



WP 1 Preparation

MEHMED

Deliverables 1.1 – 1.7

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contribution of all MEHMED partners

Introduction

MEHMED's general objective is the development & implementation of the new master degree in environmental change management in Algeria, Morocco and Tunisia through a Bologna educational approach. Within the duration of the project, one edition of a 2-year long master programme is foreseen; however, the long-term goal of the consortium is the yearly implementation of the programme at all participating PC HEIs.

Future professionals and researchers will be capacitated with the required knowledge, skills and competences for environmental change management and sustainable development in close collaboration with socio-economic stakeholders. This way, the project will address the challenges of dealing with environmental policies in accordance with EU and international standards and strengthen the role of local universities in the development of innovative environmental management strategies. This will be achieved through a transfer of the knowledge and experience of the participating EU HEIs in the implementation of related programmes.

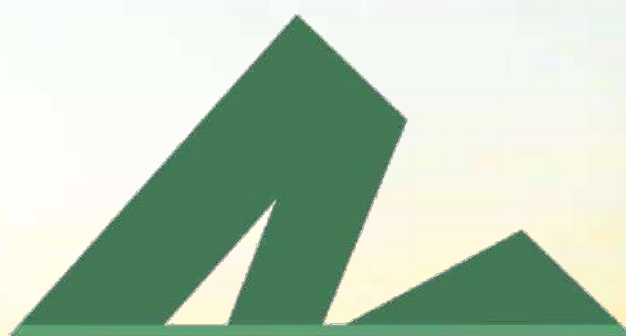
The implementation of the project activities relies on the pooling of activities in six work packages (WP) under the leadership of different partners. According to the proposal of the MEHMED project, the University Mohamed Primer (UMP) should act as coordinator for WP1. However, the practical difficulties at UMP to develop the role of the leader were in contrary to the prospects, and in the end, the leadership has been passed to the University of Girona (UdG). This unexpected change in the leadership of the WP has generated some delays in the development of the deliverables and activities but finally all working tasks were well performed by the consortium under the new leadership (UdG) in accordance and coordination with the initial WP leader(UMP).

In order to make this master's project a success story, an insightful preparation phase is essential. WP1 (preparation phase) covers research, analysis and other preparatory activities for establishment of the knowledge base for the MEHMED master programme. The activities described in Tab. 1 form part of the WP1 deliverables of MEHMED (deliverable 1.1 – 1.7).

Hereinafter follow all deliverables from WP1 in sequential order.

Table 1.1.1 Descriptive summary of WP1 deliverables

1.1	Research and analysis plan	Plan to coordinate and plan research and analysis activities including details on the information to be collected, by whom, and by when. All partners will be involved in this phase.
1.2	Academic and labour-market requirements	Report on the definition of academic and labor-market requirements for the curriculum to be developed.
1.3	Analysis of the experience of the EU HEIs	<p>Analysis results regarding the experience of European HEIs in the development and implementation of their environmental master degrees, among others:</p> <ul style="list-style-type: none"> • Master's in Environmental Change: Analysis and Management of Universitat de Girona (Spain) • Joint Master's in Policies and Planning for Cities, Environment and Landscape provided by the Universitat de Girona (Spain), the Universitat Autònoma de Barcelona (Spain), Università degli Studi di Sassari (Italy), the Università IUAV di Venezia (Italy) and the Universidade de Lisboa (Portugal). • Master GAELE: Environment: dynamic territories and Society of the Université Paris-Sorbonne (France)
1.4	Analysis of current academic offer in PC HEIs	<p>Report on the internal analysis of the Partner Country HEIs' current academic offer in the field of environment and sustainable development to specify potential input containing at least the following information:</p> <ul style="list-style-type: none"> • Topics/Specialization of the master's programs - Target students - Learning outcomes • Focus on the acquisition of transferable skills • Learning outcomes • Teaching techniques (traditional, online, blended..) • Number of students • Implementation of internships • Involvement of the private stakeholders • Employment opportunities and employability • Official accreditation
1.5	SWOT Analysis results	Report on SWOT Analysis results regarding accreditation, academic teachers, potential students, employability and role of public and private sector
1.6	Knowledge Base	Knowledge base covering all the reports and other information gathered and exchanged during the preparatory phase (WP1)
1.7	Local emphasis within the environmental change challenges	Report on the defined local emphasis for each PC HEI based on the specific environmental change challenges faced by the PCs and their expertise



MEHmed

**MEDITERRANEAN ENVIRONMENTAL
CHANGE MANAGEMENT**

MASTER STUDY & ECOSYSTEM BUILDING

WP 1 – MEHMED Deliverable 1.1

Research and analysis plan

Coordinator



Co-funded by the
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PROJECT NUMBER: 589020-EPP-Y-2016-1-2S-EPPKA2-CBHE-JP

Partners



REPORT ON RESEARCH AND ANALYSIS PLAN

MEHMED – WORK PACKAGE 1 – PREPARATION PHASE

WORK PLAN

The participating HEIs come from various national contexts (Programme Countries and Partner Countries), resulting in different methods and expectations, analysis results might not be equivalent. Contingency: Templates will be developed in order to make sure that all critical information will be collected. Furthermore, HEIs will involve additional departments in the activities

This WP1 covers research, analysis and other preparatory activities for establishment of the knowledge base for the MEHMED master programme in Algeria, Tunisia and Morocco.

Task 1.1. Research and Analysis

1.1.1. Exchange of experience as basis for research activities

All EU and PC HEIs will discuss their experience on the environmental change management studies in their countries, especially in their HEIs, during the Kick-Off Meeting. The main aspects of these studies will be explored:

- *Modules: curriculum architecture*
- *Learning outcomes, in particular transversal skills*
- *Teaching methods*
- *Target students*
- *Statistics: number of students, working places of students*
- *Duration*
- *Internship module (yes/no)*
- *Target public and private stakeholders to improve employability of students*

1.1.2. Coordinate and plan research and analysis activities

Based on the conclusions of the Kick-Off Meeting, the UMP and the UdG will elaborate the research and analysis plan on the main steps for the 5-months analysis phase. It will include details on the information to be collected. All partners will be involved in this phase.

COORDINATION: UMP - UdG

AIM: to establish the knowledge base for the MEHMED master programme

TASKS IN ORDER OF DEVELOPMENT:

- 1.1.3 Establishment of MEHMED Academic Council
- 1.1 Research and Analysis + 1.1.9 Create a Knowledge Base about:
 - Future degree competences: 1.1.5 Identify the specific required competences of the local labour markets; 1.2.1 Identify specific environmental change challenges faced by the PCs; and 1.2.2 Academic emphasis on local challenges
 - Current academic offer: 1.1.6 Collection of information of the EU masters: 1.1.7 Analysis of the PC's HEIs academic offer, including employability outcomes. 1.1.8 SWOT analysis.
- 1.1.4 Identify specific academic requirements
- 1.2 Define local emphasis → Final report based on the Research and Analysis

WP1 MEETINGS (skype)

- UMP and UdG: preparatory works - first week of April
- SC: WP work plan - end of April
- SC: Constitution of Academic Committee – mid-May
- SC: check outcome of WP – end of June

1.1.3: Constitution of the MEHMED Academic Council

Description: An Academic Council (AC) will be established by appointing one academic representative of each project partner, as well as local public and private stakeholders. This Council will be created to oversee the project activities from an academic and professional point of view, and to ensure the quality of the master programme development.

Membership of the AC:

MEHMED Steering Committee(SC)

Each HEI will invite 4 stakeholders to join: 1 Public Authority; 1 Company; 1 NGO; 1 Science-Education Institution. These stakeholders may be international or domestic, according to existing cooperation / possibilities. Invitations will be considered for all organizations cited in section 5.1.3 of the project application.

Membership will be formalized in a signed document specifying mission, objectives, tasks and duration of the involvement. AC membership document will be drafted in English by UdG, revised by all partners and translated to French or Arabic by UMP. Signed document will be in English and French or Arabic.

Governance and participation: the SC will steer the activities of the AC through its own meetings and each HEI will manage the participation of their invited members through national meetings, email communication, etc.

Activities and deadlines:

- Draft of the AC membership document: 12 April 2019
- Proposal of AC members and national meetings by each HEI: 22 April 2019
- Meeting of the SC to discuss AC membership document, invited members and national meetings: 25 April 2019
- Translation of documents and distribution of invitations: 30 April 2019
- Reception of signed AC membership documents: 15 May 2019
- SC meeting for the constitution of the AC: 22 May 2019
- WP1 tasks of each HEI with AC member: by 31 May 2019
- WP1 meeting of each HEI/national AC: by 10 June 2019
- WP1 final report by each HEI: by 20 June 2019
- SC meeting to discuss and close final report of WP1: by 30 June 2019

Figure 2.1.1 Model and structure used for AC membership document:

Academic Committee

[NAME OF LEGAL REPRESENTATIVE], as legal representative of the [ENTITY] with registered address in the city of [CITY], [ADDRES], with Tax Identification Number [TAX IDENTIFICATION NUMBER],

STATE, on my own liability that:

- a) that [NAME OF STAFF MEMBER] has been authorized to participate as a member of the **Academic Committee** in the ERASMUS+ project “Mediterranean Environmental Change Management. Master Study and Ecosystem” with project reference number 598826-EPP-1-2018-1-ES-EPPKA2-CBHE-JP
- b) that the contractual link between the [NAME OF ENTITY] and [NAME OF STAFF MEMBER] will be a current contract that will be valid for the duration of his/her claimed dedication to the project.

[SIGNATURE]

Girona, 27 February 2019

1.1 Research and Analysis + 1.1.9 Create a Knowledge Base

Description: Each HEI PC partner will develop a set of research tasks to identify the in-demand skills by the local labour market, and specific environmental change challenges in their region/country. This will be carried out in collaboration with public and private stakeholders, by sending out a **Google Forms*** questionnaire to: Public Administration bodies or agencies; private environment-related companies; research and education centres; and environment and development NGOs. At least 3 replies by each type of organization should be obtained. The members of the local AC of each HEI will also be requested to complete the questionnaire. Whenever interesting, face-to-face or phone-based interviews will be conducted, in order to obtain in-depth answers and information. On the other hand, each HEI partner will analyse the country's academic offer in environmental studies (including own offer) and employability, and produce a SWOT. National reports will be produced from merging and discussing the analysis of each participating university.

*: Google Forms is suggested for both out-going questionnaires and academic offer reports, as this will allow building the knowledge base automatically and generate data crossings and analysis.

Questionnaire about future degree competences:

- WP Tasks: 1.1.5 Identify the specific required competences of the local labour markets; 1.2.1 Identify specific environmental change challenges faced by the PCs; and 1.2.2 Academic emphasis on local challenges
- Questionnaire design methodology: The methodology and the theoretical framework followed for the elaboration of the different questionnaires used in the WP 1 are based on the following bibliographic resources:

Babbie, E. R. (2020). ***The practice of social research***. Cengage learning.

López-Roldán, P. & Fachelli, S. (2015). **Metodología de la investigación social cuantitativa**.

Coenders, G. et al. (2018). **Metodología de encuestas**. Cuestionarios: Tipos, Diseño y Prueba.

Groves, Robert M. et al. (2004) **Survey Methodology**. Hoboken: Wiley-Interscience

Callegaro, M. et al. (2015). **Web survey methodology**. SAGE

Table 3.1.2 Questionnaire results about academic and labour market competencies for future Master Degree

COMPETENCE MAPPING	COMPETENCE QUESTIONNAIRE
Competencies in land use and landscape management (Occupation specific competencies)	Enhancing low carbon society
Facilitation	Rising ecological awareness among citizens
Mediation and conflict management	Carbon emissions reduction planning
Viable contacts and influence on Policy making and on decision making	Enhancing use of renewables
Landscape restoration	Carbon neutral transport and mobility solutions
Basic environmental law	Resource efficiency
Knowledge of environmental regulations and management policy and practice	Providing ecologically sustainable solutions for construction engineering
Networks among environment and development policy professionals	Support the deployment of green infrastructure (parks, trees, grass etc.) within cities
Environmental health	Circular economy
Natural resources governance	Smart & sustainable cities and towns
Participatory methods (stakeholder involvement)	Integration of idea of low carbon society to land use and landscape planning
Competencies in the context of low carbon society	Carbon markets and carbon footprint
Climate change: causes, impacts, trends, mitigation, adaptation	Environmental governance and management
Climate change international policies	Familiarity with appropriate policy instruments and their applications.
The ability to share the ecological awareness	Knowledge of environmental standards, regulations and management in local/regional level.
Tools and mechanisms for achieving sustainable development	Comprehension the appropriate aspects of environmental law.
Energy solutions (use of renewables)	Comprehension the appropriate aspects of environmental policy.
Carbon sequestration (land use planning, forest management, carbon capture and storage)	Familiarity with public private partnership schemes as a tool for stakeholder involvement.
Carbon emission reduction planning	Knowledge of sustainability indicators and how to monitor them.
Low carbon cities or zones / eco-cities	Awareness of proceedings in environmental governance in the Global and European level.

Mobility concepts & solutions	Familiarity with sustainable land use management
Integration of LCS in planning	Familiarity with sustainable landscape planning
Use creativity and innovation to recommend approaches, technologies and solutions that support principles of sustainable development	Familiarity with sustainable governance of natural resources
Understanding societal structures, processes and challenges	Knowledge of landscape restoration possibilities
Ability to reflect Global trends and their impacts	Familiarity with waste management options
System understanding	Ability to apply ecosystem service -thinking
Local solutions for global challenges	Facilitating development in different regional levels
Work with the complexity	Ability to use participatory methods to get stakeholders involved.
Capacity to forecast and project future scenarios	Ability to co-operate with and empower communities.
Workplace competencies	Ability to assist in applying funding for development initiatives.
Team working	Knowledge of key aspects of co-creation for fostering development
Problem solving	Familiarity with co-management schemes.
Creative thinking	Ability to mediate and manage conflicts between different interest groups/stakeholders.
Economic/Business/Financial Principles and analysis	Societal and economical issues and analysis
Organisational knowledge	Understanding of Politics, democracy and power relations
Project management	Understanding of systems thinking
Interdisciplinary solutions	Comprehension of Social stratification and analysis
Social networks and Networking	Comprehension of Economic/Business/Financial Principles and analysis
Subject related academic competencies (Geography and related environmental sciences)	Understanding of Environmental health issues
Geoinformatics	Understanding the possibilities of the New Economy (green, collaborative sharing, local, degrowth)
Transcality	Understanding effects of human pressure on landscape
	Analysis, assessment and evaluation

Knowledge about nature and environment	Ability to analyse and critically evaluate whether information, materials and arguments are appropriate for a particular purpose, and up-to-date.
Human pressure on landscape	Comprehension and use of key concepts from social, political economy and environmental analysis
New economy: green, collaborative sharing, local, degrowth	Ability to predict and assess the impact of actions and policies
Spatial Thinking	Capacity to forecast and project future scenarios
Field Methods to measure geographic information in the field	Familiarity with sustainability indicators and how to monitor them
Human–Environment Interaction	Communication and networking
Personal competencies	Capability to promote innovations
"Common knowledge" yleissivistys	Ability to communicate effectively using ICT, social media, multimedia and other appropriate forms
leadership capacity	Interest on social engagement and "nudging"
Public relations & Lobbying	Ability to act proactively in creating and maintaining relationships to various stakeholders
Interpersonal skills	To have viable contacts and influence on policy making and on decision making
Self-image	Respect, awareness, knowledge and skills to interact effectively in culturally or linguistically diverse contexts
motives	Knowledge of the appropriate tools, medians and channels for communication and dissemination
	Ability to write statements, articles and bulletins to various target groups
How many years you have been working in this field of operation/occupation?	Ability to act in networks among environment and development policy professionals
	Capability to promote innovations
General Competencies	Creativity and problem solving
Multidisciplinary team work, aiming at contributions from shared reflections.	Ability to work with multidisciplinary groups to create solutions

To obtain and select information sources, using specialized ICTs, in order to develop original research with creative and critical ideas.	Ability to generate ideas/social innovations/ methods/ approaches/perspectives appropriate to the discipline and/or occupational practice
To communicate, written or orally, knowledge, conclusions and the ultimate reasons behind them, to specialized and non-specialized audiences, clearly and without ambiguities.	Ability to work with the complexity and uncertainty
To analyse new and complex situation and design different strategic solution alternatives.	Capacity to apply knowledge and skills to devise solutions to unfamiliar problems
Autonomous work balancing and maximizing personal potentialities, for the improvement of professional and research activities.	Willingness to enhance Research and Development (R & D) actions
Integrating knowledge and facing the complexity of issuing a judgment based on information that, yet being incomplete or limited, it includes reflections on the social and ethical responsibilities linked to its implementation.	Technical and practical skills
To apply the acquired knowledge and problem solving capacities to new or little known environments, within wider (or multidisciplinary) contexts related to the students study area.	Project management
To gain the learning abilities allowing the student to continue studying in a self-directed or autonomous way.	Budgeting
Specific Competencies	Ability to compile and interpret statistics
To apply the concept of complexity to the analysis and interpretation of environmental change and processes.	Comprehension and use of Big Data and Open Data
To analyse and interpret environmental change processes and conflicts from conceptual frameworks of different disciplines.	Social media skills
To analyse and interpret response and management mechanisms for environmental change and processes.	Statistical analysing skills in regard to environmental and geographical context
To apply sustainable planning instruments and techniques, as well as skills for building environmental scenarios and policies aiming at protecting, improving and regenerating territories and environmental vectors.	Familiarity with opens source program

To establish hierarchies between factors involved in case studies, based on the concept of scale, from the local to the international level.	Geoinformatic skills
To apply and interpret statistical methods and data, and GIS, for conservation and spatial planning.	Field methods to measure geographic or other appropriate information

MEHMED – ACADEMIC AND LABOUR MARKET COMPETENCIES QUESTIONNAIRE.

Objective: To anticipate academic and labour market competencies on environment change, in order to build a Master Degree programme on Environment Change in the Mediterranean Region, which adapts and innovates from current academic offer, and tackles local environmental challenges and employability demands.

Target audiences:

- Public Administration with environmental competencies (Local Authorities; water, energy, transports, or waste utilities and services; nature conservation agencies and bodies; etc.)
- Private companies working in the green economy (water; energy; waste; agriculture; forestry; fishing; tourism; mobility...)
- Research and education institutions (environment related University Departments; research groups and institutes; schools and highschoools with environmental programmes; science, nature and and environment museums...)
- Environment and/or development NGOs (nature conservation societies; environmentalist groups, foundations, and associations; grassroots community-based organizations; international NGOs present in the country...)

Goal:

- 3 replies from each type of target audience. (replies will express individual opinions, unless it is manifested otherwise).

Questionnaire (Proposal):

1) A new Master Degree on Environmental Change is under preparation: what should be the academic priorities in your opinion?

2) A new Master Degree on Environmental Change is under preparation: what should be labour market priorities in your opinion?

3) Please anticipate from 0 (low) to 4 (high) the relevance of the following environment change topics for the future of your country:

Environment Change processes and trends	0	1	2	3	4
Climate Change (temperatures and heat waves, water cycle, aridification, extreme events)					
Demographic change (aging, migration of youth, rural abandonment...)					
Urban environment (spatial planning and urban growth, air pollution and transports, water supply and treatment, waste management, etc.)					
Farming, fishing and food sovereignty					
Ecological and landscape change (rural abandonment, ecosystem threats and wildfire risk, invasive species, etc.)					
Energy transition					
Governance issues (geopolitics and international cooperation, power devolution, democracy and collaborative governance, corruption)					
Education, research, innovation					
Green business opportunities					
Other:					

Please feel free to add any comments in regards to the previous ratings:

4) Please rate current employability of environmental planning and management graduates in your country (0: low / 4: high):

Environmental planning and management fields	0	1	2	3	4
Water cycle					
Waste management					
Transports					
Air pollution					
Energy provision and efficiency					
Nature and biodiversity conservation					
Agriculture, farming and fisheries					
Spatial planning					
Industry					
Infrastructures and corrective environmental measures					
Green spaces and landscape architecture					
Forestry					
Research, Development and Innovation					
Education					
Tourism					
Global rating:					
Other:					

Please feel free to add any comments in regards to the previous ratings:

5) Please anticipate from 0 (low) to 4 (high) the relevance of the following environment change topics for the future of your local region:

Environment Change processes and trends	0	1	2	3	4
Climate Change (temperatures and heat waves, water cycle, aridification, extreme events)					
Demographic change (aging, migration of youth, rural abandonment...)					
Urban environment (spatial planning and urban growth, air pollution and transports, water supply and treatment, waste management, etc.)					
Farming, fishing and food sovereignty					
Ecological and landscape change (rural abandonment, ecosystem threats and wildfire risk, invasive species, etc.)					
Energy transition					
Governance issues (geopolitics and international cooperation, power devolution, democracy and collaborative governance, corruption)					
Education, research, innovation					
Green business opportunities					
Other:					

Please feel free to add any comments in regards to the previous ratings:

6) Please rate current employability of environmental planning and management graduates in your local region (0: low / 4: high):

Environmental planning and management fields	0	1	2	3	4
Water cycle					
Waste management					
Transports					
Air pollution					
Energy provision and efficiency					
Nature and biodiversity conservation					
Agriculture, farming and fisheries					
Spatial planning					
Industry					
Infrastructures and corrective environmental measures					
Green spaces and landscape architecture					
Forestry					
Research, Development and Innovation					
Education					
Tourism					
Global rating:					
Other:					

Please feel free to add any comments in regards to the previous ratings:

7) Please rate and comment the following academic and labour market competencies for future Master Degree graduates on Environment Change (0: low / 4: high):

ACADEMIC AND LABOUR MARKET COMPETENCIES		COMMENTS (LOCAL EMPHASYS, HIGHLIGHTS, MISSING POINTS...)	0-4
ENVIRONMENTAL CHANGE THEORY AND SCIENCE	Global, Mediterranean and local climate and environment change: causes, impacts, trends, mitigation and adaptation. Geo- politics, democracy and power relations. International and national environment and development policies.		
ENVIRONMENTAL PLANNING AND GOVERNANCE	Familiarity with appropriate policy instruments and their applications: environmental standards, regulations and management in local/regional level. Comprehension the appropriate aspects of environmental law. Comprehension the appropriate aspects of environmental policy. Knowledge of sustainability indicators and how to monitor them.		
UNDERSTANDING AND ENHANCING THE LOW-CARBON SOCIETY	Carbon emissions reduction planning; Enhancing the use of renewables; Carbon neutral transport and mobility; Resource efficiency; Familiarity with waste management options; Ecosystem services assessment and operationalization. Rising ecological awareness among citizens.		
GREEN, CIRCULAR AND COLLABORATIVE ECONOMY	Circular economy; Understanding the possibilities of the New Economy (green, collaborative, sharing, local, degrowth); Entrepreneurship and the capability to promote innovations.		
LOW-CARBON SPATIAL PLANNING AND DEVELOPMENT	Low-carbon and sustainable land use and landscape planning management; Support the deployment of green infrastructure, nature-based solutions and landscape restoration possibilities; Smart & sustainable cities and towns;		

TECHNICAL, PRACTICAL AND ANALYTICAL SKILLS	<p>Ability to analyze and critically evaluate whether information, materials and arguments are appropriate for a particular purpose, and up-to-date.</p> <p>Ability to compile and interpret statistics;</p> <p>Comprehension and use of Big Data and Open Data; Field and lab methods and techniques for measuring environmental and social topics;</p> <p>Statistical analyzing skills for social and environmental data; Familiarity with opens source programs; Geoinformatic skills; Willingness to enhance Research and Development (R & D) actions.</p>		
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ACADEMIC AND LABOUR MARKET COMPETENCIES		COMMENTS (LOCAL EMPHASYS, HIGHLIGHTS, MISSING POINTS...)	0-4
COLLABORATIVE GOVERNANCE AND FACILITATION	<p>Ability to use participatory methods to get stakeholders involved. Ability to co-operate with and empower communities. Ability to mediate and manage conflicts between different interest groups/stakeholders. Interest on social engagement and "nudging". Comprehension of Social stratification and analysis. To have viable contacts and influence on policy making and on decision making.</p>		
LOCAL / REGIONAL PROJECT PLANING AND MANAGEMENT	<p>Strategic thinking and planning. Budgeting. Knowledge of key aspects of co-creation for fostering development. Familiarity with co- management schemes. Knowledge of funding policies, programmes and institutions. Ability to assist in applying for funding and fund raising. Project filing and management.</p>		
CREATIVITY AND PROBLEM SOLVING METHODS	<p>Ability to work with multidisciplinary groups to create solutions. Ability to generate ideas/social innovations/ methods/ approaches/perspectives appropriate to the discipline and/or occupational practice. Ability to work with the complexity and</p>		



COMMUNICATION AND NETWORKING RESOURCES AND SKILLS	<p>Ability to communicate effectively using ICT, social media, multimedia and other appropriate forms; Ability to act proactively in creating and maintaining relationships to various stakeholders; Respect, awareness, knowledge and skills to interact effectively in culturally or linguistically diverse contexts; Knowledge of the appropriate tools, medians and channels for communication and dissemination</p> <p>Ability to write statements, articles and bulletins to various target groups; Ability to act in networks among environment and development policy professionals.</p>		
MISSING BLOCK OF COMPETENCIES			

Current academic offer: 1.1.6 Collection of information of the EU masters: 1.1.7 Analysis of the PC's HEIs academic offer, including employability outcomes.

