.
- Urban biodiversity – looking into different plant and animal species in cities and practical approaches how to keep urban ecosystems healthy. Developing urban biodiversity plan for Estonian capital city.
- Coastal meadows and reed-art from coastal people – introduction to a specific ecosystem type in Estonia and its connection to biodiversity. As practical work, creating traditional small decorations out of coastal reed straws.
- Biodiversity and Estonian agriculture – discussion over the public services of agriculture, mapping those services and how they are influenced.
- Panel discussion: What is the value of biodiversity? (Panelists: botany researcher, environmental educator, nature philosopher)
- Final presentations
  - National spatial planning strategy until 2030
  - Bio inspiration (bio mimicry)
  - Young researcher: biodiversity of soil fauna

## 2010 – Baltic Sea

- Introduction presentations
  - Peculiarities and environmental problems of Baltic Sea
  - Eutrophication – causes, results and ways to tackle it
  - Ship traffic system in Baltic Sea
- Workshops:
  - Oil spill operations – Basic principles how to act in oil spills and coordinate volunteers.
  - Plastic bag in the sea – looking into what plastic does in the sea, thinking on ways how to solve those problems.
  - Sand as resource – how sand gets out from the sea bottom and into industry. Practical side-work for creating sand artwork.
  - Coastal cultural heritage – discussing how to combine old and new ways of living along the coastal areas of Estonia, while preserving the old and allowing new things to emerge.
  - Water removal in mining areas and its influence on rivers – overview on how mining influences rivers, making a model of the process of how water is removed in the areas.
  - Environmentally-friendly cleaning products and cosmetics – looking into the components of conventional cleaning products and cosmetics and their environmental impact (also to sea), making new environmentally-friendly alternatives on the spot.
  - Pros and cons of wind energy – overview of how wind parks could affect coastal areas and the sea, introducing how wind parks are usually planned (what software is used in modelling), doing role-play how different stakeholders can be involved.
  - Cultural history of Kihnu Island – being one of the small islands of Estonia, its traditions have developed a little bit differently. The workshop looked into those traditions and their connection to the sea, focusing on the traditional clothing.
  - Sea pollution's connection to ordinary citizens – mapping how ordinary citizens influence the sea and how the sea influences the everyday lives of ourselves, looking into the ways as to how negative impacts could be changed.



- Sustainable renovation in coastal cultural heritage – introducing sustainable renovation principles and how to apply them in the sensitive coastal areas, combining with traditional building style. Practical side was the making of different natural colours.
- Dissecting fish – looking into the fish gives a good overview of the water ecosystem. Workshop focused on the fish parasites, what the fish eat and how it can be linked with the health of the sea.
- Panel discussion: What is the future of Baltic Sea? (Panelists: representative of Estonian Fund for Nature, member of the Parliament, sea ecosystem researcher, representative of fishers' union)
- Final presentations
  - Young researcher: detecting pollution in sea with satellites
  - Sea protection areas in Baltic Sea
  - Activities related to sea in the program of Tallinn, European Cultural Capital 2011

Descriptors Indicators	Content	Tools	Method	Outcomes
<b>New technologies</b>	Conference workshops have practical side	Depending on the specific topic: creating models, building different objects using eco-building techniques, constructing solar collector etc	Combining theory and practical part	Students are understanding the topic better and linking theory with practical sides
<b>Holistic approach</b>	Conference topic should be tackled from environmental, social, economic and technology point of view		Presentations, workshops and panel discussion allow different sides to be tackled, organizers spend a lot of time to make the program into one whole (1st day: intro, 2nd day: specific workshops, 3rd day: practical sides, conclusions)	Students can better grasp the complexity of issues and how one field can affect another, and that for sustainability, all pillars should be looked at and how they depend on each other
<b>Collaboration</b>	Students from different universities and courses are present in the conference	Workshops are organised so that students from different background have to work together	In the workshops, different methods (group work, discussion, case study etc.) are used for working together	Learning about different sides of problems and knowledge needed to solve them
<b>Critical thinking</b>	Conference is open to students from different disciplines and speakers are selected from different backgrounds as well		Simply allowing people with different backgrounds to work together in workshops or at discussions, so that different views are expressed and debated	Participants of the conference can form their own opinion about certain topics, as they have heard facts from and opinions from different sides
<b>Project base learning</b>	Workshops need to have practical side	Depending on the specific topic: creating models, building different objects using eco-building techniques, constructing solar collector etc.	Depending on the specific topic: role-play, mapping, discussion, giving a list of suggestions, watching a film	More concrete frames for what the students learn, easier to grasp one certain issue
<b>Creativity</b>	Different parts of the conference allow students to come up with their own solutions		Open space sessions, creative tasks in workshops (coming up with slogans, new product ideas, solutions to problems etc.)	New ways of seeing solutions, better basis of cooperation. Students organize even surprising things together, like building an igloo outside or jumping into ice-hole in the sea.



<b>Network building capacity</b>	Free time slots in the program, where students can announce their own discussion rounds	Several marked rooms and corners with chairs where people can sit and talk, big whiteboard in the conference room with information about where discussions are happening	Open space methodology	Students with similar interests can meet and develop ideas and projects to be carried out later (several new projects have been developed in the past)
<b>Internationalization</b>	Conference is only for Estonian students			
<b>Interdisciplinarity</b>	Same as for collaboration and holistic approach			
<b>Motivation aspects</b>	Conferences helps to create free and inspirational atmosphere		Students spend 3 days together (including parties in the evenings), they have time to develop their own ideas and discuss things with each other (open space)	Inspiration and motivation are one of the biggest outcomes of the conference every year (based on feedback), which means the mixture of presentations, practical workshops, own discussions and social activities boosts the motivation very well
<b>Transferability</b>	The conference format can be used in any other setting as well			
<b>Innovation activities (present)</b>				

## Further Information

**Website:** [www.talveakadeemia.ee](http://www.talveakadeemia.ee) (in Estonian)

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## 7.5. Specific universities policies about SD in France

### French Universities

French Universities, “Ecoles d'ingénieurs” or Higher Education establishments are autonomous structures but they have to follow the National Strategy of Sustainable Development set by an inter-ministerial committee for SD.

**Country** France

**Description** Implementation of the National Strategy of Sustainable Development at the level of the French Universities.

**Focus** Exemplarity of Universities, waste management, energy efficiency, water saving, sustainable transport.  
Long-term economic choices, Integration of environmental concerns in decision-making. General knowledge relative to SD, innovation in research and in teaching methods. Development of human capital and skills

### Further Information

#### Authors

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## 7.6. The place of the Tutored Project

### AgroSup Dijon

AgroSup Dijon is the National Superior Institute in Agronomy sciences, food sciences and environment. AgroSup Dijon organises French engineering diplomas in food, agronomy and environmental sciences. It also organizes master level diplomas, international masters and bachelor in the same fields of activity and in the field of educational sciences. The Eduter institute within AgroSup Dijon deals with the development and the technical support of agricultural education in France.

**Country** France

<b>Description</b>	<p>The place of the tutored project in the conception of the curriculum of a vocational bachelor in water and waste treatment</p> <p>The tutored project has a particularly important role in training students during the last year of a vocational bachelor. Students must learn to work on multidisciplinary topics independently. They must work using a comprehensive (global) approach in order to be able to work in companies.</p>
<b>Focus</b>	<p>Waste management, Water treatment, Energy efficiency, Pollution and risk management. Conservation of natural resources</p> <p>Valuable diplomas for companies in SD activities, integration of environmental concerns in business decision-making.</p> <p>General knowledge relative to SD, development of human capital and skills, student professionalization.</p> <p>One of the main objectives is to learn how to practise interdisciplinarity</p>

### Further Information

#### Website

<http://www.agrosupdijon.fr/formations/licence-master-doctorat/licences-professionnelles/protection-de-lenvironnement.html> ; <http://www.u-bourgogne-formation.fr/-Traitement-des-eaux-et-des-dechets,135-.html>

#### Author

Jean - Pierre Lemière

AGROSUP Dijon, Department of Sciences for Engineering ad Processes, Dijon, France.



## 7.7. E-Learning Academic Network (ELAN III)

### University Leuphana, Lüneburg

Leuphana University of Lüneburg bases its development on an all-encompassing idea of education and on the content and value oriented implementation of its activities. The University sees itself as a:

- **Humanistic university**  
In its understanding of education, Leuphana combines personal and academic development while placing the process of acquiring knowledge into a concrete context.
- **Sustainable university**  
Through its education and research, Leuphana contributes to the SD of society. Leuphana fosters competencies in dealing with complexity, problem-solving in an interdisciplinary manner, engaging in responsible and self-directed learning, developing a readiness and willingness to take on social responsibility or shaping the future in a sustainable manner.
- **Proactive university**  
Leuphana fosters the development of responsible and proactive individuals who demonstrate the creativity and thoughtfulness as well as the willingness and ability to creatively shape society. Leuphana contributes significantly to the solution of social problems through research, education, continuing education, and academic services.

