IO1_A1: Partner's current practices for the environmental security sector

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1. Environment and climate change

The EU has some of the world's highest environmental standards, developed over decades. Environment policy helps the EU economy become more environmentally friendly, protects Europe's natural resources, and safeguards the health and wellbeing of people living in the EU.

Environmental quality is central to our health, our economy and our well-being. However, it faces several serious challenges, not least those of climate change, unsustainable consumption and production, as well as various forms of pollution.

EU environmental policies and legislation protect natural habitats, keep air and water clean, ensure proper waste disposal, improve knowledge about toxic chemicals and help businesses move toward a sustainable economy.

On climate change, the EU formulates and implements climate policies and strategies, taking a leading role in international negotiations on climate. It is committed to ensuring the successful implementation of the Paris Agreement and implementing the EU's Emissions Trading System (EU ETS). In this regard, EU countries have agreed to meet various targets in the years to come. The EU seeks to ensure that climate concerns are taken on board in other policy areas (e.g. transport and energy) and also promotes low-carbon technologies and adaptation measures.

EU environment policy is based on Articles 11 and 191-193 of the Treaty on the Functioning of the European Union. Under Article 191, combating climate change is an explicit objective of EU environmental policy. Sustainable development is an overarching objective for the EU, which is committed to a 'high level of protection and improvement of the quality of the environment' (Article 3 of the Treaty on European Union).

1.1 EU Environment Policies

The 7thEnvironmental Action Programme (EAP) established three thematic priorities for the period until 2020:

- 'To protect, conserve and enhance the Union's natural capital';
- 'To turn the Union into a resource-efficient, green and competitive low-carbon economy'; and
- 'To safeguard the Union's citizens from environment-related pressures and risks to health and well-being'.

In addition, it includes four priority objectives for an enabling framework:

- 'To maximise the benefits of Union environment legislation by improving implementation';
- 'To improve the knowledge and evidence base for Union environment policy';
- 'To secure investment for environment and climate policy and address environmental externalities';

1.1.1 To improve environmental integration and policy coherence.

Two horizontal priorities address the objectives 'to make cities more sustainable' and 'to address international environmental and climate challenges more effectively.' The 7th EAP builds on policy initiatives in the Europe 2020 strategy and other strategies in thematic areas, such as the 'climate and energy package', the 'Roadmap for moving to a low-carbon economy in 2050', the 'EU Biodiversity Strategy to 2020', the 'Roadmap to a Resource-efficient Europe', the

‘Innovation Union Flagship Initiative’ and the ‘European Union Strategy for Sustainable Development’. These strategies include specific targets for 2020 as described below in the respective thematic sections. In 2018 and 2019, the Commission carried out an evaluation of the 7th EAP, based inter alia on the European Environment Agency (EEA)’s report on the state of the environment and on a consultation with interested stakeholders. 3 Another cross-cutting activity was the fitness check on reporting and monitoring of EU environment policy which resulted in Regulation (EU) 2019/10104 on the alignment of reporting obligations in the field of legislation to the environment adopted in June 2019.

1.1.2 Sustainable Development

The first sustainable development strategy in the EU was released in 2001. In 2008, the Commission proposed a package of actions and proposals on Sustainable Consumption and Production (SCP) and a Sustainable Industrial Policy Action Plan. These proposals introduced Life Cycle Thinking into European policies. The SCP Action Plan led to initiatives in a number of areas, which are presented below. The review of the Sustainable Development Strategy for the EU (EU SDS) in 2009 focused on mainstreaming sustainable development into EU policies. A key example of this mainstreaming approach is the EU’s Europe 2020 strategy for smart, sustainable and inclusive growth8 published in 2010. The Commission publishes a bi-annual monitoring report on sustainable development and Eurostat developed Sustainable Development Indicators together with MSs in order to track implementation of the goals.
In 2015, the United Nations General Assembly formally adopted the 2030 Agenda for Sustainable Development, along with a set of 17 Sustainable Development Goals (SDGs) and 169 associated targets. In November 2016, the EU adopted a sustainable development package and presented its next steps for a sustainable European future in response to the 2030 Agenda and the SDGs.9 As part of this package, the EU has committed itself to ‘fully integrating the SDGs in the European policy framework and current Commission priorities.’10 In January 2019, the Commission published a reflection paper ‘Towards a Sustainable Europe in 2030, which proposed three scenarios for the future EU policy.

1.2 Sustainable consumption and production policies

1.2.1 Eco-management and Audit Scheme (EMAS)

EMAS is a management tool enabling companies and other organisations to evaluate, report and improve their environmental performance. In 2001, the scheme was extended from industrial companies to all economic sectors, including public and private services. A 2009 revision of the EMAS Regulation19 aimed to encourage further registration with EMAS. In 2017, Regulation (EU) 2017/150520 amended the Annexes I, II and III of the EMAS Regulation to include changes associated with the revision of the ISO 14001 standard on quality management systems.

1.2.2 Ecolabelling and energy labelling

Labelling aims to provide information to consumers so that they can make informed choices. The European Ecolabel is a voluntary scheme established in 1992 through the Ecolabel Regulation and was last revised in 2010. So far, cleaning products, appliances, paper products, clothing, home and garden products, lubricants and services such as tourist accommodation have received the label. Ecolabel criteria are based on impacts identified in a life cycle assessment.
The EU Energy Label established by Directive 92/75/EEC23 guides consumers with regard to the energy efficiency of appliances (white goods). The Energy Labelling Directive24 was revised in June 2010 to cover a wider group of energy-related products. Regulation (EU) 2017/136925 established new energy labelling requirement for specific product groups. Requirements will be stepped up from 2021 onwards: for fridges, dishwashers, washing machines, TVs and lamps, an A+++ label will be replaced by a B categorisation for the same level of energy consumption. Products will need to prove that they are more energy efficient than those classified as B in order to be labelled as A class.

1.2.3 Eco-design

The Eco-design Directive established a framework for setting eco-design requirements applicable to energy-using products, such as boilers, computers and televisions. It aimed to foster the technical improvement of products. A 2009 revision extended the scope of the Directive to products with an indirect impact on energy consumption such as water-using devices, windows and insulation material.

1.2.4 Green Public Procurement (GPP)

GPP is a voluntary policy whereby public authorities opt to purchasing products, services and works with a better environmental performance and reduced negative impacts. The first two Directives referring to public procurement were adopted in 2004. Three Directives were adopted in February 2014 as part of the reform of public procurement under the Single Market Act.
These Directives aim to simplify the relevant procedures by improving the conditions for business to innovate and encouraging wider use of green public procurement. To date, 21 sets of GPP criteria have been published for selected sectors such as transport, office IT equipment, cleaning products and services, construction, thermal insulation, and gardening products and services. MSs implement GPP through National Action Plans.

1.3 Resource efficiency, the circular economy and waste management

1.3.1 Resource efficiency

The 'Resource efficient Europe' is one out of seven flagship initiatives of the Europe 2020 strategy. As stipulated by the flagship, the EC published the 'Roadmap to a Resource Efficient Europe in 2011 "to define medium- and long-term objectives and means needed for achieving them". The objective is to achieve a shift towards sustainable growth, to use fewer resources for the same production levels and to move towards a circular economy where resources are recycled and re-used. Therefore, resource efficiency, the circular economy and waste management practices are strongly interlinked. The roadmap builds on the earlier 2005 Thematic Strategy on the Sustainable Use of Natural Resources.

1.3.2 Waste management and prevention

Waste legislation in the EU started more than 40 years ago with the Directive on toxic and dangerous waste and has since then led to a considerable amount of legislation. The more recent developments are described above under 'circular economy'. Earlier Regulation includes the 2006 Waste Shipment Regulation, which prohibit exports of hazardous waste to countries outside the OECD and exports of waste for disposal outside the EU/European Free Trade Association. A 2014 amendment of the Waste Shipment Regulation addressed the issue of illegal waste shipments inter alia by enhancing inspections. A number of additional directives and regulations in the EU address specific waste types:

- Directive 86/278/EEC46 on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture;
- Directive 96/59/EC47 regulates the controlled disposal of polychlorinated biphenyls (PCBs) and polychlorinated terphenyls (PCTs) and of equipment containing these substances with the aim of eradicating them entirely;
- Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)48 aimed at protecting the environment and health from the use of six hazardous materials found in electrical and electronic products;
- Directive 2011/65/EU49 known as RoHS-Recast or RoHS 2 required RoHS compliance for CE marking of products while Directive 2015/86350 known as RoHS 3 added four additional restricted substances (phthalates) to the list of six and specified maximum levels in products for the restricted substances. In 2017, a further modification of the RoHS Directive was adopted to enable secondary market operations and allows the use of spare parts for electronic and electrical equipment.

1.3.3 Air quality

Air quality in Europe has improved in recent decades due to joint efforts by the EU and national, regional and local authorities. Directive 2008/50/EC on ambient air quality set limits for the main air pollutants (sulphur dioxide, nitrogen dioxide, oxides of nitrogen, (fine) particulate matter, lead, benzene, carbon monoxide and ozone). The Clean Air Programme for Europe started in 2013 and aimed to promote compliance with EU law by 2020 and with new air quality targets up to 2030. The revised National

Emission Ceilings Directive mainly supports this aim by tightening the limits for the five key pollutants and obliges MSs to establish national programmes to control air pollution. In addition, a new Directive to diminish air pollution from medium-sized combustion plants resulted from the programme. Industrial installations need to fulfil specific standards to prevent the pollution of water air and soil in accordance with the Directive (EU) 2010/75 on industrial emissions.

In 2018 the Commission came forward with the Communication 'A Europe that protects: Clean air for all', which outlined measures available to help MSs fight air pollution and set into motion more high level national Clean Air Dialogues.

To address pollution from road transport, a number of Directives define emission performance standards for different types of vehicles and set standards for fuel quality. Currently, for cars and light vans Euro and Euro emission standards define maximum emission quantities for air pollutants, specifically nitrogen oxides and particulate matter. In response to the 'dieselgate' scandal with the employment of software to manipulate NOx emissions, new cars need to undergo a test for ascertaining 'Real Driving Emissions' (RDEs) since 2017 and cars and heavy-duty vehicles are required to fulfil a number of other new standards. Additionally, a temporary committee investigating the measurement of emissions in the automotive sector has been calling for accountability of MSs and car manufacturers and for retrofitting or pulling out highly polluting cars from the market.

2. Climate change in the partner's countries and practices

2.1 UK

The United Kingdom (UK) government has long held an interest in the relationship between environment and security. Although not shaped as a comprehensive environmental security policy, the attention given to this issue is clearly reflected in the policies and programmes of several UK government departments, as outlined in this chapter.

In a speech earlier this year, Gordon Brown, Britain's Chancellor of the Exchequer, outlined the direction of UK policy in the coming years. Reflecting the aims of the second Comprehensive Spending Review (CSR) that will guide government spending in the next decade, Brown put security at the heart of UK government policy making. In his words, the Government will ensure: 'first, a robust security response which protects both the safety and liberties of our citizens; second, a determination to tackle terrorism internationally and nationally; and third, to tackle not just terrorism but the roots of terrorism - the extremism which seeks to justify it and the grievances that fuel it, fund it and give it cause

The objectives of the CSR, related to environment and security, include: 'an examination of the key long-term trends and challenges that will shape the next decade – including demographic and socio-economic change, globalisation, climate and environmental change, global insecurity and technological change – together with an assessment of how public services will need to respond'4

The UK government priorities in the area of environmental security can be seen to sit in four interconnected sub-areas, as considered below:

- Global Security
- Energy Security and Climate Change
- Poverty Reduction

2.1.1 Energy Security and Climate Change

Addressing issues of energy security and tackling climate change have always been at the forefront of UK government policy making. Within the current decade it is likely that the UK will become a net importer of oil and gas and, as with many other developed countries, a decline in the energy supply to the UK would be felt almost immediately.

In 2003 the UK government set out its policy on sustainable energy in its Energy White Paper which established four goals for UK policy: reduction of carbon emissions; energy security; competitive markets; reduction of fuel poverty. The government's strategy was thus groundbreaking in respect of energy policy in that it addressed the dual challenge of tackling climate change and delivering secure and affordable energy supplies. Of particular note is the UK's commitment to engage in increased cooperation with countries exporting oil and gas to ensure that supplies to international energy markets are both reliable and affordable. The UK also works with countries that import oil and gas to ensure that they manage demand by increasing energy efficiency to the maximum extent possible. The government is now undertaking an Energy Review which will also address how it can meet climate change and energy security objectives.

As said above, the UK government links energy security to addressing the effects of climate change. Prime Minister Tony Blair has articulated his government's views on climate change on a number of occasions. In his Foreword in the UK's Sustainable Development Strategy (2005), Securing the Future, Mr Blair recognised that 'climate change represents a potentially catastrophic threat. The UK government acknowledges that climate change is a serious threat to both the environment and the global economy. A serious disruption could rapidly have serious effects on the economy, public services and security in the country. At the UK Energy Strategy Launch in October 2004, Foreign Secretary Jack Straw acknowledged that 'maintaining Britain's access to secure and affordable energy supplies, while mitigating the effects of climate change is a dual energy challenge.' In this context, the FCO works closely with the Department of Trade and Industry (DTI), Her Majesty's Treasury (HMT) and other government departments 'to monitor energy market developments and maintain a detailed understanding of the dynamics of producer-consumer relations, in order to inform the necessary policy responses to cope with significant changes in energy supply.

The UK is a strong and influential player in taking forward the climate change agenda highlighting the important links between energy supply, environmental change and security and encouraging international action on this issue. The UK's G8 Presidency in 2005 was instrumental - producing a political statement on the importance of climate change and a landmark agreement among G8 leaders on the role of human activity; generating a package of actions to reduce emissions; and securing agreement to a continuing Dialogue on Climate Change, Clean Energy and Sustainable Development between the 20 countries with the greatest future energy needs.

The Dialogue aims to complement the UNFCCC process by providing an informal space for discussion for developed and developing countries to address interlinked challenges such as climate change, low-carbon development, and security of energy supply. The first annual Ministerial meeting of the Dialogue took place in November 2005. The UK is working closely with the Mexican government on arrangements for the second Ministerial meeting, due to be held in Mexico in October 2006, including on the development and transfer of technology, market mechanisms/economics, and adaptation.

The UK government is also actively trying to understand the consequences of climate change at national and global levels. It recently commissioned a review of the economics of climate change, headed by Nick Stern. The Stern Review asserts that 'greenhouse gases have broadly the same impact on the climate wherever in the world they are emitted. And in terms of its consequences, no region will be left untouched. But impacts will be unevenly felt throughout the world. Some of the most severe impacts will be felt in the poorest countries that are least able to adapt to the changes. Stern is due to present his report to the UK government in October 2006.

2.1.2 Integrating climate change vulnerability into development policy

DFID is also working to integrate climate change vulnerability and risk management into development policies, recognising that inadequate energy supplies and climate change impacts can constrain economic growth and development. A key challenge that has been embraced by DFID is to improve developing countries' access to affordable and efficient clean energy technologies, and to ensure that future international policies on climate change properly consider the interests of developing countries. DFID also recognises that climate change increases the frequency and strength of climate-related disasters.

Through the effective incorporation of disaster risk reduction approaches into policy and planning, DFID is contributing to international efforts to help developing countries adapt to climate change impacts.

2.1.3 UK Actions to Improve Environmental and Natural Resource Management

The UK government takes part in, and has launched, several initiatives, to improve the management of natural resources, enhance cooperation and promote transparency and accountability in the use of natural resource revenues.

Extractive Industries Transparency Initiative (EITI)

The EITI was launched by Prime Minister Tony Blair at WSSD in Johannesburg, in September 2002. The initiative aims to support governance programmes in resource-rich countries through the full publication and verification of company payments and government revenues from oil, gas and mining. The idea is that when governance is good, resources can generate large revenues to foster economic growth and reduce poverty. However when governance is weak, abundant natural resource may instead cause poverty, corruption, and conflict – the so called 'resource curse'. The EITI aims to defeat this 'curse' by improving transparency and accountability. Twenty countries have committed to EITI principles and criteria since signing the Statement of Principles and Agreed Actions in London in 2003. Some countries are only now beginning to launch the process, while others have published revenue and payments data.

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Illegal logging

Illegal logging is another area given priority by the UK government. In January 2006 DFID and Defra announced that the UK government would allocate £24 million over the next five years to help tackle the problem of illegal logging. This contribution, according to International Development Minister Gareth Thomas, will 'take forward measures that will support better governance and law enforcement and influence demand for legally sourced products in countries such as Cameroon, Gabon, Ghana and Indonesia'. The UK's involvement in tackling illegal logging complements the Forest Law Enforcement, Governance and Trade (FLEGT) regulation adopted by the EU in December 2005 and comes as part of the UK's broader commitments made at the G8 Environment Ministers' meeting in March 2005.