The development of the new master programme is assessed in comparison with the current academic offer of the PC HEIs, followed by a detailed evaluation of the strength, weakness, opportunities and threats regarding accreditation, academic teachers, potential students, employability and role of public and private sector to the new master.

The current academic offer of the Partner Country HEIs in the field of environment and sustainable development will be analyzed to specify potential input. This analysis will cover the following aspects:

Fill in according to the current situation at your HEI:

HEI:	COUNTRY:
DEGREE TOPICS:	
Specialisation of the master programmes	
Target students	
Learning outcomes	
Focus on the acquisition of transferable skills	
Learning outcomes	
Teaching techniques (traditional, online, blended..)	
Number of students	
Implementation of internships	
Involvement of the public and private stakeholders	
Employment opportunities and employability	
Quality assurance and official accreditation	
Analysis:	

1.1.8 SWOT analysis

SWOT

Table 4.1.3 : Model and structure used for SWOT analysis

Factors	INTERN	EXTERN
	STRENGTH	OPPORTUNITIES
positive		
	WEAKNESS	THREATS
negative		

SWOT Analysis regarding accreditation, academic teachers, potential students, employability and role of public and private sector

1.1.4 Identify specific academic requirements

Based on the results of questionnaires and SWOT analysis it will be possible to identify specific academic requirements.

1.2 Define local emphasis → Final report based on the Research and Analysis

In this brief questionnaire, we want to gather the basic information about the type of manifestations, the impacts, risks and the possible mitigation and adaptation related to environmental change at the local level. We understand as a local scale the most direct area of influence of the university, the closest territorial area with which your university identifies.

Figure 5.1.2: Model and structure used for questionnaire about local emphasis of environmental change

QUESTIONNAIRE

LOCAL EMPHASIS OF ENVIRONMENTAL CHANGE

1. What are the main manifestations of environmental change?
2. What present and future impacts and risks can be associated environmentally, economically and socially?
3. What possibilities of adaptation exist?
4. What mitigation possibilities exist?
5. Which actor (especially local) would be involved in adaptation and mitigation actions?
6. Other important reflexions to consider



MEHmed

**MEDITERRANEAN ENVIRONMENTAL
CHANGE MANAGEMENT**

MASTER STUDY & ECOSYSTEM BUILDING

WP 1 – MEHMED Deliverable 1.2

Report on defined academic and labour-market requirements

Coordinator



Co-funded by the
Erasmus+ Programme
of the European Union

info@mastermehmed.com
www.mastermehmed.com

PROJECT NUMBER: 389826-EPP-1-2018-1-ES-EPPKA2-CBHE-JP

Partners



SYNTHESIS OF THE RESPONSES TO THE QUESTIONNAIRE ON ISSUES RELATED TO ENVIRONMENTAL CHANGE, THE ABILITY TO GENERATE EMPLOYMENT AND THE PRIORITIZATION OF COMPETENCIES

An initial analysis of the quantitative results of the questionnaire responses submitted during the months of May and June of 2019 is proposed below. In all, there are 106 responses distributed as follows: 28 from Algeria, 25 from Morocco and 52 from Tunisia. Standing out among the groups are 73 participants from the education and research sector, which is well above the group of businesspersons and public administration and NGO representatives (23 participants) and the group of students (10 participants). In particular, the data referring to students was not considered representative and was not explicitly required during the collection process. They are only presented in disaggregated form throughout the first section of the results annex of the document (*Professional vs Academic vs Students*).

The analysis is divided into three main sections:

- Overview of the whole
- Group results
- Results from a territorial perspective

In addition, the analysis is obviously based on the five questions asked within the framework of the Google Forms questionnaire. The specific questions were:

Question 1 (Q1)

Please rate from 0 (lowest) to 4 (highest) the relevance of the following environmental change topics for the future of your LOCAL REGION.

Question 2 (Q2)

Please rate the current employability in the following environmental planning and management fields in your LOCAL REGION (0: lowest - 4: highest).

Question 3 (Q3)

Please rate from 0 (lowest) to 4 (highest) the relevance of the following environmental change topics for the future of your COUNTRY.

Question 4 (Q4)

Please rate current employability in the following environmental planning and management fields in your COUNTRY (0: lowest - 4: highest).

Question 6 (Q6)¹

Please rate from 0 (lowest) to 4 (highest) the following areas of academic and labour market competencies for the future Master's Degree in Environmental Change.

First of all, the data from the responses were analysed from the perspective of the participants, specifically from the two large groups (the students' responses were left out for the reasons given above). The responses were grouped according to territorial scales: the local/regional and the national. Second, the analysis was carried out based on territorial origin: that is, by countries and the Maghreb as a whole.

Other possible combinations of data such as participants in relation to countries – and those referring to students and the gender perspective – were left out for the moment because fragmentation or the irregular distribution by sector or country of responses logically reduces their importance. Likewise, the use of other statistical parameters – such as response dispersion or the median – remain for later analysis or as responses to specific questions.

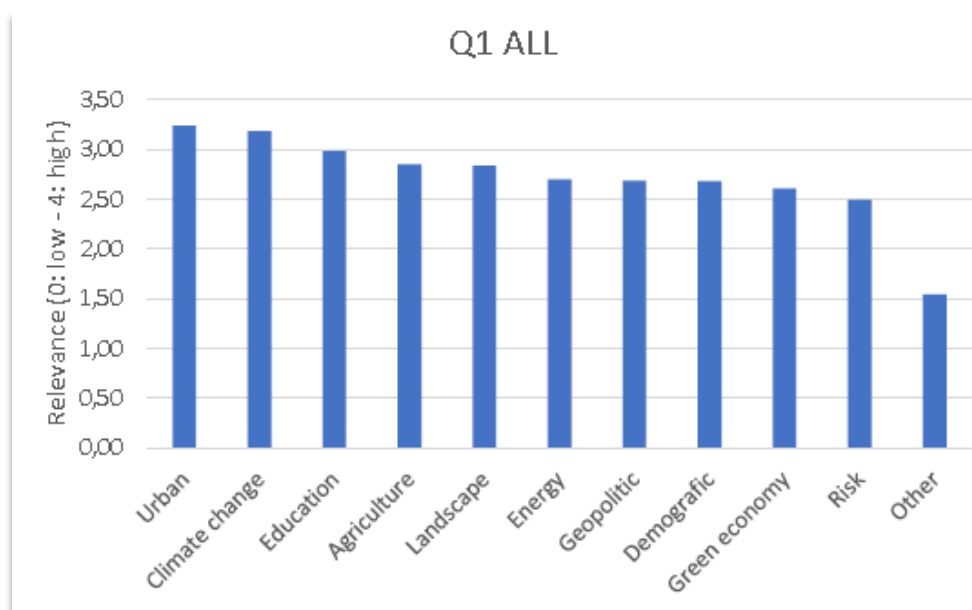
Finally, in this section of preliminary comments, it is necessary to refer to some aspects of the questionnaire itself, which probably affects the results. In addition, it is particularly necessary to refer to those cases in which the diversity of possible responses – made in search of the highest precision – may have reduced the significance of some aspects. For example, separating the “Water cycle” from “Water treatment” can imply that the employment capacity of this transcendental topic is less important; or the separation between “Planning” and “Spatial planning” could give less weight to the competency of planning.

¹ Question 5 (Q5) is related to qualitative information from the partners: **5) Would you like to highlight or comment about academic / labour market / or environmental change priorities relevant to your local region**

1. An initial, general perspective on the set of questions

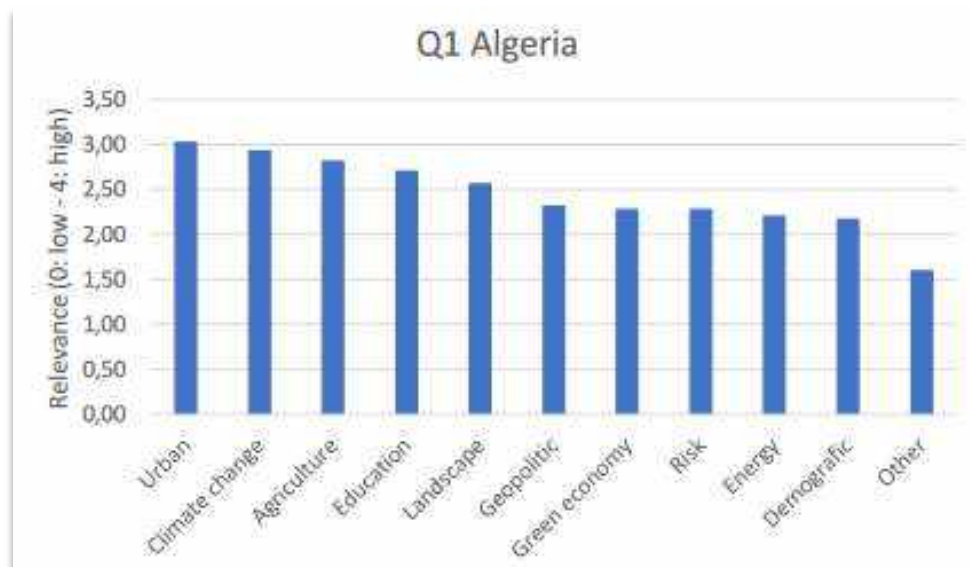
1.1 Importance of the problem areas according to the total number of respondents

An analysis of the answers from large groups of respondents shows that the **issues that matter most** about environmental change on the **local/regional** scale are those related to **Climate change** and its impact on **Urban areas** and, to a lesser extent, on **Education**.

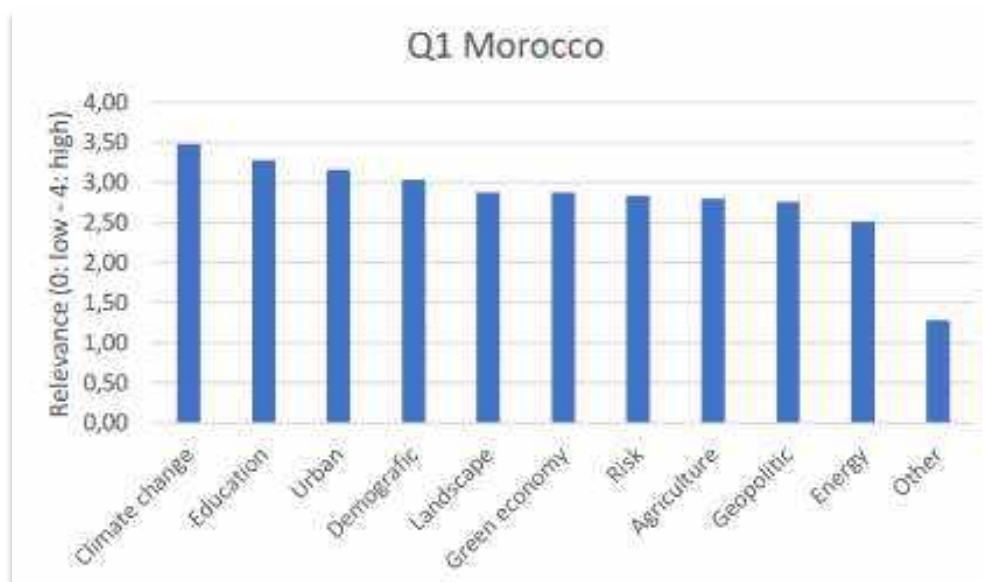


Graphic 1.2.1: answers Question 1 relevance of the following environmental change topics for the future of your LOCAL REGION from all participants.

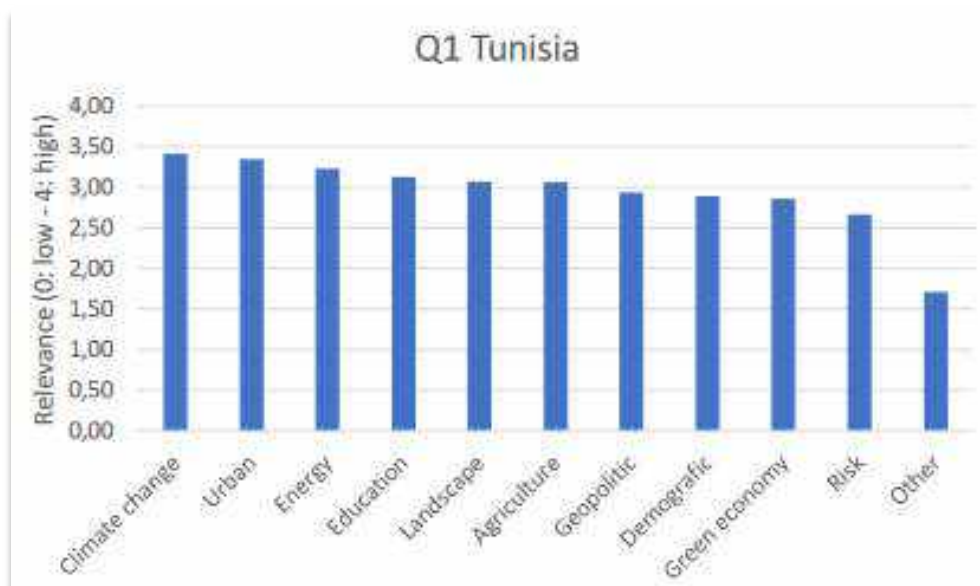
Results at the **national** level coincide in part: while **Climate change** and **Urban areas** maintain the top positions, concerns about the impact of environmental change emerge in **Agriculture**, while Education remains in fourth place (although with figures very close to third place).



Graphic 1.2.2: answers Question 1 about relevance of the following environmental change topics for the future of your LOCAL REGION from Algeria.



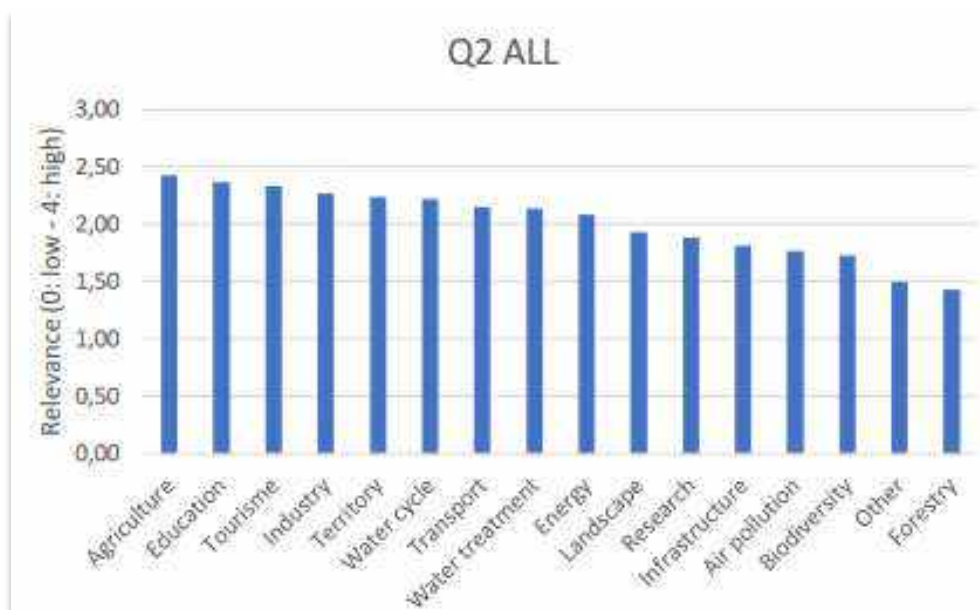
Graphic 1.2.3: answers Question 1 about relevance of the following environmental change topics for the future of your LOCAL REGION from Morocco.



Graphic 1.2.4: answers Question 1 about relevance of the following environmental change topics for the future of your LOCAL REGION from Tunisia.

1.2. Fields with higher employment expectations according to the total number of respondents

If the analysed responses are those referring to which fields can offer **greater possibilities of employment**, activities on the **local scale** associated with **Agriculture**, **Education** and **Tourism** are at a certain distance from Industry. Standing out in the opposite direction are the low employment expectations of the Forestry sector and, to a lesser extent, Air pollution and Infrastructure. In other settings, they would seem to be sectors with high demand for experts.

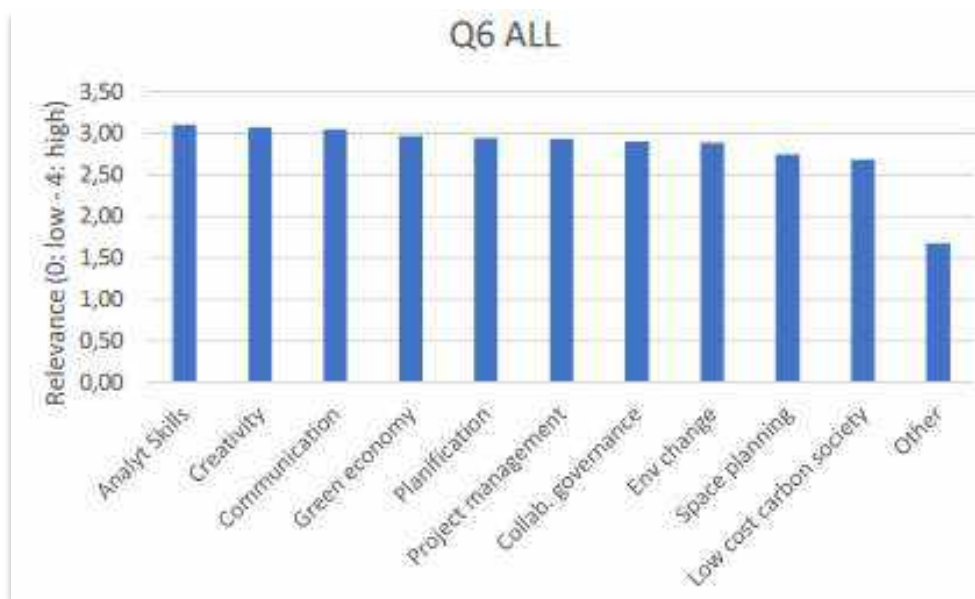


Graphic 1.2.5: answers Question 2 about current employability in the following environmental planning and management fields in your LOCAL REGION from all participants.

If this same question is answered in relation to the **nation** as a whole, the fields are basically the **same as at the local scale**, although activities associated with the **Water cycle and Water treatment** (which are separate responses) and **Industry** acquire greater importance.

1.3. Prioritization of competencies according to the total number of respondents

Finally, in the first block of questions, in the one referring to the **competencies** considered of greater importance for the development of the future master's, **transversal competencies like Analytical skills, Creativity and Communication capability stand out**. The rest of the competencies, partly the most specific, remain at a certain distance, although standing out among them are the **Green economy, Planning and Project management**. As will be seen later, if the results are analysed according to the group surveyed, the answers would differ considerably.



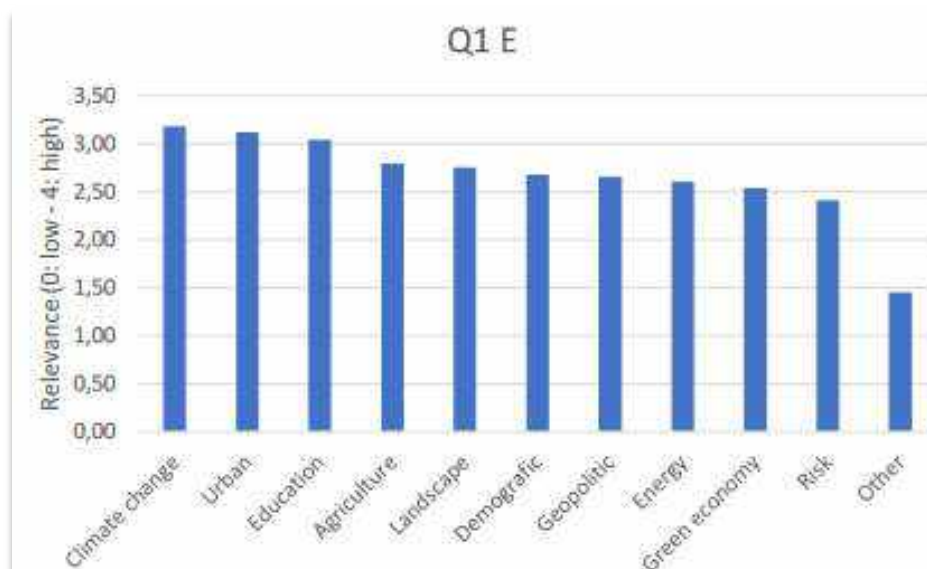
2

Graphic 1.2.6: answers Question 6 about the following areas of academic and labour market competencies for the future Master's Degree in Environmental Change from all participants.

2. The results by groups

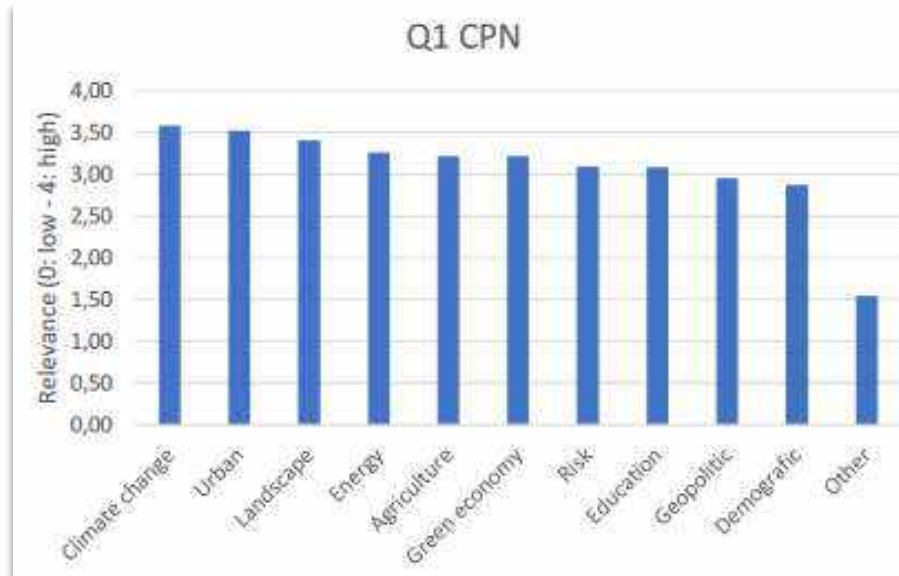
2.1. Relevance of the problem areas according to groups of respondents

Regarding the most relevant **problem areas**, the group of **Educators and researchers** considers that, both at the **local** and **national level**, **Climate change**, **Urban problems** and **Education** correspond to the total values.