**Country** Germany

**Description** As part of the e-learning initiative of Lower Saxony "eLearning Academic Network" (ELAN), the aim of the project "Introduction to Sustainability" is the development of a versatile e-learning module to teach the basic issues of SD within an interdisciplinary perspective. The module is used during the so-called "Leuphana semester", which has to be completed by all undergraduate students at the University of Lüneburg across the faculties. Here, the online self-learning phases are linked to attendance periods. Thus, in an interactive and communicative learning situation, the aim is to stimulate discussion and reflection on SD and education for SD. It can also be used at other universities within different contexts in subjects in which the issue of sustainability should be considered. By designing a blended learning module with completed sub-units, the module can be used both as a complete and finished purpose product, on the other hand can also take the subject-specific background of a discipline. This is supported by the combination of e-learning and attendance periods. In site-



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specific content, the requirements of each subject can be considered and such a customised adaptation to the own needs of each user can be made.

**Focus** Biological and landscape variety.  
Better understanding of and motivation to study sustainability related issues.

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### Further information

#### Website

<http://www.leuphana.de/institute/infu/aktuell/archiv/ansicht/datum/2008/09/03/elan-iii-projekt-einfuehrung-in-die-nachhaltigkeit-ausgezeichnet-1.html>

<http://www.dfn.de/fileadmin/3Beratung/Betriebstagungen/bt49/forum-mm-ottow.pdf>

#### Contacts

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## 7.8. Master GESLOPAN

### University of Teramo

The University of Teramo was established in 1993. Today, the University boasts 5 Faculties, 19 Degree Courses, 24 Masters, 6 Post-Graduate Courses and 10 Departments.

The development strategy of University of Teramo focuses on two major study areas: Law-Politics-Communication and Agricultural-Biological-Veterinarian studies.

The Law-Politics-Communication sector of the University of Teramo, characterised by the Faculties of Law, Political Science and Communication Science was ranked among the top 7 of the country according to a national survey conducted by the Public Administration Department and Formez.

The agricultural-biological-veterinarian sector (Faculty of Veterinary Medicine and Faculty of Agriculture) started 20 years ago and has become not only a strategic scientific reference for the local Region, but is also recognised for its important role within the National and International context as well, mainly directed towards inter Adriatic relationships.

Master GESLOPAN is promoted and managed in an interdisciplinary way by three Faculties: Veterinary Medicine, Agriculture and Political Science. It is now in its 10th edition.

### Country Italy

<b>Description</b>	<p>Management of Local Development in Parks and Natural Areas</p> <p>Master GESLOPAN is a one year post-degree course that offers an interdisciplinary education in the field of management, conservation and economic development of the Protected Areas.</p> <p>The Master's aims at building new experts who are able to validate the natural, cultural and agro-food local resources through a sustainable approach.</p> <p>The educational programme is characterised by an interdisciplinary approach, and aims to develop naturalistic, zoological, agro-food, sociological, economic and legal competences through the implementation of different educational instruments useful for operating with an innovative methodology in e protected areas (laboratories of EU project elaboration, business planning and fundraising exercises, stages in operative centres).</p> <p>The didactical activities show two main objectives:</p> <ul style="list-style-type: none"><li>- Developing the self-employment capacities, directed to the creation of new business activities inside the protected areas and to the implementation of the role of SD consultant and project manager.</li><li>- Increasing in Natural Parks administrators and employees new skills concerning the validated in a sustainable way of the local resources</li></ul>
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and new management and project capacities.

**Focus** Conservation of natural resources; biodiversity; sustainable management of the natural resources.  
 Environmental economy; green economy; environmental marketing; rural development; sustainable services and productions.  
 Sustainable infrastructure. Contact with the nature, also for learning the environment. Building good social relations and good understanding of the environment.  
 Elaboration of local SD strategies; validation of local cultural resources (agro-food products, local traditions); development of the local competences; reduction of the marginal lands decline.  
 Geopark is a dialogue between man and the Earth.

The course is organised in collaboration amongst different Faculties (Veterinary Medicine, Agriculture and Political Science) and provides an interdisciplinary learning approach to furnishing useful skills directed at improving the student capacities to approach the sustainability field.

Descriptors Indicators	Content	Tools	Method	Outcomes
<b>New technologies</b>	One of the master objective is to create a »community« of students and experts and to diffuse job opportunities for actual and former students: so a Facebook page is continually updated with news, call for projects and job opportunities, and is open to exchanges of opinions (mainly beyond the lessons period)	An e-learning platform allows student to complete their study activities. The students can also follow in video-conference the lessons if they are unable to stay in class for justified motifs and communicate in advance this necessity (for a small % of the total number of lessons)	The e-learning platform also support the teaching activities in the interval among the 5 lessons cycles (one week per month for 5 month) and in the preparation of the final thesis	Continuity of the teaching activities during the Master. Creation of a master community that follow and support the students after the conclusion of the course.
<b>Holistic approach</b>	The Master's aims to build new experts who are able to valorise the natural, cultural and agro-food local resources through a sustainable approach. The educational program is characterized by an interdisciplinary and trans-disciplinary approach, both in the general program and in the specific didactical units (one week full time). A specificity of the Master approach is that each didactical unit (one week) is developed in a different protected area so different opportunities of interaction with the local contest are put in place.	During each unit, students have to elaborate, present and discuss, in public with local representatives, their own project ideas for local development and sustainable management of natural resources. In the project ideas elaboration working groups and trans-disciplinary approaches are used.	Integration among different teachers / experts in the same teaching unit. Round tables with the participation of entrepreneurs, Parks managers, local development experts with the aim of facing real situations and integrating different points of view.	Strong integration of different disciplines and proactive approach adopted by students, with reference to a specific topic and/or to a specific territory (case studies).



<b>Collaboration</b>	To increase collaboration among students it is used like a didactical approach.	Working group for elaborating project ideas and public presentation of the working groups' results.	Project working and working groups.	Integration of disciplines. Collaboration among students and with teachers.
<b>Critical thinking</b>	To create a critical thinking students are faced with real development problems in the protected areas where any didactical unit is developed.	Presentation of real problems and good practices to the students by teachers and local experts. During each unit, students have to elaborate, present and discuss, in public with local representatives, their own project ideas for local development and sustainable management of natural resources.	Integration among different competences on a real and defined problem. Case studies and public discussions.	Increase the capacity of students to face with real situation, working together and compare theoretical solutions with the exigencies of local actors.
<b>Project base learning</b>	A specificity of the Master approach is that each didactical unit (one week) is developed in a different protected area: in this way different tools are put in act to create a bidirectional learning (students learn from the experiences of the Park that hosts them but also they can give their own contribution to the development of the territory)	- Round tables with the participation of entrepreneurs, Parks managers, local development experts - During each unit, students have to elaborate, present and discuss, in public with local representatives, their own project ideas for the local development and sustainable management of natural resources.	Integration among different competences on a real and defined problem. Case studies and public discussions.	Realization of a bidirectional learning process. The master is appreciated by the local actors for his contribution to local development.
<b>Creativity</b>	Apply innovative proposal in real situations.	Round tables, presentation of good practices.	Put in relation the formal (teachers and students) and informal (local actors) knowledge	Innovation in the local contest.
<b>Network building capacity</b>	Networking among University and Local / National administrations. Three National Parks, one Regional Park and one National Marine Protected Area are strongly involved in the organization of the Master, together with a Regional administration and four Municipalities.	Each didactical unit (one week) is developed in a different protected area. The protected areas managers are involved in the master organization, through: - The presentation of their activities / best practices to students - Hosting of students' training and tutorship of Master thesis - Offer of accommodation facilities and scholarships	Involvement of the partners both in the planning and in the realization stage of the Master	Networking among master managers and students with the local community and Parks management. A desirable outcome is the involvement of the master students in the Parks projects and activities after the master ending.
<b>Internationalization</b>	Presentation and discussion of international experiences and problems in protected area management and local developments.	Lessons, case studies, good practices presentation.	Participation of teachers from other countries with very different experiences (Brazil, Switzerland)	Students – but also managers and local development actors of the hosting protected areas – can compare their experience with other countries.
<b>Interdisciplinarity</b>	The course is organized in collaboration among different Faculties (Veterinary Medicine, Agriculture, Political Science and Communication Science). The course host	Lessons, case studies, good practices presentation. Interdisciplinary working groups.	Integration among different competences on a real and defined problem. Case studies and public discussions.	The course provides an interdisciplinary learning approach to furnishing useful skills directed to improve the student capacities to approach the



	students with different backgrounds (natural science, economics, social, geography, territorial planning...)			sustainability field.
<b>Motivation aspects</b>	Students are usually strongly self-motivated in the choice of this post-graduate course.	Specific teaching topics contribute to motivate students offering transversal skills: - enterprise creation - projects elaboration and fundraising - management and planning	The didactical activities show the main objective of developing the self-employment capacities, directed to the creation of new business activities inside the protected areas and to the implementation of the role of SD consultant and project manager.	Increasing of the employment and self-employment capacity of the students by specific skills.
<b>Transferability</b>	Content and organization of the course can be applied in other countries. One limitation at the transferability of the Master at international level is the number of credits previewed by the Italian legislation (60 credits), that differ this kind of courses from the Master degree (2 years, 120 credits).	The teaching tools can be applied in other countries	The teaching method can be applied in other countries	The outcomes will depend of the contest where the Master will be realized.
<b>Innovation activities (present)</b>	The main innovation aspects concern the project base learning, the network building capacity and the interdisciplinarity of the Course.	Working group for elaborating project ideas and public presentation of the working group's results. Protected areas host students' training and do tutorship of Master thesis.	Students have to elaborate, present and discuss, in public with local representatives, their own project ideas	Realization of a bidirectional learning process. Increasing of the employment and self-employment capacity of the students by specific skills.