Kimberley Process (KP)

The UK participates in the Kimberley Process, a voluntary international agreement that regulates the trade in rough diamonds. Since January 2003, participants within the KP (45 governments, with the EU as one member and all the major producing and importing countries) have operated a certification scheme to control the export and importation of rough diamonds. Under the scheme, only rough diamonds which are accompanied by a government issued certificate stating the diamonds have not been sold to fund armed conflict can be imported and exported. Trade between participants and non-participants is not allowed.

2.1.4 Environment and Security Risk and Needs Assessment and Management

There is growing interest among UK policy-makers in tackling the problem of fragile and unstable countries. DFID is introducing political analysis to its work, using an approach known as 'Drivers of Change' to understand what is likely to bring about positive change in countries and how to encourage powerful groups to take account of poor people's needs. DFID has so far carried out 'Drivers of Change' studies in 15 countries.
The importance of tackling the issue of failed states prompted Prime Minister Tony Blair to ask his Strategy Unit to lead a cross-departmental team to analyse the challenges raised by fragile and unstable countries and recommend improvements to the UK's strategic response. The team produced a report entitled 'Investing in Prevention – An International Strategy to Manage Risks of Instability and Improve Crisis Response' (2005) outlining the causes of instability and recommending a holistic view when addressing insecurity and conflict and the interconnects between national and global security. The report argued that 'increased conflict and state failure will impact on the UK directly, by hampering efforts to tackle terrorism and organised crime, locking countries into poverty, stimulating refugee flows and undermining the UK's energy security. The risk of instability in many countries is likely to increase over the coming decades, not least as HIV/AIDS and climate change impact already unstable countries.

The report proposes four priority areas for action:

- Prevention must focus on real investment to build vulnerable countries' capacity to peacefully manage conflict, with a particular focus on countries dependent on oil and other natural resources.
- Stronger regional organisations and relationships are needed to support governments committed to stability, and effective sanctions to tackle destabilising behaviour such as the looting of state assets.
- All countries must take greater responsibility for helping tackle global causes of instability such as poverty, HIV/AIDS, climate change, financial crises, organised crime and competition for oil.
- Finally, an effective response to crises must be maintained for when prevention fails, with adequate numbers of well-trained and deployable peace support personnel and better systems to cut off funding to conflict protagonists.

Natural disaster mitigation and adaptation
DFID currently provides over £7 million a year to multilateral and bilateral disaster risk reduction (DRR) schemes, including the International Federation of the Red Cross/Red Crescent, the UN and the World Bank. In addition, DRR work is sometimes incorporated into DFID country offices' development programmes, although often not systematically and without a specific budget line allocated for DRR. DFID is currently designing training courses to deliver to its disaster-prone country offices in order to inform staff of how DRR can be more effectively programmed and implemented. DFID is now committed to spending up to 10% of its funding in response to each natural disaster to prepare for and mitigate the impact of future natural disasters, where this can be done effectively. This will only apply to responses above £500,00044. The 10% commitment has already been implemented in the case of the Tsunami (£7.5m) and the Pakistan earthquake (£5.8m).
DFID is also working on reforming the UN humanitarian and disaster response system. In the context of the White Paper 2006 consultation, Hilary Benndelivered a speech to the UN on 23 January 2006 in which he proposed six reforms to the international humanitarian system45:

- the need for more, and more flexible, funding to be available right from the moment crisis strikes;
- secondly, ensuring that we have better and stronger Humanitarian Coordinators, with the power and funds to act;
- thirdly, greater clarity about who does what in a crisis - including dealing with Internally Displaced People;

· fourthly, the development of benchmarks to measure how we perform;

2.2 Spain

2.2.1 Environmental Policies of Spain

Over the past 15 years, Spain has considerably improved its environmental policies. An environmental performance report from OECD highlights the following achievements of the country:

- Strengthened legislative and institutional environmental framework at regional and national levels, on the basis of EU directives and new laws
- Enhanced quality of coastal bathing waters and municipal water infrastructure
- More emphasis on biodiversity and nature in terms of Natura 2000 proposals, management of protected areas, a national biodiversity strategy, and better international co-operation
- Renewed commitments to climate change policies to match with EU and Kyoto commitments
- Recent revision of water management policies to adhere to the EU water framework directive

In 2008 the clean energy use in Spain was less than 8% of total energy supply, a far cry from the 2020 target of 22.7% stipulated by the National Renewable Energy Action Plan 2011 – 2020.To curb the high energy dependency on oil imports, the government framed the Energy Efficiency and Saving Action Plan 2008 – 2012 to encourage the use of florescent bulbs. It also offered financial incentives to promote eco-friendly and innovative vehicles and extended support for electric vehicles in line with the Comprehensive National Strategy to Promote Electric Vehicles.

The National Plan for Air Quality and Atmosphere Protection 2013- 2016set the framework to improve air quality through specific actions undertaken in coordination with other sectoral plans. Several programs for the non-ETS sectors within the second period of the Kyoto Protocol (2013-2020) have been developed. Different Plans focusing on specific sectors have been set up to promote the reduction of GHG emissions in hotel and other tourism facilities through energy efficiency improvements.

Furthermore, the National River Restoration Strategy and the National Integrated Plan for Solid Waste Management 2008 – 2015 were approved by the government. The Spanish Monitoring Plan was set up to assessthe effectiveness of the measures taken to reduce POPs, and human biological bio monitoring (HBM) is not the gold standard in pollutant exposure estimations in humans.

2.2.2 Clean Technology in Spain

Spain ranks high on innovation drivers specific to clean technology and commercial cleantech innovation. However, it scores low on emerging cleantech innovation. Experts feel that though Spain has government policies that are cleantech-friendly, what the country needs is more public R&D spending and access to private finance. The poor score in emerging cleantech innovation is due to lack of environmental patents and VC investment.

According to the World Bank's Little Green Data Book, Spain's average annual deforestation percentage stood at -1.9% during 1990 to 2007 and 3.7% of its total energy is generated from biomass and waste. About 61.8% and 9.2% of the total electricity produced in the country is being generated from fossil fuels and hydropower, respectively. Also, the whole of Spain has access to improved water source and sanitation.

Globally Spain currently ranks 12th in the Environmental Performance index, with a score of 78.39. It ranked number one in water and sanitation, and scored highly in areas such as air quality and environmental health. In the climate and energy arena, it has a score of 67.77 and ranked 23rd. This performance index tracks a set of objectives such as ecosystem vitality and environmental health.

Each of these objectives comprises policy categories such as ecosystem effects and climate change. These are further sub- divided into several core indicators of environmental performance, which can be directly measured, e.g., child mortality and indoor air pollution.

2.2.3 A Clean Future for Spain

An environmental performance report from the OECD lauds a number of Spain's environmental policies. However, the report also insists that the country needs to enhance the efficiency of these environmental policies and should integrate the environmental concerns in industries such as tourism, transport, energy, construction, and agriculture.

The OECD suggested Spain progresses towards a sustainable future by:

- Decoupling energy consumption and waste generation from economic growth in relevant sectors
- Adapting the international environmental agenda
- Modifying the ecotax
- Curbing ghg growth and further increasing oda
- Ratifying the Aarhus convention
- Managing fisheries better
- Preventing marine pollution due to oil spills and land based pollution
- Reviewing of harmful impact of the taxes and subsidies and enabling strategic environmental assessments in the transport, tourism, energy, agriculture, and construction sectors

2.3 Romania

2.3.1 Environmental Policy and Management

The new legal system in Romania is based on the Constitution of 1991. Statutory control is provided by legal acts comprising: (i) primary legislation, i.e. laws and so-called urgent ordinances (i.e. temporary laws passed by the Government for immediate implementation, but not submitted to the debates and approval of Parliament; they are transformed later into normal laws, after being submitted to and discussed in Parliament); and (ii) secondary legislation in the form of government decisions, ministerial orders and instructions, which are legally binding. Secondary legislation is aimed at the implementation and the enforcement of existing laws and urgent ordinances. Government decisions are approved by the Cabinet of Ministers and are applicable to all ministries and governmental institutions. Ministerial orders can be issued by one or more ministers, e.g. the Minister of Waters and Environmental Protection and the Minister of Health or the Minister of Agriculture, Food and Forests, and are mandatory. Regulations and instructions are issued to give further guidance and to indicate how to implement specific provisions in the government decisions and ministerial orders.

Environmental protection has its framework law, i.e. the Law on Environmental Protection No. 137/1995. The major provisions set out in the Law include the following:

- The principles and strategic elements that are the basis of the laws;

- The right to access information on environmental quality;
- The right to information and consultation on the siting of industrial facilities as set out in the Law on Environmental Impact Assessment;
- The implementation of environmental impact assessments, the results of which are to be made available to the public;
- The establishment of liabilities regarding environmental quality rehabilitation;
- The regime of dangerous substances, hazardous waste, chemical fertilizers and pesticides;
- The protection against ionizing radiation and safety of radiation sources;
- The protection of natural resources and biodiversity conservation;
- Prompt action and reporting when accidental pollution occurs;
- The prerogatives and responsibilities of the environmental protection authorities, central and local authorities, natural and legal persons;
- The right to appeal to the administrative or judicial authorities.

According to article 88 of this Law, special laws have been drawn up such as: the Forest Code (No. 26/1996); the Law on the Hunting Fund and the Protection of Game (No. 103/1996); the Law on Water (No. 107/1996); and the Law on the Safe Deployment of Nuclear Activities (No. 111/1996). The Forest Code establishes the State's Public Property Forest Fund and the Private Property Forest Fund and sets out requirements for administering and ensuring the protection and development of the forest funds. The Law on the Hunting Fund and the Protection of Game provides that, except for hunting sport and other specifically designated needs: "the hunting fund of Romania is a natural resource of national and international interest, and shall be managed and administered for the purpose of conservation of the wild fauna's diversity and the maintenance of the ecological balance".

In 2000, several other important laws were adopted: Law No. 73/2000 on the Environmental Fund, Urgent Ordinance No. 78/2000 on Waste Management (since enacted as Law No. 426/2001), Urgent Ordinance No. 243/2000 on Atmosphere Protection, Urgent Ordinance No. 200/2000 on the Protection of Natural Areas, Urgent Ordinance No. 236/2000 on the Protection of Habitats, and Wild] Fauna and Flora Species (now Law No. 462/2001), Urgent Ordinance No. 49/2000 on Genetically Modified Organisms (GMOs), Urgent Ordinance No. 89/1999 on the Trade in and Restrictions on the use of ozone-depleting substances (now Law No. 159/2000) and the draft law on cultivated plants and pesticides. The Urgent Ordinances on Atmosphere Protection, on GMOs and on the Protection of Natural Areas are all before the Parliament for discussion and transformation into normal laws.

The most important secondary legislation is linked to the environmental impact assessment and licensing procedure. In this regard the Ministry of Waters and Environmental Protection (MWEP) has issued (i) Ministerial Order No. 125/1996 on the setting-up of a licensing procedure for economic and social activities with an environmental impact and (ii) Ministerial Order No. 184/1997 for the approval of the environmental audit completion procedure. The latter was based on some parts of Ministerial Order No. 125/1996 that were further improved regarding the evaluation of the impact of existing facilities.

In the period 1998-2000, the MWEP issued a number of government decisions and ministerial orders on environmental protection, such as:

- Government Decision No. 155/1999 on adopting the European Waste Catalogue and the list of hazardous waste;
- Government Decision No. 173/2000 on regulation of the special regime governing the control and the management of PCB/PCTs;
- Ministerial Order No. 699/1999 on the procedure and competency for issuing water authorizations.

Other laws or ordinances aimed at effectively ratifying international agreements and conventions have been passed, e.g. the adoption of the Copenhagen Amendment to the Montreal Protocol (adopted by Law No. 9/2000), the bilateral cooperation with Germany (approved by government decision.), the Law on the ratification of the UNECE Convention on Access to Information, Public

Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention, adopted by Law No. 86/2000). The Law on ratifying the Kyoto Protocol has recently been adopted as Law No. 3/2001. Over the past eight years Romania has ratified the most important international environmental conventions and agreements (see Chapter 5). According to existing legislation, for a standard to be compulsory it must figure in a legally binding text, e.g. some environmental standards for waste-water discharges and air emissions are made compulsory by ministerial order.

2.3.2 Objectives of the environmental policy

The gist of the environmental policies is set out in the Governmental Programme and action plan for the next four years, and is expressed in the National Medium-term Development Strategy of the Romanian Economy. A second key process that shapes the environmental policies is the EU Accession Partnership, which contains clear environmental targets in line with the overall objectives of EU environmental policies. The National Programme for the Adoption of the EU body of law specifies the priorities of the country and is regularly updated. Finally, the National Environmental Action Plan, which puts in practice the National Environmental Strategy, is also regularly updated. It contains a series of projects that are progressively incorporated into the NAAP when they fully match the EU targets. In 1995, following the 1993 Lucerne Ministerial Conference on Environment, the Ministry of Waters and Environmental Protection drew up a National Environmental Protection Strategy and a National Environmental Action Plan (NEAP) with the technical and financial support of the Danish Environmental Protection Agency (DEPA) in cooperation with the National ResearchDevelopment Institute for Environmental Protection (ICIM). The NEAP was presented to the Ministerial Conference 'Environment for Europe' in Sofia in October 1995, before the Romanian Government approved it.
Activity within the NEAP has continued by updating the projects included on the list of shortand medium-term priority projects and by implementing them using different economic instruments. The most recent version of the NEAP was drafted at ICIM-Bucharest in 1998 and contains all the main objectives for sectoral strategies, including agriculture and transport. The list of priority projects that were included in the updated version of the NEAP was based on the data provided by the local structures. The NEAP (1999-2000) includes 286 projects, of which 233 projects are on the short-term list and 53 on the medium-term list. The total value of the projects on this short-term list is estimated at € 2,276.5 million. By Government Decision No. 540/1998, the coordination of the NEAP was assigned to the Inter-ministerial Committee for the Promotion and Follow-up of the NEAP chaired by the Ministry of Waters and Environmental Protection. This Committee also includes representatives of the Ministries of Public Works, Transport and Housing, of Industry and Resources, and of Agriculture, Food and Forests. Since May 1999, the Department for Authorization and Certification of the MWEP has been responsible for the technical secretariat of the NEAP.
The NEAP complies with the general principles and priority objectives of the Romanian Environmental Protection Strategy (1995). This Strategy was also updated in 2000 and represents a unitary and integrating approach to the environmental protection issues in the country. The Environmental Protection Strategy for the period 2000-2004 was prepared according to the following general environmental protection principles:

- Maintaining and improving the population's health and quality of life;
- Maintaining and improving the natural heritage through sustainable development;
- Preventing natural disasters and accidents;
- Complying with international environmental agreements.

At the same time, the NEAP is being updated according to the National Programme for the adoption of the EU body of law, becoming a basic element of the conditions to be fulfilled for integration in the European Union structures. The main issue in the NEAP implementation is the provision of the necessary financial resources. In addition to the traditional financial sources, which already exist (domestic sources, local and State budgets), new sources can be identified

which will depend on the adoption of legal regulations on economic incentives for environmental protection and on the creation of the environmental fund and funds received from the EU through PHARE and ISPA (See more details in Chapter 3). At the level of the local Environmental Protection Inspectorates and with the help of enterprises, the representatives of the local administration and civil society, Local Environmental Action Plans (LEAPs) are being drawn up and authorized by the respective County Councils. In contrast with the NEAP, these plans include objectives of local interest for communities with over 2,000 inhabitants. Several LEAPs (Bacau, Piatra Neamt, Baia Mare, Deva and Resita) have already been drawn up and five others are in the pipeline. Progress is slow as neither the local nor the national level has enough capacity to draw up the plans. The 1995 Law on Environmental Protection, article 64, paragraph 1, gives the central environmental protection authority the responsibility for drawing up and promoting a national environmental strategy for sustainable development. In 1997, the United Nations Development Programme (UNDP) established a National Centre for Sustainable Development. In cooperation with various partners in Romanian society, such as academics, NGOs and government representatives, a working group was formed and produced the National Strategy on Sustainable Development (NSSD). Civil society also participated in the drawing-up of the NSSD. This Strategy was presented in July 1999 and assessed the potential and needs for sustainable development until 2020. The Romanian Strategy for Sustainable Development was set up by Government Decision No. 305/1999.