Graphic 1.2.7: Relevance of the problem areas according to the group of Educators and researchers

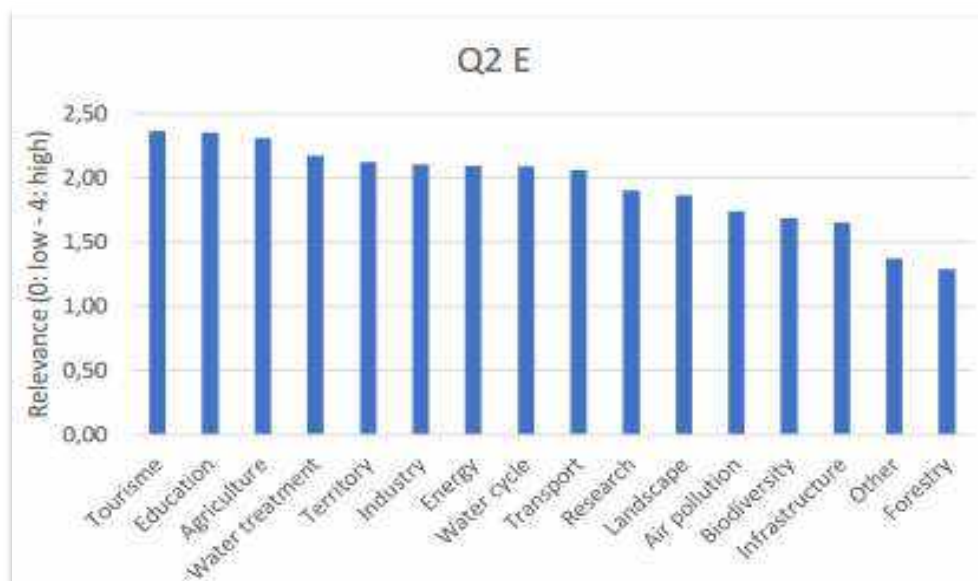
For its part, for the group of **Businesspersons, Administrations and NGOs**, the main concerns at the **local scale** vary as the **Education field loses importance and**, conversely, **Landscape appears**. On the **national scale**, the **priorities change** notably, with **Agriculture and Energy appearing** in the first positions. Landscape is relegated to the lower-rated aspects. It is also remarkable that **this group tends to signal higher values** than the previous one.



Graphic 1.2.8: Relevance of the problem areas according to the group of Businesspersons, Administrations and NGOs

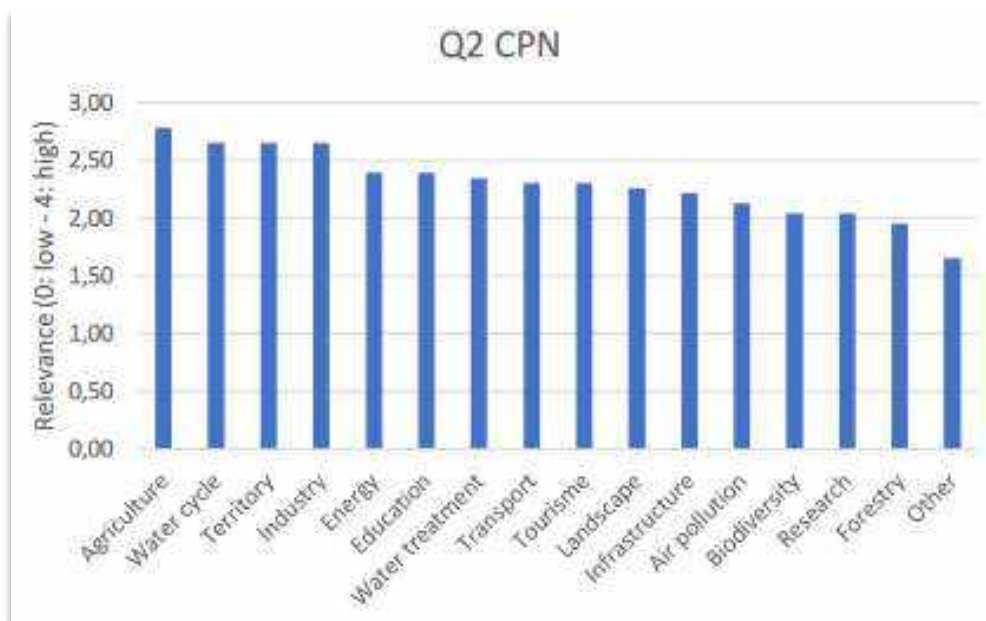
2.2. Fields with higher employment expectations according to groups of respondents

If the results analysed are those of the assessment of **employment opportunities**, the **Educators and researchers** make **Tourism** emerge, followed by **Education** and **Agriculture**, with the remaining fields – Water treatment, Territory, Industry, etc. – at a certain distance. The only **difference between the local and the national scale** is found in the **ascent of the Water cycle at the national level**.



Graphic 1.2.9: answers Question 2 about higher employment expectations according to the group of Educators and researchers.

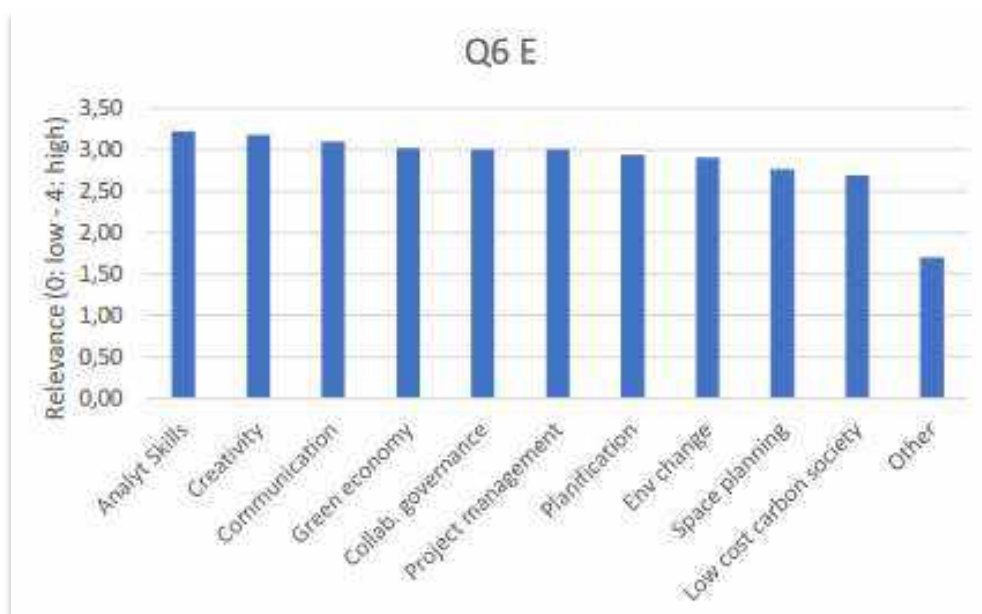
For their part, **Businesspersons, Administrations and NGOs** confirm the importance in terms of employment of **Agriculture and Territory**, at both the local/regional and the national scale. **Industry** is also prioritized in the two scales. Nevertheless, if on the **local scale the Water cycle appears in second place**, on the national it falls to fifth place; and **Education**, which occupies fourth place on the national scale, falls to sixth on the local.



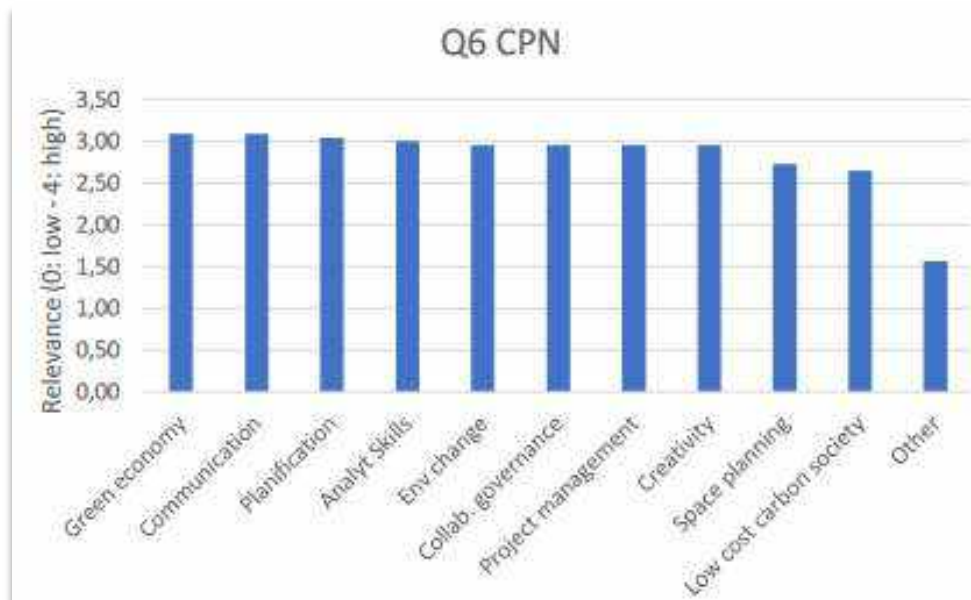
Graphic 1.2.10: answers Question 2 about higher employment expectations according to the group of Businesspersons, Administrations and NGOs.

2.3. Prioritization of competencies according to groups of respondents

Finally, in relation to the competencies, the disparity between actors is very large. Thus, **Educators and researchers** prioritize the instrumental – logically coinciding with the total results: **Analytical skills, Creativity and Communication capability**. Conversely, **Businesspersons, Administrations and NGOs** combine instrumental competencies like **Communication and Analytical skills** with others in more specific fields such as the **Green economy and Planning**, although other aspects like Environmental change, Collaborative governance, Project management or Creativity obtain very close scores.



Graphic 1.2.11: answers Question 6 about prioritization of competencies according to the group of Educators and researchers.



Graphic 1.2.12: answers Question 6 about prioritization of competencies according to the group of Businesspersons, Administrations and NGOs.

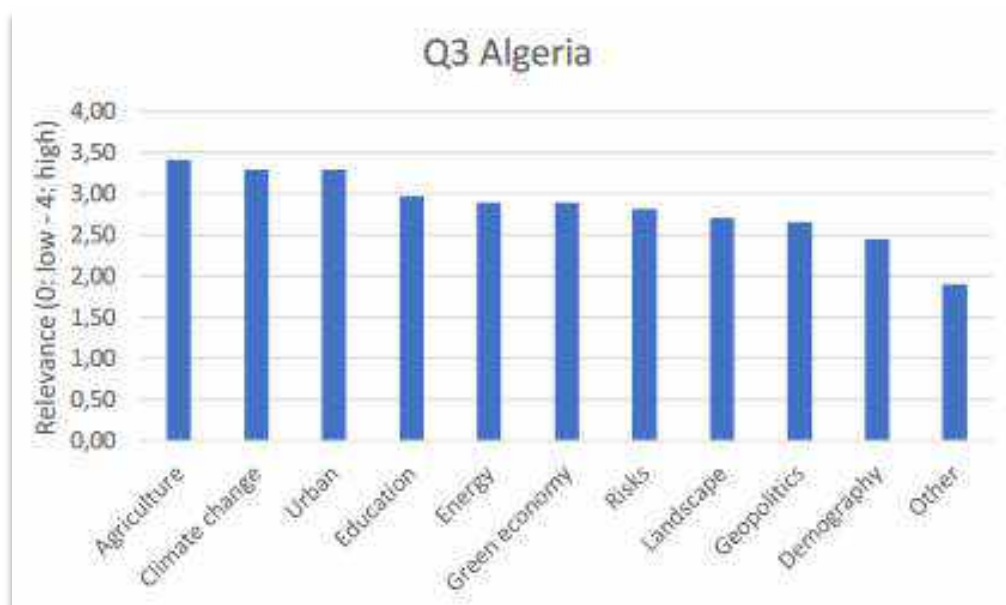
3. The results from a territorial perspective

3.1. The combined results and differences between countries

Another perspective of the results is territorial, starting with country-by-country responses and the combined results of all of them. These results must contribute to defining which aspects seem to be shared by Morocco, Tunisia and Algeria and, therefore, can establish combined contents for the future master's, and which ones are specific to each country and region in order to define the specific contents.

Regarding which **problems** are seen with greater concern at the **local scale**, the three countries (that is, the universities of each one of them, each from its local perspective) all stress, as is well known, **Climate change, Urban areas and Education** among the first four priorities. At that point, the **differences** arise, since the responses from **Algeria propose Agriculture, from Morocco, Demographic factors and from Tunisia, Energy**.

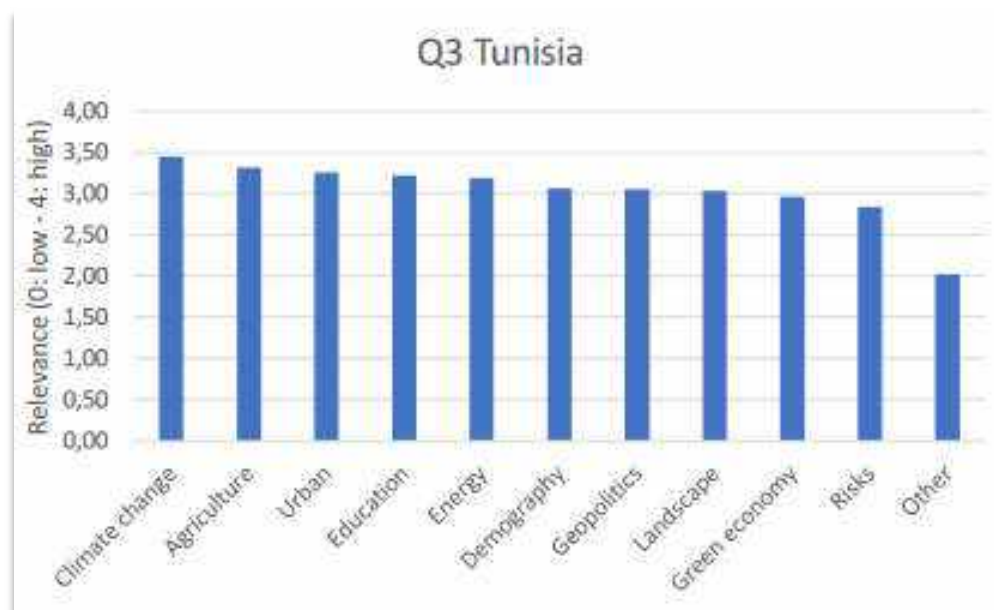
At the **national level**, these **same priorities** are maintained, with the only difference being that **concern about Landscape** emerges in fourth place in **Morocco**, although only a little ahead of aspects that follow it such as demography or urban problems.



Graphic 1.2.13: answers Question 3 from Algeria, about the relevance of the following environmental change topics for the future of your COUNTRY.

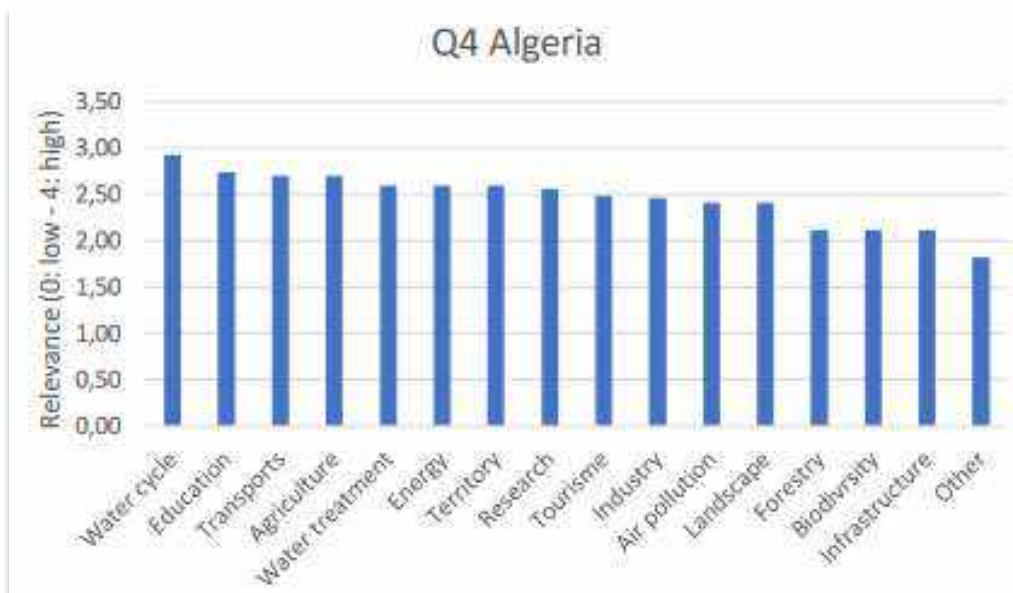


Graphic 1.2.14: answers Question 3 from Morocco, about the relevance of the following environmental change topics for the future of your COUNTRY.

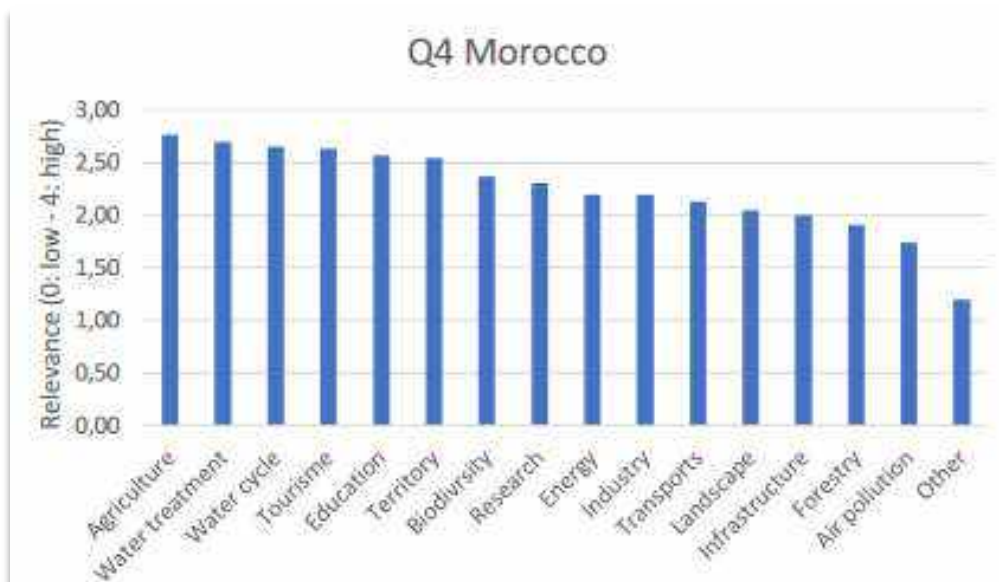


Graphic 1.2.15: answers Question 3 from Tunisia, about the relevance of the following environmental change topics for the future of your COUNTRY.

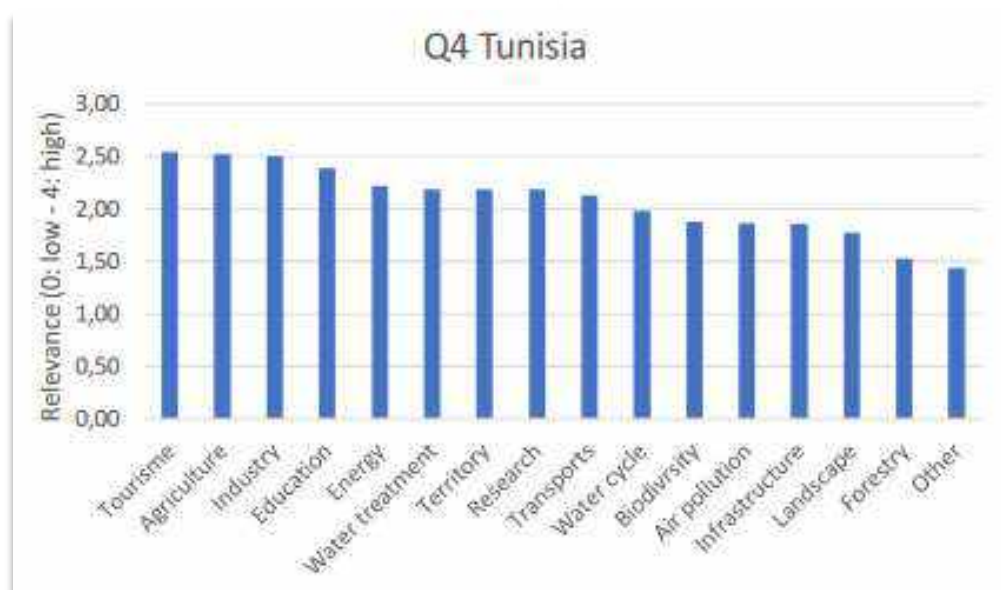
With respect to the fields where one finds **Employment**, the coincidence is limited to **Agriculture and Education**. Beyond these two areas, **Algeria highlights Water cycle and Transports** (which occupy the highest positions), **Morocco also prioritizes Water cycle** and adds **Territory**, and **Tunisia places Tourism and Industry** among the four main fields of employment.



Graphic 1.2.16: answers Question 4 from Algeria, about current employability in the following environmental planning and management fields in your COUNTRY.

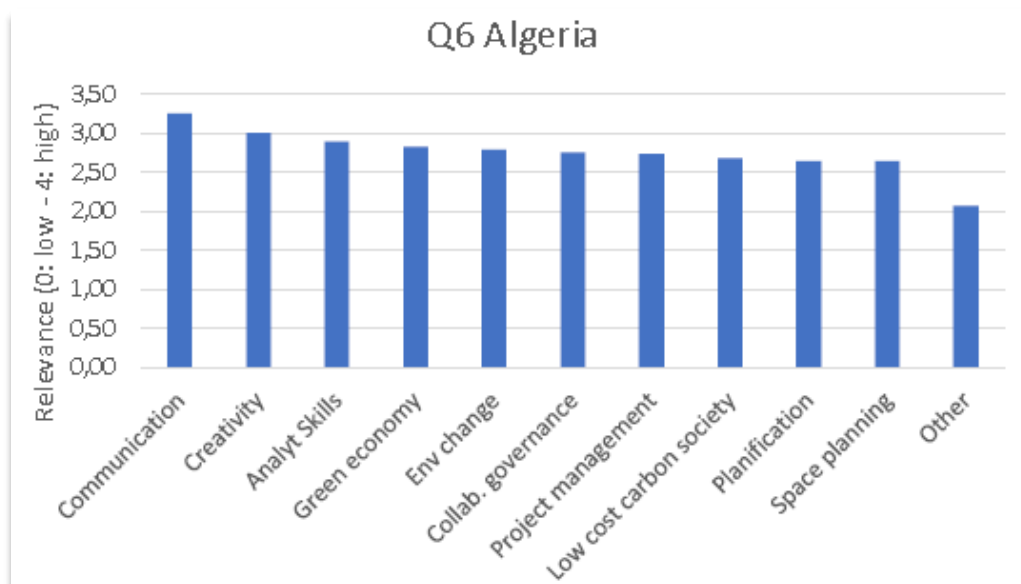


Graphic 1.2.17: answers Question 4 from Morocco, about current employability in the following environmental planning and management fields in your COUNTRY.