## Further Information

**Website:** [www.unite.it](http://www.unite.it)

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## 7.9. Fair Trade Management

### University of Applied Sciences van Hall Larenstein, location Wageningen.

Van Hall Larenstein (VHL), University of Applied Sciences, is a unique university in The Netherlands. The curricula focus on nature and the environment, human and animal health and responsible entrepreneurship. Combinations of these areas of expertise result in special and challenging bachelor and master's programmes with unique specialisations. But we offer more than just bachelor and masters programmes. Postgraduate courses and consultancy on national and international terrains are part of our service. VHL is not just a university, but also a knowledge company for social and economic questions. Van Hall Larenstein has 3 venues Leeuwarden, Velp and Wageningen. As a result there is a vast range of professional, applied and academic programmes and research on offer.

**Country** The Netherlands

**Description** International development management – Fair trade management  
Implement value chain development. To develop informal market structures into formal market access, add value through the implementation of logistic management, apply quality management systems, warehouse management  
Develop competences on conversion plans towards organic agriculture and design organisational structures for market access through voluntary standards certification.

**Focus** Apply sustainable agricultural practices, Organisational Development  
Develop diversified market access (from informal to formal market access), Develop sustainable market access  
Develop inclusive business capacity competences

Activities relate to the multi-stakeholder approach (supermarkets, warehouse service providers, extension services and NGO facilitation).

Integration of agronomic, logistic, post-harvest, standard & certification, commercialisation

Competent students for value chain development practice

Empowerment of informal sector actors towards formal market actors

### Further Information

**Website:** [www.vanhall-larenstein.com](http://www.vanhall-larenstein.com)

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## 7.10. MSc in Agriculture: Agro-ecology and Renewable Energy

**Warsaw University of Life Sciences-SGGW (WULS-SGGW)**  
**Faculty of Agriculture and Biology**

Warsaw University of Life Sciences-SGGW (WULS-SGGW) is among the premier Polish institutions of higher education. It educates experts for the broad-sense needs of the national biosphere. It offers wide-ranging programmes of study – from biological and technical, through veterinary medicine, economics to humanities.

The programme of WULS - Faculty of Agriculture and Biology - specialisation in Agro-ecology and Renewable Energy provides a scientific and holistic basis for describing, analysing and improving farming and food systems. The challenges linked to climate change and increasing energy demands have generated considerable interest in renewable energy, as well. Graduates with backgrounds in renewable energy sources should be in demand at various, both public and private entities, as projects of renewable power plants and power sources (i.e. wind power, hydropower, bio-energy, biomass, biogas etc.) find their way into agricultural enterprises of different sizes.

Topics lectured in agro-ecology include environmental, production-related, economic and social challenges in farming and food systems; interdisciplinary approaches to dealing with complex processes of change; SD within a local and global context; ecological organic agriculture. Renewable energy is covered within the scope of natural resource management energy technology, problems related to the production of renewable energy, as well as selected topics in economy.

**Country** Poland

**Description** Master of Science in Agriculture – Specialisation: Agro ecology and Renewable Energy. The objective is to familiarise students with fundamentals of agro-ecosystems, holistic methodology for evaluation and improvement, attitudes, ethics and values.

The programme is designed to develop agro-ecologists who will be successful contributors to future food systems' projects, management of agricultural and natural resources, environmental protection, and further education and research. With real-life experiences as the starting point, the programme provides knowledge and methods transferrable to a wide range of situations, as well as the personal skills to become a life-long learning agro-ecologist.

The programme also aims at providing fundamental knowledge, as well as the skills of combining and using knowledge within the area of technological aspects of resources management and renewable energy generation and related aspects of economic problems.

**Focus** Ecology; biodiversity; waste management; energy efficiency;



conservation of natural resources; climate change; development of clean technology; reduction of gas emission  
Sustainable consumption; urban and local development, sustainable production, integration of environmental concerns in business decision-making.

The programme combines fundamentals of organic farming and renewable energy problems under single theme of eco-agrobiology, at the same time including practical issues of economy related to these topics.

Descriptors Indicators	Content	Tools	Method	Outcomes
New technologies	organic food systems, natural resource management, environmental protection	lectures, labs	site visits at companies	students are familiar with state-of-the-art solutions in food systems
Holistic approach	internal and external dependencies of food systems	introductory lecture and case studies	dependencies mapping	students are aware of cross-links of food systems with suppliers and final users, can predict evolution of cross-links
Collaboration	assessment of capabilities and limitations	Projects	brainstorming sessions	students are able to match problem solving teams with complementary skills of members
Critical thinking	ideation of solution, elimination and focusing	Projects	idea presenting & defending games in work teams	students can critically approach a set of ideated solutions and focus on most beneficial through elimination
Project base learning	team-based work out of a solution for particular problem	lab environment with equipment and consumables enabling delivery of a low resolution prototype	sub-team or individual work on tasks assigned by project leader	students efficiently work in teams to deliver solutions to real life problems and demonstrate them convincingly
Creativity	Empathy and problem redefinition	introductory lecture and case studies	students exercise emphatic assessment of problem from the consumer point of view and attempt to redefine the essence of problem to come up with innovative solution	students know how to emphatically assess demand and how to look for innovative ways of delivery through problem redefinition
Network building capacity	competence matching, empathy, cold call techniques	lectures, exercises & networking sessions	stand-around lectures/exercises with professional trainers	students are trained in establishing and maintaining of effective contacts in their field



<b>Motivation aspects</b>	means of effective self-management and self-motivation	seminars, case studies	lecture by faculty and external professionals, exercises with competition based games	students are able to asses problems emphatically & envision goals to find self-motivation
<b>Transferability</b>	confrontation of basic models and low res. prototypes with real life problems	seminars, site visits and pitch presentation events with professionals working in the field	pitch presentations pecha kucha presentations	students are able to competitively present their ideas and capture interest of decision makers and professionals
<b>Innovation activities (present)</b>	high impact topics in food systems, resource management & environmental protection	seminars, open case studies, events	participatory learning, prioritizing available information	students recognize their new skills, cross-links to networking, creativity and transferability

## Further Information

### Website

[www.sggw.pl](http://www.sggw.pl)

[www.agrobiol.sggw.waw.pl](http://www.agrobiol.sggw.waw.pl)

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## 7.11. Botanical Gardens, Special Places to Involve Special People

### Jardim Botânico da Ajuda

The Royal Botanic Gardens of Ajuda was founded around 1768. The gardens were planned by Domingos Vandelli and were Europe's fifteenth and Portugal's first botanical gardens. They are divided into two levels: the upper terrace contains a patchwork of flowerbeds that house the botanical collection, while the lower level is dominated by a large central lake that is richly ornamented with sculptures of water-related animals and is prepared for growing aquatic plants, being characterised by the perfect symmetry of their layout. Various boards of management came and went, until in 1910 the Gardens were placed under the responsibility of the Instituto Superior de Agronomia (ISA).

**Country** Portugal

<b>Description</b>	Providing contact with nature to people with disabilities, increasing their experience and knowledge by participating in activities in accordance with their capabilities. Provide feelings of solidarity and transmission of knowledge for non-disabled people. Obtain, with the help of disabled people, the same results in the maintenance of the JBA as those obtained by non-disabled people. Provide work and a salary that allows economic independence for three people to whom the labour market was inaccessible.
<b>Focus</b>	Waste management ; pollution; conservation of natural resources; biodiversity; conservation of heritage Urban and local development; sustainable production; sustainable tourism; corporate social responsibility Community cohesion; social equity; health and quality of life; equal opportunity

A Garden of all for all, a place where people of all generations and all walks of life together with ISA students, have the opportunity to collaborate in all activities, along with a very small body of workers, strengthened by help from people who work within their capabilities, among them many volunteers, some of them disabled.