A number of other specific environmental strategies have also been drawn up in the framework of the EU accession preparations, such as the National Forest Management Strategy, the Approximation Strategy on Air Pollution and Climate Change (1999), the National Water Management Strategy, the Approximation Strategy on Industrial Pollution Control (1999) and the Medium-term Strategy to Combat Desertification and Drought (2000-2020). In 1996, the National Strategy and the National Action Plan for Biological Diversity Conservation and Sustainable Use of its Components were drawn up. These include objectives and measures following the Pan-European Biological and Landscape Diversity Strategy and the provisions of the main international conventions and agreements in the field.

The Strategy and Action Plan for the Danube River were adopted by the 11 Environment Ministers of the Danube watershed area and by the EU Commission in December 1994 in Bucharest. The National Strategic Action Plan for the Black Sea was presented and accepted at the Conference of the Environment Ministers of the Black Sea Riparian Countries in Istanbul (October 1996), and was followed by the National Action Plan for the Black Sea. This Plan represents the Romanian Government's environmental policy for the Black Sea as expressed in the Environmental Protection Strategy and for this reason its objectives comply with those in the National Action Plan for Environmental Protection. Moreover, a special Management Plan for the Danube Delta was developed in 1994 and a National Health and Environmental Action Plan (NEHAP) in 1996. Thus, a wide variety of documents reflecting the objectives of the environmental policy have been prepared. However, concrete implementing programmes with implementation mechanisms and the corresponding funding are lacking, which explains why there is no effective implementation of the above strategies. Problem-oriented programmes at national and local level would be needed to set the existing strategies in motion. As part of the integration of environmental policies= into sectoral policies, both the National Development Plan and the National Plan for Agriculture and Rural Development include an environmental chapter. Their approval by the European Commission represents a precondition for the EU Regional PHARE Programme 2000 and the Special Accession Programme for Agriculture and Rural Development (SAPARD), respectively. The Romanian strategy for the implementation of the EU Instrument for Structural Policies for Pre-Accession (ISPA) was approved in July 2000 and a National Programme for the adoption of the EU body of law (NPAA) has been prepared.

2.4 Portugal

2.4.1 Integration of Environmental and Economic Decisions

Portugal's environmental expenditure has generated improvements in areas such as sewage treatment plants or regulated dumps. However, economic growth, industrial development and migration towards the coast and towns have all complicated the search for solutions by sometimes creating new environmental problems, particularly in mainland Portugal. They have affected the quality of life and the tourism industry.

Based on the information currently available, it appears Portugal, at its current level of pollution abatement and control expenditure, will find it very difficult:

(i) to pursue sustainable development and face up to the pressures caused by relatively rapid economic growth, and

(ii) to ensure environmental convergence, i.e. to attain a degree of environmental protection comparable to the European Community average.

The exact scope of the additional efforts needed depends on the transition period which has yet to be defined, the objectives set and economic trends during such period. Financing this effort within Portugal's budget will certainly cause problems. Its funding could thus be provided principally by (i) Community funds (and in particular cohesion funds), (ii) new charges paid by users or polluters, and (iii) new forms of partnership and sponsorship, in particular for natural heritage protection. The financial effort required may be reduced if environmental considerations were better integrated into economic decision-making, whether sectoral or not, and if various instruments (regulatory, economic and land-use planning measures) were used together.

Madeira and the Azores have achieved positive results in integrating environmental protection, tourism and more traditional activities.

2.4.2 Institutional mechanisms and instruments for policy implementation

Measures taken since 1987 have enabled Portugal to acquire a coherent set of laws and regulations on the environment and associated institutions. The creation in 1990 of the Ministry of the Environment and Natural Resources and progress accomplished in inter-ministerial consultation on the environment should improve the efficiency of the central administration. Information on Portugal's environmental protection expenditure shows that measures have been taken and investment has significantly increased in recent years. The relationship with industry has been developed through voluntary agreements. Environmental impact assessment procedures are beginning to be applied to major projects as well as to activities financed by the European Community. Land-use planning and management are well developed in Portugal, particularly in coastal areas. The adoption by the Portuguese Government of objectives concerning (i) State efficiency in implementing environment policy ("less of the State, but better") and (ii), the use of economic instruments (pricing and fiscal measures but also environmental investment) is strengthening the progress made. In this regard, it is recommended that consideration be given to the following proposals:

-- The report on the follow-up to the Rio Conference should serve as the basis for the development of a national plan on the environment. This plan should enable essential overall studies to be carried out, mobilise the various ministries and social and economic partners involved, and show the way to sustainable development.

-- The level of environmental expenditure and their funding mechanisms should be examined in depth.

-- Concerning economic instruments, it appears urgent to introduce pollution charges in order that environmental costs be taken into account and new financial resources generated at national and municipal level.

-- Implementation of regulatory instruments should be strengthened, in association with other incentive instruments. Efforts could be undertaken for infringements to be formally

recorded, and in order that the courts play a greater role by setting penalties more frequently when serious pollution and other illegal acts occur.
-- Land-use planning and management could be made to play a preventive role in environmental policies. The Ministry of the Environment should strengthen its team of economists in order to better study and integrate costs, subsidies and damages relating to the environment into governmental policy. Economic information should be developed in association with other competent ministries and possibly with social and economic partners.
-- The progressive increase in demands for environmental protection should lead public authorities and industry to encourage the emergence of an eco-industry able to respond to such demands, in particular in the areas of water and waste.

2.4.3 Environmental training and information

The training and information efforts which should be made are all the more necessary and sizeable in Portugal, because communication between the administration, companies and the public can still occasionally be insufficient, as a result of habits inherited from the past.
Portugal's policy in this area was defined as early as 1987 and has been progressively implemented by the Ministry of Education and the Ministry of the Environment. The results obtained after only a few years are noteworthy but remain little known and, of course, limited:

-- The inclusion of the environment in educational policy is a good example of successful integration. This success results largely from the existence of an organisation with specific responsibility for these matters under the auspices of the Ministry of the Environment: the Institute for the Promotion of the Environment.
-- Public information policy is very complete and is aimed at the public, decision-makers, laymen and specialists. Collection of environmental data has been completed in a few years, starting from an unsatisfactory situation. The materials collected and distributed have had a positive effect on public awareness of environmental matters.
-- Actions intended to enable the public to take an active part in the decision-making process have been undertaken for some environmental problems. Although the issues submitted to public inquiry are still limited, this type of initiative, only five years after Portugal's framework legislation on the environment, is a highly positive sign of the Government's interest in public participation.

The Portuguese Government considers that continued efforts in environmental training and information are a priority. In view of the task ahead, such a policy requires an extension of the resources available. At the same time, it would be useful to make a detailed evaluation of the efficiency of those measures already taken, in order to avoid dispersal of efforts and to correct on- going strategies where necessary.
The central administration will have an essential role to play, though concertation with local authorities, environmental protection associations, unions and industry will have to be strengthened. The deficit of information and public awareness on environment could be reduced by the use of greater and more decentralised resources. The regionalisation of the public authorities' activities could be expressed through real administrative deconcentration and by involving the public through participation activities. A greater degree of transparency together with an improved communication policy on the part of the administration and industry should also be developed.

2.4.4 Sectoral integration: air pollution, energy and transport

In comparison to other European OECD member countries, Portugal's performance on air is characterised by a low total volume of atmospheric emissions and generally good air quality.

However, emissions are increasing more rapidly and local atmospheric pollution problems occur

in some urbanised and industrialised areas. The development of emission levels relative to GDP indicates that the economic growth of the 1980s was not accompanied by a comparable air pollution control effort. Today, legislation relating to the control of atmospheric pollution is progressing. Joint commissions enable concertation with industry and preparation of the introduction of new emission standards, made necessary by the adoption of European Community legislation. During the past decade, Portugal's energy requirements and intensity increased at a rate which is one of the highest among OECD countries. In contrast to most of these countries, Portugal has become increasingly dependent on energy supply to achieve economic growth. On- going changes in Portugal's energy structure have already had a noticeable effect on SO2 emissions in spite of increased coal use, due to fuel quality improvements. Energy product taxation has recently begun to integrate incentives linked to fuel quality, and in particular to sulphur and lead content, which have had a noticeable effect. The reduction in taxes on LPG is an encouraging example of the extension of this approach to alternative fuel use. However, a sharp drop in real energy and transport prices has been and remains an important factor in stimulating demand for energy and transport services. Electricity prices in particular reflect neither the economic realities of production, nor social costs.

In the future, it is probable that atmospheric pollution problems, and in particular those due to NOx emissions, will increase. The benefits of energy conservation efforts, the forthcoming introduction of natural gas and the success of co-generation may be more than compensated by very strong growth of the transport sector, particularly in coastal areas. Efforts to modernise and rationalise public transport represent a first step towards wider action in favour of modal transfers to less-polluting forms of transport.

The legislative framework is in place, and the main measures necessary to lessen the growing impact of energy and transport activities on the environment have been taken. The provisions of the framework law on air quality of 1990 which were the subject of a decree adopted in 1993, should be implemented. It is therefore recommended that the following proposals aimed at integrating environmental concerns into sectoral policies on transport and energy be considered:

-- The strengthening of energy conservation measures, currently threatened by falling energy prices, and the implementation of an integrated development plan for the transport sector, could be made priority areas.

-- Economic instruments should increase awareness of the real costs of energy and transport services, as well as of external environment-related costs. In this respect, it would be desirable to improve balance of taxation between vehicle fuels and other energy products and extend existing fiscal incentives so that they may better reflect environmental protection goals; to continue efforts to rationalise energy pricing, in particular for network energy sources such as electricity; and to extend this rationalisation effort to taxation on vehicle and road use.

-- Large pollution abatement investments will be necessary, in particular in refining and electricity production.

-- Taxes or charges on atmospheric pollution could encourage the development of less polluting facilities by improving the cost-effectiveness of pollution control techniques and clean technologies, and possibly contribute to financing improved energy efficiency and air pollution control investments.

-- Environmental impact assessments should be systematically carried out at an early stage of the decision-making process for major energy and transport infrastructure projects.

2.5 Estonia

2.5.1 Major environmental policy orientations and management practices

Estonia adopted its first National Environmental Strategy (NES) in 1997. Based on internationally accepted principles, the Strategy takes into account international environmental agreements and the 1995 EU White Paper on the Preparation of the Associated Countries of Central and Eastern

Europe for Integration into the Internal Market of the Union. It also incorporates the recommendations that the first UNECE Environmental Performance Review addressed to the Ministry of Environment (MoE) in 1995. The Strategy identified as the main causes of environmental problems the use of out-of-date and environmentally harmful technologies, the rather low level of public awareness regarding environmental matters, the underdeveloped environmental-technical infrastructure, and an insufficiency of management instruments and financial resources. The Strategy highlighted ten principal policy goals (Box 1.1) of equal priority for which it defined short-term (2000) and longer-term (2010) tasks to be undertaken, goals to be reached and, in some areas, targets. The Strategy was immediately followed by the 1998 National Environmental Action Plan (NEAP) that set in motion the operations required to attain the short- term goals. The three-year action plan included 658 projects, two thirds of them short-term and involving an estimated total financial outlay of EK 8.2 billion. This was to be financed through different governmental and private sources and from international sources. About half of this sum was to be devoted to reducing the negative effects of the energy sector and to improving air quality; another 25% to improve usage and protection of groundwater resources and the protection of sea waters and fresh surface waters, and the rest allocated to the other six policy goals.

Towards the end of the year 2000 a second NEAP was prepared and in mid-2001 the final document was issued, following up on the previous NEAP. While NEAP 1 was worked out in close cooperation with the European Union, NEAP 2 has been managed entirely by Estonian experts. The broad involvement of all potential stakeholders that characterized the NEAP 1 was even more evident during the formulation of NEAP 2. More than 250 specialists combined their efforts to update and refine the action necessary to maintain progress toward achievement of the ten NES policy goals. The Internet was extensively used during this exercise as a communication tool between partners and also to familiarize the public with the NEAP 2 draft and invite their comments. The NEAP was also extensively publicized through the media to heighten public awareness.

NEAP 2 follows from NEAP 1 and integrates the priorities and commitments of other national and international programmes and action plans (sectoral programmes as well as EU accession obligations and international conventions). A few new policy goals were included such as protection against radiation and strategic planning issues. During the elaboration of NEAP 2 it was strongly felt that the NES needed to be updated as the rapid progress achieved since 1998, in particular because of the approximation process, has made the ten goals defined at that time partly obsolete.

2.5.2 Integration into the European Union

Another important strategic action plan, the NPAA (National Programme for the Adoption of the Acquis) was adopted in 1998 as the concretization of the EU accession process into which Estonia was officially entering. The updated version of the NPAA issued in 1999 contains a Chapter on the environment, as negotiations began on this issue in December 1999. The NPAA objectives and implementation fields are narrower than those of the NEAP as some important issues of relevance to Estonia, such as strategic planning, past damage, oil-shale waste, and clean technology, are not covered by them. In negotiations on the Chapter on the environment, concluded in June 2001, four transition periods were agreed: for volatile organic compounds (VOC) (2006), for landfills (2009), for waste-water (2010), for drinking water (2013), and for nitrates (2008). These transition periods relate to the directives that are difficult to implement

for reasons of cost. The directives on drinking water, wastewater, waste and landfills necessitate heavy investment and involve a significant increase in the cost of the service paid by the consumer, if the polluter-pays and user-pays principles are applied. Similarly, the large combustion plants and the packaging directives will place a burden on the private sector. Up until the end of 1999, attention was concentrated on adjusting the legislation to the Acquis Communautaire. In the year 2000, however, implementation of legislation and the restructuring of environmental institutions were emphasized. For example, new units able to deal with integrated pollution prevention and control (IPPC) and investments under the Instrument for Structural Policies for Pre-Accession to the EU (ISPA) were set up at the Ministry of Environment. The next phase will be devoted to

implementation of the ISPA programme and achievement of the necessary infrastructural adjustments for air, water and waste. In order to incorporate the EU directives into its legislation, Estonia made a tremendous effort to reorganize and strengthen its institutions and train staff. The transposition of directives and the elaboration of sectoral strategies is undertaken through ad hoc working groups in which all interested ministries participate, and organized under the leadership of a designated ministry. The EU Integration Bureau is involved in the organization of task sharing and ensures smooth coordination among ministries and partners. The accession process placed a significant demand for new tasks on the ministries. Particular effort was therefore devoted to staff training, often with the support of or through twinning with EU donor countries. All EU legislation has been translated into the Estonian language and the texts made available on the Internet so that the administrative staff involved in the process and the local authorities may study the content of the directives and become familiar with their future tasks and responsibilities (in particular with regard to the management of the water, waste-water and waste infrastructures).

2.5.3 Sustainable development

In 1995, Estonia adopted an Act on Sustainable Development, the first of its kind in the ECE region. A National Commission on Sustainable Development (NCSD) was set up in 1996, headed by the Prime Minister, co-chaired by the Ministers of Economy and of Environment and involving representatives of all other ministries. The Commission meets once a year. There are currently no working bodies under this Commission (in the past, an ad hoc inter-ministerial board dealt with the coordination of CBD implementation). The mandate of the NCSD includes: (1) to assess the progress of sustainable development policy in Estonia; (2) to assess the impact of sectoral activities such as energy, agriculture, natural and mineral resource exploitation, water use, fishery and territorial marine zone exploitation; (3) to consult all relevant stakeholders on sustainable development problems; and (4) to propose draft legislation on sustainable development and for research on forestry and transport. So far, the Commission has played little part either in the legislative procedure, or in the main sectoral strategies that have been developed recently. Terms of reference for a National Sustainable Development Strategy were approved in April 2001. Following the example of the NEAP, it will be formulated after a widespread democratic consultation process. The Estonian Agenda 21 process began in 1997. The overall objective of the project is to strengthen Estonia's capacity to develop into the 21st century, leading to sustainable economic growth, solving social problems and properly using natural resources. The project also aims at promoting Local Community Planning and Local Agenda 21 Development processes. As a first step, a guidebook for applying Agenda 21 locally was widely distributed throughout the country to local government officials, community members, and development groups. A sustainable development database was developed with a similar aim. The Ministry of Environment is coordinating Agenda 21 at the national level and participates in this process at regional levels (Baltic 21), while the Association of Estonian Cities coordinates local Agenda 21 processes.
By 2001, only two local agendas were developed: Kuressaare city was launched in 1997 and Tartu city in 1998. In 2000, a second booklet was issued to provide information on what had been achieved and to mobilize those communities that had remained inactive. The results were a

fruitful exchange of information at grass-roots level. Websites were created that provided information on how to establish the process and a Web forum was set up. The eventuality of an administrative reform that would reduce the number of municipalities from 247 to 108 and counties from 15 to 8 has discouraged initiatives, however, as municipalities are reluctant to make medium- and long- term plans in such a context.
Launched in 1996, Baltic 21 is the Agenda 21 for the Baltic Sea region. So far, it constitutes a unique experience of working out an Agenda 21 at regional level. The process involves the Nordic states and all other countries around the Baltic Sea. Regional co-operation and the environment are emphasized as well as their bearing on economic and social aspects of sustainable development. Seven sectors are covered: agriculture, energy, fisheries, forests, industry, tourism, and transport. Goals and scenarios for the sustainable development of each sector have been worked out as well as sectoral action programmes including time frames, actors, and financing.