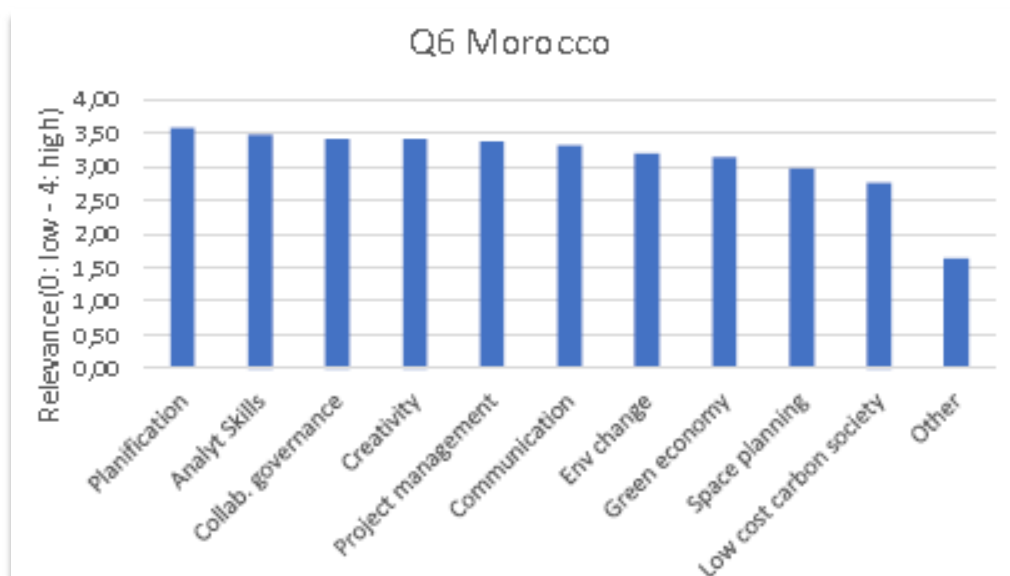


Graphic 1.2.18: answers Question 4 from Tunisia, about current employability in the following environmental planning and management fields in your COUNTRY.

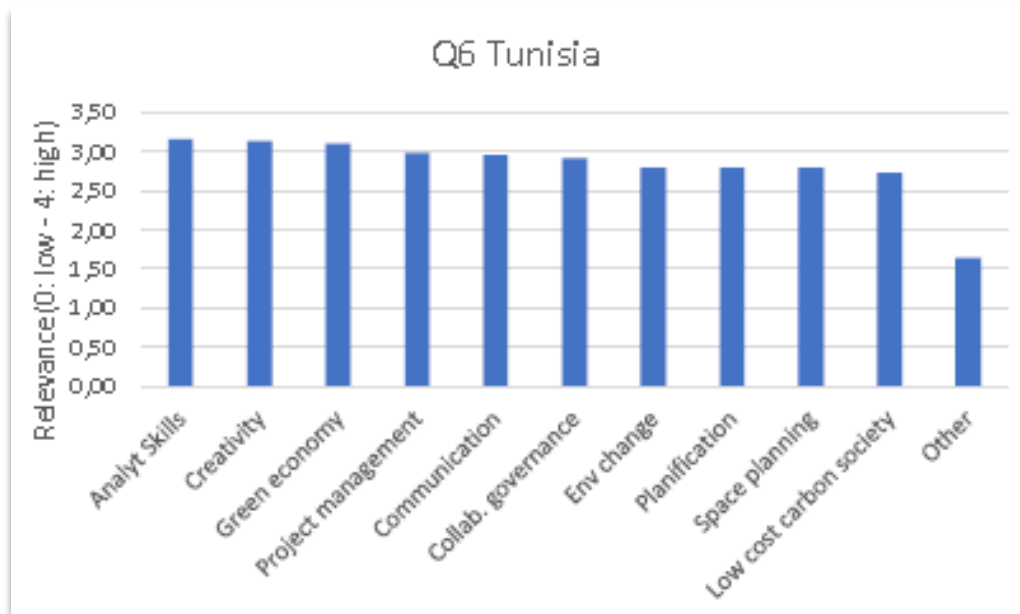
The responses with respect to **Competencies** present significant discrepancies between countries. If, as has been said, **Analytical techniques, Communication and Creativity** are highlighted as a whole (a certain consequence of the weight of the responses from the actors of the area of Education and Research), **Algeria** absolutely conforms to the three competencies shared by everyone; **Morocco** puts **Planning** in first place and **Collaborative governance** in third; and **Tunisia** raises to third place the **Green economy**.



Graphic 1.2.19: answers Question 6 from Tunisia, about areas of academic and labour market competencies for the future Master's Degree in Environmental Change.



Graphic 1.2.20: answers Question 6 from Morocco, about areas of academic and labour market competencies for the future Master's Degree in Environmental Change.



Graphic 1.2.21: answers Question 6 from Tunisia, about areas of academic and labour market competencies for the future Master's Degree in Environmental Change.

GENERAL ANALYSIS

After the results presented through the graphs, some considerations can be obtained to draw interesting conclusions for the development of the master, both from its content and from the perspective thinking about the employability of the students.

As stated at the beginning of this section, the questions have been grouped according to the issues related to environmental change at the local and state level, occupability also with this double scale, or what are the areas of interest considering the necessary skills for the master. Questions, all of them, that have the vocation to help improve the profile of students and their training and work capacities.

Overview of the whole

The first graphs collect the answers in a general way, to the group of people who have responded and for all the participating countries of the Maghreb. And the first question highlights the coincidence of recognizing climate change as a key aspect. This means putting in the center of the reflection, and therefore, of the contents. These are followed by other concepts, such as cities or agriculture, and education. The first two provide a territoriality that can help offer different perspectives on environmental change. Finally, the issue of education demonstrates the recognition of the importance of having people trained in these areas, who must help manage change.

Closely related to it, also the aspect of occupation. Here, aspects such as agriculture or tourism emerge as from the local point of view, taking a special interest. Also training, to be able to have professionals in these areas in a territory with great changes expected by environmental change. Water management is recognized as one of the most important options for student occupation. These profiles and answers are very important for the academic perspective of the master's degree, and its transfer in each of the participating universities.

Also linked to this, the skills associated with the master's degree, according to the survey participants, point to important results. The most outstanding thing is a great transdisciplinarity, since the capacity for analysis, creativity or communication stands out. All this, therefore, points to the transversal vision that the master's degree proposal already points out.

Group results

The second group of graphs collects the responses grouped by groups of respondents, differentiating on the one hand, researchers and teachers; and on the other, those linked to companies, administration or associations. Also answering the same order of questions, from the key issues and problems, employability and associated skills. For the first question, the results partly coincide with the previous ones. For the first group, it highlights climate change and cities, as well as education as fundamental aspects. But the second group, the aspect of the landscape emerges, and education passes to another minor degree of importance. With landscape, another interesting aspect is introduced, and also closely linked to environmental

changes. This aspect is important to know the demands, for example, of future workers' applicants.

And precisely linked to this, the second aspect is occupation. The results also diverge in part between the two groups. But they are very interesting and they complement each other. Researchers collect tourism, education or agriculture at the local level as fields of occupation. But at the national level, water emerges as a key issue for future students. On the other hand, the second group also recognizes the territory and the industry as sources of work. A vision more linked to economic development.

Finally, regarding this section of responses by groups of respondents, in reference to competencies, some divergences should be noted. Educators and researchers highlight the need to reinforce analysis, communication and creativity as transversal competences. These results are in line with the global ones stated at the beginning. Instead, the occupiers show an interest in the green economy, communication and planning. The profiles are different, and show the importance of asking these questions to various agents as they help to improve the master.

Results from a territorial perspective

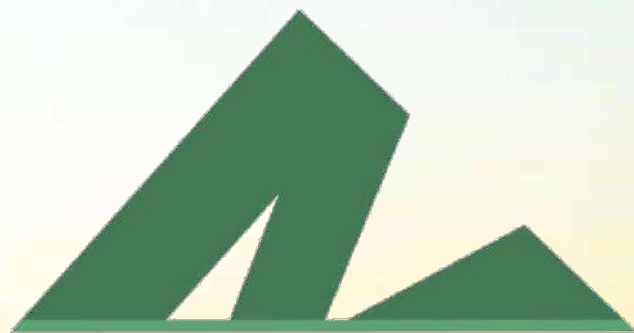
The last group of graphs distinguishes by country, emphasizing the state level. The results, as mentioned in the analysis accompanying the graphs, show some divergences, especially with regard to employment and skills. Not so in the priorities, since they remain very similar in the three states, only with small changes such as the emergence of the landscape. This shows how the impacts are transversal in all the participating states, giving shared meaning to the project.

The differences in occupation probably demonstrate the particularities of each reality, although occupations share some outputs such as education, which is very transversal in all analyzes, or agriculture. Then some give more weight to the water cycle or the territory, with a more geographical focus, or tourism and industry, with a more economic approach. In any case, all of them are aspects that have emerged consistently throughout the analysis.

Final conclusions

To conclude with this whole set, the competencies also show divergences between the different states and their responses. Some have been transversal in all three, and also mentioned throughout the analysis such as analytical techniques, communication and creativity. But others also emerge depending on each state, highlighting planning and governance, related to the management of transformation, or the green economy, also, as in employment, emerging from the economic point of view, being an opportunity for development.

All this analysis makes it possible to jointly assess key aspects for the development of the master. Understanding the dynamics of environmental change at the local and state level, the expected competencies and future employability make up a necessary panorama to be able to offer a postgraduate degree that is useful for the reality of the Maghreb, but above all, that can successfully face the challenges derived from this reality.



MEHmed

**MEDITERRANEAN ENVIRONMENTAL
CHANGE MANAGEMENT**

MASTER STUDY & ECOSYSTEM BUILDING

WP 1- MEHMED

Deliverable 1.3

Report on the analysis of the experience of the EU HEIs

REPORT ON THE ANALYSIS OF THE EXPERINECE OF THE EU HEIS

This report is mainly organized in two different sections:

1. First, we have a section based on the **General European Experience** in order to get a general overview about **similar Master's at the European level**. It can be a point of inspiration to know how the topic of environmental change is working right now in general in Europe. Search by keywords: Master in Environmental Sciences, Master in Climate Change
2. Second, we have a **general presentation about the experience on the topic "Environmental Change" from three academic EU partner institutions participating in the MEHMED project: University of Girona (Spain), Sorbonne Université (France) & University of Sassari (Italy).**

GENERAL OVERVIEW OF SIMILAR MASTERS AT THE EUROPEAN LEVEL.

The information included in this chapter was based on an internet research of different Master's at the European level searching by keywords: *Master in Environmental Sciences*, *Master in Climate Change*. The information is organized in two parts:

- Collection of links to webpage of the Master's.
- Summary table with general information about their main characteristics:
 - Title & University.
 - Synthesis of contents.
 - ECTS.
 - Modality.
 - Webpage.

First of all, we have the link of the master's degrees located under the keyword "*Master in Environmental Science*", also generally presented as interdisciplinary master's degrees for the training of professionals with the ability to respond to environmental challenges. A distinctive feature, at the outset, is the greater presence of the concept of climate / global change in the title. Most are classified as Master of Science (MSc) and have a greater weight of scientific disciplines (physics, chemistry,...). The vast majority offer a two-year training program.

Here the main result of the searching for the keyword "*Master in Environmental Change*":

- MA in Environmental Protection: Sustainability Studies (Cardinal Stefan Wyszyński University)
- MD IN BIOLOGY OF ENVIRONMENTAL CHANGE (University of Eastern Finland)
- Master's Program in Integrated Climate System Sciences (University of Hamburg)
- Master's Programme in Environmental Science: Atmosphere-Biogeochemistry-Climate (ES- ABC) - (University of Stockholm)
- MSc Environmental Sciences (University of Vienna)
- Master of Environmental Science (ISA Lille)
- Master's Degree Program in Environmental Sciences (Ca'Foscari University of Venice)

Venice)

- Environmental Geography, Master of Science (University Bayreuth)
- Environmental science (Ms) (Eötvös Lorand University, Hungary)
- Spatial Planning with Environmental Assessment (University of Dundee)
- Masters Programme in Environmental Change and Global Sustainability (University of Helsinki)
- Master's Programme in Ecology and the Environment (Linköping University)
- Energy and Environmental Sciences (University of Groningen)
- MSc in Sustainable Energy and Environment (University of Cardiff)
- Master's Programme in Life, Earth and Climate (Utrecht University)
- Master in Sciences and Management of Nature: Global Change Ecology & Sustainable Development Goals - GCE & SDG- University of Bologna
- Energy and environmental change MA (University of Westminster)
- Msc in Environmental Sciences, Policy and Management (University of Lund, Sweden)
- Master in Political Science: Global environment governance, sustainability and climate change (Vrije Universiteit Amsterdam)
- Master in Environmental Science (Eastern Norway University)
- Master in International Environmental Studies (Norwegian University of Life Sciences)
- Master in Biological and Environmental Science (Jyväskylä University)
- MSc Global Environmental Change (University of Greenwich)
- Restoration and management of environment – M.Sc. Studies of Environmental Protection (Warsaw University)
- MSc in Environmental Science (Trinity College Dublin)
- Master of Science in Environmental Sciences (Debrecen, Hungary)
- MSc in Environmental Entrepreneurship (University of Strathclyde, Glasgow)
- MSc in Territorial planning and Environmental Management (University of Barcelona, Spain)

Later this internet search was completed by another search for the keyword "*Master in Climate Change*" duplicating some of the entries found in the previous point. The master's degrees are also two-year programs, some more general but mostly with some point of specialization: the central theme is climate change but from various perspectives such as GIS, marine environments, biology, risk management, cities... Unlike from the previous search, the UdG Master's degree has also been located under this concept.

Here the main results of the search for the keyword "*Master in climate change*":

- Urban Environment, Sustainability & Climate Change (Erasmus University Amsterdam)
- Geographic Information and Climate Change, MSc (University of Swansea, UK)
- Master's Program in Integrated Climate System Sciences (University of Hamburg)*
- Master's Degree Program in Environmental Sciences (Ca'Foscari University of Venice)*
- MSc in Marine Science and Climate Change (university of Gibraltar)
- Master of Biology: Global Change Biology (university of Antwerpen)
- Masters Programme in Environmental Change and Global Sustainability (University of Helsinki)*
- Disaster Risk Management and Climate Change Adaptation - Master's Programme (Lund University)
- MSc Global Energy and Climate Policy (SOAS University London)
- 2nd level specializing Master in Climate Change: Adaptation and Mitigation Solutions (Politecnico di Torino)
- MSc in Renewable Energies, Climate Change and Sustainable Development (University of Santiago de Compostela, Spain)

Below, a summary table of the main masters' related to the objectives and perspective of the Mehmed project:

“Master in Environmental Change”:

MA in Environmental Protection: Sustainability Studies (Cardinal Stefan Wyszyński University)	
<p>Sustainability is most commonly defined as meeting the needs of the present generation without compromising the ability of future generations to meet their own needs. The field of Sustainability Studies explores and critiques ways to achieve it in the context of maintaining ecological and environmental health while generating economic welfare and ensuring social justice. 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.</p>	
ECTS	124
MODALITY	FACE TO FACE & on-line
http://ecology.uksw.edu.pl/	

MD IN BIOLOGY OF ENVIRONMENTAL CHANGE (University of Eastern Finland)	
<p>The Master's Degree Programme in Biology of Environmental Change (BEC) is a new research- oriented programme that aims to increase student's knowledge of biological and biogeochemical aspects of the state of the environment. The 2-year education offers advanced knowledge in environmental science, biology, biogeochemistry, hydrobiology, ecotoxicology, environmental policy and law, and environmentally oriented forestry.</p> <p>There are two main subjects in the BEC programme: Environmental science in Kuopio campus and Biology in Joensuu campus. The curriculum consists of 120 ECTS credit points, which includes general skills studies, advanced level courses in the main subject plus master's thesis, as well as alternative studies in other disciplines e.g. environmental law and policy, statistics, or sustainable development.</p>	
ECTS	120
MODALITY	FACE TO FACE
http://www.uef.fi/en/web/bec	

Master's Program in Integrated Climate System Sciences (University of Hamburg)

The analysis and assessment of our climate and earth system increasingly require interdisciplinary competencies. The MSc ICSS program teaches across all subjects involved in climate research in order to provide a holistic picture of the climate system. Our interdisciplinary claim challenges the traditional subject-related teaching. Through this approach and the imparting of interdisciplinary competencies, the MSc ICSS program has a unique selling proposition. The location in Hamburg with access to Germany's hub for Climate research offers ideal study conditions.

ECTS

120

MODALITY

FACE TO FACE

<https://www.uni-hamburg.de/en/campuscenter/studienangebot/studiengang.html?1241548214>

Master's Programme in Environmental Science: Atmosphere-Biogeochemistry-Climate (ES-ABC) - (University of Stockholm)

Our society is facing environmental challenges that urgently need large-scale efforts. These challenges call for professionals with solid training to take on important roles in local, regional and global governmental offices, NGOs, media, the private sector, schools and research communities around the world.

The ES-ABC programme at Stockholm University gives students the opportunity to familiarise themselves with the environmental science perspective on current major environmental challenges such as air and water pollution, and climate change, as well as help prepare them to contribute potential solutions.

ECTS

120

MODALITY

FACE TO FACE

<https://www.aces.su.se/education/masters-program/masters-programme-in-environmental-science-atmosphere-biogeochemistry-climate-change-es-abc/>

Master Programme in Exploration and Environmental Geosciences

Since 2005 Luleå University of Technology offers a two-years master's programme in exploration and environmental geosciences. This programme is unique in its character and will provide the students with cutting edge knowledge in exploration and ore geology used by earth scientists active in exploration and mining of metals and minerals. For those interested in geosciences and the environment this programme provides the most up to date courses on all aspects necessary for the environmental geoscientist. The programme is given in English and therefore we welcome applications also from non-Swedish students.

ECTS	120
MODALITY	FACE TO FACE
https://www.ltu.se/edu/program/TMNGA/TMNGA-Geovetenskap-inr-malmgeologi-och-miljogeokemi-master-1.76946?l=en	

MSc Environmental Sciences (University of Vienna)

The master's programme and research network Environmental Sciences is a hub for students and scientists who want to apply deep scientific thought to the earth environment and some of its most urgent problems. Geoscientists, life scientists, geographers, chemists, physicists, mathematicians, economists and lawyers come together to tackle these problems in a collaborative way. Our goal is to prepare a new generation of professionals and scientists for solving the challenges ahead.

The interdisciplinary programme focuses on the analysis of fundamental environmental processes using know-how from a wide range of scientific fields. This disciplinary diversity is reflected not only in the diversity of the fields of expertise of the faculty, but also in the diversity of students coming from various areas of science.

The master's programme deals with the scientific principles underlying the relationship between humans and the environment, focusing on system analysis. For this purpose, students acquire extensive skills in the relevant fields of natural sciences, in particular earth sciences and biology. The curriculum is internationally oriented and courses are held in English.

ECTS	120
MODALITY	FACE TO FACE
https://slw.univie.ac.at/en/studying/degree-programmes/master-programmes/environmental-sciences-master/	

Master of Environmental Science (ISA Lille)

COURSE OBJECTIVES

The Environmental Science program gives students a general overview of:

- Prevention of soil pollution Water and air pollution
- Management and treatment of sites contaminated by human activities
- General assessment of pollution
- Remediation/treatment of polluted sites (bioremediation, phytoremediation, biotechnology, and more)

ECTS	120
MODALITY	FACE TO FACE
https://www.isa-lille.com/academics/master-programs/environmental-science/	

Master's Degree Program in Environmental Sciences (Ca'Foscari University of Venice)

Possibility to choose between three paths: Global Environmental Change (in English); Environmental Control and Remediation; Evaluation and Management of Environmental Systems

ECTS	120
MODALITY	FACE TO FACE
https://www.unive.it/pag/25693/	

Environmental science (Ms) (Eötvös Lorand University, Hungary)

The Environmental Sciences program offers wide range education in chemistry, biology, physics, Earth and their interdisciplinary sciences. The subjects are presented in lectures (theoretical background of the topics, with the aim to provide a wider view for environmental application), seminars with discussion of the topics and practicing calculation, and laboratory work. Students will familiarize with and develop their skills in most of the environmental sampling and measurements techniques.

ECTS	120
MODALITY	FACE TO FACE
http://environment.elte.hu/docs/environmental-science-msc	

Environmental Geography, Master of Science (University Bayreuth)

Environmental changes at any scale, from global to local, are of crucial importance to life on planet Earth. In addition to climate change, the major contemporary challenges include changes in biodiversity, soil degradation, and increases in mass movements. Often the dynamics of such environmental processes require an understanding of the spatial and temporal couplings between the atmosphere, biosphere, relief sphere, pedosphere, and hydrosphere. In addition, the interaction with human activities is of utmost importance. Physical geography – as an interdisciplinary field with a marked focus on the environment- society nexus – is among the core disciplines addressing and examining these environmental changes. The English-taught master's programme 'Environmental Geography' provides expertise and practical experience in the field of environmental systems science from an explicitly interdisciplinary perspective. The combination of core areas in the natural sciences and contextualization from the social sciences (e.g. ecosystem services and geographical conflict research) ensure that our students receive training that is unique in Central and Eastern Europe. Research-led teaching, state-of-the-art quantitative methods, and training facilities such as a dating laboratory or the University's Botanical Garden allow for an application- and target-oriented programme of study. Students receive training in the analysis and evaluation of complex environmental systems, in critical reflection upon the research process, in abstraction of research results, as well as in oral and written communication of findings.

ECTS

120

MODALITY

FACE TO FACE

https://www.uni-bayreuth.de/de/studium/masterstudium/environmental_geography/index.php

Master of Science in Environmental Science and Technology (Ghent University)

The general objectives and learning outcomes of this reformed and innovated study programme remain unchanged. The 'MSc in Environmental Science and Technology' still 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.

ECTS	120
MODALITY	FACE TO FACE
https://www.ugent.be/bw/en/education/master-programmes/environmental-science-technology.htm	

Spatial Planning with Environmental Assessment (University of Dundee)

Spatial planners create and manage sustainable cities and the countryside and help solve urban problems. This course focuses on the impact both of wider developments and specific projects on the environment. You will learn about the policy context and application of tools and methods used to analyze the potential impact of major developments in environmentally sensitive places.

You will develop your understanding of spatial analysis, statutory planning, property development processes, sustainability in contemporary cities, and environmental assessment.

ECTS	180
MODALITY	FACE TO FACE
https://www.dundee.ac.uk/postgraduate/spatial-planning-environmental-assessment	

Master's Programme in Environmental Change and Global Sustainability (University of Helsinki)

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.

You can choose from two study tracks: The Environmental Change study track in natural sciences and the Global Sustainability study track in social sciences. You can also study topics like food and sustainability, climate studies, indigenous studies, urban studies, global land use or Baltic sea studies.