### Further Information

**Website:** [www.jardimbotanicodajuda.com](http://www.jardimbotanicodajuda.com)

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## 7.12. "De Sol a Sol" - a sustainable day

AlumnISA,  
Associação de Estudantes do Instituto Superior de Agronomia (AEISA),  
Verde Movimento,  
Instituto Superior de Agronomia (ISA),  
Universidade Técnica de Lisboa (UTL).  
Consortium between the actual and former students of the ISA, Verde Movimento and the ISA/UTL

**Country** Portugal

<b>Description</b>	Creation of a sustainable day – The "De Sol a Sol". To carry out a sustainable cultural event designed for all the UTL community, where all energy will be generated by renewable sources. A set of photovoltaic panels will be installed at the event location and will generate the energy to support the activities of the whole event. Other uses of energy from renewable sources will be demonstrated during the event activities, such as solar cookers, etc.
<b>Focus</b>	Waste management, energy efficiency, pollution, conservation of natural resources, sustainable transport, climate change, development of clean technology, reduction of gas emission. Sustainable consumption, urban and local development, sustainable trade, sustainable tourism, CSR practices, integration of environmental concerns within business decision making. Development of human capital and skills, community cohesion.

The installation of photovoltaic panels is a good example for students in our Institute as in the future all energy necessary for the horticultural production area will be guaranteed by this installation.

Too be 100 % sustainable for one whole day.

### Further Information

#### Website

[www.isa.utl.pt](http://www.isa.utl.pt)

#### Authors

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Ana Rita Ramos  
Maria Borges



Descriptors Indicators	Content	Tools	Method	Outcomes
New technologies	Energy will be generated by renewable sources	Photovoltaic panels Other renewable sources, such as solar cookers, etc.	A set of photovoltaic panels will be installed at the event location and will generate the energy to support the activities of whole event. Other uses of energy from renewable sources will be demonstrated during the event activities, such as solar cookers, etc.	To show people different sustainable activities that can be easily done in our life.
Holistic approach	We expect to promote a totally sustainable cultural.	Sustainable activities	Cultural event	We expect to engage more than 10,000 students.
Collaboration	Between actual and former students of the ISA, Verde Movimento, ISA/UTL and civil society	Facilities and capacities of consortium partners to collaborate	Consortium	Engagement of population from UTL and other universities involvement in social and cultural life
Critical thinking	Applying new technologies to save energy	Use of good examples to demonstrate how we can contribute to a sustainable life	Comparison of energy consumptions for the different methods	Participants will be able to realize the benefits and constraints
Project base learning	Participants from different disciplines work together in areas concerning the 4 pillars of ESD	Case studies	Evaluation of benefits and constraints	Adaptation of results and solutions
Creativity	How to be sustainable	SD activities	Practical examples of SD activities	Stimulate people to be sustainable in their life
Network building capacity	UTL is merging with another Portuguese University; when merged the new university will be the biggest Portuguese university	SD activities	Practical examples of SD activities that can be easily developed at the universities	UTL and other Life Sciences Universities in Portugal
Internationalization	Life Sciences, social sciences and economics	SD activities	Practical examples of SD activities	UTL and other Life Sciences Universities in Europe and all over the World
Interdisciplinarity	Life Sciences, social sciences and economics	SD activities	Practical examples of SD activities	To show to the people the SD Pillars
Motivation aspects	Stimulate the curiosity of participants	Activities during the event	SD activities experience during one day	Participants may be interested to reproduce and adapt the experiences in their own life
Transferability	To be the first example of SD within the national universities	SD activities	Practical examples of SD activities	Practices that can be adopted by other universities
Innovation activities (present)	Stimulate people to be sustainable in their life	SD activities	Demonstration of SD activities	Be 100% sustainable for one whole day event.



## 7.13. Learning regions in Slovenia with polygons within nature

### International Centre for ecoremediation

The International Centre for ecoremediation was established at the University of Maribor, Faculty of Arts, with the goal of developing new integrated knowledge relating to the economy, environment and society.

Throughout history nature has developed incredible buffer capabilities. These processes can be used because of the rapid development of knowledge we possess and which has improved our quality of life. The application of natural processes to protect the environment is called Ecoremediation, a concept that is acknowledged in Slovenia as being associated with exceptional development opportunity. Traditionally good relationships exist between West Balkan countries and consequently we wish to recognise this development potential in this part of Europe as well.

#### THEMATIC SCOPE:

1. Ecosystem technologies
2. Education for Ecoremediations
3. Application of Ecoremediations
4. Knowledge transfer
5. Examples of Best practices and Opportunities for participation.

#### Country Slovenia

#### Description

The aim of the project Learning regions in Slovenia with polygons in nature for learning about ecoremediations, self-sufficient supply and SD was to establish innovative and experimental conditions for the generation of knowledge and functioning of natural and built ecosystems, which is needed to achieve SD of the local environment. Thus, the specific objectives of the project were as follows:

- Designing and implementing the conditions and their realisation in the field of education through direct experience.
- Increasing the capacity for autonomous decision-making in favour of the protection of nature and the environment. Innovative design of learning materials for experiential education is based on the acquisition of personal experience and research approach.
- Development of programmes, which are intended for use under the established conditions for education. Programmes are based on educational achievements and they develop skills at all stages of Bloom's classification. Educational institutions receive these programmes to develop the proactive approaches of education for SD. The programmes are also designed to prepare the system bases for the mandatory practice of



biotechnology schools.

- Creation of models, concepts and a systemic basis within primary and secondary education with the aim of SD being used as an ecosystem approach to protect nature and the environment, which is the basis of the survival of mankind.

**Focus** Conservation of natural resources, protection of natural resources with ecoremediations; using permaculture for protecting and using natural resources;  
Local development;  
Development of human skills; social equity

Learning Polygons have a major impact on local SD, thus helping to develop the local environment, as well as the inclusion of a wider crowd of local people who have become part of the development. Such education polygons have an impact on the educational system in Slovenia, because of the increasing interest in experiential education in classrooms in nature, which are polygons, as well as they deliver the SD of the local area. We will establish an International Eco remediation Network, the main purpose of which is to efficiently connect partners within the area of Eco remediation to ensure more appropriate SD in Europe.

Descriptors Indicators	Content	Tools	Method	Outcomes
New technologies	Ecoremediations and permaculture approaches are natural approaches, which through the work of nature imitating clean environment pollution, maintain the balance in the environment and retain the quality of the individual elements in nature (water, air and soil) that these ecosystems can perform their functions and offer the services, which provide a healthy life.	Nature's Classroom, which is composed of: learning polygon for self-sufficiency and ecoremediations in Dole, learning paths and bike paths. All learning places are equipped with didactic educational items and learning boards.	Experiential education based on experiments and experience. It also encourages team working, where learners are trained how to work in a team and they can realize that a group can do more as an individual.	Developing new natural approaches, which are based on experimental and experiential learning. This new natural approaches solve environmental problems and enhance ecosystem services in the local area and provide opportunities for development within the natural balance that ensures healthy and quality living environment. Development of this natural technologies in the local area is also the opportunity for the employment of local population, consequently this also represent the economic and social stability.
Holistic approach	Education is holistically conducted. It is based on experience, which is necessary for a sustainable solution of the problems, where are involved all aspects of the development: environmental, social, economic, legal aspect and also the ethical aspect.	Nature's Classroom, which is composed of: learning polygon for self-sufficiency and ecoremediations in Dole, learning paths and bike paths. This all learning places are equipped with didactic educational items and learning boards.	Experiential education based on experiments and experience. It also encourages team working, where learners are trained how to work in a team and they can realize that a group can do more as an individual.	The holistic approach to education in the classroom in nature, which even includes all aspects of the SD and ethics, is enabling people to change their behaviour and habits, in order to start making goals of the development that can actually achieve the SD and ensure a healthy living environment. Also, learners acquire knowledge that can be transferred to their home environment.