Estonia is co-lead party for tourism and energy, and a participant in all other topics. Partnership among cities of the Baltic region is developing through a network of twinning arrangements.

2.5.4 Environmental information

In 1994, Estonia launched a National Environmental Monitoring Programme (NEMP) but in autumn 1999 it was redrawn on the basis of the 1999 Environmental Monitoring Act. The monitoring programme for 2001 introduced four main changes: (1) strategic priorities were established for monitoring so that data necessary for decision-making at the national level are collected and analysed; (2) a single and integrated monitoring procedure will be implemented; (3) the monitored data will be fed into a Geographical Information System, and made available through the Internet; (4) a wider use of the data will be encouraged for research, student education and the training of environmental specialists. The total Programme will cost 8.9 million EK and includes 12 sub-programmes involving more than 1,600 monitoring stations throughout Estonia to carry out the following activities

1. Meteorological monitoring;
2. Air monitoring;
3. Groundwater monitoring;
4. Monitoring of inland water bodies;
5. Coastal sea monitoring;
6. Monitoring of biological diversity and landscapes;
7. Forest monitoring;
8. Complex monitoring;
9. Radiation monitoring;
10. Seismic monitoring;
11. Soil monitoring;
12. Ensuring the quality of data analyses;
13. Support programme.

Formerly the responsibility of the Environmental Information Centre, monitoring activities are now coordinated by the Monitoring Council. The sampling and analytical tasks are sub-contracted to laboratories through procurements given for a one-year period for which any certified laboratory is eligible. The Estonian Environmental Research Centre (into which the Viru and Pärnu Counties' Environmental Research Centres have recently been merged) and the Tartu Environmental Research Centre are the major monitoring institutions. The Estonian Environmental Research Center is currently the only organization in the environmental field that has an international quality accreditation for water and air, and is therefore the only one able to carry out sampling and analysis in compliance with EU standards and requirements. It also participates in large international monitoring programmes on transboundary air pollution, on climate change and on coastal seawaters. Estonia is developing a Geographical Information

System that will become accessible on the Internet. Environmental data from sites throughout the country will be collected through the NEMP and processed by the Environmental Information Centre.

2.5.5 Current Priorities of Environmental Policy and Management

Water management framework

A candidate for membership of the European Union, Estonia is particularly committed to following EU policies for managing water resources and is to introduce a system of water management by river basin areas (i.e. catchment areas). This move is in accordance with the EU framework directive for water management (2000/60/EC). The concept of management by river basin is an integrated approach that covers not only the protection of the quality of the water bodies but all of the elements that characterize them (such as aquatic and river bank ecosystems including

flora and fauna) and affect or contribute to maintaining their integrity (i.e. pressures that in Estonia are essentially agricultural and hydro-infrastructures). The introduction of this new type of management will affect every aspect of the process from the monitoring, controlling, authorizing, financing (in particular), and operating of water facilities, to the users and other stakeholders involved in decision-making. Its implementation will require additional technical and administrative means (in terms of competence and work force) and new sources of funding.

The initial step is to amend the national legislation and harmonize it with EU directives and standards. As explained in Chapter 1, numerous laws have been enacted: the 1994 Water Act, amended in 2000; the 1995 Law on the Protection of Marine and Fresh Water Coasts, Shores and Banks; the Public Water Supply and Sewerage Act (1999), and the new drinking water quality requirements (2001). These laws are complemented by a series of regulations and provisions in other laws: Government Order introducing requirements on waste-water discharged into water bodies or soil (1998); regulations for the use of sewage sludge in agriculture, green area creation and recultivation (1999); procedure for the issuance and revocation of special water use permits (1996, amended in 2000 and 2001); the Pollution Charge Act (1999) and Environmental Monitoring Act (1999). A key feature of the newly amended Water Act regards the detailed provisions for the drafting of water management plans of catchment areas (i.e. river basins). This is an essential first step toward water management by basin rather than according to the present administrative division of the territory by counties.

Estonia has no major rivers, but a number of short rivers that flow into the Baltic Sea. Their catchment areas are too small to justify a basin management concept being developed for each of them. It is therefore envisaged that the full territory will be managed administratively as one river basin, subdivided into eight surface water basins and one specific sensitive groundwater area. Water resources management plans should be drafted for each of these sub-basins and further consolidated into one general water resource management plan that will encompass the content of the eight sub-basin plans. The sub-basin plans will be elaborated from 2001 to 2005, the general plan in 2005. The costs are estimated at EK 13.2 million for the elaboration of the sub-basin plans and EK 3 million for the general plan.

2.5.6 Waste Management

A waste generator (be it an enterprise, a municipality or a simple household) has to manage collection of its waste and organize its delivery to a licensed or registered waste handler. Waste transportation has to be organized by waste holders unless organized municipal waste transport is available. The latter is organized by the local government unless it decides not to include a certain territory in the transport scheme. Waste holders will have to subscribe to the organized

municipal waste transport unless they are exempt because they manage the transport or handling of the waste by themselves. Local authorities have to co-operate with each other for managing their waste, if necessary. They can be obliged to cooperate if such cooperation is prescribed in the national waste management plan or if refusal of such co-operation could cause a hazard to health or the environment. Consistent with national legislation, local authorities should have established waste management regulations within their territories before 1 December 1999. By March 2000, 47 local waste management regulations had been established in 247 municipalities.

The Waste Act defines the waste management obligations for the producer or importer of a product, if waste generated from a product can cause danger to health or to the environment. This obligation is not as extensive as the so-called producer responsibility in the EU waste legislation, nor does it cover so many industrial branches. In general, waste management fees for organized municipal waste transport should take into account (but in fact not necessarily cover) construction, operation, closing and aftercare of waste management facilities. The maximum fee is determined by local government decision. A local government has the right to establish and collect a real encumbrance for the purpose of organizing waste management in its territory. However, real encumbrances have not been established in Estonia so far.

According to the 1998 Waste Act, the Ministry of Environment organizes the network of hazardous waste management facilities. Local governments organize the collection of hazardous

from households and their delivery to waste handlers. Collection and transport of hazardous wastes, apart from household waste, requires a waste permit. However, collection of hazardous waste generated in households is exempt until the waste arrives at a licensed waste handler. The Estonian hazardous waste handling system, initiated at the beginning of the 1990s, does not envisage a centralized incineration plant for hazardous waste, due to its cost and the quantity of hazardous waste requiring treatment. Sufficient capacity for inorganic hazardous waste and less hazardous organic wastes can be achieved in Estonia. Since a dedicated hazardous waste incineration plant is not expected, Estonia will have to rely on foreign assistance in treating organic halogenated hazardous wastes. However, organic non-halogenated hazardous wastes have to some extent been incinerated in the oil-shale industry and cement kilns. Such a procedure can be continued only if the plants are able to comply with the most recent directive on incineration of waste – which may be unlikely.

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Introduction

This report aims at providing a deeper perspective into Environmental Security in Higher Education in Europe, with special emphasis on the 2nd Cycle (Masters) revealing a niche in this specific field. The need for the development and furthering an in-depth understanding of the field has been noticed through the international agenda and focus on five main areas that directly influence environmental security, namely, high energy demand; current climate change; institutionalization of the environment; insecurity and conflicts.

The concept of security has shifted over the last few decades, having been transferred from the military field to include economic, environmental and social dimensions of security. The North Atlantic Treaty Organization (NATO), in 1995, launched the Pilot Study entitled "Environment and Security in an International Context" [1] with the objective to "integrate environmental considerations in security deliberations and to integrate security considerations in national and international environmental policies and instruments".

The overexploitation of natural resources is one of the major contributions to environmental change and the consequent shift in the use of the term. Similarly, depleting water resources, oceanic exploitation, dwindling forests, coral reefs and land, all contribute to these climate changes, which in turn result in alterations in ecosystems, natural habitats and vegetation.

Environmental alterations in conjunction with human demands lead to conflict as human consumption becomes unsustainable. 'Developing countries, particularly those whose economies are heavily geared toward agriculture and other sectors that directly depend on the health of the natural resource base, are most immediately affected by environmental problems. There, the needs and interests of contending groups tied closely to the land— farmers, nomadic pastoralists, ranchers, and resources extractors— are often incompatible [2].'

The ENSEC[1] project arises from a Strategic Partnership composed by higher education and business institutions that will actively cooperate among them and key stakeholders (enterprises, regional bodies and other HE/VET institutions) for the development of an International Master Degree for the Environmental Security Sector, which will offer an adapted curriculum to equip the young generation with the specific, basic and transversal competences currently required in the planning, climate change mitigation and vested industries.

The Master's degree course for the Environmental Security Sector (ENSEC) will be developed by the ENSEC consortium, which includes the Universidad Politecnica de Madrid[2], Buckinghamshire New University[3], the University of Transilvania[4] and the University of Madeira[5]. Also, as industry partners, the consortium includes the following entities:

[1] ENSEC Website: http://ensecproject.eu/
[2] http://www.upm.es
[3] https://bucks.ac.uk
[4] https://www.unitbv.ro
[5] https://www.uma.pt

Associação Comercial e Industrial do Funchal - Câmara do Comércio e Indústria da Madeira (ACIF-CCIM)[6], EVM[7], Eeesti Metsakesku OÜ (EMO)[8] and Projects Abroad[9].

The Master's courses created by the different members will be taught online and are led by experts in each field. This MA has a total of 10 to 15 courses, each with 6 ECTS in average, totalling 60 ECTS and entails 156 hours, approximately, for each course.

This document was written at University of Madeira, but with the participation of all the remaining partners. This report will start with some information about existing courses in Environmental Studies offered by project partners. A SWOT analysis is then presented about ENSEC and the new Master programme. After, an analysis of the offer of programmes in the European Union is presented. The conclusion summarises the main findings in this study.

[6] http://www.acif-ccim.pt
[7] http://evm.net
[8] http://metsakeskus.ee
[9] https://www.projects-abroad.co.uk

Project University Partners Master's

The objective of this section is to present the Master's offered by the Universities partners in ENSEC project on Environment and on Security. Also, the related degrees offered by the Universities is included in each section list.

The information included about each Master's includes a small description of the objectives and content of each and some career perspectives for the students who take the programme. Most of the information was obtained in the Universities' Websites and/or Master's description documents.

Buckinghamshire New University (United Kingdom)

MSc Rural and Environmental Crime and Policing[10]

The course looks closely at all types of rural and environmental crime, from theft from farms and hare coursing, through modern slavery and organised crime in the rural setting, to heritage crime and environmental offences such as fly-tipping or wildlife crime. You will consider the causes and context of such offending and the explanations offered by rural and green criminologies alongside the legislation in place to deal with it.

Unlike other courses, which focus primarily on the law, this master's takes a strong practical perspective. Using case studies and specialist insights from industry experts, students explore how the relevant legislation translates into practical compliance and enforcement.

Students gain an appreciation of the complexity of rural and environmental crime, but also go away with the legal and enforcement practices increasingly sought after in this field.

Taught as a flexible-learning programme, the course culminates in an extended project, where students develop research in an area of their interest or of their employer.

University of Madeira, Funchal (Portugal)

Master's Degree in Ecotourism[11]

This master's degree objective is to provide a solid theoretical and practical education, with a strong component of professional application. It focuses on responding to the demands of a sector that presents one of the highest growth rates in the tourism industry. This degree runs for 4 semesters and students need 120 ECTS to complete the course.

Ecotourism is an activity with a low environmental impact, demonstrating an economic sustainability and is a strong alternative in regions where traditional activities have been shown to be insufficient for the maintenance of dependent populations.

[10] https://bucks.ac.uk/courses/postgraduate/rural-and-environmental-crime-and-policing
[11] https://www.uma.pt/en/ensino/2o-ciclo/mestrado-em-ecoturismo/

The Ecotourism programme requires from prospective students both a knowledge of the environment and some management background. Thus, the main objectives of this course are: to provide extensive and transversal training in various areas of Biology, Geology, Management, Economics and Tourism – which are considered fundamental topics for the pursuit of a career in Ecotourism; provide students with methodological skills and tools that enable them to effectively develop the operation, administration and management of products and services related to ecotourism and address problems in broad and multidisciplinary contexts related to tourism, sports and leisure; and finally, pass onto students solid ethical and social values.

Career perspectives: organization, expertise, consultancy in Nature Tourism; participate and/or develop a tourism project (animation, research, training, etc.).

Other degrees include some 4-year programmes in: Biology and Chemistry.

University of Transilvania, Brașov (Romania)

Master in Multi Purpose Forestry[12]

This Master's programme of academic studies in the field of Forestry is the first in Romania, taught in English, and offers students the opportunity to interact with and learn from nationally and internationally renowned specialists. The duration of studies is 2 years, at the end of which, students can earn 120 ECTS credits. Students will acquire skills in research and the management of resources and forest-based systems. Graduates of this master's programme will be able to work in education, research, and forest management at a national and international level.

Courses studied: International Environmental Governance and Forests, Remote Sensing and GIS in Natural Resource Management, Forests and Water, Applied Statistics in Forest Research, Biodiversity Conservation, Academic Skills in Forest Science, Forest Stand Dynamics, Integrated Pest Management, Management of Wildlife Populations, Management of Timber Harvesting Operations, Advanced Forest Biometry, Forest Management and Chain of Custody Certification, Forest Based Bio-economy, Management of Research Projects, Decision-Support Systems in Forest Ecosystem Management, Energy Procurement from Woody Biomass, Strategy and Marketing of Forest Products, Silviculture and Yield of Forest Ecosystems, Life Cycle Assessment in Forestry, Business Process Management in Forestry.

Career perspectives: this master's programme trains specialists in research, education, and forest management. It focuses on the development of skills and competences necessary for leadership, management, and entrepreneurship in the field. Graduates of the programme will be able to work in top positions in Government agencies and NGOs, national and international organisations and companies, or choose a career in forest research.

[12] https://www.unitbv.ro/en/prospective-students/academic-programmes/academic-programmes-in-foreign-languages.html

Other degrees include some 4-year programmes in: Food Engineering, Forest Engineering, Forest Management, Industrial Environment Engineering and Protection.

Universidad Politecnica de Madrid (Spain)

PhD in Engineering and Management of the Natural Environment[13]

The PhD Programme in ENGINEERING AND MANAGEMENT OF THE NATURAL ENVIRONMENT, attached to the College of Forestry and Natural Environment, has the general objective of equipping the student with the necessary skills for the elaboration of a Doctoral Thesis on a research topic related to environmental management and engineering applied to the natural environment, including forestry and natural environment, environmental sciences, and other related degrees in the broadest sense. Our objective is that the Doctorate student be able to develop scientific research and technological innovation of quality and excellence, within the strategic framework of R & D & I of the Technical University of Madrid, with the support and guidance of the Teachers of the Doctorate Programme. All of them are actively involved in Research Groups, and their lines of work are included in the Moncloa International Campus of Excellence, of which the UPM is a member.

Master's in Agroforestry and Environmental Engineering[14]

- Agricultural Engineering
- Agro-Environmental Technology for a Sustainable Agriculture
- Animal Production and Health
- Biosystems Engineering
- Dual Agronomic Engineering and Agricultural Economics
- Economics Applied to Agriculture, Food and Natural Resources
- Ecosystem Restoration
- Forest Engineering
- Forest Firefighting Technology
- Uses and Management of Water Resources in the Natural Environment

They mostly run under common characteristics, namely, most carry 60 ECTS and have the duration of 2 semesters with On Campus Learning. We proceed to give more details of four of these Master's courses.