ECTS	120
MODALITY	FACE TO FACE
https://www.helsinki.fi/en/admissions/degree-programmes/environmental-change-and-global-sustainability-masters-programme	

Master's Programme in Ecology and the Environment (Linköping University)

This master's programme prepares students to work with the management of ecosystems, ecological communities and populations, based on a thorough knowledge of ecological concepts and theories.

ECTS	120
MODALITY	FACE TO FACE
https://liu.se/en/education/program/6meco	

Energy and Environmental Sciences (University of Groningen)

What are the causes of the various large scale global environmental issues like climate change? Can we identify options to solve these issues? Are options different in different countries?

The global challenges with respect to environment and sustainability are huge and can only be addressed in an interdisciplinary approach. Since it is impossible to address all these issues equally in a Master degree program, specialization is essential. The Energy and Environmental Sciences (EES) programme specializes in energy and is treating it from a natural science perspective. However, it trains the students that the natural sciences/technical approach to and solution of problems is only a part of the story and collaboration with other scientific disciplines is vital.

ECTS

120

MODALITY

FACE TO FACE

https://www.rug.nl/masters/energy-and-environmental-sciences/?gclid=CjwKCAjwhOD0BRAQEiwAK7JHmEV5rvW3V2rp2TM91Mi3FGeY1bqp5mzJkh0KWkUVbmkDQmoxw_HvzxoC8y8QAvD_BwE

MSc in Sustainable Energy and Environment (University of Cardiff)

Amidst the introduction of new energy and environmental technologies, this course aims to train graduates that are capable of working across the interface of traditional disciplines and be effective in an ever-increasing multidisciplinary environment.

Climate change, the global consumption of energy and the use of fossil fuels to provide us with heat, power and transportation are all engineering challenges which need addressing now and in the future. It is clear that solutions to these long-term problems – ensuring the best use of resources, and developing new more sustainable ways to produce and use energy

– will require graduates who can work in an increasingly multidisciplinary environment.

This course will offer you the knowledge and expertise you will need in relation to sustainable

energy and the environmental impact of energy systems

ECTS

120

MODALITY

FACE TO FACE

<https://www.cardiff.ac.uk/study/postgraduate/taught/courses/course/sustainable-energy-and-environment-msc>

Master's Programme in Life, Earth and Climate (Utrecht University)

In our Master's programme in Earth, Life, and Climate, you will explore the fundamental processes which regulate the past, present, and future dynamics of sedimentary systems, biodiversity, and climate, as well as their evolution. This two-year programme will provide you with the knowledge you need to understand climate change and its impact on natural environments such as soils, sediments, lakes, groundwater, wetlands, estuaries, and oceans.

The main topics you will study include the evolution of life, the development of sedimentary basins, carbon sources and sinks, biogeochemical and geochemical fingerprinting of sedimentary processes/environments, and climate reconstruction.

ECTS	120
MODALITY	FACE TO FACE
https://www.uu.nl/masters/en/earth-life-and-climate	

Master in Sciences and Management of Nature: Global Change Ecology & Sustainable Development Goals - GCE & SDG- University of Bologna

The International Curriculum "Global Change Ecology & Sustainable Development Goals - GCE & SDG" aims to train a generation of scientists and managers able to analyze complex problems related to global change and to propose solutions for mitigation and adaptation with a multi-scale and multidisciplinary approach, applied to both natural and anthropized systems. This Curriculum, entirely given in English, offers a customized training programme based on the student's profile: students can choose different teachings, according to their aspirations, within biological, geological, ecological, technical and economic disciplines. The typical student of the Curriculum GCE&SDG is therefore a young man/woman aged 22-30, coming from different three-year degree programme, sensitive to the ecological issues concerning the management of natural and environmental resources and the sustainable development of society in an era characterized by rapid global changes.

ECTS	120
MODALITY	FACE TO FACE
https://corsi.unibo.it/2cycle/GlobalChangeEcology	

Energy and environmental change MA (University of Westminster)

The Energy and Environmental Change MA is an interdisciplinary degree that combines international relations, law, business and sustainability studies. As such it provides a comprehensive examination of energy security, energy markets and climate change from global, regional and local perspectives. The degree equips students with knowledge of key intellectual frameworks and critical issues. The course offers a holistic approach to the dynamics governing energy-transition to a low-carbon economy nexus. Students are required to complete five interconnected core modules and may select one option module.

ECTS 90

MODALITY FACE TO FACE

<https://www.westminster.ac.uk/construction-management-and-urban-planning-politics-and-international-relations-courses/2020-21/january/full-time/energy-and-environmental-change-ma>

Msc in Environmental Sciences, Policy and Mangament (University of Lund, Sweden)

The *International Master's Programme in Environmental Management and Policy* (EMP) enables graduates to inspire and drive change by developing their abilities to evaluate, design, and implement management and policy responses to complex environmental challenges. The EMP programme revolves around distinguished key features: interdisciplinary learning, its international nature and practically applied studies. The EMP is focused on both environmental policy and environmental management. This is based on our collective experience that decision makers within both these spheres benefit vastly from having such a dual understanding. More and more, we find that many alumni, regardless of their profession or sector, work within both the realms of public policy and corporate management to move the environmental agenda further.

ECTS 120

MODALITY FACE TO FACE

<https://www.lunduniversity.lu.se/lubas/i-uoh-lu-XAMIS>

Master in Political Science: Global environment governance, sustainability and climate change (Vrije Universiteit Amsterdam)

The Master's in Political Science gives you a thorough, broad-based training in social and political science methodology. This involves the application and practical use of a variety of political research methods within the traditions of positive theory development and critical theory.

ECTS	60
MODALITY	FACE TO FACE

<https://masters.vu.nl/en/programmes/political-science-global-environmental-governance-sustainability-climate-change/index.aspx>

Master in Environmental Science (Eastern Norway University)

Our world faces massive challenges, and the need for professionals with relevant knowledge is huge.

You can be one of those professionals.

This master provides an integrated, quantitative, and interdisciplinary approach to the study of environmental systems.

ECTS	120
MODALITY	FACE TO FACE

<https://www.usn.no/english/academics/find-programmes/mathematics-natural-sciences-and-environmental-sciences/master-of-environmental-science/>

Master in International Environmental Studies (Norwegian University of Life Sciences)

This program provides students with the skills needed to study local to global environmental problems and to formulate policies and strategies for sustainable development. They learn to engage with the issues from an interdisciplinary perspective.

ECTS	120
MODALITY	FACE TO FACE

<https://www.nmbu.no/en/studies/study-options/master/master-of-science-in-international-environmental-studies>

Master in Biological and Environmental Science (Jyväskylä University)

Both global and local environmental problems make studying biological and environmental sciences important and meaningful. Due to climate change and decrease in natural resources and biodiversity, there is a growing need for specialists in the field.

Studies in our international Master's Degree Programme in Biological Science provide you with the ability to understand different phenomena of life comprehensively, from interaction between molecules to the functioning of ecosystems.

The programme combines two focus areas: sustainable management of inland aquatic resources and ecology and evolutionary biology. As our university is surrounded by lakes and forests in the diverse landscape, you are in an ideal position to combine field work in natural environments with laboratory and theoretical exercises during your studies.

ECTS	120
MODALITY	FACE TO FACE
https://www.jyu.fi/en/apply/masters-programmes/masters-degree-programmes/biological-and-environmental-science	

MSc Global Environmental Change (University of Greenwich)

With our MSc Global Environmental Change, you'll develop the knowledge and skills to address some of the world's major challenges. Your study topics include climate change, environmental law and policy, meteorology and sustainability. This wide-ranging programme reflects the strength of unique expertise held within our prizewinning Natural Resources Institute (NRI).

Our recent interdisciplinary research ranges from practical areas with a direct relevance to climate adaptation - such as agricultural practices - to issues of equity and environmental economics. NRI academics who run modules for the MSc Global Environmental Change have contributed to global initiatives such as the Intergovernmental Panel on Climate Change (IPCC) assessment reports.

ECTS	120
MODALITY	FACE TO FACE
https://www.gre.ac.uk/postgraduate-courses/engsci/glob-envi-change	

MSc in Environmental Science (Trinity College Dublin)

The overall aim of the course is to promote students understanding of environmental science, and their capability to apply that knowledge to current environmental issues. Students should develop the necessary intellectual skills and the practical expertise to enable them design and execute high quality independent research and become skilled environmental communicators.

ECTS	60
MODALITY	FACE TO FACE

<https://naturalscience.tcd.ie/postgraduate/msc-envirsci/>

Restoration and management of environment – M.Sc. Studies of Environmental Protection(Warsaw University)

The Restoration and management of environment (RME) aims at providing students with comprehensive and interdisciplinary environmental knowledge presented by the best specialists from a range of scientific areas. Studies are focused on both technical and ecological aspects of the environment, emphasizing the role of human in shaping sustainable landscapes and ecosystems

RME has been established to provide its students with (1) understanding biological processes,

(2) knowledge legal aspects and management rules of environmental protection, and
(3) a range of tools for future specialists who could cope with the challenge of managing good quality environment and to restore various ecosystems across scales...

ECTS	90
MODALITY	FACE TO FACE

<http://wbis.sggw.pl/en/studies/m-sc-sudies-of-environmental-protection-restoration-and-management-of-environment-interfaculty-study-of-environmental-protection/>

Master of Science in Environmental Sciences (Decebre, Hungary)

The MSc in Environmental Sciences, with specialization in Ecology, Environmental and nature conservation provides knowledge on the main topics regarding environmental sciences, focusing on terrestrial and aquatic environmental protection and ecological and nature conservational aspects.

ECTS	120
MODALITY	FACE TO FACE

https://www.edu.unideb.hu/page.php?geography_bsc&id=254

MSc in Territorial Planning and Environmental Management (University of Barcelona, Spain)

The master's degree in Territorial Planning and Environmental Management, recognized at European level, is aimed at university graduates and graduates who are interested in working or researching in the field of the complex relationship between society and the territory. Based on the integrative approach of geography, the aim of the master's degree is to train professionals capable of developing their theoretical and applied skills in the field of spatial planning and environmental management, applied to different environments and geographical scales (medium urban and rural and coastal, inland or mountain areas).

ECTES

60

MODALITY

FACE TO FRACE

https://www.ub.edu/web/ub/en/estudis/oferta_formativa/master_universitari/fitxa/S/M0H02/index.html

Master in climate change:**MSc in Marine Science and Climate Change (university of Gibraltar)**

Designed and delivered by expert academics and scientists, this full or part-time interdisciplinary programme blends theoretical study with practical, field-based work. You will cover specialist subject areas and gain the skills required to tackle the complex issues associated with the sustainable development of marine ecosystems.

ECTS

60

MODALITY

FACE TO FACE

<https://www.unigib.edu.gi/msc-marine-science-climate-change/>

Geographic Information and Climate Change, MSc (University of Swansea, UK)

The MSc in Geographic Information and Climate Change gives cross-disciplinary training in the scientific basis of GIS, satellite remote sensing and earth system modelling, alongside aspects of climate change.

You will concentrate on the technical aspects of GIS and earth observation, as well as the past, present and future global and regional environmental and climatic change

ECTS

120

MODALITY

FACE TO FACE

<https://www.swansea.ac.uk/postgraduate/taught/science/geography/msc-geographic-information-and-climate-change/>

Urban Environment, Sustainability & Climate Change (Erasmus University Amsterdam)

Smart and resilient cities are essential in tackling the growing threat of climate change processes and fostering sustainability. This learning track focuses on different analytical and practical approaches to foster resilience and environmental sustainability in urban areas worldwide among others through smart city innovations. It offers its participants the opportunity to understand the most recent trends and developments related to sustainable, green, smart and resilient cities. Key topics include nature-based solutions, urban climate mitigation and adaptation, sustainable urban energy, water and transport systems, urban climate resilience and smart city innovations.

ECTS	65 ECTS
MODALITY	FACE TO FACE
https://www.eur.nl/en/master/urban-environment-sustainability-and-climate-change	

Master of Biology: Global Change Biology (university of Antwerpen)

The Master's programme Global Change Biology focuses on the complex causes and far-reaching consequences of global change. You will learn about the multifaceted nature of global change, encompassing changes in climate, land use, water and biogeochemical cycles, as well as environmental pollution and the loss of biodiversity, and how these changes impact all levels of biological organization, from molecules to ecosystems.

Specific attention within the Master's programme is given to the development of nature-based solutions, where fundamental knowledge on ecosystems is translated into applied ecosystem management, that addresses the negative impacts of global change.

ECTS	120
MODALITY	FACE TO FACE
https://www.uantwerpen.be/en/study/education-and-training/master-global-change-biology/programme-info/	

Disaster Risk Management and Climate Change Adaptation - Master's Programme (Lund University)

The trend of increasing disasters and related losses is a truly global challenge. The changing global risk landscape due to processes such as climate change, urbanization, and the increasing complexity of modern society poses major challenges for sustainable development and must be addressed with an interdisciplinary approach. A growing number of governments and international organizations acknowledge the necessity to increase their efforts in disaster risk management and climate change adaptation in order to successfully adjust to changing environments and develop safe and sustainable societies.

The Master's programme in Disaster Risk Management and Climate Change Adaptation has support from important national and international institutions, e.g. UN agencies, the Red Cross/ Red Crescent movement, NGOs and national authorities.

ECTS	120
MODALITY	FACE TO FACE
https://www.lunduniversity.lu.se/lubas/i-uoh-lu-TAKAK	

MSc Global Energy and Climate Policy (SOAS University London)

The MSc Global Energy and Climate Policy is the online version of the successful campus degree of the same name; housed within the Centre for International Studies and Diplomacy (CISD) this programme focus is on policy and policymaking in the energy and climate space. The MSc introduces students to the key energy sources, their economic and technical bases and how they are regulated. Its further analyses energy and climate governance at the international level, and discusses the geopolitics of energy. This programme places policy and policymaking as the key to enabling change and creating the requisite legal and regulatory environment within which the low-carbon energy system of the future can develop and grow.

ECTS	120
MODALITY	Online
https://www.soas.ac.uk/cisd/online-programmes/msc-global-energy-and-climate-policy-online/	

2nd level specializing Master in Climate Change: Adaptation and Mitigation Solutions (Politecnico di Torino)

The first edition of the 2nd level specializing Master in Climate Change: Adaptation and Mitigation Solutions started on January 2020 at the Politecnico di Torino. The Master is designed for students and professionals who want to gain a comprehensive understanding of the climate change impact and the innovative technologies that will drive the mitigation and adaptation responses to global warming.

ECTS	63
MODALITY	FACE TO FACE
https://didattica.polito.it/master/climate_change/2020/introduction	

MSc in Renewable Energies, Climate Change and Sustainable Development (University of Santiago de Compostela, Spain)

The general objective is to train trained technicians to plan, project, organize and direct global projects in the field of renewable energy and sustainability within the complex framework of climate change. When we talk about a global project, we are making mention from the technical design of the installation through the modeling of realistic processes, the evaluation of the return time, the study of energy efficiency and viability, its sustainability, the performance of energy management tasks in various areas, issuing energy efficiency certifications, the provision of continuous training courses for graduates or personnel from companies and institutions and, in the latter case, the construction of the energy system and its subsequent quality control and monitoring.

ECTS	90
MODALITAT	Face to Face
https://www.usc.gal/en/studies/masters/science/master-renewable-energies-climate-change-and-sustainable-development	

2) MASTER'S IN ENVIRONMENTAL CHANGE: ANALYSIS AND MANAGEMENT

UNIVERSITAT DE GIRONA - ESPAÑA

Specialization of the master programme	Specialization in analysis, diagnose and management of global environmental change
Target students	University degree (240 ECTS) in Geography, biology, environmental science, physics, territorial planners, agronomists, foresters, journalists ...
Focus on the acquisition of transferable skills	<ul style="list-style-type: none"> - To train a good professional in order to think and activate a more sustainable and especially efficient society model in economic and environmental social issues. - Provide training in different scientific approaches to the study of climate change. - Apply them to the management of specific environmental changes on local and regional scales. - It also seeks to identify adaptation processes and instruments for sustainable management based on the evaluation of adaptive strategies - To acquire the basic knowledge to analyze, diagnose and manage global environmental change - To acquire the basic knowledge to manage the reduction of impacts on society and the environment and facilitate social and environmental adaptations - To acquire the know-how, skills and tools needed to solve the previously mentioned problems.

Teaching techniques (traditional, online, blended..)	Individual work and group work <ul style="list-style-type: none"> · Face-to-face classes, · Practical work, · Project work, · Laboratory practice, · Field trips
Number of students	2013-14- 21 students 2014-15- 15 students 2015-16- 12 2016-17- 9 2017-18- 10 2018-19- 13
Implementation of internships	There are no credits foreseen for practical courses in the master. Students might have the possibility of a practical in private or public companies within the frame of the master's thesis.
Involvement of the public and private stakeholders	Some public administrations and private entities offer grants (payment of matriculation fees) for the performance of a master's thesis covering topics of their interest.
Employment opportunities and employability	Data from 2017. Response: 56,8% Employed: 92,2% Position related to master: 36% Position related to university degree: 48% Other: 16% Public companies: 52% Private companies: 48%
Quality assurance and official accreditation	Verified: 23/07/2013 Accredited: 19/09/2017

Structure of the master's degree

MODULE	ECTs
COMPULSARY MODULE ANALYSE AND DIAGNOSIS OF ENVIRONMENTAL CHANGE	30 credits
OPTIONAL MODULE MANAGEMENT TOOLS	18 credits
MASTER'S DEGREE FINAL PROJECT	12 credits

MODULE	COURSES
COMPULSARY MODULE ANALYSE AND DIAGNOSIS OF ENVIRONMENTAL CHANGE	<ul style="list-style-type: none"> • Scientific bases of environmental change (9 credits) • Environmental impacts (9 credits) • Impacts and adaptation in human activity, territory and landscape (9 credits) • Integrated placement (3 credits)
OPTIONAL MODULE MANAGEMENT TOOLS Optional subjects (each subject 3 credits)	<p>Biodiversity management</p> <ul style="list-style-type: none"> • Tools for conservation biology • Flora adaptation: bases for its management • Fauna: adaptation and management • Data handling and analysis • Multivariate analysis of environmental data • Environmental management models • Cartographic tools • Fundaments of GIS • GIS applications to environmental analysis • Land management and planning • Adaptation and mitigation. Geopolitical dimension and public instruments of regulation • Adaptation tools in urban, landscape and spatial planning • Pollution and energy management • Pollution and energy management • Emissions and air pollution • Energy management

Analysis: SWOT

Table 1.3.1: Results from SWOT analysis Girona University

Factors	INTERN	EXTERN
	STRENGTH	OPPORTUNITIES
positive	<p>Interdisciplinary teaching: Implication of different departments of the UdG</p> <p>Students from different bachelors and different universities.</p> <p>Students from different geographic origin.</p> <p>Teachers holding a doctor degree and mainly permanent staff.</p> <p>Seminars given by invited experts specialized in topics of climate change</p> <p>Implementation of new teaching methodologies</p>	<p>Public master. Verified and accredited</p> <p>Few offers of masters dealing with topics concerning climate change</p> <p>Increasing interest of the society in environmental topics</p> <p>Increasing demand for specialists in climate change from public administration and private companies.</p> <p>Confidence with teachers of the UdG</p>
	WEAKNESS	THREATS
negative	<p>Low number of students matriculated.</p> <p>Low English level of students</p> <p>Lack of compulsory practical courses in companies or administrations</p> <p>Lack of specialized teachers of some topics that actually affect already local administrations</p>	<p>Universities located in Barcelona are very attractive.</p> <p>Master held in Catalan or Spanish language causes difficulties to students from other countries when matriculating</p> <p>Master of 60 credits (Spanish universities) instead of 120 (all the other European universities) causes difficulties to the students from other countries when matriculating</p>

**MASTER GAED, SPECIALIZATION ENVIRONMENT: TIME, TERRITORIES, SOCIETIES
(ETTES) GEOGRAPHY AND PLANNING DEPARTMENT****SORBONNE UNIVERSITE. FRANCE****1. OBJECTIVES**

The GAED-ETTES master is proceeding from the master EDTS-Geodep. It will begin on September 2019.

This mention has the objective to form students in environment with a transversal approach between disciplines. Current environmental issues are turning more and more complex the territorial management. There is a need to identify and to train actors having the ability to understand and analyze the multi-scale interactions between natural and societal dynamics. The conceptual and methodological evolutions required to tackle environmental challenges encourage the collaboration between disciplines for the analysis of the past, present and future dynamics, themselves related with the social history. Some UE are shared with the master Sciences and Policy of Environment (Science and technology faculty of Sorbonne University).

2. SKILLS AND STRUCTURE

The master GAED-ETTES is part of the master GAED, Geography, Planning, Environment and development (common name of all the masters in geography in France). In Sorbonne University, GAED offers several specializations, among them ETTES.

In the core courses, transversal skills, useful for all geographers, are acquired, like GIS or foreign languages. Transversal knowledge is an optional UE. Skills focused on environmental issues are acquired in the specialization modules, jointly with specific knowledge. Part of the specialization courses are shared with the master Sciences and Policy of Environment (Science and technology faculty of Sorbonne University): environmental watch, environmental transition.

The master gives a great importance to the professionalization of our students, in cooperation with the SCUIOP department (career guidance of the university), providing a career platform to each student.

3. ORGANIZATION OF THE MASTER

TYPE	CREDITS
COMPULSORY	30
OPTIONAL	12
INDIVIDUAL RESEARCH OR INTERNSHIP	18
TOTAL	60

4. DETAILED SCHEDULE

Year	Sem.	UE	Title
1	1	UE1: Transversal skills	Science of the territory
			Mapping and GIS
			Quantitative survey
		UE2: Transversal knowledge (select 1)	Geographical approach of heritage
			Geography of mobility
			Environmental issues
		UE3	Language course
		UE4: ETES specialization	Integrated analysis of catchments
			Environmental transition
			Environmental law
			Biodiversity: assessment and management
			Collective field research
		Free option	
	2	UE1: Transversal skills	Professionalization
			Preparation of internship or research project
		UE2: Transversal knowledge (select 1)	Geographical approach of consumption
			Geographical approach of risk
			Geographical approach of development

2		UE3	Language course
		UE4: ETES specialization	Geoarchaeology and paleo environments
			Geomorphologic crisis
			Agricultural systems and environment
			Geomorphologic heritage and geodiversity
			Free choice (Faculty of science)
		UE5	Internship or individual work
	1	UE1: Transversal skills	Professionalization
			Mapping and GIS
		UE2	Language course
		UE3: ETES specialization	Coastal zone risk management
			Environmental actors and stakeholders
			Scientific watch
			Environmental engineering
			Urban ecology, sustainable city
			Collective field research
		UE4	Free choice (Faculty of science)
	2	UE1	Internship or individual work

5. STUDENT'S ORIGIN

A web platform, E-candidate, allows to gather the applications of students living in France and Europe. For extra-UE students, applications are gathered on Campus France platform. Around 20 students are selected every year, half of them are undergraduate students of Sorbonne University. ETES selects students of geography, earth science, ecology, and social science (with a strong mobile). In the next years, ETES will select students from the Majeure Geography- Mineure Environment degree, a transversal and multidisciplinary degree to be launched in September 2019 in Sorbonne University.

6. TEACHERS

Teachers are geographers of different specialization areas, from the Geography and Planning department, and from other disciplines (language, Faculty of Science).