<p><b>Collaboration</b></p>	<p>Cooperation takes place on several levels. First and foremost, we work with educational institutions and the local environment. Education learning is different, because they learn on concrete examples and experience. This allows them to learn on their own with experiments and to acquire new knowledge, but also to learn responsibility towards the environment. Locals come to us for new skills, that enable them to know how to check what quality of soil and water they have, how they can use natural substances to improve soil quality and plant health and how it can be grown in a small space and produce much food. We also work with various decision-making bodies at the municipal and state levels, which are presented to support decision makers in the field of environment and SD.</p>	<p>Nature's Classroom, which is composed of: learning polygon for self-sufficiency and ecoremediations in Dole, learning paths and bike paths. All learning places are equipped with didactic educational items and learning boards.</p>	<p>Experiential education is based on fieldwork, experiments, research and team collaboration.</p>	<p>Experiential learning and teamwork with the experiment learning in the classroom in the nature can enable learning on the specific problems; learners can find workable solutions that are sustainable. Teamwork, which brings together different generations of people brings intergenerational respect and lifelong learning. Research and experiments on in the classroom in nature bring new results, which have a significant impact on the decision-making bodies at local and national levels.</p>
<p><b>Critical thinking</b></p>	<p>Problems in the environment need to be critically solved, if we do not want to cause even greater problems. Therefore, education in the classroom in nature, which is based on the experience, that enables the problem-solving approach with a critical thinking, which is the basis to learn how to assess a variety of different choices, learn to find the causes and consequences of the decisions and learn to argue the accepted decisions.</p>	<p>Nature's Classroom, which is composed of: learning polygon for self-sufficiency and ecoremediations in Dole, learning paths and bike paths. All learning places are equipped with didactic educational items and learning boards.</p>	<p>Experiential education based on experiments and experience. It also encourages team working, where learners are trained how to work in a team and they can realize that a group can do more as an individual.</p>	<p>Experiential learning that takes place in the form of set in advance and known cases enable the learners to develop critical thinking. The experiences enable them to explain the causes and consequences, and to defend their decisions. Results of those learning approaches include an effect on the behaviour change of learners, greater individual responsibility and knowledge transfer.</p>
<p><b>Project base learning</b></p>	<p>Education in the classroom in nature is lifelong learning oriented. Learners learn about natural approaches named ecoremediations, they acquire knowledge how to clean and protect the environment. Also they learn about</p> <ul style="list-style-type: none"> <li>- permaculture as a way of self-sufficiency, which saves natural resources and provides a healthy food and, consequently,</li> <li>- about the healthy lifestyle in an environment where a natural balance is achieved and</li> <li>- the action of ecosystem services that provide a healthy and quality living environment.</li> </ul> <p>Obtained knowledge in the classroom in nature is transferred to the local environment on the way of the designed projects.</p>	<p>Nature's Classroom, which is composed of: learning polygon for self-sufficiency and ecoremediations in Dole, learning paths and bike paths. All learning places are equipped with didactic educational items and learning boards.</p>	<p>Experiential education of the individual, where can one with the help of experimental work acquire new knowledge, which can be transferred to their living environment.</p>	<p>Learners will acquire lifelong skills in the field of the environmental protection and the production of healthy food and they acquire knowledge how can be increased ecosystem services. Ecoremediations and permaculture arrangements are provided with minimal financial contributions and have the maximum impact.</p>
<p><b>Creativity</b></p>	<p>The desire and motivation of the people to organize for</p>	<p>Nature's Classroom, which is composed of:</p>	<p>Experiential education of the</p>	<p>Linking experience and achieving new knowledge with</p>



	<p>them-selves healthy and self-sufficient life forces them to be creative. Therefore, learners in the classroom in nature first learn about the features and operation of ecoremediation and permaculture organization. After that they go with this knowledge to experiential learning in the nature. With the experiences and new knowledge they develop with their creativity creative solutions for the problems.</p>	<p>learning polygon for self-sufficiency and ecoremediations in Dole, learning paths and bike paths. All learning places are equipped with didactic educational items and learning boards..</p>	<p>individuals who can use experimental work to acquire new knowledge, which can be transferred to their living environment.</p>	<p>the experiential learning encourage people to engage in creative thinking, in particular if the new knowledge can be transferred to their home environment and help them improve their living environment.</p>
<b>Network building capacity</b>	<p>Improving the living environment through the ecoremediations and the permaculture enables networking, because it presents the best practices, knowledge transfer, inter-generational socialization and the need for lifelong learning to improve people's living environment.</p>	<p>Organizing the workshops on the different places in the classroom in nature for the mutual discussion and knowledge transfer.</p>	<p>Experiential learning, teamwork.</p>	<p>Networking enables the dissemination of the knowledge about ecoremediation approaches and permaculture and the transfer of knowledge and practice into other contexts to improve the quality of the environment, conserve natural resources, and ensure the greatest possible level of self-sufficiency.</p>
<b>Internationalization</b>	<p>Improving the living environment through ecoremediation and permaculture to internationalization, as people from abroad, who have the same environmental, social and economic problems, can see the examples of good practice, intergenerational socializing, and the need for lifelong learning, improve the living environment, obtain new skills that contribute to successful solution of the problems and ensure SD.</p>	<p>Organizing the various study visits, working groups to discover the best practices in the classroom in the nature through the experiential education.</p>	<p>Experiential learning, teamwork.</p>	<p>Transfer of knowledge of the use of ecoremediation to eliminate environmental pollution and enhance ecosystem services and knowledge of permaculture to protect natural resources and to increase the self-sufficiency of the company. As a result, thus making the SD of the local environment.</p>
<b>Interdisciplinary</b>	<p>Ecoremediations prove that one can use natural approaches and exploit the natural resources, eliminate pollution in the environment and use natural resources to preserve health. Permaculture provides self-sufficiency, which results from the content of the closed-in circuit and enables the understanding of waste as material for further use. This can best be achieved by connecting the different areas. Experiential learning in the classroom in nature connects geography, environmental education, biology, chemistry, agriculture, economics, technology ... so all the natural and social science areas which are necessary for the SD of the environment.</p>	<p>Nature's Classroom, which is composed of: learning polygon for self-sufficiency and ecoremediations in Dole, learning paths and bike paths. All learning places are equipped with didactic educational items and learning boards.</p>	<p>Experiential education is based on fieldwork, experiments, research and team collaboration.</p>	<p>Interdisciplinarity allows the dissemination of the knowledge about ecoremediation approaches and permaculture and the transfer of knowledge and practice in other contexts to improve the quality of the environment, conserve natural resources, and ensure the greatest possible level of self-sufficiency.</p>
<b>Motivation aspects</b>	<p>Living in a healthy environment, where is</p>	<p>Nature's Classroom, which is composed of:</p>	<p>Experiential education is</p>	<p>Students learn the processes and management of</p>



	<p>achieved the natural balance and function of ecosystem functions and services is motivation for everyone. So the learners in the natural classroom learn about the possibilities, how can they on their own provide such an environment with preserving natural resources and producing a healthy food. Ecoremediation and permaculture allow this. These are natural approaches, which can provide every person with big effects and minimal financial resources. This self-independence regulation of healthy environment raises motivation for learning and practical work.</p>	<p>learning polygon for self-sufficiency and ecoremediations in Dole, learning paths and bike paths. All learning places are equipped with didactic educational items and learning boards.</p>	<p>based on fieldwork, experiments, research and team collaboration.</p>	<p>ecoremediation and permaculture. They can easily transfer these new skills to their home, and can use these natural approaches for natural protection with little money themselves. So they can easily ensure a healthy living environment and self-sufficiency with new practical knowledge.</p>
<b>Transferability</b>	<p>Outdoor and experiential learning about solving environmental problems, protection of natural resources and increasing self-sufficiency are developed on the permaculture and ecoremediations approaches. The learners learn first about the structure and function of the approach. Then they try to test its effectiveness. So they learn about the integrated operation and are able to critically evaluate the usefulness of one of represented natural systems. Learning on the case conquers the transferable skills, which are life-long skills that a person needs and looks for, because one can by oneself be able to build and make certain natural approaches. This knowledge is heterogeneous and can provide different solutions with multiple affects and ensure SD.</p>	<p>Nature's Classroom, which is composed of: learning polygon for self-sufficiency and ecoremediations in Dole, learning paths and bike paths. All learning places are equipped with didactic educational items and learning boards.</p>	<p>Experiential education is based on fieldwork, experiments, research and team collaboration.</p>	<p>Learners are learning on the concrete examples of the natural approaches, which solve the environmental pollution and natural sources. They acquire knowledge about the operation, design, construction and management of ecoremediations and permaculture arrangements. This knowledge can be easy transferable in their home environment.</p>
<b>Innovation activities (present)</b>	<p>Outdoor and experiential education happens in the classroom in nature. There are learners who learn on concrete examples. On them they do some tests and experiments. With this they learn by themselves and acquire new skills, which can be transferred to their home environment. With this experiential and experimental work they also learn to be critical and responsible at the same time.</p>	<p>Nature's Classroom, which is composed of: learning polygon for self-sufficiency and ecoremediations in Dole, learning paths and bike paths. All learning places are equipped with didactic educational items and learning boards.</p>	<p>Experiential education based on experiments and experience. It also encourages team working, where learners are trained how to work in a team and they can realize that a group can do more as an individual.</p>	<p>Self-learning in the classroom in nature, which happens on different places with different environmental or social problems, is guided and so the learners have the opportunity to acquire new skills by themselves through their own work (experiment, test). With this can learners achieve some skills for lifelong and they can see, that this knowledge is usefulness. So they have possibility to transfer this knowledge and skills to their environment.</p>



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## 7.14. Management of pests, diseases, and weeds

### Swedish University of Agricultural Sciences (SLU – Sveriges Lantbruksuniversitet), Faculty of Landscape Planning, Horticulture and Agricultural Sciences.

SLU is one of Sweden's most research-intensive universities, charged with the task of developing sustainable management and the use of biological natural resources. Education and research at the university spans a spectrum from genes and molecules to biodiversity, animal health, sustainable forestry, food supply, societal planning and sustainable urban and rural development, as well as global phenomena such as climate change and its effects.