Master's in Environmental Engineering

Environmental Engineering is the branch of engineering that studies the environmental problems in an integrated manner, taking into account their ecological, social, economic and technological aspects, with the aim of promoting sustainable development. This programme

[13] http://www.montesymedionatural.upm.es/Estudiantes/EstudiosTitulaciones/Doctorado/Doctorado_Ingenieria_Gestion_MN
[14] http://www.upm.es/internacional/Students/StudiesDegrees/University+Masters/Master+programs

is of great interest for its multidisciplinary character and its important contributions in many fields of science, both past, present and future. This Master's programme carries 120 ECTS, contrary to most of the Master's mentioned above.

In many industrial and production sectors there are important contributions from this branch of engineering.

Master's in Agro-Environmental Technology for a Sustainable Agriculture

The main objective of the Master's in Agro-Environmental Technology for Sustainable Agriculture (T.A.P.A.S.) is the development of experienced specialists for the sustainable production of agricultural systems. To obtain this degree, the student must earn a minimum of 60 ECTS. The Master's program consists of compulsory subjects (24 ECTS) that equip the student with knowledge in the main methodologies for the analysis of agrosystems and the capacity to apply them. In addition, it offers the possibility of intensifying the training in Agro-Environmental Management (20 ECTS) or in Integrated Management of Plant Health (20 ECTS), itineraries with high professional projection. The Master's Thesis is compulsory for all students and is worth 12 ECTS. And the remaining 4 ECTS (required to obtain the minimum of 60 ECTS) can be obtained through curricular practices or through the choice of one of the optional subjects offered.

Master's in Uses and Management of Water Resources in the Natural Environment

This Master's Degree aims at meeting the increasing demand for specialists in the management of the water resources in the natural environment. It runs for 2 semesters and students need to obtain 60ECTS to complete their degree.

In the last decades, due to the rising urban, industrial, and agricultural water consumption, a new social demand for the ecological quality of the ecosystems where water becomes essential has emerged. This social demand has been taken into consideration by the Water Framework Directive and the Water Law, which prescribe that the water resources can be used as long as the ecological quality of all the water bodies in the natural environment is guaranteed.

Due to this obligation, which is now regulated, of developing River Basin Management Plans for the sustainable management of water and the ecosystems related, it becomes necessary to have professionals for the design, implementation, and monitoring of these plans. These professionals must be trained to:

- develop strategies that are consistent with ecological quality for the management of river ecosystems.
- develop and apply diverse methods for the quantitative and qualitative optimization of the water resources.
- restore degraded aquatic ecosystems.
- plan cultural and recreational uses of river and marsh ecosystems.

- create aquaculture production systems which are compatible with sustainable development.

Master's in Ecosystem Restoration

The Master's in Ecosystem Restoration (MER) programme has evolved as a network of knowledge and experience that links universities, lecturers, researchers, students, private and public companies, NGOs, and administration centres. This Master's allows its graduates to follow either the Professional or Research areas.

MER consists of 90 ECTS (European Credit Transfer System), 60 ECTS of subjects, 20 ECTS of Practicum and 10 ECTS of the Master's Thesis. MER is learning based upon individual or small group projects based on student work in classrooms and labs and on field trips. In this type of experimen-tal study, one credit is equivalent to 25-30 hours of a student's time.

In the next section we list a set of Environment Studies Master's in EU, by country and describing the main characteristics

Academic programmes in the European Union

This section provides information regarding educational programmes related to the environmental security in European Union, and not offered by the partners of the ENSEC project. Thus, attention has been focused on High Education programmes, master's degrees, especially, but it has been covered the entire spectre. Due to the complexity of educational laws in each country, not completely regularized with the European Union standard, this has been the only differentiation possible to make, and even that, there may be some levels that do not fit in it.

Both the search and the report were divided by countries, so the investigation responsible of each country is noted at the beginning of its section with the number of programmes found in it. The last thing to note is that not all the 28 countries of the European Union appear, because some of them have no programmes of our interest or they could not be found.

Austria

Master Environmental and Sustainability Management, the master program Environmental and Sustainability Management prepares you for the implementation of ecological and social strategies in companies.

Belgium

International MSC in Agro- And Environmental Nematology, Ghent University - Faculty Of Sciences, this International Master prepares students for a career in very diverse fields and environments. Their work can vary between teaching, research in universities and laboratories in governmental institutions and industry and providing advisory services to the public, farmers, or governmental policies.

MSC In Environmental Science And Technology (ENSCITEC), Ghent University - Faculty Of Bioscience Engineering, this 'MSc focuses on the education of environmental specialists with ample knowledge of (1) the concepts and issues associated with environmental pollution, (2) the detection and quantification of environmental contamination, (3) the possible impact of environmental pollutants on ecosystems and biota, together with the current techniques for risk assessment, and (4) the available technologies for the prevention and remediation of environmental pollution (soil- water-air-waste) and the way they are designed and applied in practice.

Cyprus

MSC/MPHIL in Environmental Sciences - The Cyprus Institute, is an international research organization located in Nicosia, the capital of Cyprus. The Environmental Sciences program involves two specialization tracks, each dealing with important aspects of the field and aiming to shed light on and address the environmental sciences challenges.

Czech Republic

Master in Environmental Modelling, Czech University of Life Sciences Faculty of Environmental Sciences, environmental modelling master programme prepares the graduates to combine knowledge of applied mathematics, statistics and informatics with understanding of processes related to atmosphere, soil, surface and subsurface water, groundwater and contaminant transport.

Master In Health, Safety, Environment Professional, VSB – Technical University Of Ostrava, the aim of the study is to equip the graduate with competencies enabling him to successfully apply himself in the labour market in the field of HSE (Health, Safety, Environment). The graduate of the study program is equipped with the necessary range of technical, natural sciences and social disciplines, to the extent sufficient to solve complex safety problems in practice. While studying, the emphasis is on acquiring skills, especially through internships and guided practice. Graduates are also prepared for scientific research, especially in the field of safety and security.

Denmark

MSC in Environmental and Resource Management - University of Southern Denmark has created an institution of higher research and education which provides first-class educational opportunities and is cooperation partner for both public and private. MSc in Environmental and Resource Management combines natural science, engineering, and a social science which enable the students to create sustainable solutions by addressing the environmental problems of tomorrow.

Estonia

MSC in Environmental Engineering and Management, the course offers an integrated approach towards current and long-term strategic environmental issues, focusing on technologies and concepts in environmental planning and management for the sustainable development of industrial production systems.

Finland

Master of Administrative Sciences in Security and Safety Management – Security Governance ,**Tampere University of Applied Sciences (TAMK)** is one of the largest and most popular universities of applied sciences in Finland. The Master's Degree Programme in Security and Safety Management (SAFER) responds to this demand by educating experts who specialise in either Security Governance or Safety Management and Engineering.

Master In Environmental Change And Global Sustainability, Global socio-ecological problems call for multidisciplinary solutions that transcend the usual boundaries of science and decision-making. In the master's Programme in Environmental Change and Global Sustainability (ECGS), you are trained to tackle global environmental and sustainability challenges by lectures, seminars, project learning and laboratory and field courses.

France

Master Engineering: Agronomy, Food, Environment, this program is taught in FRENCH. A Master-level diploma recognized by French State, the Engineering Programme prepares students to occupy various managing positions in professional organizations, public institutions, companies, and laboratories of the agricultural and food sectors.

Master In City And Urban Environment (U-Env), this Master offers a world-class education to future engineers and town planners by providing the skills necessary to address environmental and health issues in the context of sustainable urban development, in research and in urban engineering.

Master in Environmental Science, ISA Lille offers a Master of Science and Engineering in Environmental Science, focusing on Sustainable Management of Pollution (SMaP). The SMaP program, taught in English or in French, is based on the internationally renowned expertise that ISA Lille has gained in the management of polluted sites.

Msc in Environmental Hazards and Risks Management, Université Côte d'Azur (UCA), Natural and anthropogenic hazards and risks account for hundreds of thousands of deaths and billions of dollars in damage each year in a context of global warming and rapidly evolving land-use change. The goal of this M.Sc. is to acquire skills in risk management, data analysis, and GIS/remote sensing to better predict and mitigate environmental hazards and risks. The M.Sc. is project-oriented and will make extensive use of case studies typical of the Mediterranean zone.

Hungary

MSC in Environmental Science - Eötvös Loránd University (ELTE), The Environmental Science MSc program is a complex interdisciplinary research module with environmental awareness. This course is aimed at improving understanding of the environment and the processes that support life on Earth. They are particularly interested in the impacts of human activity in the world around us and in developing ready-to-use approaches for achieving environmental sustainability

Italy

Environmental Sciences - University of Venice, this Environmental Sciences master's degree offered at Ca' Foscari University of Venice provides you with an elevated qualification and specialisation in a variety of fields.

Netherlands

Master in Environmental Sciences – Wageningen University, students at Wageningen University in the Netherlands will develop the skills to analyse the environment and the critical thinking skills to create government policy. The course is taught in English.

MSC in Environment and Society Studies, learning how contemporary society deals with its physical environment and how you can help enhance sustainability in the economy, society, and politics. How can we work towards a sustainable future? There are plenty of new

sustainable technologies, smart governmental instruments, and new ideas on organising the market to become more sustainable, but very often we do not use them.

Poland

MSC in Process Engineering, Environmental Protection, this master's course in Process Engineering, Environmental Protection for international students. The program provides knowledge on modern technologies of water treatment, wastewater treatment, waste management and utilization. Graduate can solve problems related to planning, designing and control of technological processes, supervision, and operation of installations for water and wastewater treatment as well as disposal and management of municipal and industrial wastes, independently or in an international team. Graduate knows and applies advanced research techniques and tools as well as analytical and simulation methods.

MA in Environmental Protection: Sustainability Studies, Cardinal Stefan Wyszynski University In Warsaw, the Sustainability Studies is an interdisciplinary program which aims at fostering students' understanding, appreciation, and thoughtful problem-solving skills regarding the relationship and interactions between human society and the environment. The studies will provide the interdisciplinary background that is needed to understand many of the complex challenges facing our world and will equip students with the skills needed to develop solutions to these problems.

Spain

Master's Degree in Environmental Design and Management of Buildings - University Of Navarra offer train experts in sustainability in buildings, both in the design and in the quantification of the efficiency of the measures adopted.

Master in Environmental Management - IMF Business School, The master in environmental management of IMF seeks to train professionals who respond to the increase in demand that has been occurring in recent years in organizations and companies in the field of environment.

Sweden

Masters in Environmental Studies And Sustainability Science – Lund University, Students at Lund University in Sweden will learn about the complex interactions between economics, society, technology and industry with an interdisciplinary approach.

MSC in Environmental Science, Stockholm University, developing solutions to our environmental challenges such as climate change, pollution, air, and water quality, requires people who both understand problems holistically and can tackle them at the microscopic level. A Master of Environmental Science degree from Stockholm University will give those tools, through education in either Atmospheric Science, Biogeochemistry or Environmental Toxicology and Chemistry. The courses in Atmospheric Science and Biogeochemistry will provide the fundamental knowledge of the composition and functioning of the environmental compartments: the atmosphere – the freshwater and ocean – and the land systems.

Switzerland

Master in Environmental Sciences – ETH Zurich, This course is aimed at students who wish to have a future academic career in the Environmental Sciences. Students can concentrate on topics such as Environmental Systems and Policy or Atmosphere and Climate and the course is in English.

Master in Environmental Sciences And Engineering – École Polytechnique Fédérale De Lausanne, students on this will learn the issues around protecting the environment for the future, and can specialise in topics like Environmental Chemistry and Environmental Monitoring and Modelling. This course is taught in English.

United Kingdom

MSC in Environmental Change and Management – University of Oxford, Students on this course at the University of Oxford will focus on the wide-ranging causes of environmental change and the organisations that are involved with the management of the environment.

MPhil in Environmental Policy – University of Cambridge, students planning on undertaking a MSc and PhD in Environmental Studies at the University of Cambridge can begin by taking an MPhil.

MSC in Environmental Technology – Imperial College London, this course at Imperial College London focuses on solving the issues facing modern environmental scientists and developing the skills necessary for a successful future career such as networking with fellow professionals.

MSC in Environment and Sustainable Development – University College London, this course at UCL prepares students for work with organisations that shape and influence global environmental policy.

MSC in Environment and Development – Lancaster University, this course at Lancaster University can be taken as an MA or an MSc depending on your dissertation topic. It allows you to tailor your studies to your future plans with a large choice of modules including subjects like Conservation Biology and Environmental Law.

MSC in Environmental Sciences, Policy and Management – University of Manchester, The first two semesters at the University of Manchester are based in Budapest studying political, legal, technological, scientific and economic environmental issues. The 3rd and 4th semesters are based back in Manchester where you gain practical scientific experience and complete your dissertation.

Although the variety of courses presented, a specific course on Environment security was not found in the European Union. In the next section we will present a SWOT Analysis on the development of a new Master's degree course for the Environmental Security Sector (ENSEC).

SWOT Analysis

Strengths	Weaknesses
- Creation of an interdisciplinary, inter-institutional graduate degree programme, bringing together skilled professionals and resources within the EU for a common cause. - High possibilities of putting the acquired knowledge, skills and abilities into practice, due to the considerable number of companies dedicated to the sector. These companies are looking for highly qualified people to incorporate their staff, so they can demonstrate in the field everything they have learned in their previous training. - Greater focus on Environmental Security as a niche area in need of effective development, policy making and solutions. - The substantial number and variety of professions that derive from the environment sector. - Greater communication, development and diversification of the students' knowledge, which they begin to become aware of and subsequently realise the new possibilities and perspectives of their employability. - More flexibility offered to students due to teaching and learning methods.	- Despite the growing demand of distance, on-line or blended learning methods, there is still a difficulty in the adoption and use of these by the Universities and by the students, also in the Environmental Studies area. - Lack of adaptation of Environmental Security training programmes and course contents to new learning methods. - Inexistent training in the area, making any new programme be viewed as experimental and tentative. - Technical problems may arise hindering both teachers and students in the teaching and learning experience. - In some of these emerging fields there is a lack of sufficient library/reference resources to expand knowledge.
Opportunities	**Threats**
- The substantial number and variety of professions that derive from the environmental sector. - Inexistent specific Master's programmes in the EU for Environmental Security, with the possibility of leading in training and/or internships. - To program, plan and design new certificates of vocational training, adapted to the various levels of studies. - To develop new open contents that are accessible to education institutions, enterprises and individuals. - To create Higher Education joint programmes, such as Master's Degrees, that perfect the participating institutions' strengths.	- Lack of publicizing, marketing and awareness of the importance of the sector compared to other studies in other areas of knowledge. - Atomization of programmes that entails repetition of contents and loss of information. - Lower number of graduates interested in the course due to the economic situation in the EU. - If market assessment has been inadequate, graduates may not achieve their expectations in the job market.

Analysis on Master´s in Environmental Studies in EU

This chapter complements the study of Master's courses available in Environmental Studies with a list of other Master's courses which are offered in European Universities. The data was obtained from the search on University websites and from two Master courses databases: Master Portal[15] and Master Studies[16]. The numbers presented were retrieved in the beginning of June 2018 and the filters used were, first, 'Europe' and, thereafter, each country of the European Union. Also, only Master of Science (M.Sc.) programs were selected.

In the case of the Master Portal, the area of study is identified as "Environmental Studies & Earth Sciences" and, in the case of the Master Studies platform, the area of study is just "Environmental Studies". The former presented a larger number of courses, for the same type of filters, and could be used as unique data source, but the latter, the Master Studies website, had a different set of areas considered relevant for the project, such as 'Climate Change' and 'Environment Sustainability', and, due to this, it was decided that the information of both would be included.

The number in the tables below do not show the complete number of courses. A larger number of courses for each area and country is very likely, in most cases. This number only shows the programmes announced on the websites, but many exist and are not present in this data base.

Another aspect that should be considered when analysing the data is the individual and total number of Master's on the websites. In some cases, the numbers do not add up causing some differences between total and individual values. The differences are not clear, nor are these differences explained so the reader has a better understanding of the diverging values. In our opinion, the data given for many programmes are, most likely, incomplete, but are considered for many internal database queries. As an example, the number of masters is 19 for Spain, but the information for attendance refers 11 masters. The other 8 programmes were, probably, not inserted into the attendance information (full time or part-time). Despite this important detail, the differences were not considered an impediment for our analysis because they were insignificant figures that did not alter the relations between areas and/or countries.

A final abnormal element found in the data was a value considered an outlier. The number of offers in the United Kingdom in the Master Portal Website is 50% of the all Masters in the European Union. This could be related to a difference in marketing and the competition for students, leading the United Kingdom Universities to use this approach very actively, and some others, to announce and present their programmes.