7. PROFESSIONAL INSERTION

The inquiry realized in 2016 revealed a rather insufficient professional insertion of the students of the Geodep specialization, 2 years after its implementation. That is the reason why during the following years, a great attention has been paid to the professionalization of the students, via the 'career platform' and a professional watch provided by the whole team of teachers, in order to help the students to find internships and former students to find a job or a thesis funding. Unfortunately, the faculty of Letters gives only one thesis contract in geography, giving very little opportunities to our student to proceed with doctoral thesis.

MASTER IN PLANNING AND POLICIES FOR CITY, ENVIRONMENT, AND LANDSCAPE

UNIVERSITY OF SASSARI

1. Introduction

The Master in Planning and Policies for City, Environment, and Landscape (CAP: Città, Ambiente e Paesaggio) started in the Academic year 2011-2012 as an international Master, as the participation in the Consortium for the homonymous European Master was compulsory: till the next Academic year, students have to attend at least a semester abroad, in one of the partner Universities (Universitat de Girona y Autònoma de Barcelona, Universidade de Lisboa). Students can also choose to work on their thesis and/or participate in a job placement scheme in numerous other international destinations. At least one workshop with students and teachers from at least one of the University partners is mandatory.

From the next Academic year the internationalization will be broader, with a double degree held together with the Tianjin University (China) and another with the University of Carthage (Tunis); in all cases, students will attend the whole first year at their home University and, for the second year, they can choose among: a National degree, with a second year attended at the same home HEI; the double degree in Tianjin, with the whole second year spent abroad at the partner HEI (including traineeship and elective courses); the mentioned European Master or the double degree in Carthage, with the first semester abroad at one of the partner Universities. The last semester must be (compulsory) including a period of traineeship and the thesis preparation, for which credits are recognized.

Lessons can take place in the language of the hosting Country (Italian, Spanish, Catalan, Portuguese, French) and, during the first year, free courses of these languages and of English are provided by the University of Sassari.

The course brings together a number of various disciplines (Architecture, Engineering, Landscape Design, Conservation, Sociology, Economic...), and planners need to be capable of entering into dialogue with these fields.

This Master is an evolution of a former degree, held by the same Universities of Sassari and Aut3noma de Barcelona, together with the IUAV (University Institute of Architecture at Venice), called Master of Planning and Policies for the Environment.

2. Expected skills

Planning

Knowledge and know-how:

Deep knowledge of themes (deeper than the first degree in Planning), critical interpretation of territorial, urban, environmental and landscape dynamics.

Ability to apply knowledge and know-how:

Skills in choosing, applying, combining different techniques, methods, theories and knowledge in order to face urban, environmental, landscape problems

Skills in urban and landscape design and in autonomous development of plans and projects at different scales and in different sectors.

Engineering

Knowledge and know-how:

Deeper use of different tools in transportation planning and management, according to an integrated approach and by recognizing the mutual influences between settlement and mobility.

Deeper knowledge of data base and GIS

Ability to apply knowledge and know-how:

Skills in using and analysing data in order to analyse, plan and develop plans, projects and decision processes

Skills in monitoring, interpreting and communicating phenomena

Economics and Sociology

Knowledge and know-how:

Theoretical and practical problems of urban management and DSS

Ability to apply knowledge and know-how:

Skills in case studies and their application to real contexts, also using DSS and assessment techniques.

Environmental Sciences

Knowledge and know-how:

Basic Ecology, as applied to urban and hydro-geological problems

Ability to apply knowledge and know-how:

Skills in autonomous research of solutions to eco-systemic problems

Other areas of knowledge

Knowledge and know-how:

Basic Environmental resources Management, by using data retrieval and international Journals.

Basic micro-Economics: phenomena that are relevant for urban and regional dynamics (localization, agglomeration, externalities, interactions, processes)

Ability to apply knowledge and know-how:

Skills in choosing, combining and using techniques, tools, methods and theories related to environmental issues, reclamation, remediation.

Skills in interpreting the most relevant economic issues for planning and assessing the social, economic, institutional feasibility of plans and projects, also by scenarios.

3. STUDY PLAN

TYPE	ECT ECTS
Mandatory	93
Optional	12
Linguistic	3
End-of career: Traineeship	15
End-of career: Dissertation	12
TOTAL AMOUNT OF CREDITS	120

LIST OF COURSES (and link to their webpages with a Syllabus)

1st year

ECOSYSTEMS AND LANDSCAPE - 12 credits - Compulsory

PROJECTS AND POLICIES FOR THE LANDSCAPE - 10 credits - Compulsory

CITY, ENVIRONMENT AND INFRASTRUCTURES - 18 credits – Compulsory

VALUTAZIONE E GESTIONE DELLE RISORSE - 12 credits - Compulsory

PROCESSES AND SYSTEMS OF DECISION AIDS - 6 credits - Characterising - Compulsory

SYSTEMS ECOLOGY - 3 credits - Elective Course - Optional

URBAN ECOLOGY - 6 credits - Elective Course - Optional

LANDSCAPE ARCHAEOLOGY - 2 credits - Elective Course - Optional

2nd year

URBAN AND TERRITORIAL PROJECT - 10 credits - Compulsory

PLANNING TECHNIQUES - 10 credits - Compulsory

FURTHER LANGUAGE KNOWLEDGE - 3 credits - Compulsory

TRAINING - 15 credits - Compulsory

FINAL TEST - 12 credits - Language/Final Examination – Compulsory

Courses listed above are those in the official website of the Master.

Starting from the Academic year 2019-2020 there will be some changes in credits and courses sequence.

4. ACCESS REQUIREMENTS

A first level degree in Geography, Architecture, Planning, Agronomy, Environmental Sciences is necessary to be admitted. Other degrees can be admitted by the Assessment Committee, which assesses all the CV and the portfolio. Students who still have to achieve the degree, can be admitted *sub conditione*, according to the enrolment call.

Applicants must have reached at least a B1 level, according to the Common European Framework of Reference for Languages, in a EU language. It can be certificated, or it can be substituted by exams passed abroad. If both these requirements are not present, an exam will be necessary.

Each year places are reserved for students from outside Europe.

Schedule is established each year. The University provides free courses of Italian language before each semester starts.

5. PROFESSORS

Most of the teachers in the Master come from the Department of Architecture, Planning and Design of the same University. All professors accomplish the requirements of research quality, all of them are MSc or MA, and most of them are PhD or similar. For some disciplines, some can come from other Departments of the same University or can be visiting professors coming from abroad, especially from the University partners.

Educational activities include lessons, seminars, design studios, field works, case studies, ICT analysis and simulation, essays writing.

6. AREAS FOR CAREER OPPORTUNITIES

Position in a workplace:

Basic Environmental resources Management, by using data retrieval and international Journals.

Basic micro-Economics: phenomena that are relevant for urban and regional dynamics (localization, agglomeration, externalities, interactions, processes)

Position-related skills:

Skills in choosing, combining and using techniques, tools, methods and theories related to environmental issues, reclamation, remediation.

Skills in interpreting the most relevant economic issues for planning and assessing the social, economic, institutional feasibility of plans and projects, also by scenarios.

Career opportunities:

The degree allows the access to a second level Master, to a PhD course, or to a professional association of architects (by passing a state exam for professional qualification), in the planners list, or a job placement in some sectors:

- A. as civil servant
- B. as planning practitioner (coordinator of planning groups, policy designer, urban designer, spatial analyst, EIA or SEA coordinator, etc.)

Possible opportunities lie in the fields of tourism, transport, infrastructure, redevelopment, planning, conservation.

FOR FURTHER INFORMATION:

web: www.architettura.aho.uniss.it

FB: <https://www.facebook.com/ArchitetturaAlghero/>

twitter: https://twitter.com/Architettura_AA

Instagram: <https://www.instagram.com/architettura.alghero/>

YouTube: <https://www.youtube.com/user/ArchitetturaAlghero>

RSS: <https://www.architettura.aho.uniss.it/it/rss.xml>

KEY POINTS

The three analyzed masters are taught in three European universities each with a different university structure, history and tradition. Sorbonne university is a university with a long history while the University of Girona and university of Sassari are much younger.

At the three universities, a master's degree in environmental issues is taught based on different approaches and specialties in which issues related to environment and territory stand out.

Due to the university structures in Girona and the Sorbonne, the master consists of 60 ECTS studied over 2 semesters whereas at the University of Sassari the master consists of 120 ECTS completed in 4 semesters, 1 semester (30 ECTS) must be taken in a university from another country (one of these universities is Girona and Sassari students study 30 ECTS of the Master in Environmental Change).

The three masters are based on the idea that environmental issues should be addressed from mainstreaming, multidisciplinary, multiscalarity and in addition, all three consider that the master is professional.

The three masters access students from different disciplines, with the number of students being around 20 in Girona and Sorbonne and around 35-40 in Sassari.

The professors who teach the master in the case of Sorbonne come from different departments and specialties of geography; In the case of Girona, they come from different departments (geography, environmental science, physics, biology...). In the case of Sassari, the majority of professors are linked to the Department of Architecture, Planning and Design of the same University but their students will study 30 ECTS in other universities and their professors are from different traditions and departments. Attentively analyzing, it is observed that, although the three masters analyze and study the fears from multidisciplinary, only the master taught at the University of Girona, since its inception, was considered from different departments and faculties.

In the three master programs, theoretical and practical subjects are given and there are conceptual as well as other instrumental subjects.

As far as external practices are concerned, they are only mandatory in the master taught in Sassari. At the University of Girona and at the Sorbonne university they can be done linked to the Final Master's project but not in a mandatory way. This is a weakness if the master is intended to be a professional.

Only few concrete data are available at the three universities on Employment opportunities and employability. As we observe from Sassari and Girona, the opportunities are diverse and come from public administrations and private enterprises.



MEHmed

**MEDITERRANEAN ENVIRONMENTAL
CHANGE MANAGEMENT**
MASTER STUDY & ECOSYSTEM BUILDING

WP 1 – MEHMED **Deliverable 1.4**

Report on current academic offer in PC HEIs

REPORT ON THE MASTERS PROGRAMMES IN THE ENVIRONMENT OFFERED BY THE PARTNER UNIVERSITIES OF THE MAGHREB WITHIN THE FRAMEWORK OF THE MEHMED PROJECT

This report has a dual objective. First, it should be a tool to keep all the members of the MEHMED project informed about the master's programmes in the environment offered by project partners located in the Maghreb.

Second, it should be a tool to help the project design and plan the Master's in Mediterranean Environmental Change Management. It should respond to the needs of the region in general and of the three countries involved (Algeria, Morocco and Tunisia) in particular, respecting and taking advantage of the specific characteristics and experiences of each of the 8 Maghreb universities involved in MEHMED.

The report has been compiled from the data provided by the common form (information collected through Google Forms), which was shared and sent to each of the universities involved in the project. Not all universities could answer all the questions raised, which is why some tables are missing information about one or more of the partners.

Beginning with Table 1 (see below), the different master's will be cited using the numerical code assigned to facilitate reading the document.

Table 1.4.1: List of environmental master's programs currently taught at the universities of the Maghreb involved in the MEHMED project.

UNIVERSITY	MASTER'S OFFICIAL	Master's code
University of Monastir - Faculty of Sciences	Environnement et Analyses Physico chimiques Industrielles	1
UMP	Civil engineering and Geo-environmental sciences	2
Abdelmalek Essaadi University	Median spaces and management fundamentals	3
FLSH, USMBA	Natural Environments: Dynamics, Risks and Cleansing	4
ISA-CM, Sousse	Soil Water & Environment	5
University of BBA	Process engineering	6
University of Constantine 3, Institute of Urban Technical Management (GTU)	Eco-Management and Sustainable Development	7
University of Mostaganem	Building Climate Change Adaptation Capacity	8

All the universities involved in the project offer a master's degree focused on environmental topics. **This is a very important issue to keep in mind when designing a new master's programme focused on the study and the management of environmental change in the Mediterranean region.**

From what we can infer from the titles and the general descriptions of those master's, the approach to environmental issues is very different and specific in each case and is closely related to the faculty or department offering the master's. We see that they deal with a range of issues, from those related to construction to natural and industrial issues. **When designing the new master's programme, each university should decide if it should be considered complementary to an existing master's programme or if, on the other hand, it should be planned without considering any relation.**

Table 1.4.2: Number of credits in each of the master's programs.

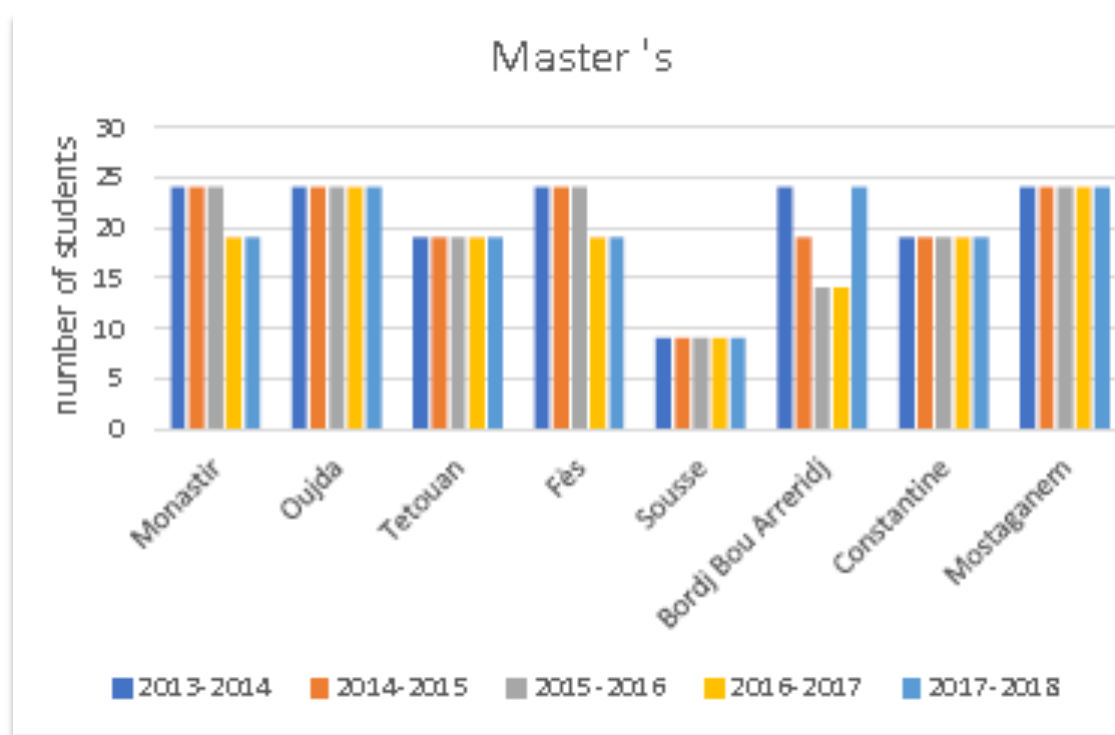
Subjects-credits	1	2	3	4	5	6	7	8
Total number of credits	120	240	48	120	120	120	120	120
Number of theoretical credits	75	40	28	65	25	70	90	90
Number of practical credits	45	60	20	15	5	50	30	30
Number of obligatory credits	102	120	48	0	30	110	120	120
Number of elective credits	18	20	0	10	5	10	0	0
Number of internship credits (in the institution or in external organizations)	30	20		0	0	10	10	30
Number of credits of the final project/thesis	30	60	12	30	30	30	30	30

We do not have enough information to delve deeper and compare the number of credits in each of the master's programmes. The results of Table 2 show that not all the master's programmes are based on comparable credit standards because not all credits have the same value. **To design the new master's degrees, it will be essential to give a value to face-to-face class hours, to work and to study for each credit and, from this agreed upon starting point, that each university use that value to plan. The initial proposal would include ECTS credits used in European universities, taking advantage of the progressive process of convergence initiated by various university systems in relation to the European model.**

The information provided by the partners indicates that the master's degrees are programmed over 4 semesters; that the final master's project/thesis is compulsory in all of them; and that all of them offer theoretical and practical subjects. It should be noted that all the master's programmes do not require practical placements in companies or administrations. **Following the general scheme of the master's programmes already offered, the new master's should be designed to be taught over 4 semesters. Likewise, they should include theoretical and practical subjects, obligatory and elective subjects, and a final master's project/thesis. In the project we presented and that was approved, great efforts were made to schedule practical internships in businesses or administrations and to increase the number of credits initially planned from 90 to 120.**

Table 1.4.3: Number of students registered in the master's programs

Number of students	1	2	3	4	5	6	7	8
Yearly number of students [2013- 2014]	24	24	19	24	9	24	19	24
Yearly number of students [2014- 2015]	24	24	19	24	9	19	19	24
Yearly number of students [2015- 2016]	24	24	19	24	9	14	19	24
Yearly number of students [2016- 2017]	19	24	19	19	9	14	19	24
Yearly number of students [2017- 2018]	19	24	19	19	9	24	19	24



Graphic 1.4.1: The number of students, with the exception of Sousse, ranges from 20 to 25.

In the project we resented, this number was considered adequate and appropriate to efficiently control and promote the exchange of students, the good quality of the final master's projects/theses and the practical classes.

Table 1.4.4: Origin of the students

Students' origin	Master's code
FSM Applied Chemistry bachelor's degree (75% of places), FSM Basic Chemistry bachelor's degree (10%), other institutions and other disciplines (15%)	1
University degree in geology, civil engineering and environmental science,	2
Degree in geography	3
Geography and earth sciences	4
University degree in agronomy, biology, geography, environmental science or forestry	5
University degree in environmental science	6
<ul style="list-style-type: none"> - Bachelor in Urban Management and Urbanization. - Bachelor in Urban Engineering - Bachelor in Urban Techniques and Environment - Bachelor in Habitat Management and Environment - Bachelor's degree in urban planning - Bachelor in <u>Urbanistics</u> 	7
Bachelor's degree (180 ECTS credits) in: chemistry, environmental science, physics, agricultural sciences, biology, marine sciences, earth sciences, meteorology, hydrometrology.	8

The origin of the students is directly related to the specificity of each master's degree and to the faculty or department promoting and/or teaching it. Considerable interdisciplinarity can be seen in only a few cases. **We must rethink this characteristic in the future since we start from the idea that environmental issues must be addressed from multiple perspectives.**

Table 1.4.5: Competencies and skills focus

Competencies and skills focus	Master's code
Environmental analysis, pollution treatment techniques (air pollution, water and wastewater, solid waste), communication and project management	1
Transdisciplinarity; planning and management; analysis and forecasting; communication	2
Human geography, natural geography, geomatics, cartography, hydrology, planning and management	3
Planning and management, data production, diagnostic analysis, impacts studies, heritage development	4
Multidisciplinarity	5
Transdisciplinarity	6
The skills acquired should enable future graduates to identify all the problems inherent to the protection of the environment, and the preservation of ecosystems and resources in urban areas (energy, water, biodiversity, etc.). The degree obtained will allow a specialization in various fields: -Advisor in sustainable development. -Specialist of environmental impact studies. -Project management.	7
Climate change vulnerability and adaptation; climate change mitigation; methods for environmental decision-making; research methods for environmental management; environmental science for sustainable development; world energy resources and renewable technologies; energy politics and governance; development and growth; globalization and regional development; land planning / sustainable cities; risk and governance	8

Table 1.4.6: Specialized courses

Specialized courses:	Master's code
Air, soil and sediment analysis, water and wastewater analysis, atmospheric pollution treatment, wastewater treatment, cleaner technologies (case studies), environmental management, bacteriologic analysis, drug analysis, food analysis, solid waste treatment and assessment, statistical data analysis, material analysis (polymers, glass and ceramics)	1
Environmental option: Integrated management of Mediterranean coastal areas, sustainable management of natural resources, environmental impact studies, liquid and solid waste management	2
Atmospheric pollution and waste recovery	6
<p>The proposed Master aims to train specialized executives in the ecological and sustainable management of the city. Faced with the contingencies of the moment in terms of energy and water management, the imperative to reduce climate change, noise pollution and problems related to the living environment, this master, would represent, by the modules and themes it proposes, a training framework for an ecological and sustainable management of urban space. It will be based essentially on the themes and challenges of sustainable development. The basic units frame the themes raised. Compared to the profile of the proposed training, the fundamentals focus on</p> <p>Urban ecology 1 and 2: essential module and key training, the title of the master clearly highlights it. In fact, the issues of sustainable development mentioned in the previous paragraph would come from the urban ecology. This discipline will allow graduates to absorb all the issues and themes of eco-urbanism: energy, water resources, waste, noise pollution, climate change).</p> <p>Urban ecology is the dimension that federates the other modules. Urban Ecology 2 will address issues related to sustainable urban development, local agendas 21 and governance. These are essential for training. The purpose of these lessons is to familiarize students with founding concepts and tools in the social and environmental sciences. Climatic and ecological changes affect both the natural environment and the built environment. The urban ecology option has directly taken on the current big questions. It represents an original offer in Algeria, through its interdisciplinary approach of questioning, problematization and search for innovative solutions to the challenges of our time.</p> <p>Environmental and Urban Law: A fundamental module, highlighting the institutional and legal aspects, this module will provide knowledge of international and national institutions responsible for environmental protection, current planning law, environmental law and environment and real estate, the law of sustainable development and finally the practices of environmental law and urban law.</p> <p>Major urban projects: This module makes it possible to draw lessons from the experiences of developed countries: Germany, Italy, Spain, etc. have achieved large-scale projects that have been designed to meet environmental requirements. It is appropriate to refer to this, and to give learners major lessons in architecture and urban planning</p>	7
Climatology / Global Operation of the Climate System Vulnerable Environments	8

Tables 5 and 6 are difficult to comment on and, furthermore, we must do it jointly because on some occasions there has been confusion between “Competencies and skills focus” y “specialized course”. In addition, the degree of detail of the information available differs greatly from one master’s to another. The results indicate that, except for two cases, the skills and abilities that students are expected to acquire are very specific and specialized in accordance with the focus promoted by each master’s programme.

A careful reading of the results of Tables 5 and 6 indicates the polyhedral view of the environmental issues is only possible from the conjunction and confrontation of specializations.

Table 1.4.7: Teaching techniques

Teaching techniques	Master's code
Face-to-face classes, practical activities, laboratory practice, field trips	1
Face-to-face classes, individual and team work, reading / discussion seminars, practical activities, project planning and management, laboratory practice, field trips, problem-solving case studies, communication techniques (written, oral, visual, online...)	2
Face-to-face classes, individual and team work, reading / discussion seminars, practical activities, field trips, flipped classroom, problem-solving case studies, communication techniques (written, oral, visual, online...)	3
Face-to-face classes, individual and team work, reading / discussion seminars, practical activities, laboratory practice, field trips, communication techniques (written, oral, visual, online...)	4
Face-to-face classes, individual and team work, reading / discussion seminars, practical activities, project planning and management, laboratory practice, field trips	5
Individual and team work, practical activities, laboratory practice, field trips, communication techniques (written, oral, visual, online...)	6
Face-to-face classes, individual and team work, reading / discussion seminars, practical activities, project planning and management, field trips, flipped classroom, problem-solving case studies, communication techniques (written, oral, visual, online...)	7
Face-to-face classes, individual and team work, reading / discussion seminars, practical activities, project planning and management, laboratory practice, field trips, problem-solving case studies, communication techniques (written, oral, visual, online...)	8

The analysis of the teaching techniques indicates that all the master's programmes analysed use different working and teaching methodologies simultaneously. These results are **a good indicator that will allow us, in the future, to be able to coordinate methodologies and move towards common methodological proposals such as, project-based learning or problem-based learning, flipped classes, etc.**

Table 1.4.8: Practical internships (description)

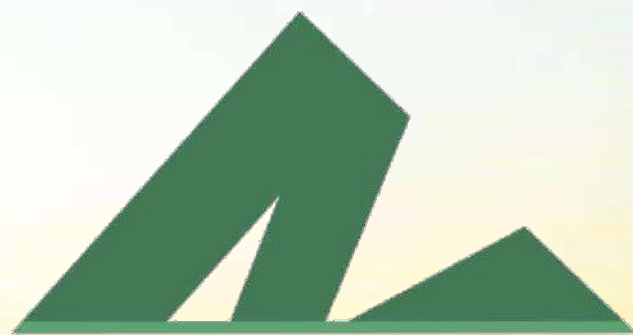
Practical internships (description)	Master's code
Six-month internship in professional enterprises with a practical subject to deal with.	1
Liquid and solid waste management, hydrology, flash flood	2
Not obligatory	3
Nothingness	4
None	5
Four-month internship at the level of specialized institutions according to the field of study at the end of the internship; this work must be defended in front of a board.	6
Internship in a company that aims to teach the student field approaches from the collection of data to their interpretation, illustration and analysis.	7
Research laboratories of the university	8

As indicated at the beginning of this report, not all of the master's programmes have compulsory external work placements. As can be seen in Table 8, the purpose is always to put into practice the knowledge acquired while working in a company, public administration or with a university research group. It can be observed that the duration of the placements do not always coincide.