#### *Mission Statement*

SLU develops the understanding and sustainable use and management of biological natural resources.

This is achieved by research, education and environmental monitoring and assessment, in collaboration with the surrounding community.

#### *Vision*

"SLU is a world-class university within the fields of life and environmental sciences."

**Country** Sweden

#### **Description**

The course gives fundamental understandings of the application of such basic disciplines as biology, ecology and technology for environmentally-sound and the sustainable management of pests, diseases and weeds in horticultural crops. The course follows up on species knowledge and principles from basic plant protection courses aiming at management programmes that are logical, practical and can be adopted by farmers.

On completion of the course the students will:

- Explain the fundamental applications and integration of such basic disciplines as biology, ecology and technology for the developing of the sustainable management of pests, diseases and weeds in crops that are logical, practical and possible to adopt by farmers
- Explain the definition of integrated pest management and its historical background.
- Have knowledge of and describe the authorities' responsibilities in plant protection issues in the agricultural sector within a European perspective.
- Explaining the environmental impacts of different pest management strategies.



**Focus** Important problems with pests, diseases and weeds especially in horticulture are addressed both traditionally and within the concept of integrated pest management and organic farming.

During the course students carry out several study excursions to farms. During these visits they practise their skills in communication with farmers, comprising farming practices as well as social and political aspects of farming.

The students showed progressive skills in the sustainability of production systems for horticultural and agricultural crops during the course. Through the different pedagogic methods used in the course and the large focus on individual work and discussion the students matured in their relationships to questions of sustainability and especially on plant protection issues. At the end of the course the students showed much more integrated and cohesive knowledge about sustainability within plant protection. The students understand and work with questions connected to sustainability.

Indicators	Descriptors	Content	Tools	Method	Outcomes
New technologies		Evaluation of new pest management strategies	Blended learning	Analysing international and national journals and interviewing stakeholders	Learners design new production system in the context of pest management
Holistic approach		Pests are evaluated as a part of the of the production system and theories are based in science of ecology	Blended learning	Learners develop hypotheses and visions about pest management	Learners understand the importance of including pest management in the design of the cropping system
Collaboration		Learners and lecturers work in a participatory way	Excursion	Discussion and problem solving	Learners understand the importance of collaboration
Critical thinking		Through analysing different production systems and discussing them	Case studies	Internet based case studies	Learners understand the complexities of the cropping system
Project base learning		Students work together to solve a complex problem	Case studies	Workshop	Learners develop skills to solve a complex problem and to collaborate
Creativity		Group work to learn how to present complex situations	The students create an editorial office	Students present to stakeholders pest management problems	Learners developed skills in presentation techniques
Network building capacity		Building network during their independent work	Contacts with relevant stakeholders	Independent practices	Learners develop cooperative skills
Internationalization		Exchange with international partners	International projects	Presentation of international projects/cases by visiting scientists	Learners develop an international understanding of the curriculum



<b>Interdisciplinarity</b>	Learning across the curriculum	Excursion	Group or team work	Learners are introduced to solving complex problems in the context of pest management
<b>Motivation aspects</b>	The learning environment are performed to create curiosity	Blended learning	Analysing farms students have visited or E-cases.	Learners show an interest in handling new challenges
<b>Transferability</b>	Students synthesize part of their knowledge	Collaboration Individual work	Applying their knowledge in new situations	Learners integrate their knowledge in new situations
<b>Innovation activities (present)</b>	The course is based on innovation pedagogic to get the students motivated to go on learning	All activities	Get students to reflect on their own learning	Reflecting and critically thinking students

### Further Information

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## 7.15. Green Academy

### University of Forestry, Sofia

The University of Forestry, (*Bulgarian: Лесотехнически университет — София (ЛТУ)*), often abbreviated as LTU) established in 1923 is located in Sofia. Formerly a division of Sofia university and after that Higher Forestry Institute it was renamed the University of Forestry with the Decree of the National Assembly of Bulgaria dated 27th of July 1995. The University of Forestry has two Forestry Training and Research Centres and one Training and Experimental Field Station. For more than 90 years the University of Forestry has been the only university in Bulgaria providing education in forestry, forest industry and landscape architecture. In the 1990s the range of scientific fields was expanded to include ecology, agronomy, veterinary medicine and business management. In the mid 1990's the University adopted the three-level degree system of bachelor, master, and doctor degrees. At that time it also introduced the European Credit Transfer System.

The motto of the University is *Bulgarian traditions and European standards in education*. As an educational institution the University of Forestry strives to establish an academic environment in which values such as professionalism, freedom of speech and thought, humanism, collaboration and tolerance are encouraged.

The Green Academy - an extension activity of Biological resources extension service (BIOREX) at the University of Forestry – Sofia. The University of Forestry (UF) in Sofia is the “Green Bulgarian University”.

The mission of the university is to disseminate knowledge within a broad range of subjects in the field of forestry, wood processing and furniture industry, engineering design, ecology and environmental protection, landscape architecture, agriculture and veterinary medicine, and the management of the activities in these fields.

**Country** Bulgaria

#### Description

- Both education and research at UF have multidisciplinary character beyond traditional engineering study covering almost all aspects of bio-economy.  
The Biological Resources Extension service BIOREX was developed within the framework of project funded by the USA for the Bulgaria Foundation.
- Conducting information events “Green academy” is one of the core activities of the extension service BIOREX.
- The Academies is a meeting point between academy, administration, businesses, and local communities.
- Amongst the lecturers are representatives of the University of Forestry, Executive forest agency, Bulgarian food safety agency, Ministry of agriculture and food, Agricultural academy etc.



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<b>Focus</b>	<p>The Green Academy is focused on the following topics: forests and their products, environment and biodiversity, agriculture, home and garden, food and health.</p> <p>The conducted so far green academies were hosted by vocational schools what allowed the involvement of young people in the idea of extension.</p> <p>The programme of events was set up on the basis of the preliminary need for identifying the region. Presentations, exhibitions and discussions, allowed the participants to exchange ideas concerning selected topics.</p>
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## 7.16. Practical questionnaire

### University of Forestry Sofia, Agricultural Faculty

This innovation practice was created within the University of Forestry, Agricultural Faculty (for details see 7.15.). The questionnaires are focused on problems concerning mushroom production in Bulgaria. They could be adapted for other disciplines. The total questions are 20, divided in three main groups – technological, economic and social. The students receive the blank document at the beginning of the course. The students are independent when forming work teams, selecting area and object to investigate and analyse the collected data. During the second half of the semester the students present their results and discuss with other colleagues and the teacher, sometimes the business partners are invited to participate in this event. The final assessments at the end of the course include significant parts of the knowledge received during this innovative activity.

The mission of this questionnaire is to activate students' efforts and disseminate knowledge received in real situations to other people using different forms (PPT, conferences etc.).

**Country** Bulgaria

#### Description

- The questionnaire has both education and research characteristic focused on agricultural topics. The questionnaire was developed and inspired of our participation in ISLE project.
- The total questions are divided in three main groups – technological, economic, and social.
- This questionnaire is easy to be adopted and use from another agronomic disciplines.

#### Focus

The mission of this questionnaire is to activate students' efforts and disseminate knowledge received in real situations to another people.

Evaluation of a questionnaire for lectures in mushroom growing, vegetable production or similar includes 20 questions about the farmers, area of interest, profit, growing technology and phytosanitary problems, possibilities to participate and be granted from public funds.

Students split it to the farmers and collect and analyse data and present them to the seminars with colleagues, teachers, and growers.



## Further Information

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## 7.17. Practices MON BG – National project of BG Government

### University of Forestry, Sofia – beneficent of BG Government

University of Forestry (for details see 7.16.) is active participant in this action. The main targets of the project are: to improve the quality of education by providing opportunities to gain experience and improve the practical skills of students from universities in accordance with the needs of the labour market; to facilitate the transition from education institutions to the workplace and increase the successful realisation of young people into the labour market; to support and encourage the development of strong partnerships between educational institutions and business; to increase incentives for students at every level of their education (BSc and MSc) to participate in additional practical training in a real work environment; to stimulate growth in the number of students who find a job immediately after graduation; to provide the conditions for updating both the curriculum as a whole, and taught subjects, courses and topics according to the needs of the labour market; to support the establishment of sustainable mechanisms and opportunities, employers' selection of students who have proven skills within a real working environment, and their direct involvement in the labour market.

**Country** Bulgaria

#### Description

- Activities on methodological, technical and administrative procedures to ensure the conduct of student placements.
- Development of methods, materials and programmes.
- Creation and maintenance of a web - platform and modules for service coordination process and implementation of student placement.
- Training of functional experts.
- Coordination and provision of student placements.
- Organisation of information campaigns among employers.
- Recruiting employers.
- Organisation of information campaigns amongst students and teachers
- Application, recruitment, approval of students, training, implementation and certification of student practice within a real work environment.
- Perform the on-going monitoring of activities by conducting student placements.  
Multiplying and transparency of the process and of the implementation of student placements.