The first analysis divides the courses per area, and the numbers are in Table 1 and Table 2. The second analysis organizes the courses by countries, and the numbers are in Table 3, Table 4 and Table 5.

[15] https://www.mastersportal.com
[16] https://www.masterstudies.com

Concerning the areas of study, on the website Master Portal there are 13 areas (see Table 1). The 3 bigger areas represent more than 50% of the degrees and they are 'Sustainable Development' (24.4%), 'Environmental Sciences' (22.2%) and 'Environmental Management' (16.3%). The lesser numbers relate to 'Soil Science' (1.9%), 'Climate Studies & Meteorology' (5.5%) and 'Earth Sciences' (5.5%).

In the case of the Master Studies website (see Table 2), the 2 areas with the most degrees represent more than 60% of the degrees and these are 'Environmental Management' (33.0%) and 'Environmental Sciences' (28.3%). The areas with a smaller number of degrees of study are 'Climatology' (1.0%) and Coastal and Marine Management and Environmental Health, both with the same percentage (3.1%).

Table 1: List of areas in "Environmental Studies & Earth Sciences" from the Master Portal website

Environmental Studies & Earth Sciences Areas	Courses	Percentage
Biodiversity & Conservation	93	10.2%
Climate Studies & Meteorology	50	5.5%
Earth Sciences	50	5.5%
Ecology	85	9.3%
Environmental Economics & Policy	58	6.4%
Environmental Management	149	16.3%
Environmental Sciences	203	22.2%
Geology	79	8.7%
Hydrology & Water Management	91	10.0%
Natural Resource Management	63	6.9%
Soil Science	17	1.9%
Sustainable Development	223	24.4%
Toxicology	23	2.5%
Total	**913**	**100%**

Table 2: List of areas in "Environmental Studies" from Master Studies website

Environmental Studies Areas	Courses	Percentage
Climate Change	8	4.2%
Climatology	2	1.0%
Coastal and Marine Management	6	3.1%
Ecology	40	20.9%
Environmental Biology	8	4.2%
Environmental Health	6	3.1%
Environmental Management	63	33.0%
Environmental Sciences	54	28.3%
Environmental Sustainability	16	8.4%
Total	**161**	**100%**

As expected, and in both cases, the representative degrees are 'Environmental Sciences and Management', which are more traditional choices for Environmental Studies. 'Sustainable

Development' also appears as an offer with a relatively large number of Master's. With a smaller number of studies are 'Climate Studies & Meteorology' and 'Climatology', as similar degrees, and other groups include 'Earth Sciences', 'Soil Science', 'Coastal and Marine Management' and 'Environmental Health'. These areas are considered *niche* areas and, as expected, have fewer offers.

Next, the distribution of programmes is presented by each EU country, first with aggregate data of all countries, in Table 3, with the number of masters found in each website for each country. In Table 4 we extend the information from each country in the Master Portal, with the data of Duration (1, 1.5 or 2 years), Attendance (Full Time and/or Part-Time) and Learning approach (on Campus, on-line and/or Blended Learning).

Table 3: Number of Master's in "Environmental Studies" in each country

Country	Master Portal	Master Studies	Country %
Austria	17	5	1,9%
Belgium	20	4	2,0%
Bulgaria			0,0%
Croatia		1	0,1%
Cyprus	1	2	0,3%
Czech Republic	12	6	1,5%
Denmark	26	4	2,5%
Estonia	2	1	0,3%
Finland	23	8	2,6%
France	24	14	3,2%
Germany	63	20	7,0%
Greece	4	2	0,5%
Hungary	12	3	1,3%
Ireland	36	8	3,7%
Italy	25	9	2,9%
Latvia	1	1	0,2%
Lithuania	3	1	0,3%
Luxembourg	1		0,1%
Malta			0,0%
Netherlands	99	16	9,7%
Poland	13	6	1,6%
Portugal	10	7	1,4%
Romania		2	0,2%
Slovakia			0,0%
Slovenia	2		0,2%
Spain	11	21	2,7%
Sweden	87	19	9,0%
United Kingdom	491	39	44,8%
Total	**1183**	**203**	**100%**

Some of the countries do not present any programmes, and this does not mean they do not have any master's in Environmental Studies. The only fact we can deduce is that they do not have a master's on some or both websites. More detailed searches found some courses in

these countries, but to maintain the same data collection method in order to relate areas and countries, only the masters found on the websites previously mentioned were considered.

The countries with a larger number of master's programmes are the United Kingdom (GB), Netherlands, Sweden and Germany, with GB representing almost half of the master's. Some other countries also present a large number of master's programmes, such as, Ireland, Denmark, Italy, France and Finland. The countries with a low number of master's (or even none) could be related to the country's dimension and population or lack of tradition of promoting its master's on websites.

Table 4: Information on Duration, Attendance and Learning Method

Country	Total	One year	1 ½ year	Two years	Full-Time	Part-Time	Campus	On-Line	Blended
Austria	23			18	18	1	18		1
Belgium	27	4		20	24		24		
Bulgaria	0								
Croatia	0								
Cyprus	2		2		2		2		
Czech Republic	18			12	12		12		
Denmark	32			25	26		26		
Estonia	2			2	2		2		
Finland	26			22	22		22		
France	28	6	1	15	24		24		
Germany	127		4	87	93	3	94		1
Greece	4	2	1	1	4	3	3	2	
Hungary	16	1	1	10	12		12		
Ireland	54	28		4	33	14	32	6	1
Italy	33	4	2	19	25		22	2	
Latvia	1			1	1		1		
Lithuania	3		1	1	2		2		
Luxembourg	1			1	1		1		
Malta	0								
Netherlands	153	29	17	51	100	1	100		
Poland	21		9	4	13		13		
Portugal	15			10	11		10		1
Romania	0								
Slovakia	0								
Slovenia	3			2	2		2		
Spain	19	3	3	5	11		11		
Sweden	111	8		74	85		84		1
United Kingdom	664	419	3	13	459	324	479	26	6
Total	**1383**	**504**	**44**	**397**	**982**	**346**	**996**	**36**	**11**
% related to Total		*36%*	*3%*	*29%*	*71%*	*25%*	*72%*	*3%*	*1%*
Total Without GB	**719**	**85**	**41**	**384**	**523**	**22**	**517**	**10**	**5**
% related to Total - GB		*12%*	*6%*	*53%*	*73%*	*3%*	*72%*	*1%*	*1%*

In Table 4 we present the information on Duration, Attendance and Learning Method. One initial aspect to note is the total values presented with and without GB. The reason for this extra line of values is due to the large number of GB master's and some big differences in relation to the rest of the EU. This will be referred to further on in the analysis.

The Duration of the programmes are divided in 1, 1 ½ and 2 years programmes. One or Two-year programmes are the most common. The list of 1 ½ years only amounts to 3 to 6%. The GB value for One-year programmes is very high (419) and, without GB, the more common option is Two-year programmes in the rest of the EU, with 53%. The rest only accounts for 18% (the missing percentage represents master's without this information). Only Ireland and the Netherlands also present a large value of programmes with the option of One year (Greece, in percentage, has a large number, but it only has two programmes).

On the item Attendance, the Full-Time characteristic is the only option in almost all programmes (73%-75%). Only in the United Kingdom and in Ireland do many programmes present the option for Part-Time Master's. In the other countries, the Part-Time option does not exist in any programme, with a very small number of exceptions.

The item Learning Method presents as its common option On Campus Learning, with only very few exceptions. Between On-line and Blended Learning, the on-line option is more representative in the programmes, but the numbers are very small, therefore not relevant to conclude on a major difference.

The data points out a basic profile for master's programmes in the EU: the master's are Two-year programmes, with the On Campus Learning Method as Full-Time studies. The United Kingdom and Ireland have a very different Durations, being most of the master's One-year programmes with a larger number of options for Part-Time studies. The On-line or Blended Learning Methods are still residual in all of the EU.

The data in Table 5 is the detailed information of the study areas and the lowest and highest tuition fees in each country. The totals of the areas presented in this table are different since the collection of data occurred at different moments and also due to some unclear numbers from the websites which have already been referred to previously in this report. The detail of the area will be described in the country sub-section. Table 6 provides a description for the acronyms in Table 5.

In the item, Tuition, the numbers range from free tuition to over 24000 EUR per year. Most of the programmes charge Tuition each year, but some charge for the full programmes (less common) or the cost is associated to the selected modules or credits. The countries with free tuition in some programmes are: Denmark, Finland, Germany, Greece, Hungary, Poland and Sweden. The exception is Denmark with free tuition for all programmes. The lowest tuitions have an average of, approximately, 1500 EUR per year. The highest tuition fees have an average of, approximately, 9100 EUR per year.

In the following sub-sections, after the description of the degrees by areas and total by countries, we present and discuss some more information of each country on Environmental Studies to better understand the existing offer for each of them.

Table 5: Number of Masters in "Environmental Studies & Earth Sciences" in each country, with tuition values

	AT	BE	CY	CZ	DK	EE	FI	FR	DE	GR	HU	IE	IT	LV	LT	LU	NL	PL	PT	SL	ES	SE	GB	Total
B&C	2	3	-	4	1	-	1	1	8	1	1	6	1	-	-	-	4	3	-	-	2	11	57	**106**
CS&M	-	-	-	-	1	-	1	1	5	-	1	4	1	-	-	-	7	-	-	1	1	2	28	**53**
ESC	2	-	-	-	-	1	1	1	11	-	3	-	3	-	-	-	18	-	4	-	2	10	44	**100**
ECO	4	-	-	-	-	-	3	5	17	-	-	-	1	-	-	-	11	3	1	-	1	17	33	**96**
EE&P	1	2	-	-	2	-	-	1	3	2	1	8	1	-	-	-	9	1	-	-	0	2	34	**67**
ENM	5	-	-	1	2	-	2	3	11	-	3	11	5	-	1	-	13	3	1	-	1	3	111	**176**
ENS	3	2	2	2	9	1	6	4	20	-	5	11	6	1	2	-	33	10	3	1	2	14	106	**243**
GEO	2	1	-	1	3	-	2	1	13	-	-	1	2	-	-	-	2	1	1	-	1	10	37	**78**
H&WM	1	5	-	2	1	-	1	1	15	-	1	-	2	-	-	-	14	-	2	1	5	8	51	**110**
NRM	-	5	-	4	4	-	-	2	8	-	1	4	2	-	-	-	15	-	1	-	2	2	19	**69**
SOS	-	2	-	-	-	-	1	-	1	-	-	-	-	-	-	-	2	-	-	-	0	0	11	**17**
SUD	3	7	-	4	9	-	7	8	12	1	-	8	9	-	-	1	23	-	2	-	1	28	123	**246**
TOX	-	-	-	-	-	-	1	-	3	-	-	1	-	-	-	-	2	-	-	-	1	4	10	**22**
Total	**23**	**27**	**2**	**18**	**32**	**2**	**26**	**28**	**127**	**4**	**16**	**54**	**33**	**1**	**3**	**1**	**153**	**21**	**15**	**3**	**19**	**111**	**664**	**1383**
Tuition Min. €/y	726	234	3.600	180	free	N/A	free	250	free	free	free	3k - 5k	900	3.309	2.400	400	1.906	free	1.750	5.000	1.500	free	1.145	
Tuition Max. €/y	9.000	4k-6k	5.400	3.500	free	N/A	15.000	17.000	8k - 14k	4.000	12.000	16.800	14.000	3.309	2.400	400	19.000	3.200	1.750	9.000	12.667	14.100	24.223	

Table 6: List of areas and acronyms

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX
Biodiversity & Conservation	Climate Studies & Meteorology	Earth Sciences	Ecology	Environmental Economics & Policy	Environmental Management	Environmental Sciences	Geology	Hydrology & Water Management	Natural Resource Management	Soil Science	Sustainable Development	Toxicology

Austria

Table 7 presents the detailed information relating to Austria. Environmental Management and Ecology are the areas with the largest number of programmes in Austria. On the other end, Climate Studies & Meteorology, Natural Resource Management, Soil Science and Toxicology do not have any programmes.

Table 7: Austria programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
2	-	2	4	1	5	3	2	1	-	-	3	-	**23**	726	9.000

All the programmes have a duration of 2 years. Almost all their programmes are Full-Time with On Campus Learning Method, except for one master's that is Part-Time and offers blended learning (Packaging Technology and Sustainability, University of Applied Sciences, Vienna).

Although the tuition fees range from 726 EUR to 9 000 EUR, most of the programmes are 726 EUR, with some charging around 1326 EUR and only one charging a fee of 9000 EUR.

Belgium

Table 8 presents the detailed information of Belgium. Sustainable Development, Hydrology & Water Management and Natural Resource Management are the areas with the larger number of programmes in Belgium. On the other end, Climate Studies & Meteorology, Earth Sciences, Ecology, Environmental Management and Toxicology do not have any programmes.

Table 8: Belgium programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
3	-	-	-	2	-	2	1	5	5	2	7	-	**27**	234	4k-6k

Many of the programmes have a duration of 2 years, except for 4 master's lasting a period of only 1 year. All programmes are Full-Time with an On Campus Learning Method.

Although the tuition fee ranges from 234 EUR to 6000 EUR, most of the programmes' fees cost around 922 EUR (16 programmes), with some around 1500 EUR and only one has a fee of 6000 EUR.

Bulgaria

From the websites used for the data collection, no programme was found for Bulgaria. There are, very likely, many programmes, but only in Bulgarian. A global search in English only returned one master's in English related to Environmental Studies:

Master of Earthquake Engineering: This Master of earthquake engineering programme aims at enhancing and deepening civil engineers' qualification in the field of anti-seismic security of buildings and facilities during their design and implementation.

Croatia

Upon searches on the websites, only one programme was found for Croatia: Master in Water Resources and Environmental Engineering, from the Faculty of Civil Engineering, Architecture And Geodesy - University Of Split[17]. The master programme duration is 4 semesters (2 Years).

The programme educates engineers enabling them to solve environmental and water resources problems by applying principles from natural sciences, engineering, economics and other disciplines. Students are provided with the engineering and scientific fundamentals to be able to face current and future engineering and environmental problems. The study offers an interdisciplinary approach to better understand the world labor market demand and provides students with a wider picture of water resources and environmental engineering through fundamentals and basic principles.

The tuition fee is 3000 EUR for EU students and 4500 EUR for non-EU students.

Cyprus

Table 9 presents the detailed information of Cyprus. Environmental Sciences is the only area with programmes in Environmental Studies in Cyprus.

Table 9: Cyprus programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
-	-	-	-	-	-	2	-	-	-	-	-	-	2	3.600	5.400

One of the programmes' duration is 1 year and 4 months and, in the case of the other, it is 1 year and 2 months long. Both are Full-Time with an On Campus Learning Method.

The tuition fees are 3600 EUR and 5400 EUR.

Czech Republic

Table 10 presents detailed information of the Czech Republic. Sustainable Development, Natural Resource Management and Biodiversity & Conservation are the areas with the most programmes in the Czech Republic. On the other end of the scale, Climate Studies & Meteorology, Earth Sciences, Ecology, Environmental Economics & Policy, Soil Science and Toxicology do not have any programmes.

[17] https://www.masterstudies.com/Master-in-Water-Resources-and-Environmental-Engineering/Croatia/UofSplit/

Table 10: Czech Republic programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
4	-	-	-	-	1	2	1	2	4	-	4	-	**18**	180	3.500

All the programmes have a duration of 2 years, have a Full-Time attendance and an On Campus Learning Method.

The tuition fee ranges from 180 EUR to 3500 EUR, with 7 programmes costing around 200 EUR and 5 around the value of 3500 EUR.

Denmark

Table 11 presents detailed information on Denmark. Environmental Economics & Policy and Natural Resource Management are the areas with the larger number of programmes in Denmark. On the other opposite end, Earth Sciences, Ecology, Soil Science and Toxicology do not have any programmes.

Table 11: Denmark programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
1	1	-	-	2	2	9	3	1	4	-	9	-	**32**	free	free

All the programmes have a duration of 2 years, are Full-Time and use the On Campus Learning Method.

In terms of Tuition, Denmark programmes are all free, being the exception in the whole of the EU.

Estonia

Table 12 presents detailed information on Estonia. Earth Sciences and Environmental Sciences are the only areas with programmes which we found in Environmental Studies in Estonia.

Table 12: Estonia programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
-	-	1	-	-	-	1	-	-	-	-	-	-	**2**	?	?

Both programmes have a duration of 2 years, are Full-Time and use the On Campus Learning Method.

The tuition fees were not announced on the platform, but other sources[18] refer to values between 1660 EUR to 7500 EUR for bachelor‘s and master‘s studies.