Table 1.4.9: Employment rate among master's degree graduates

Master's	1	2	4	6	8
Master's Degree	20	80	20	60	20
Bachelor's Degree	20	60		20	
Public Admin.	20	60	20	60	20
Private Sector	40	80		60	
Research Institute	20	40		20	20
NGOs	40	20			

As can be seen, we have no occupation data for some of the master's programmes analysed. First, from what data we do have, we can emphasize that the employment rate is higher for persons with a master's degree than it is for those who only have a bachelor's degree. This underscores the importance of having a master's degree to help students find work. The second point to emphasize is the high rate of employment in private companies, although we cannot forget to point out administration demands. One limitation on the information available is that the degree of affinity between the student's final occupation and the profile of their studies is unknown. **The results indicate that we cannot design any master's programme without first keeping in mind the demands of private companies and, then, public administration demands as well.**



MEHmed

**MEDITERRANEAN ENVIRONMENTAL
CHANGE MANAGEMENT**

MASTER STUDY & ECOSYSTEM BUILDING

WP 1 – MEHMED Deliverable 1.5 SWOT Analysis results

Coordinator



Co-funded by the
Erasmus+ Programme
of the European Union

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PROJECT NUMBER: 588020-EPP-1-2018-1-ES-EPPKA2-CBHE-JP

Partners



REPORT ON THE SWOTS OF MASTER'S PROGRAMMES IN THE ENVIRONMENT OFFERED BY THE PARTNER UNIVERSITIES OF THE MAGHREB WITHIN THE FRAMEWORK OF THE MEHMED PROJECT

This document reproduces (literally) and succinctly values the SWOTs of the various master's programmes in the environment that are offered by the partner universities of the MEHMED project located in the Maghreb region.

As can be observed, the results are not homogenous and certainly, on some occasions, the persons who filled in the SWOTs organized them based on what the MEHMED project might mean and not according to the meaning of the master's that is currently offered.

This document must be considered very important now that each university is designing the new Master's in Mediterranean Environmental Change Management. This master's programme aims to complement the strengths and opportunities and respond to the weaknesses and threats detected by each one of the partners. Likewise, it is recommended to consider the contributions of the other universities to detect aspects not included in the SWOT itself but also possibly of interest to them.

MOROCCO OJUDA

CIVIL ENGINEERING AND GEO-ENVIRONMENTAL SCIENCES

Table 1.5.1: SWOTs values of the master's programs from *MOROCCO OJUDA*

STRENGTHS	WEAKNESSES
Part of a long tradition in academic programmes in environmental science and management, our university (UMP) is specialized in environmental change bioindicators and water treatment and management.	The main WEAKNESS of the academic programme in environmental topics in our institution is chemical analysis.
OPPORTUNITIES	THREATS
The main OPPORTUNITY for the academic programme in environmental topics in our country is the great environmental diversity in the eastern region of Morocco.	The main THREAT to the academic programme in environmental topics in our country and institution is the payment of private or public collaborators.

MAROCCO TETOUAN

TRANSITIONAL SPACES AND MANAGEMENT FUNDAMENTALS

Table 1.5.2: SWOTs values of the master's programs from *MAROCCO TETOUAN*

STRENGTHS	WEAKNESSES
Diversified programme, high demand.	Lack of integration of stakeholders' knowledge, material means, adapted and qualified human potential, and bureaucracy.
OPPORTUNITIES	THREATS
Mehmed is in accordance with national and regional plans and directions; authorities will encourage the project because it integrates into the broad lines of development at the national and regional level	Retirement of a large number of experienced staff.

MAROCCO FÈS

MILIEUX NATURELS: DYNAMIQUE, RISQUES ET AMÉGAGEMENT

Table 1.5.3: SWOTs values of the master's programs from *MAROCCO FÈS*

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> Interdisciplinary teaching: Involvement of different departments of the USMBA Students from different national universities Students of different geographical origins Teachers holding doctoral degrees and mainly permanent staff 	<ul style="list-style-type: none"> Students' low levels of foreign language skills Most students come from modest social backgrounds Implementation of the master's degree at the Faculty of Arts and Humanities
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> Verified and accredited public master's programme Increasing interest of society in environmental topics Administrations and private companies Good reputation at the national level of the teaching staff and of the research members 	<ul style="list-style-type: none"> Nothingness

TUNISIE SOUSSE

SOIL, WATER & ENVIRONMENT

Table 1.5.4: SWOTs values of the master's programs from *TUNISIE SOUSSE*

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> Students of different geographic origins Teachers holding doctoral degrees and mainly permanent staff Understanding global and specific environmental issues linked to agriculture and the food sectors 	<ul style="list-style-type: none"> Low number of students Low English level of students Lack of compulsory practical sessions and internships in companies or administrations Lack of specialized teachers of some topics that already affect local administrations
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> Public master's programme; highly recommended by public decision makers Almost no master's programmes dealing with topics concerning climate change Increasing interest of society in environmental topics Increasing demand for sustainability and climate change specialists 	<ul style="list-style-type: none"> Students and employers are still not used to transdisciplinary and multidisciplinary diplomas; risk that they will be reluctant to implement these kinds of profile competencies

ENVIRONNEMENT ET ANALYSES PHYSICO CHIMIQUES INDUSTRIELLES
Table 1.5.5: SWOTs values of the master's programs from *TUNISSIE MONASTIR*

STRENGTHS	WEAKNESSES
Oldest academic offer in the environmental field from a technical point of view (analysis and treatment of all environmental aspects) with a focus on the chemical aspects of the phenomenon.	Lack of performed analysis Equipment
OPPORTUNITIES	THREATS
All the social, economic and environmental area are ready to assist and help our students by offering long-term (six months) internships. environment	Unemployment, redundancy between this academic programme and the one of the bachelor's degree programme.

ALGERIA BORDJ BOU ARRERIDJ
PROCESS ENGINEERING
Table 1.5.6: SWOTs values of the master's programs from *ALGERIA BORDJ BOU ARRERIDJ*

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> There is long tradition of water treatment and wastewater treatment Our university is specialized in water treatment 	<ul style="list-style-type: none"> Lack of specializations in sea and atmospheric pollution, and in landscaping and land use planning or management
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> Consultation and design of professions specialized in environmental fields 	<ul style="list-style-type: none"> The private sector does not recruit enough; they prefer to work with consulting agencies

ALGERIA CONSTANTINE 3

ECO-MANAGEMENT AND SUSTAINABLE DEVELOPMENT

Table 1.5.7: SWOTs values of the master's programs from ALGERIA CONSTANTINE 3

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • Students from different geographical origins. • Teachers with PhDs and different specialties. • Seminars given by guest experts specialized in the themes of sustainable development and the environment • Implementation of new teaching methodologies 	<ul style="list-style-type: none"> • Low English level of students • Employability is low
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • Master of a public university. Verified and accredited • Constantine 3 University is an asset (is part of the university hub) • Possibility of pursuing his doctorate 	<ul style="list-style-type: none"> • Competition with other specialties that deal with environmental issues

ALGERIA MOSTAGANEM

BUILDING CLIMATE CHANGE ADAPTATION CAPACITY

Table 1.5.8: SWOTs values of the master's programs from *ALGERIA MOSTAGANEM*

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> We have had a similar experience with the TEMPUS project: 530656-TEMPUS-1-2012-MA- TEMPUS-JPCR including two universities each from Algeria, Morocco and Tunisia. As far as the MEHMED Project is concerned, we have a strong team involved in a Smart Cities project and great knowhow with GIS (ArcGIS) and climate simulators (SimCLIM) Very high number of students applying each year for the master's degree programme 	<ul style="list-style-type: none"> Difficulties finding practical training opportunities in external institutions or organizations
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> Our country is concerned with climate change. However, little has been done so far and we are convinced that we will contribute greatly to any specific actions taken by local and national authorities. We are conscientious and the proof is that our country is always involved in such programmes proposed and financed by the European Union. 	<ul style="list-style-type: none"> Students will come from different backgrounds and fields and the master's curricula might be a disadvantage for some of them so we have to upgrade skills.

GENERAL COMMENTS AND ANALYSIS

A SWOT analysis has been carried out on the different master's programs related to environmental issues at the participating universities in the Maghreb region. This makes it possible to provide valuable and interesting information to be able to outline the implementation of the new master's degree.

SWOT analysis provides a multiscale view, from an internal point of view on the one hand, and external on the other, and helps to place the master in context, highlighting the positive and negative aspects.

The master's degrees analyzed, as well as the state where they are held and the universities that teach them are the following:

Morocco

University: Ojuda

Master: Civil engineering and geo-environmental sciences

University: Tetouan

Master: Transitional spaces and management fundamentals

University: Fès

Master: Milieux naturels: dynamique, risques et aménagement

Tunisie

University: Sousse

Master: Soil, water & environment

University: Monastir

Master: Environnement et analyses physico chimiques industrielles

Algeria

University: Bordj Bou Arreridj

Master: Process engineering

University: Constantine 3

Master: Eco-management and sustainable development

University: Mostaganem

Master: Building climate change adaptation capacity

A first aspect to take into account is the varied profile of the different master's degrees offered. Although they are all linked to the environment, they all come from very different backgrounds and disciplines. This is a very interesting wealth, and offers an opportunity to be complemented with the MEHMED master that is proposed with this proposal. The three profiles of these postgraduate courses are engineering, environmental and resource management, and social and ecological adaptation and development.

Although, as mentioned, the profiles are very different, the different analyzes carried out show some shared challenges and potentialities.

On one hand, regarding **strengths**, it should be noted, on the one hand, that these programs have a long and recognized history, and therefore, many of them stand out for being in high demand, even by students of different geographical origins. In addition, universities highlight the profile of teachers, with a solvent academic career.

On the other hand, regarding the **weaknesses**, the universities coincide in highlighting the difficulties derived from the lack of training in the English language, which may represent a significant difficulty for potential students. Also, in reference to students, they point to a possible difficulty in finding institutions or companies that can host internships or internships. Lastly, the possible lack of training in some areas of specialization on the part of teachers, as well as some technical skills on the part of some universities, should also be noted.

The **opportunities** coincide in practically all of the analysis carried out, and show a reality: an increasing awareness of society and administrations in relation to the impacts of global environmental change and social and ecological transition. This means a greater capacity for

demand and acceptance in the socioeconomic fabric. In addition, the trajectory of some of the programs analyzed as well as the profile of the teachers are a value to improve the offer with the proposed master's degree.

Lastly, the **threats**. The analyzes proposed by the different universities highlight, on the one hand, a possible problem derived from the difficulty of accommodating transdisciplinarity, on the one hand of future students, but also, it does not help to fit in possible job offers. The private sector has not yet seen, in some cases, the opportunity it represents. Competitiveness, therefore, may not help in this case and may be a weakness for future students.

All these aspects provide indications that should help universities to shape the offer and development of the master's degree. Greater awareness of climate and environmental challenges by the entire society is a key point, but great competitiveness should not be a problem, but rather an element to improve and propose a more adequate and attractive offer.

The analysis must also suppose a horizon that allows to facilitate the implementation thinking in a context of great complexity at all scales. Therefore, a transversal reading of the results can be very useful to help in the purpose of establishing a master's degree that helps society to face global environmental change and its effects in Mediterranean countries.



MEHmed

**MEDITERRANEAN ENVIRONMENTAL
CHANGE MANAGEMENT**

MASTER STUDY & ECOSYSTEM BUILDING

WP 1 – MEHMED
Deliverable 1.6

Deliverable 1.6 Knowledge Base

Knowledge Base

Within the frame of the MEHMED project, a knowledge base covering all the reports and other information gathered and exchanged during the preparatory phase (WP1) is generated.

This knowledge base is part of Activity 1.1.9. of WP1 “Create a knowledge base covering all the information gathered and exchanged”. All analysis and conclusions are gathered into the knowledge base that will serve as a basis for the development of the MEHMED master programme.

After checking different possibilities, the most convenient option for this knowledge base was to gather the information in google drive – giving easy access to all partners. This easy access system is also practical for partners in case of official requests (monitoring visits, internal administration etc.) to get information on deliverables, contracts and other documents related to the project.

https://drive.google.com/drive/folders/17uHhziBLPKxESKc_3wJDDRW1PXJeSv2

The documentation inside of google drive is organized in an easy way to find the documentation requested or needed in any moment:

0. Proposal / Application documents.

1. Financial Management:

- Budget.
- Legal documents.
- Supporting documents.
- Templates.

2. Work Packages:

- WP1 Preparation.
- WP2 Development 1.
- WP3 Development 2 / Implementation.
- WP4 Quality.
- WP5 Dissemination
- WP6 Management.

3. Meetings:

- A folder for each SC meeting: Girona, Sousse, Paris, Constantine, Oujda, Sassari & final SC meeting.

4. Reports:

- Minutes SC meeting.
- WP1 deliverables.
- WP2 deliverables.
- WP 3 deliverables.
- WP 4 deliverables.
- WP 5 deliverables.
- WP 6 deliverables.

5. Courses:

- Teaching training

6. Photos:

- A folder for each SC meeting: Girona, Sousse, Paris, Constantine, Oujda, Sassari & final SC meeting has been created. In addition, for other common activities developed in the project like training activities, etc. will be created a separate folder.



WP 1 – MEHMED

Deliverable 1.7

Report on local emphasis within the environmental change challenges

REPORT ON THE LOCAL EMPHASIS

QUESTIONNAIRE

LOCAL EMPHASIS OF ENVIRONMENTAL CHANGE

In this brief questionnaire, we want to gather the basic information about the type of manifestations, the impacts, risks and the possible mitigation and adaptation related to environmental change at the local level. We understand as a local scale the most direct area of influence of the university, the closest territorial area with which the university identifies.

The following questions were addressed to partner universities:

1. What are the main manifestations of environmental change?

2. What present and future impacts and risks can be associated (both environmentally, economically and socially)?

3. What possibilities of adaptation exist?

4. What mitigation possibilities exist?

5. Which actor (especially local) would be involved in adaptation and mitigation actions?

6. Other important reflexions to consider.

University of Sousse

1. What are the main manifestations of environmental change?

- Solid waste pollution
- Coastal pollution
- Drought and floods
- Unsustainable agriculture
- Urban pollution and landscape

2. What present and future impacts and risks can be associated (both environmentally, economically and socially)?

- Health issues and esthetical aspects
- Tourism sector (beaches, hotels...)
- Urban structures, agronomic production and agricultural yields
- Consumer's health (pesticides in food), energy high consumption, great wastes to manage

3. What possibilities of adaptation exist?

- Almost none
- Organic agriculture centre and research institutes
 - studies by APAL
 - Studies on seawater, groundwater and surface water quality monitoring
 - Studies in ISA-CM for the reuse of treated wastewater
 - National water management system integration
 - National strategy for the adaptation and mitigation of the climate change impacts
 - Project proposals for developing green areas in the city of Sousse
 - Establishment of a strategy in Sousse for the development of the city (rehabilitation of a river, green transport, sustainable energy for lightening, integrating the smart cities Mediterranean network...)

4. What mitigation possibilities exist?

- National strategy for the adaptation and mitigation of the climate change impacts
- Project proposals for developing green areas in the city of Sousse
- Establishment of a strategy in Sousse for the development of the city (rehabilitation of a river, green transport, sustainable energy for lightening, integrating the smart cities Mediterranean network...)

5. Which actor (especially local) would be involved in adaptation and mitigation actions?

- Ministry of agriculture (CRDA)
- Ministry of tourism
- National agency of coastal protection (APAL)
- National agency for environmental protection (ANPE)
- Ministry of environment and local affairs
- Municipalities and governorates (Sousse and Monastir)
- National agency for sanitation (ONAS)
- National agency for environmental waste management (ANGED)
- NGOs for environmental actions
- University of Sousse
- International partners via cooperation projects / actions

6. Other important reflexions to consider.

There is a citizen's awareness of the importance of environmental and climatic changes. But a lack of involvement and commitment. The same for the decision makers.
Environment is still not a priority. Economic issues are dominant.

University of Monastir

1. What are the main manifestations of environmental change?

- Warmer summers
- Longer rainy episodes
- Longer drought episodes
- 15% rainfall decrease by 2050 in Monastir region
- Evaporation and evapotranspiration increase
- Important coastal land loss from sea-level rise
- Water tables salinization from seawater intrusion

2. What present and future impacts and risks can be associated (both environmentally, economically and socially)?

- Increase in energy consumption (air conditioning, water production ...)
- Monastir cliff erosion under the effect of longer and longer raining episodes
- Frequent floods
- Decrease in agricultural production
- Food security threatening
- Damage to the constructions by the sea
- Biodiversity/ecosystems changing
- Probable people displacement (climate refugees)
- (Re)emergence of infectious (tropical) diseases
- Impact on tourism sector

3. What possibilities of adaptation exist?

- The preservation of the coast and the cliff
- Dike construction
- The improvement of rainwater drainage systems
- Reservoir construction to recover rainwater
- Use of alternative farming methods
- Use of renewable energy

4. What mitigation possibilities exist?

- Introduction of environmental education in school curricula
- Encouraging the activities of environmental NGOs
- Increasing environmental awareness
- Energy saving (building, transport, public etc sectors)
- Water saving
- Increasing green spaces

5. Which actor (especially local) would be involved in adaptation and mitigation actions?

- Municipal officials
- Civil society (environmental NGOs)
- Educational leaders (teachers, youth club leaders)
- Researchers/Students
- Think tanks (reflection groups)

6. Other important reflexions to consider.

Tunisia contribute to 0.07% of worldwide carbon emissions and its Intended Nationally Determined Contribution (INDC) pledges to reduce carbon intensity by 41 percent in 2030, compared to 2010 levels (mostly in the energy sector). However, the country is in a region of the world that will suffer the most from global warming and the authorities have no clear and efficient plans for adaptation. Therefore, every effort must be made in that direction.

University Sidi Mohamed Ben Abdellah

1. What are the main manifestations of environmental change?

- Regression of the surface of the canopy
- Disappearance of endemic species
- Appearance of new non-endemic species
- Deterioration of environmental balances
- Cultural mutations
- Water resources degradation
- Pollution
- Urban extension
- Soil erosion

2. What present and future impacts and risks can be associated (both environmentally, economically and socially)?

- Change of farming techniques
- Population movements
- Social movements
- Geopolitical issues
- Redefining environmental conservation policies
- Freshwater supplies shortage
- Increase in conflicts
- Poverty worsening
- Decrease in agricultural production

3. What possibilities of adaptation exist?

- Environmental protection funds
- Public institutions in charge of environmental protection
- Adaptation of farming techniques (irrigation system)
- Awareness campaigns about environmental changes
- Reforestation campaigns
- Introduction of resistant species

4. What mitigation possibilities exist?

- Revalorization of some traditional farming techniques
- Introduction of the concept in school curricula
- Introduction of repressive legislation

- Integrate and enforce decisions of international agreements and conventions
- Strengthening of water pollution control infrastructure
- Encouraging the use of renewable energies
- Education

5. Which actor (especially local) would be involved in adaptation and mitigation actions?

- The authorities in charge of the environment
- Local authorities
- The territorial municipalities
- Civil society

6. Other important reflexions to consider.

University Abdelmalek Essaadi

1. What are the main manifestations of environmental change?

- Decrease of water availability
- Multiplication and severity of hydroclimatic fragilities
- Pollution and degradation of natural resources
- Socioeconomic mutations

2. What present and future impacts and risks can be associated (both environmentally, economically and socially)?

- Acceleration of pressures on water and the environment
- Regression and degradation of agricultural and natural heritage and landscapes
- Degradation of non-renewable resources and threat of development factors
- Ecological and sectorial imbalances
- Irreversibility of the damage

3. What possibilities of adaptation exist?

- Participatory and shared approach (unify perception and get involved in complementary actions)
- Improve governance and strengthen institutional capacity
- Boost and involve all stakeholders in sustainable actions and shared gain

4. What mitigation possibilities exist?

- Act locally with innovative and sustainable targeted solutions
- Share knowledge about overexploitation and deterioration
- Develop water saving techniques for irrigation, recycling and reuse of treated wastewater
- Reduce pressure on resources and control the use of pollutants
- Strengthen human potential and economic means

5. Which actor (especially local) would be involved in adaptation and mitigation actions?

- Act locally with innovative and sustainable targeted solutions
- Share knowledge about overexploitation and deterioration
- Develop water saving techniques for irrigation, recycling and reuse of treated wastewater
- Reduce pressure on resources and control the use of pollutants
- Strengthen human potential and economic means

6. Other important reflexions to consider.

- Encourage environmental dialogue and consultation between different stakeholders
- Promote collective learning and knowledge sharing
- Support training and scientific research

University Mohamed Primer

1. What are the main manifestations of environmental change?

- At the level of the Mediterranean coast the area of the urban area of the city of Saidia has increased by 70% in place of forests and wetlands
- Destruction of the dune cord to build cornices and cafes and restaurants
- In the cities of the interior there is a worsening and an increase in the frequency of the floods

2. What present and future impacts and risks can be associated (both environmentally, economically and socially)?

- flooding by increasing the groundwater level of Saidia,
- erosion causing the reduction of the width of the beach
- Decrease or disappearance of animal and plant biodiversity
- destruction of infrastructures
- casualties
- inconvenience of urban and intercity traffic

3. What possibilities of adaptation exist?

- Establishment of warning systems for flooding and marine crossings
- Establishment of city planning plan presenting areas at risk of flooding and sea crossing

4. What mitigation possibilities exist?

- Adjustment and redevelopment of sanitation networks
- Dune cord fixation with adequate planting
- Establishment of the retention basin in the mountains surrounding the cities
- reforestation of watersheds
- Ecological slope stabilization

5. Which actor (especially local) would be involved in adaptation and mitigation actions?

- The Ministry of the Interior represented by the Wali and governors
- Local communities
- The Ministry of Equipment and Transport

6. Other important reflexions to consider.

- pollution from urban waste in public landfills
- pollution of the Mediterranean by wastewater discharges
- air pollution through incineration and the cement industry
- Pollution of the water table by fertilizers and pesticides

University Constantine 3

1. What are the main manifestations of environmental change?

Atmospheric pollution
Increase of mineral surfaces, reduction of green surfaces, Long heating periods, heat wave, urban heat island Flooding, Forest fire, Wastes, dirt....