#### Focus

The Practices MON BG – National project of BG Government is focused on the following topics: students, academic staff, employers, and the current situation of the labour market. The implementation of the project enlarges the connections between educators, trainers and





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employers. It gives a chance to establish and research real problems and to go on towards sustainable agricultural practices and to improve educational system in Universities.

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## 7.18. Agro-environmental chemistry – a (requisitely) holistic view

### University of Maribor, Faculty of Agriculture and Life Sciences

The mission of the University of Maribor is based on the quest for knowledge, authenticity, creativity, freedom of spirit, cooperation, and the exchange of information in science, arts and education. In its concern for humanity and SD, the University of Maribor enriches our store of knowledge, strengthens humanist values, raises our level of awareness, a culture of dialogue, and the quality of life and justice throughout the world. The University of Maribor will be a globally recognized ecosystem of innovation in which the students, faculty and administrative staff will enthusiastically engage in creative activity.

The vision of the FALS is to become an educational, research and economy-integrating centre of European importance, where superb knowledge will be created and later spread amongst domestic and foreign graduates at all study levels, as well as into the technological knowledge of agricultural holdings and companies. We wish to become a renowned European centre with intensive exchanges of professors, researchers and students. The FALS's vision in connecting with corporations is to become a development incubator and a place for demonstrating and analysing alternative technological and business processes in agriculture, food processing and environmentalism. The FALS wishes to become an important factor in the creation of the agricultural, economic and environmental policies of the Republic of Slovenia (RS) and a European factor in these areas.

Agro-environmental chemistry is a course of the 1<sup>st</sup> level study programme Agriculture and the Environment, which started in 2014/2015.

**Country:** Slovenia

**Description** A requisitely holistic approach to agro chemistry of the atmosphere, hydrosphere and the terrestrial environment evoked by the discussion Environmental burden resulting from agricultural production and their tracking  
Effects of increased intake of nutrients in agricultural ecosystems, balanced nutrient cycling  
Soil pollution (sources and types of pollution, organic (pesticides...) and inorganic pollutants (heavy metals)  
Measures to protect the quality of air, soil, surface water and groundwater  
Recycling of agricultural waste; Ecodesign – “waste equals food”  
Environmental protection in agriculture: protection and recovery of the polluted soil, cleaning of the polluted soil, ecoremediation, wetlands, water protection, biodiversity, renewable energy  
Sustainable environmental agro-chemistry



Social issues and the environment: effects, the burden, human responsibility, risk, environmental ethics, human ecology, ethical values  
Food system studies – local food self-sufficiency and their importance  
Food chemistry – food as the medicine of nature  
Vegetarian food  
Alkaline and acid food  
Raw food chemistry  
Natural laws that are governing geo-, bio-and social systems  
Bio-energy  
Specific examples

**Focus** The aim of this course is to educate and train students to integrate different skills in order to recognise and analyse environmental problems and to evaluate options for addressing them. The purpose of this course is to acquaint students with the requisitely holistic approach to agro-environmental protection.

Learning and teaching methods: a requisitely holistic approach to learning, use of »Open space« moderator tools, ongoing discussion between students and lecturer, opinions pro and contra.

Agro-environmental chemistry is a case study course, which includes all pillars of SD connected through the content (syllabus outline) with a requisitely holistic approach. The environmental dimension refers to the consumption of resources (energy, water, and minerals), pollution (soil, water, and air), waste reduction, transport, organic food, land use and cultivation practices, short local supply chains... The economic dimension is reflected in cost reduction, possible foundations, environment-friendly goods and services, including the local self-sufficiency of organic food, emphasising the importance of a vegetarian diet and raw food. The social dimension of the course includes cooperation within and with the wider community, environmental awareness raising and promoting values. Participants have the opportunity to learn the importance of respecting ethical values and social responsibility. Students will know the environmental impact of agriculture, environmental protection measures and conservation of multi-functionality in rural areas. Critical thinking. Ability to adapt quickly to situations. Taking independent decisions.

### Further Information

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Descriptors Indicators	Content	Tools	Method	Outcomes
New technologies	Using new technologies participants understand complex/global problem	Open space moderation tool, video, e-library, social media, ISLE tools.	Stimulation of the interactivity of the participants and teaching staff to choose the applicable idea.	Open minded, critical and reflective participants
Holistic approach	Participants connect their open mind, transcend their traditional boundaries, connecting the importance of the respect for ethical values and social responsibility with sustainable agro-environmental chemistry topic	Participants elaborate, present and discuss seminar works, express their opinions, points of view. Open space moderation tool.	Problem-based learning, opinions pro and contra, tutoring, capability to think about connecting different aspects, open space principles.	Participants develop a requisitely holistic approach to sustainable agro-environmental chemistry issue.
Collaboration	Ongoing collaboration is established in a creative atmosphere; discussion about the topic takes place partially inside small groups, partially in the entire group of participants	Humans should be humans to the human being. Listening to others, respect each other, encouraging that each participant expresses the best of one-self	Personal skill of the moderator to find a solution for excellent team work. Consultative team learning to find easy and innovative solutions and to create synergetic effects	Integration of disciplines. Collaboration among participants and with teachers. Discussion for acceptable and reliable solutions.
Critical thinking	To create the capacity to develop the problem looking for better solutions, participants are faced with actual problems	The analysis of the case studies, ongoing discussion, expression of participant opinions	Ongoing controversial discussion, opinions pro and contra Evaluation of case studies, analysis, results	Participants express individual way of thinking
Project base learning	Ability to see agro-environmental chemistry issues as a linking space concerning the 4 pillars of ESD (ethics, society, ecology and economy)	Seminar work presentations, round tables, workshops	Public discussions. Evaluation of the results. Involvement in the project work.	Participants are able to adapt quickly to situations. Taking independent decisions.
Creativity	Apply innovative proposals in real situations. Mediating diverse opinions of all participants.	Round tables, workshops, seminar work presentations, video challenge.	Brainstorming, open space moderation tool, opinions pro and contra, tutoring, knowledge sharing	Participants present a new design to transfer the knowledge in unfamiliar situations. Open minded creativity of participants.
Network building capacity	Networking capability.	Internships and collaboration with civil society, NGO's and governmental institutions in local and global levels.	Informal learning, use of social media tools. Co-working. Ideas like ISLE video challenge for students.	Participants develop management skills and cooperative competencies.
Internationalization	Participants from all Universities welcome! Ethical relationship with international partners	International participant in exchanges encourages new point of views	Participation of students from other countries with different point of views.	Participants exchange their experiences and their knowledge
Interdisciplinarity	Agro-environmental chemistry is a case study course. It includes all pillars of SD, connected through the content with a requisitely holistic approach.	Interdisciplinary working groups.	Team teaching. Invited lectures.	Participants are able to present complex information and to argue controversial issues. They are able to understand the necessity of inter-



				disciplinarity
<b>Motivation aspects</b>	<p>Teacher's capability to motivate students is a key that makes participants proactive with many questions, aspirations, conscious.</p> <p>A motivation leads us through the end of the day, but inspiration leads us through the whole life!</p>	<p>Teacher's frame of mind to provide useful knowledge which inspires participants to become proactive. Co-working.</p>	<p>Participants submit their opinions; ongoing discussion, opinions pro and contra motivate students to co-work.</p>	<p>Increasing of the employment and self-employment capacity of the participants by motivating them to elaborate a seminar work in such a way, that it could be the basis of their own company.</p>
<b>Transferability</b>	<p>Content of the agro-environmental chemistry course can be applied in other countries. It is applicable also in other course cases.</p>	<p>The teaching tools can be applied in other courses and other countries</p>	<p>The teaching method can be applied in other courses and other countries</p>	<p>Applying knowledge and skills independently</p>
<b>Innovation activities (present)</b>	<p>The main innovation aspects concern the requisitely holistic approach, project-based learning, the network-building capacity, motivation aspect, creativity and the interdisciplinarity of the agro-environmental chemistry course.</p>	<p>Inspired participants develop their own personal niche which leads to the establishment of ideas how to start their own business</p>	<p>Participants have to elaborate, present and discuss their own ideas</p>	<p>Increasing of the employment and self-employment capacity of the participants by specific skills.</p>



## 8. GAPS AND FUTURE DIRECTIONS

The Innovative Practices Compendium gave rise to significant findings. Among the innovative practices shown, emergent signs of innovative ideas in the teaching of SD within life sciences are evident in the reports dealing with the extraction of good practices published in the Compendium Good Practices (Chiodo, 2013) during the same ISLE project.

A number of gaps in teaching, skills, competences and useful knowledge might set a useful agenda for the further evolution of teaching the sustainable development in the area of life sciences. Especially regarding the ethical and social pillars of SD, there is a huge gap for further research and intervention strategy by the politicians.