[18] http://www.studyinestonia.ee/tuition-fees

Finland

Table 13 presents detailed information on Finland. Sustainable Development and Environmental Economics & Policy are the areas with a significant number of programmes in Finland. Contrarily, Environmental Economics & Policy and Hydrology & Water Management do not have any programmes.

Table 13: Finland programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
1	1	1	3	-	2	6	2	1	-	1	7	1	**26**	free	15.000

All programmes have a duration of 2 years and are Full-Time with an On Campus Learning Method.

Although the tuition fee ranges from free to 15000 EUR, most of the programmes are free (24 programmes), with one costing 5000 EUR and other 2 with a fee of 15000 EUR.

France

Table 14 presents detailed information on France. Sustainable Development and Ecology are the areas with larger numbers of programmes in France. On the opposite side lies Soil Science and Toxicology which do not have any programmes.

Table 14: France programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
1	1	1	5	1	3	4	1	1	2	-	8	-	**28**	250	17.000

Most of the programmes have a duration of 2 years, with 6 being a 1-year long course and one being a 1 ½ year long course. All the master's programmes are Full-Time with On Campus Learning and Teaching experience.

Although the tuition fee ranges from 250 EUR to 17000 EUR, only 3 are around 250 EUR. Many programmes are around 4500 EUR (7 programmes) and the rest stars at 10000 EUR going up to 17000 EUR.

Germany

Table 15 presents detailed information on Germany. This is one of the countries with the largest number of programmes. Environmental Sciences and Ecology are the areas with the most programmes in Germany. All areas have master's programmes and the ones with the lowest number of programmes are Soil Science, Environmental Economics & Policy and Toxicology.

Table 15: Germany programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
8	5	11	17	3	11	20	13	15	8	1	12	3	**127**	free	8k-14k

Most of the programmes have a duration of 2 years (87 programmes) and 4 programmes are 1 ½ year long. Almost all the programmes are Full-Time, but 3 have the Part-Time option. Also, the On Campus Learning Method is used by all programmes with one exception for a programme that also offers Blended Learning.

Although the tuition fee ranges from free to 14000 EUR, many of the programmes are free (40 programmes), and around another 40 programmes are under 5000 EUR and, the rest of the programmes charge higher fees, being 14000 EUR the highest fee.

Greece

Table 16 presents detailed information on Greece. Environmental Economics & Policy is the area with the most programmes in Greece, followed by Biodiversity & Conservation and Sustainable Development. All the remaining areas do not have any programmes.

Table 16: Greece programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
1	-	-	-	2	-	-	-	-	-	-	1	-	**4**	free	4.000

Four of the Master's programmes offer Full-Time, whilst three offer Part-Time modes too. These programmes range between 1 and 2 years. Two courses have a one-year programme, 1 has a 1 ½-year programme and the last one has a two-year programme. Three of these Master's offer On Campus Learning and two venture into online learning.

Tuition fees vary from being free to the highest fee of 4000 EUR, but the highest is the value of 3 of the programmes.

Hungary

Table 17 presents detailed information on Hungary. Environmental Sciences, Environmental Management and Earth Sciences are the areas that are representative in Hungary. The areas of Ecology, Geology, Soil Science and Sustainable development do not have any programmes.

Table 17: Hungary programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
1	1	3	-	1	3	5	-	1	1	-	-	-	**16**	free	12.000

The Master's of Science programmes ….

Although the tuition fee ranges from free to 12000 EUR, only 3 of the programmes have free (1) or the highest tuition fee (2). The remaining programmes (13) have a cost between 3000 EUR and 7000 EUR.

Ireland

Table 18 presents detailed information on Ireland. Environmental Economics & Policy and Environmental Management are the areas with the most programmes in Ireland. On the other

end, Earth Sciences, Ecology, Hydrology & Water Management and Soil Science do not have any programmes.

Table 18: Ireland programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
6	4	-	-	8	11	11	1	-	4	-	8	1	54	3k - 5k	16.800

Most programmes have a duration of 1 year (28), with 4 being 2-years long. Almost all the master's programmes are Full-Time (33), but 14 masters' also have the option of Part-Time. Most programmes provide On Campus Learning Method, but 6 have the On-Line option and 1 offers the Blended Learning Method.

The tuition fee ranges from 3500 EUR to 16800 EUR. Many programmes are under the 7000 EUR value (17 programmes) and the rest start at 10000 EUR and go until 17000 EUR.

Italy

Table 19 presents detailed information on Italy. Sustainable Development and Environmental Sciences are the areas that are most representative in Italy. Toxicology and Soil Science do not have any programmes being developed in Italy.

Table 19: Italy programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
1	1	3	1	1	5	6	2	2	2	-	9	-	**33**	900	14.000

This country offers a diversity of 1, 1 ½ and 2-year Master's programmes. The majority are 2 years long. Most of their courses are Full-Time and 22 of these programmes offer On Campus Learning whilst 2 offer On-Line Learning. No reference is made to Blended Learning methods.

The tuition fee ranges from 900 EUR to 14000 EUR, with many of the programme's cost around 3000 EUR (14). The number of programs with the highest tuition fee is 2.

Latvia

Table 20 presents detailed information on Latvia. The only area found to be representative in Latvia is Environmental Science, with only one Master's programme. All other areas in this study do not have any programmes.

Table 20: Latvia programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
-	-	-	-	-	-	1	-	-	-	-	-	-	1	3.309	3.309

This study programme occurs over a period of 2 years, is Full-Time and offers On Campus Learning.

With only one programme announced, its tuition fee is 3309 EUR.

Lithuania

Table 21 presents detailed information on Lithuania. Environmental Sciences is the most representative area in Latvia. This is followed by a Master's in Environmental Management and all the other areas do not have any programmes.

Table 21: Lithuania programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
-	-	-	-	-	1	2	-	-	-	-	-	-	**3**	2.400	2.400

Two of the Master's programmes run as Full-Time courses which offer only On Campus Learning. In terms of Duration, one of the master courses is one year programme and another is a two-year long programme.

The tuition fees are the same for all programs and its value is 2400 EUR.

Malta

Malta offers a Master's in Ocean Governance and aims at understanding and applying emerging legal and policy issues related to ocean governance. In this interdisciplinary course, the social and anthropological aspects of marine environment, sustainability of the oceans, maritime security and regulations and policy making are a crucial focus. There seems to be a lack of programmes in the other areas focused on in this report, but it may simply be due to courses not being promoted online.

The Master's in Ocean Governance is delivered over 13 months and completion of the course implies obtaining a total of 90 ECTS. The tuition fees for this course is 3500 EUR.

The Netherlands

Table 22 presents detailed information on The Netherlands. This country has Master's programmes in a vast array of areas. The most representative area in The Netherlands is Environmental Sciences, followed by Sustainable Development and Earth Sciences. The least representative areas are Geology, Soil Science and Toxicology, however all the scientific areas of study approached in this report have Master's programmes which are dedicated to their development in The Netherlands.

Table 22: The Netherlands programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
4	7	18	11	9	13	33	2	14	15	2	23	2	**153**	1.906	19.000

A third of the Master's in the Netherlands are two-year programmes. 29 courses are one-year programmes and the remaining 17 last 1 ½ years. 100 Master's are Full-Time and only 1 offers Part-Time modes to its graduates. Two-thirds of these programmes have On Campus learning and despite inexistent information about on-line and blended learning environments, this country is well-known for adhering to the use of digital teaching and learning environments.

The tuition fee ranges from 1906 EUR to 19000 EUR. There are 74 programmes with the cost of 2.078 EUR or less, that is, most of the master programmes. Next, many of the programme's cost is around 12667 EUR (18). With the highest fees we have 5 programmes, between 13338 EUR and 19000 EUR.

Poland

Table 23 presents detailed information on Poland. Environmental Sciences is the area with the highest representation in Poland. Other fields of study developed are Biodiversity and Conservation, Ecology, Environmental Economics and Policy and Geology. All other fields in our study do not have any Master's programmes in Poland.

Table 23: Poland programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
3	-	-	3	1	3	10	1	-	-	-	-	-	**21**	free	3.200

Most of the Master's last 1 ½ years to complete and the remaining 4 courses are two-year programmes. All 13 courses are Full-Time and offer On-Campus Learning. No mention is made to on-line and blended learning environments.

The tuition fee ranges from free to 3200 EUR, where 6 programmes are free and 6 other programmes' costs range between 1925 EUR and 3200 EUR.

Portugal

Table 24 presents detailed information on Portugal. Earth Sciences and Environmental Sciences are the areas that are representative in Portugal. Biodiversity and Conservation, Climate Studies and Meteorology, Environmental Economics and Policy, Soil Science and Toxicology do not have any programmes in Portugal.

Table 24: Portugal programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
-	-	4	1	-	1	3	1	2	1	-	2	-	**15**	1.000	1.750

All Master's courses in Portugal are two-year programmes and follow Full-Time schedules. Most courses offer On Campus and learning and only 1 programme refers to Blended Learning as a teaching and learning methodology.

The tuition fees in Portuguese masters are very similar and its value is between 1000 EUR, in the case of 2 programmes, to 1750 EUR, for 6 programmes.

Romania

There is not much information regarding Master's courses in Romania in the selected platforms but, as referred to previously, this could be due to the courses not being promoted online. In Romania, there are Master's programmes relating to Environmental Science and Management as the main areas of study In one of the partners University (UTB), already described in previous sections. In the Master Studies platform were found 2 master's related

to environment: Life Sciences and Ecology from the University Politehnica of Bucharest, and Environmental Management and Sustainable Energy from the Gheorghe Asachi Technical University Of Iasi.

The Master's found run over a period of two years and are taught both in Romanian and English. They offer Full-Time courses with On Campus Learning and students need to accomplish 120 ECTS to complete these programmes.

Slovakia

Although no programme was found in the websites, a global search In the Internet allowed us to find at least one University in Slovakia with Master's in Environmental Sciences: Comenius University[19]. The Master's found were: Environmental Geochemistry, Environmental Planning and Management, Nature and Landscape Conservation and Use, and Soil Science. No information about the contents and other aspects of the courses was found in English.

Slovenia

Table 25 presents detailed information on Slovenia. The only three areas that are representative in Slovenia are Climate Studies and Meteorology, Environmental Sciences and Hydrology and Water Management. All other areas of study do not have any programmes in Slovenia.

Table 25: Slovenia programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
-	1	-	-	-	-	1	-	1	-	-	-	-	**3**	5.000	9.000

The data shows us that the programmes in Slovenia run over a period of two years, are Full-Time courses and offer On Campus Learning.

The tuition fee in for a master in Slovenia is 5000 EUR. The 9000 EUR tuition is for a master of the IHE Delft Institute for Water Education, The Netherlands, and operates in several countries.

Spain

Table 26 presents detailed information on Spain. The areas that are most representative in Spain are Hydrology and Water Management, followed by Biodiversity and Conservation, Earth Sciences, Environmental Sciences and Natural Resource Management. Soil Science and Environmental Economics and Policy do not have any programmes.

Table 26: Spain programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
2	1	2	1	0	1	2	1	5	2	0	1	1	**19**	1.500	12.667

[19] https://fns.uniba.sk/en/study/uchadzaci-o-studium/msc/

Most of the Master's programmes in Spain run as Full-Time courses which offer On Campus Learning. 5 of these courses are two-year long programmes, whilst the rest operate between a one-year or a 1 ½-year span.

The tuition fee ranges from 1500 EUR to 19000 EUR. There are 3 programmes with the cost of 1640 EUR or less, and one programme costing 3000 EUR. The higher tuitions are for masters of the IHE Delft Institute for Water Education, The Netherlands, and operates in several countries.

Sweden

Table 27 presents detailed information on Sweden. Sweden is one of the countries with many programmes, having almost all areas covered. Sustainable Development and Ecology are the areas that are representative in Sweden. Soil Science is the only area without programmes.

Table 27: Sweden programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
11	2	10	17	2	3	14	10	8	2	-	28	4	**111**	free	14.100

Almost all programmes are 2-years long, having only 8 masters with 1-year duration. No programme was found in the 1 ½ year duration. All programmes are Full-Time and On-Campus, except for 1 programme also having the Blended Learning Method.

Although the tuition fee ranges from free to 14000 EUR, most of the programmes are free (88 programmes), and only 3 programmes have tuitions of 12000 EUR (2) or 14100 EUR (1).

United Kingdom

Table 28 presents detailed information on the United Kingdom. The United Kingdom is a special case in this study since it represents almost half of the master's. All areas have master's programmes being Soil Science and Toxicology the areas with the lowest number of programmes. Sustainable Development, Environmental Management and Environmental Sciences are the areas that offer more programmes in the United Kingdom.

Table 28: United Kingdom programmes on Environmental Studies

B&C	CS&M	ESC	ECO	EE&P	ENM	ENS	GEO	H&WM	NRM	SOS	SUD	TOX	Total	Tuition Min €/Y	Tuition Max €/Y
57	28	44	33	34	111	106	37	51	19	11	123	10	**664**	1.145	24.223

In some other items of this study, the United Kingdom presents a different profile, compared to most of the other countries (except for Ireland). The most common duration of the programmes is 1 year, with 419 master's courses in total. It is followed by the programmes with a 2-year duration, with 13 programmes. The last option is the 1 ½ year long course and these are present in only 3 programmes. Another particularity of the United Kingdom is the Attendance item: 324 Master's are Part-Time, almost as many are Full-Time programmes (459). Again, this data is only comparable with Ireland, which has a similar relation in attendance options.

As Learning Methods, most of the programs are On Campus, like the rest of the countries in the EU. The options for On-line or Blended learning only count 26 and 6 programmes, respectively. Despite being greater absolute numbers than in other countries, the relation with On Campus is similar with the relation in other countries.

In the United Kingdom the tuition fee ranges from 1145 EUR to 24223 EUR. Since the number of programmes is very high, the values for the tuition are very diverse. Below the 5000 EUR, GB there are 27 programmes. In the range of values between 5001 EUR and 10000 EUR, we have 231 programmes, the larger group of masters. After these values, and with the limit of 20000 EUR, we have 151 programmes, also a large group. Above 20000 EUR we only have 3 programmes.

Conclusions

Despite the large number of Environmental studies found in all European Union countries, a specific programme for Environmental Security sector was not found in the European Union. The search led to many programmes in the environmental area, with many including courses in Environmental Security, but a programme focused mostly on security concerning the environment and with the title 'Environmental (or Environment) Security' was not found. Some programmes were found in Australia and the United States of America, but in a very small number.

The need for competences in Environment Security, due to the increasing concerns around climate change and worldwide natural dangers, is a global-scale issue and a strong factor for the creation of new professional profiles, more adjusted to this reality, not only within the environmental sciences background, but with knowledge in methods, technologies and tools to deal with these (not new) challenges.

The offer of master's programmes in Environmental Studies is still very traditional, with a very small number of options for Part-Time Studies (in many EU countries) and On-Line Learning Method (in all countries). This confirms the opportunity created by the ENSEC project, with an International Master's Degree in the Environmental Security Sector.

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[2] Kingham, R. & Bernstein, J. (2006). Inventory of environment and security policies and practices: an overview of strategies and initiatives of selected governments, international organisations and inter-governmental organisations. The Hague: Institute for Environmental Security. ISBN: 90-808184-3-7

Key Competencies Report

1. Introduction

The Key Competences Report was produced in order to identify competences required for a graduate of International Master's Degree for The Environmental Security Sector. This report was compiled by UTB and adapted by BUCKS to ENSEC requirements. This assists the project promoters in establishing the structure of the programme and in formulating the learning outcomes in each module. In ENSEC project competences are regarded as reference points for curriculum design and evaluation, not as straightjackets. They should allow flexibility and autonomy in the construction of curricula. At the same time, they were meant to provide a common language for describing what the programme is aiming at. Following the TUNING model in the first stage of the programme development the emphasis is on the process of consultation with 'actors' or 'stakeholders', for the definition of academic and professional profiles as these will be translated into desired learning outcomes.

As this programme modules will be implemented across four European Universities the European Qualification Framework will be used to bench mark the appropriate skill levels. This will relate different countries' national qualifications systems to a common European reference framework. Individuals and employers will be able to use the EQF to better understand and compare the qualifications levels of different countries and different education and training systems. The framework is described:

‘The core of the EQF are eight reference levels describing what a learner knows, understands and is able to do – 'learning outcomes'. Levels of national qualifications will be placed at one of the central reference levels, ranging from basic (Level 1) to advanced (Level 8). It will therefore enable much easier comparison between national qualifications and should also mean that people do not have to repeat learning if they move to another country’ European Commission Education and Training (accessed December 2010)

The Masters level benchmarks are provided at level 7. The interpretation of level 7 study is summarised by

‘Achievement at level 7 reflects the ability to reformulate and use relevant understanding, methodologies and approaches to address problematic situations that involve many interacting factors. It includes taking responsibility for planning and developing courses of action that initiate or underpin substantial change or development, as well as exercising broad autonomy and judgement. It also reflects an understanding of relevant theoretical and methodological perspectives, and how they affect their area of study or work.’ QCDA (2011)

Many European natural hazards command centres are now introducing the expertise of environmental security to pre-empt catastrophic incidents due to climate change and human

factors. A key feature of the course will be to combine theoretical and practical qualifications needed to work professionally in environmental security. The course will be multi-disciplinary to make links between natural resources management, planning, disaster management and people engagement.

2. Methodology

To identify the key competences, surveys and desk research were conducted in Portugal, Estonia, Spain, Romania and the United Kingdom involving university lecturers, planning managers, local authorities, national disaster management authorities.

The data collection focused on the following aspects:

Knowledge and Understanding

To collect data regarding the above attribute the following descriptors have been used:
Ability to reformulate and use practical, conceptual or technological understanding to create ways forward in contexts where there are many interacting factors.

Ability to critically analyse, interpret and evaluate complex information, concepts and theories to produce modified conceptions.

To collect data regarding the above attribute the following descriptors have been used:

1. understand the wider contexts in which the area of study or work is located.
2. Ability to understand current developments in the area of study or work.
3. Ability to understand different theoretical and methodological perspectives and how they affect the area of study or work

Application and Action

To collect data regarding the above attribute the following descriptors have been used:
Ability to conceptualise and address problematic situations that involve many interacting factors.

Ability to determine and use appropriate methodologies and approaches.

Ability to design and undertake research, development or strategic activities to inform the area of work or study or produce organisational or professional change.

Ability to critically evaluate actions, methods and results and their short- and long-term implications.

Autonomy and accountability

Ability to collect data regarding the above attribute the following descriptors have been used:
Ability to take responsibility for planning and developing courses of action that initiate or underpin substantial changes or developments.

Ability to exercise broad autonomy and judgement across a significant area of work or study.

Ability to lead complex tasks and processes, taking responsibility, where relevant, for the work and roles of others.

In summary a level 7 attainment is

'Achievement at level 7 reflects the ability to reformulate and use relevant understanding, methodologies and approaches to address problematic situations that involve many interacting factors. It includes taking responsibility for planning and developing courses of action that initiate or underpin substantial change or development, as well as exercising broad autonomy and judgement. It also reflects an understanding of relevant theoretical and methodological perspectives, and how they affect their area of study or work.' (QCDA, 2011)

An alternative framework is provided by the Tuning project. The Tuning Project is an initiative funded by the European Commission to develop learning outcomes/competences for degree programmes in Europe and to promote harmonisation in the Higher Education sector. The report produced by Cumming and Ross will be referencing to guide subject specific indicators for modules at the content stage of development.

3. Results

Data collected through surveys in each of the participating countries was analysed and conclusions have been drawn in order to assist the promoters of the project define key competences and in strong connection with these to set learning outcomes for the modules that will be used to deliver the content of the programme. (Appendices-1-4 contain results obtained in each country).

3.1. Generic competences expected of a graduate of the INTERNATIONAL MASTER'S DEGREE FOR THE ENVIRONMENTAL SECURITY SECTOR

3.1.1 Professional attributes

Probity, honesty, ethical commitment

Commitment to maintaining good practice, concern for quality

Critical and self-critical abilities, reflective practice

Empathy

Creativity

Initiative, will to succeed

Interpersonal skills

3.1.2. Professional working

Ability to recognise limits and ask for help

Ability to work autonomously when necessary

Ability to solve problems

Ability to make decisions

Ability to work in a multidisciplinary team

Ability to communicate with experts in other disciplines

Ability to lead others

Capacity to adapt to new situations

Capacity for organisation and planning (including time management)

3.1.3. As expert in Environmental Security

Appreciation of diversity and multi-culturality

Understanding of cultures and customs of other countries

Ability to work in an international context

Knowledge of a second language

General knowledge outside natural resources

Capacity for analysis and synthesis

Capacity to learn (including lifelong self-directed learning)

Capacity for applying knowledge in practice

Ability to teach others

Research skills

3.1.4. Ethical and legal principles in Environmental Security

Maintain confidentiality

Apply ethical principles and analysis to unknown source of start cases

Obtain and record informed consent

Apply national and European law to private privacy

3.1.5. Promote engagement with population and work effectively in a disaster scenario

Provide support which minimises the risk of harm to local population

Apply measures to prevent the spread of environmental disasters

Recognise firefighting man power needs and ensure that numbers does not interfere with professional responsibilities

Conform with professional regulation and certification to practise

Receive and provide professional appraisal

3.2 Subject specific competences expected of a graduate of the International Master's Degree for The Environmental Security Sector

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3.2.1 .Knowledge and Understanding

A broad overview of the application of science to prevent and environmental disasters

An advanced understanding of how to integrate knowledge from natural resources management into provision of environmental security and management

An in depth understanding of how scientific knowledge underpins exercise practice

A critical approach to contemporary issues in dealing with environmental security on individual cases

A comprehensive, systematic knowledge and understanding of a selected current research area

3.2.2 Intellectual/Cognitive Skills

Systematically retrieve, select and integrate appropriate information from the practice sciences

Synthesise and evaluate evidence, arguments and ideas from both primary and secondary sources in a self-directed manner

Analyse and interpret quantitative information in graphs, figures, tables and equations and apply and analyse appropriate statistical tests

Integrate and link appropriate information across course components, including material met in different disciplines

Plan and conduct a substantial research project and present it in a coherent manner

3.3. Practical skills:

Able to design appropriate investigations, bearing in mind technical, logistical, safety and ethical limitations

Competent in the safe and effective use of appropriate basic exercise equipment, prescription and monitoring techniques

Able to explain the principles and limitations of a range of more advanced practical techniques. For example, different equipment and approaches in tackling natural hazards

Competent in the field skills required for careers in environmental security

Able to use appropriate software packages for data collection, presentation, statistical analysis, etc.

3.4. Vocational / Industry Indicators of Key Skill Areas

Environmental hazards risk assessment skills

Benefits and risks associated with physical activity

Pre-participation of risk stratification

Equipment testing

Pre-mission evaluation

Interpretation of field test data

Emergency management

Key definitions and concepts relating to resources management

The relationships between detection and monitoring

The importance of climate behaviour change

How to control behaviour change/behaviour strategies

Communicating effectively and appropriately with people in the field

Recognise and respond to warning signs and symptoms

Develop and manage a Control Team

How to involve the local communities

Approaching the local authorities

The use of learning outcomes and competences is necessary in order to make the study programme and its modules student centred and output oriented.

This approach requires that the key knowledge and skills that a student needs to achieve during the learning process determine the content of the study programme. Learning outcomes and competences focus on the requirements both of the discipline and of society in terms of preparing for citizenship and employability.

ENSEC promoters recognize fully the importance of making maximum use of the available expertise of the staff, but this aspect should not dominate a programme.

In an output-based study programme as ENSEC intends to be, the main emphasis lies on the qualification profile. This profile is determined by the academic staff and endorsed by the responsible authorities. The profile is based on an identified and recognized need by society. That is why we have consulted and will be consulting throughout the development of the programme stakeholders like employers (organizations), graduates and professional organisations.

Conclusions

By synthesising the data collected the following were set as desirable abilities and competences for the International Master's Degree For The Environmental Security Sector

Graduates should be capable of leading a environmental hazard response team.

They will be capable of understanding the environment behaviour and ecology in a series of scenarios. Specifically, they will be capable of:

On successful completion of the module, the student should be able to:

1. Interpret, evaluate and utilise research and specialist guidelines to inform practice, and instigate relevant approaches to prevent environmental disasters.
2. Apply knowledge of natural resources management and appreciate when other professional input is required
3. Apply a comprehensive knowledge of the underlying hazard prevention and monitoring, and a working knowledge of the behaviour in relation to land topography.
4. Employ evidence based knowledge to give targeted solution.
5. Demonstrate detailed knowledge of management and leadership.
6. Discuss and analyse the interaction of socio-economic aspects.
7. Competently design and analyse safe and effective exercise interventions.
8. Perform a number of environmental restoration actions.
9. Analyse and interpret data acquired from field testing procedures.
10. Provide appropriate recommendations based on the findings of the field testing.
11. Understand social-economic realities and models used to predict risk at local level.
12. Have a knowledge and understanding of people behavioural strategies used to promote community engagement
13. Locate, analyse and critically evaluate secondary data sources
14. Assess the merits of contrasting data collection methods and select those most suitable for research projects
15. Analyse, synthesise and use appropriate research design skills within the context of qualitative and/or quantitative methodology
16. Undertake independent research to produce meaningful findings, analysis, conclusions and recommendations supported by evidence
17. Present the outcomes of their research project in the form of a dissertation

18. Compare and contrast policies, strategies, approaches and practice in different European countries.
19. Design environmental security awareness programmes by considering country specific factors (political, economical, social and cultural).
20. Formulate major trends in European countries in the area of Environmental Security based on existing research.
21. List professional organisations at national and European level and explain their aims and objectives.

The pedagogy for this course of study will encourage many of the themes from the EQF to develop, not only through the course content but also through the approach to course delivery.

Within ENSEC, following the TUNING model, competences are developed in a progressive way. This means that they will be formed in a number of modules at different stages of the programme. During the design phase of the programme it has to be decided in which units a particular competence has to be formed. Depending on the size of a unit or module ENSEC partners are convinced that it is advisable not to include more than six to eight competences in the learning outcomes for one unit. Although there might be competences which can be trained implicitly in a programme, only competences which can actually be assessed will be mentioned explicitly.

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Evaluation of the Key Competences Report

The evaluation of the Key Competence Report (KCR) produced by the ENSEC partners was conducted by examining its content in relation to the aims. The main aim of evaluating the KCR was to assist the project team in improving the content of the KCR. Therefore the evaluation attempted to answer the following questions:

1. To what extent the methodology used was adequate to the aim?
2. What proportion of the stakeholders was consulted?
3. What stakeholders groups were underrepresented?
4. What are the similarities regarding the responses from the participant countries?
5. What are the main differences regarding the responses from the participant countries?
6. What data we still need to collect in order to be able to formulate the learning outcomes?
7. To what extent the KCR was useful in defining the academic and professional profiles?
8. To what extent the KCR was helpful in guiding the process of outcome formulation?
9. To what extent did the KCR assisted the project partners in constructing a common language?
10. How did TUNING methodology assist us in developing the KCR?

The internal evaluation of the KCR is part of the Quality Assurance process and aims at improving the quality of the project outputs. It also aims at encouraging collaboration and communication between the partners in this project. By critically evaluating each-other's work we aim at developing the way in which we work within the project and ultimately at enhancing the quality of the main outputs.

1. ***To what extent the methodology used was adequate to the aim?***

To collect data on KCR we have used the TUNING project survey model. The outline of the TUNING survey was distributed to project partners and the recommendation was to use it as a guide. The partners were encouraged to use their own surveys if they so wished. The advantage of using a similar methodology consisted in the fact that the results were easier to compare. However by examining the reports by country we can note that TUB and UMA had not followed the TUNING closely and this creates problems when trying to compare the results.

2. ***What proportion of the stakeholders was consulted?***

To identify the key competences, surveys were conducted in Portugal, Estonia, Spain, Romania and the United Kingdom involving university lecturers, practitioners, local authorities, natural disaster management authorities. The report fails to explain to what extent the respondents are representative to the population. In spite of the fact that a reasonable large amount of stakeholders were surveyed we are not sure of the reliability of our conclusions. To address this we think that when designing the learning outcomes we need to consult a larger number of stakeholders. We need to formulate the profile of the Masters' graduate and present to the stakeholders the learning outcomes of the programme. We trust that in this way we will be able to collect valuable opinions and design the structure of the programme so that the learning outcomes will respond to the market demand.

3. ***What stakeholders groups were underrepresented?***

By analysing the content of the KCR it seems like we have mostly consulted colleague lecturers and students. We, it seems, failed to consult ground people, hazard combat brigade. Although in their reports UMA, EVM and EMU have listed the groups that were consulted it is difficult to assess what group expressed what views. To correct this shortcoming we need to consult each group by presenting to them the profile of the future graduate and the learning outcomes of each of the modules that will be part of the programme. A structure will be presented so that all partners follow a similar model.

4. ***What are the similarities regarding the responses from the participant countries?***

Due to the fact that the methodology employed was not entirely standardised the comparison is not easy to make. However a couple of common features emerge:

-Employers' opinions

Ability to apply knowledge to practice; basic general knowledge in environmental hazard behaviour; capacity to learn; ability to work in a team; planning and management abilities; information management competences;

-Employees opinions

Ability to apply knowledge to practice; decision making capacity; capacity to adapt to new situations; ability to solve problems; ability to work as a member of a team; analysis and synthesis capacity; capacity to manage own time; capacity to generate ideas; concern for quality.

-Academics' opinions

Capacity to conduct research; competence to use the IT; decision making competences; ability to work as member of a team; interpersonal competences.

5. ***What are the main differences regarding the responses from the participant countries?***

The structure of the reports was different and therefore the comparison is not easy to make. However a couple of main differences emerge:

*Employers' opinions

-Understanding the culture of other countries (UK-important; EE-Not important;)

-Leadership (UK-Important; PT-Not important; ES-Important, RO-Important; EE-Not mentioned)

-Ability to work in an international context (UK-Important; PT-Not important; RO-not mentioned; ES-Important, EE-not mentioned)

-Initiative and entrepreneurial spirit (UK-Important; PT-Important; RO-Important; ES- Important; EE-not mentioned)

*Employees (students') opinions

-Initiative and entrepreneurial spirit (PT-Not important; UK-Important; RO-Important; ES-Not important; EE-Important)

-Capacity to generate new ideas (RO-not important; EE-not mentioned; UK-Important; ES-not important, PT-not mentioned)

-Critical and self critical competences (PT-not important; RO-important; ES-important; UK-important; EE- important)

-Ability to work in an interdisciplinary team (PT-not important; UK-important; EE not mentioned; RO-not mentioned; ES-important)

-Ethical commitment (UK-Important; EE-not important; RO-important; PT-not mentioned; ES-Important)

*Academics' opinions

-Ethical commitment (UK-important; EE-not important; RO-not mentioned; PT-Important; ES-Important)

-Oral and written communication in own language (UK-not important; EE-not important; RO-not mentioned)

-Knowledge of a secondary language (UK-not important; EE-not important; RO-important; ES-important)

6. ***What data we still need to collect in order to be able to formulate the learning outcomes?***

By analysing the KCR we think that we need to collect more information regarding key stakeholders' opinions on practical environmental hazards prevention techniques; specific situation knowledge; essential skills; what disaster command centre is best to work with.

7. ***To what extent the KCR was useful in defining the academic and professional profiles?***

By conducting the surveys and collecting data on key competences we have managed to better understand the main features of the future graduate of a *International Master's Degree for The*

Environmental Security Sector. However interviews with potential beneficiaries and people who work on the ground, environmental hazards prevention brigades will enable us to better understand the most important elements that we need to address.

8. ***To what extent the KCR was helpful in guiding the process of outcome formulation?***

The KCR is an essential element that should be now used when deciding on the structure of the modules and the content of each of the module. The extent to which we trust the CKR reflects the reality will give a strong support to our rationale.

9. ***To what extent did the KCR assisted the project partners in constructing a common language?***

If we used a more standardised mode of presentation the communication between us would have gained in strength. We need to use the TUNING methodology and theoretical framework if we are to facilitate our understanding of key terms when designing the programme. The feeling is that there is still a lack of understanding regarding the terminology we need to employ and even the meaning of some of the main concepts.

10. ***How did TUNING methodology assist us in developing the KCR?***

Apart from using TUNING methodology to facilitate communication between partners we need to study existing good practice when developing the modules and when deciding on the link between the required competences and the formulation of the learning outcomes. We also need to look into other projects that were based on TUNING, especially those conducted in the area of natural resources management.

The evaluation was based on discussion with students, lecturers, employers, and partners in the project.

Results have been compiled by Ioan Abrudan of Transilvanis University, Romania, based on reports put together by:
- GGR-UK
- ARACIS- RO
- A3ES - PT
- EKKA - EE
- ANECA - ES
- OECD - ES