The more common barriers in SD teaching in EU universities nowadays are:

- lack of awareness/ignorance/laziness
- professors' resistance to changes
- lack of cooperation
- lack of coordination between subjects and professors
- complexity/ interdisciplinarity
- new curricula are needed

Leticia Chico Santamarta, an excellent teacher from the ISLE partner institution Harper Adams, UK, wrote on Facebook:

“It is sad leaving the office late to finish a presentation but the feeling is even worse when you see your students completely wasted in the street! I just wonder why I have put so much effort in preparing the lecture, if tomorrow they will not even listen to what I have to say (and they will all be covered in blue paint, because they will have to answer all the questions).”

One of the biggest gaps in the teaching of SD nowadays is the demotivation of students. How to motivate them? How to even inspire them? It is very important just to listen to them, to give them power that their opinions are equal to teachers' opinions. Who is right anyway? Are teachers right with all their knowledge and experiences or the open-minded, unrestricted students?

I asked my seventeen year old son Sebastjan, who is almost a student, for his opinion on students' demotivation. After a while he replied: “they are trying to prove themselves, not knowing that knowledge is going to improve their existence”.

Motivation leads us through at the end of the day, but inspiration leads us throughout our whole lives.

We'd all like to live in prosperity. Nowadays it is obvious that the path to prosperity travels through the wisdom of respecting all pillars of SD, especially ethical - social ones. Useful knowledge of SD is going to improve our existence, that's why it is so important to attain this knowledge.



## 9. CONCLUSION AND RECOMMENDATIONS

The biggest problems nowadays started with our education; thus learning is not only individual, but is also a social phenomenon. It is the right time for the development of systemic, i.e. requisitely holistic, innovations.

According to HEFCE's (2009) vision our starting point is that over the next years the higher education sector "will be recognised as a major contributor to society's efforts to achieve sustainability – through the skills and knowledge that its graduates learn and put into practice, its research and exchange of knowledge through business, community and public policy engagement, and through its own strategies and operations." For this reason Sustainable Development education has to become a central issue for Higher Education Institutions (HEIs). As observed by UNESCO Associated Schools (2011), Ministries of Education worldwide are currently examining how to introduce and reinforce the SD dimension throughout the curricula, in the training of teachers, in extra-curricular activities and in non-formal education. So an approach that considers all these aspects - and possibly also their interrelationships – is necessary. (Chiodo, 2013)

The objective of the work carried out in the WP6 working group of the ISLE project has contributed to these goals with the selection and presentation of innovative practices connected with SD education in Higher Education Institutions (HESD).

All Innovative Practices were chosen for their attention to transferability, inter- and trans-disciplinary approaches to ESD, the attention to achieving tangible results, the involvement of local communities and the bottom-up approach, the importance of partnerships and networking, the capacity building and the innovations of the initiatives. The described innovative practices can be replicated in other contexts present all over Europe. Detailed recommendations for the innovative teaching of SD are described in Chapters 4, 6 and 7 of this report.

Education and learning processes within virtual environments require responsibility and self-initiative from each individual. The success of virtual learning depends on mutual relationships, communication, and group motivation. Experiences showed that when the tutor was included within the educational process and was active, the group was more motivated and the work was done according to the work plan. A tutor has to be a person who students can trust, somebody who is interested in their work, progress, and is personally involved in the process.

Interdisciplinary and trans-disciplinary approaches are the most suitable approaches in educating for sustainability. Moreover, SD needs disciplines to transcend their traditional boundaries and move towards a holistic concept, able to integrate regarding socio-economic, ethical, and environmental questions.

The main goal nowadays isn't the solutions to theoretical questions but the changes in the values of society and in the behaviour of the people, starting from the practitioners of the education process. The teacher's mind-set is a key to the education of SD. With our society and our world within sight of a major breakdown from resource scarcity and subsequent political conflict, it has become crucial that we face up to the need for a radical shift, beginning with a change of perception inside each one of us. Our survival depends on learning the very lessons of empathy, responsibility, self-control, and humility.



The acceptance of whole food, plant-based diet model for all programmes taught at universities seems to be one of the more important innovations in the teaching of SD within life sciences.

Today's students will be tomorrow's leaders, intellectuals, and they will handle the authority and power, so the mission of HEIs must be to give them not only the know-how but also and above all the VCEN (values/culture/ethics/norms). Precisely because of this power that it is very important to speak out regarding spiritual topics with students and educate them to be specialists who are skilled in handling power and influence in their professional activities.

HEIs teachers must grasp the significant importance of allowing the younger generation to stay open-minded and to use this open mind-set to research their environment and just to tutor them into acquiring their own requisitely holistic points of view. It seems to be a reasonable way to teach this younger generation how to also acquire useful knowledge about things that we, their teachers, don't understand.

Recommendations: Open space principles, opinions "pro" and "contra", problem-based learning, tutoring (tutor as mediator), knowledge sharing, VCEN (values/culture/ethics/norms) exposing honesty and reliability, interdependence and requisite holism.

It is time that teachers allow students, as young as they are, to also teach them - the teachers. This seems to be the most important recommendation - innovation in teaching of SD, especially within life sciences.

Teaching is needed which provides the participants with knowledge that changes their lives. We need green, generative, and researching higher education institutions for the makeover of economy and society. Useful knowledge of SD is going to improve our existence, that's why it is so important to attain this knowledge.

Nowadays it is obvious that the path to prosperity travels through the wisdom and VCEN of respecting and realising all pillars of SD.

The students may become protagonists of the learning process and of the interaction between HEIs and civil society. Relationships that can be realized between HEIs and civil society, with particular regard to local communities, are very important. Partnerships amongst different institutions are created for better achieving the goals on ESD, networks are created to share knowledge and experiences within universities, links between universities and business are achieved for better defining the field of application of ESD and to spread innovation amongst enterprises.

Increasing the role of HEIs within society contributes not only to their fundamental tasks of research and education, but also for the activities of local people's involvement, dissemination, diffusion of new approaches to social and environmental issues, and social innovation.

The Innovative Practices Compendium presents several types of innovations: in the topics (globalisation, healthier lifestyles, energy production and consumption, green procurement, social inclusion), in the methods (multi-stakeholders and participatory approaches, usages of new technologies, new learning methods, inter-disciplinary and trans-disciplinary approaches) and in the capacity of building an institutional and cultural framework favourable to SD education.

Education is a key instrument for bringing about changes in values and attitudes, skills, behaviours and lifestyles consistent with sustainable development (UNESCO Associated Schools, 2011). The conditions for success of the presented initiatives are not only linked to the capacity of providing students with new knowledge, practical skills and competencies, but





above all they are linked to the widespread adoption of new values, attitudes and behaviour aimed at contributing to sustainable development for current and future generations.

We need to develop a conceptual framework that integrates the biological, cognitive, and social dimensions of life; a framework that enables us to adopt a systemic approach to some of the critical issues of our time.

In times of crises, society needs a university capable of providing innovative solutions and opening up new horizons. As Einstein put it, “problems cannot be solved by the same level of thinking that created them”. Therefore, effective solutions must be sought at a higher level. Universities play a key role in raising awareness of social responsibility and SD that meets the needs of the present without compromising the ability of future generations to meet their own needs.

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## **Innovative practices compendium**

The Innovative Practices Compendium was the final product of Work Package 6 entitled "Innovative Practices" which was carried out within the framework of the **ISLE** Erasmus Thematic Network (**I**nnovation in the teaching of the **S**ustainable Development of **L**ife Sciences in **E**urope) which was co-financed by the European Community within the framework of the Lifelong Learning Programme.

ISLE was a 36-month project that started in October 2010. Its consortium consisted of 38 partners from 32 European countries representing Higher Education Institutions, Research Institutes, and Enterprises that focus on life sciences.

The project's objective was to implement the concept of Sustainable Development within Higher Education (HESD). The project approached the topic in a comprehensive way, analysing the different aspects concerning the implementation of SD in higher education and developing both research activities and specific tools and devices that could be utilised by the wider sector for facilitating HESD.

The objective of Innovative Practice Compendium is the extraction of existing and other ideas for possible innovative practices in the area of HESD.

18 Innovative Practices are discussed and presented in form of indicators and descriptors. The Innovative Practices were mostly selected from a Compendium of Good Practices emerging from the previous Work Package 3 analysis, carried out within the ISLE project, and from the research of the project partners.

The (requisitely) holistic and interdisciplinary approaches to HESD, the attention to achieving tangible results, the involvement of local communities and the bottom-up approaches, the importance of partnerships and networking, the capacity building, the innovation of the initiatives, the attention given to building a framework favourable to SD, tutoring and VCEN (values/culture/ethics/norms) was the common thread during the formation of an Innovative Practices Compendium.

The biggest problems nowadays started with our education; thus learning is not only individual, but is also a social phenomenon. It is the right time for the development of systemic, i.e. requisitely holistic, innovations. Academic society today has the privilege of lauding and showing the sustainable path.

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