2. What present and future impacts and risks can be associated (both environmentally, economically and socially)?

The impact and risk associated with air pollution in urban areas is the increase of acute respiratory diseases such as bronchial asthma in the Constantine region (through the presence of the regional cement factory in eastern Algeria); and chronic (lung cancer), as well as cardiovascular diseases.
Water scarcity, drought, food dependence, diminution of energy resources, disease's epidemic (outbreak)

3. What possibilities of adaptation exist?

Very few:
Waste valuation, management, wastewater treatment Extraction of oils,
Energy consumption and management,
The adaptation possibilities are first tackled at the source of the pollution.
Most sources of pollution are not the responsibility of people and require the intervention of officials of the municipality, decision-makers, national and international

4. What mitigation possibilities exist?

Very few. Awareness campaign for environmental aspects such as seaside pollution, forest fire, economy in energy use, rationalisation in water use
Existing mitigation opportunities are promoting greener modes of transportation, more efficient energy production and good waste management.

5. Which actor (especially local) would be involved in adaptation and mitigation actions?

The main actor involved in adaptation and mitigation actions is the direction of the environment. Also local authorities (PAPC (maire de la ville et son assemblée, APW, WALI, community participation)

6. Other important reflexions to consider.

Raise awareness of society for all what concerns environmental changes
Propose new educational programs related to environmental problems from primary school to masters or environmental engineering,
Facilitate communications, advertising etc...
Be pragmatic and effective on site strategies' application...

UBBA

1. What are the main manifestations of environmental change?

Can be observed in:

- A higher sea level than before;
- extreme climatic events (droughts, torrential rains, storms, etc.) more violent and more frequent;
- a rise in average temperatures.

2. What present and future impacts and risks can be associated (both environmentally, economically and socially)?

According to the traditional approach of relations between economic and environmental issues, ecological pressures appear as constraints and costs likely to threaten the sustainability of organizations. This approach is essentially based on two complementary analyses of environmental issues. The first is part of a societal perspective in which the company is subject to external pressures to which it must imperatively respond. The gaps between society's expectations and the perception of corporate behaviour, often associated with "polluters", therefore represent threats to the legitimacy and survival of organizations.

Thus, environmental issues are the source of social pressures that companies must know how to analyse and anticipate.

3. What possibilities of adaptation exist?

Environmental education is essential for the change of society, it calls everyone to participate in a sustainable development by deploying in his daily actions for the protection of natural resources: sorting waste, saving money, water or energy, prefer public transport, etc.

4. What mitigation possibilities exist?

The action plan has several objectives:

- safeguarding the country's energy resources,
- the increase of natural gas exports (GN and LNG),
- the improvement of the quality of the environment,
- reducing the effects of pollution on health and job creation. The sector's guidelines focus on:
 - The development of renewable energies,
 - the use of the least polluting energies,
 - energy saving,
 - energy efficiency and environmental management.

Government measures are underway to achieve the following objectives:

- adaptation of the legal and regulatory framework: pricing, energy taxation, regulation and control (technical and environmental standards),
- promotion of the energy efficiency and renewable energy market,
- the promotion of investment (case of cogeneration), consultation, participation and decentralization.

5. Which actor (especially local) would be involved in adaptation and mitigation actions?

A new police unit, the environment police, has been set up to cooperate with the environment and environment department for the protection of the local environmental territory.

6. Other important reflexions to consider.

To protect the environment, special laws and procedures must be applied, for example:

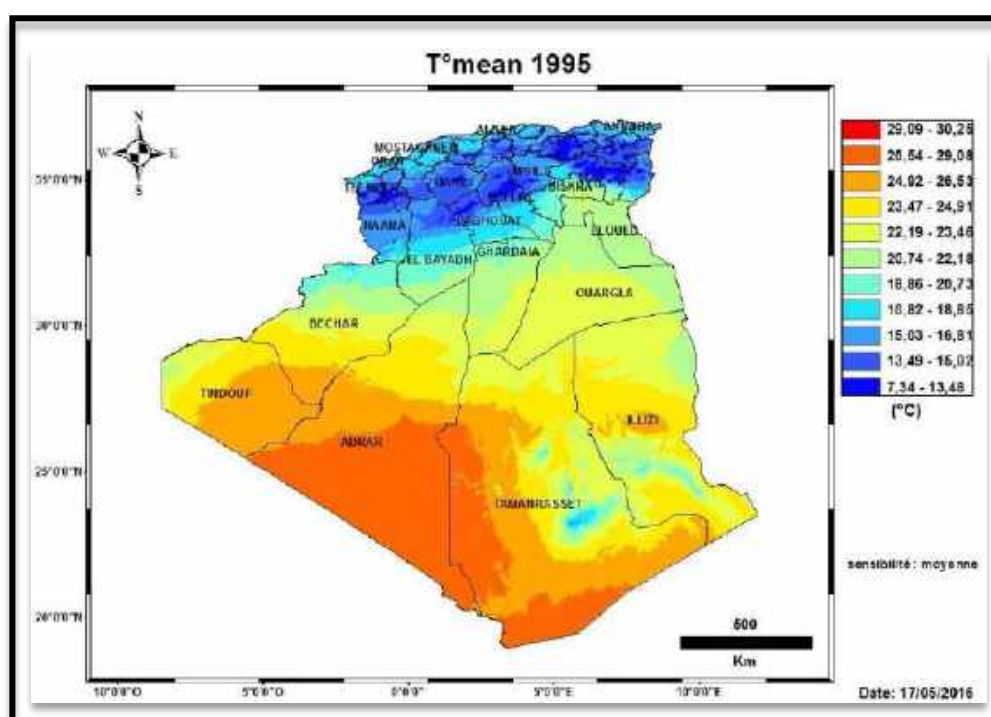
- Preserve the local environment
- Join volunteers and raise awareness of the environment
- Whoever pollutes the ocean is fined,
- Reduce the carbon footprint, by encouraging citizens to use urban transport,
- tree planting,
- Keep the water,
- Balance production-consumption electricity,
- Choose eco-friendly clothes.

University of Mostaganem

1. What are the main manifestations of environmental change?

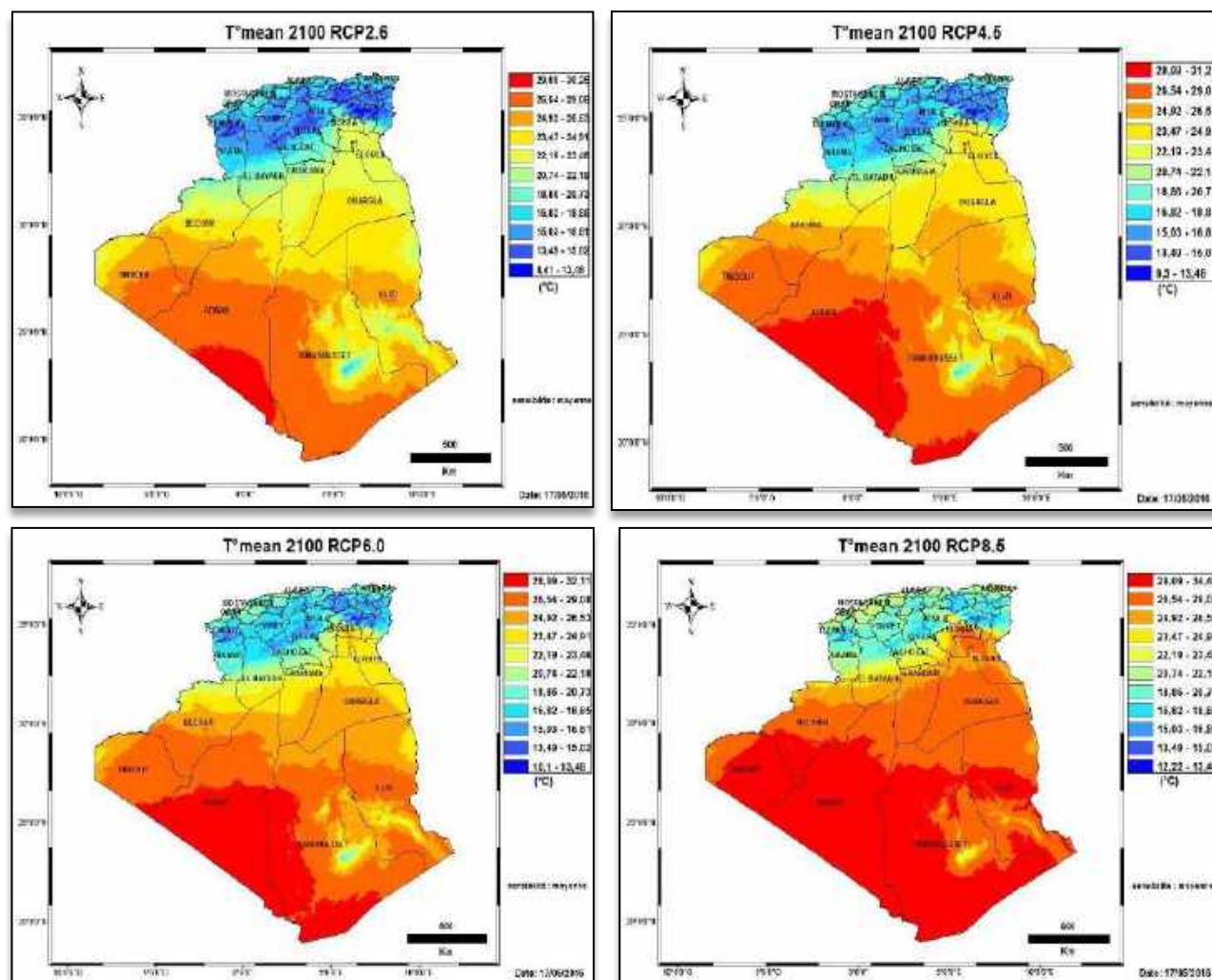
Models have been adapted to the observed manifestations of environmental change in our country and studies have been conducted at the University of Mostaganem related to the predictions of temperatures and rainfall according to different scenarios: from the worst-case scenario (RCP 8.5) to the optimistic scenario (RCP 2.6). The following plots illustrate with “NO COMMENT” these predictions.

Case Studies of temperature change on a nationwide scale with 1995 as a baseline year

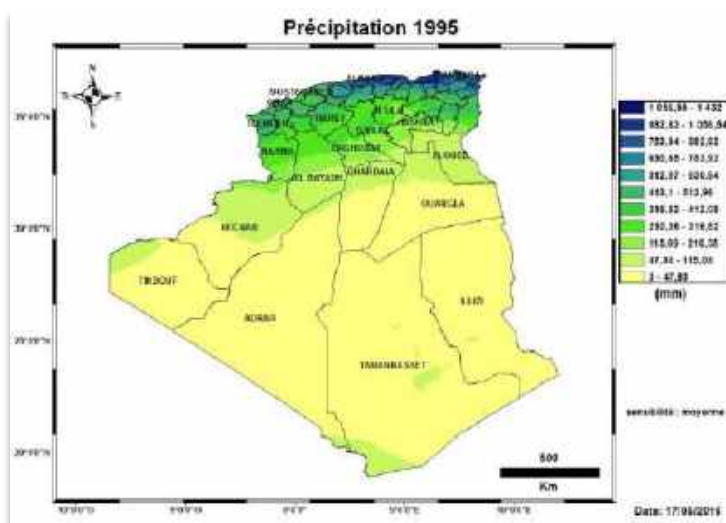


Graphic 1.7.1: temperature change on a nationwide scale with 1995 as a baseline year

Temperature prediction from different scenarios for the year 2100



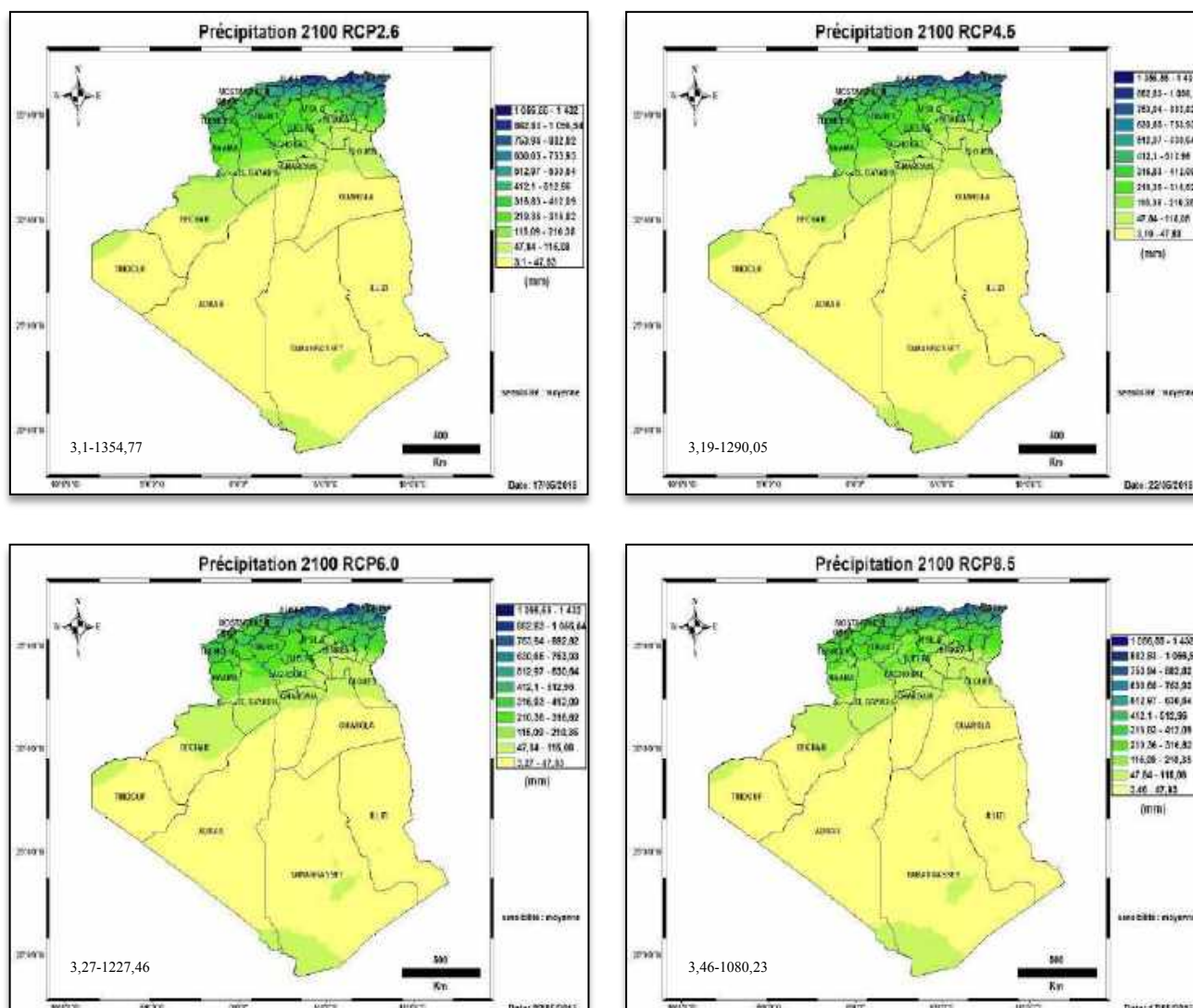
Graphic 1.7.2: temperature prediction from different scenarios for the year 2100



Case Studies of rainfall change on a nationwide scale with 1995 as a baseline year

Graphic 1.7.3: rainfall change on a nationwide scale with 1995 baseline year

Predictions of rainfall from different scenario for the year 2100



Graphic 1.7.4: Predictions of rainfall from different scenario for the year 2100

2. What present and future impacts and risks can be associated (both environmentally, economically and socially)?

CLIMATE CHANGE: THE (NORTH) AFRICAN CONTEXT

Africa has been dealing with the impacts of climate change since the 1970s. The most recent report of the Intergovernmental Panel on Climate Change (IPCC) described the African continent as the one that will be most affected.

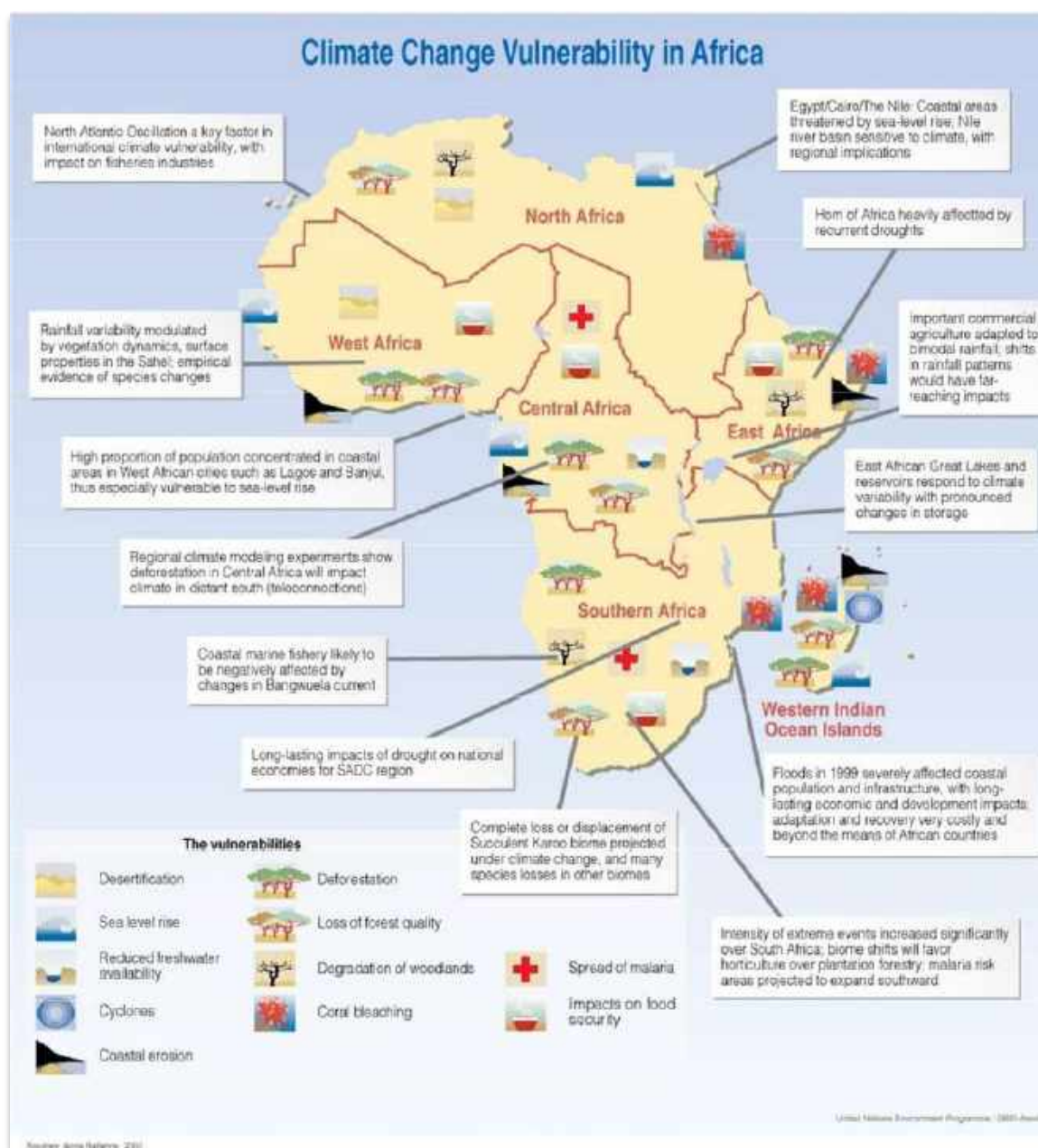


Figure 1.7.1: CLIMATE CHANGE: THE (NORTH) AFRICAN CONTEXT

Africa is set to experience:

- Significant increases in temperature, particularly in the Sahel and part of southern Africa.
- Dramatic decreases in precipitation, declining by more than 20% compared to levels 20 years ago.
- More frequent and intense tropical storms—parts of the continent will see a 20% increase in cyclone activity.

The projected impacts for human security include:

- Between 75-250 million people exposed to water stress in the next 10 years, and as many as 1.8 billion by the end of this century.
- Agriculture fed by rain could drop 50% in some African countries in a near future. The IPCC report predicts that wheat may disappear from Africa by 2080, and that maize—a staple—will fall significantly in southern Africa.
- Arid and semi-arid lands are likely to increase by up to 8%, with severe ramifications for livelihoods, poverty eradication and meeting and maintaining the Millennium Development Goals.

These facts and figures underline the direct ramifications climate change is set to have on the social fabric of Africa.

In Africa, climate change will bring about an increased incidence of extreme weather events (droughts, floods, mudslides, etc.), as well as a rise in infectious diseases. At the same time, many Africans argue that the continent is the least responsible for GHG emissions, the least prepared for the changes, will require the most efforts to adapt and is already burdened with human security challenges related to poverty and conflict.

Drought is a key factor behind the declining productivity of Africa. There is a strong correlation between rainfall and GDP, and between land degradation and the incidence of

poverty. Many scientists believe that climate change is going to make this situation even worse. Adaptation and mitigation are going to be central to the future development of the continent.

3. What possibilities of adaptation exist?

Biotechnology is one solution proposed by African scientists. With careful use, it can provide crops that give higher yields in dry and barren land and be a major contributor to food security. However, although there are an increasing number of examples of biotech crops in Africa, compared to Latin America and Asia the use of biotechnology is extremely low and South Africa is the only country in Africa to commercialize biotech crops so far.

One interesting example is NERICA rice, a recent initiative by the Bill and Melinda Gates Foundation to support the development of drought-resistant maize through the Kenya-based African Agricultural Technology Foundation. Research and application in climate related biotechnology in Africa represents a unique opportunity. Philanthropic organizations such as the Gates foundation are leading the way. Governments—especially those in the G8 countries—can do much more in this field and Japan, for example, has significant research and applied work on biotechnology agriculture (e.g., the Kihara Institute at Yokohama City University, and at Tsukuba University).

Clearly, food security is a priority issue for Africa, so instead of merely sending rice and other band-aid approaches, why not come up with a framework to invest in and transfer some of the interesting research in biotech to Africa to get a “climate- proofing green revolution” of sorts going there.

As Africa becomes an emerging player on the global market—with a population of more than 900 million, natural resources and growing political stability—it wants the rest of the world to take it seriously. Africa wants new partnerships with those that are willing to understand its own innovation systems and give it access to technology that it can adapt to its own local knowledge, values, and visions.

4. What mitigation possibilities exist?

Making adaptation and climate risk management a core developmental component with a particular focus on sustainable water resources, land, and forest management, integrated coastal development, increased agricultural productivity, health problems, and conflict and migration issues.

Taking advantage of mitigation opportunities through access to carbon finance against land use changes and avoided deforestation, promoting clean energy sources (e.g., hydropower) and energy efficiency, and adopting cost effective clean coal energy generation and reduced gas flaring.

5. Which actor (especially local) would be involved in adaptation and mitigation actions?

MAKING CLIMATE CHANGE A DEVELOPMENT PRIORITY

An analytical work must be carried out - focused on analyzing adaptation options through local institutions, and conducting vulnerability assessments.

All governance bodies should be implied in investing in research and advisory services to develop and disseminate adaptation options, and scaling-up investments that build resiliency.

6. Other important reflexions to consider.

ROLE OF HIGHER EDUCATION AND RESEARCH

Higher Education and research are key to solving problems caused by climate change. For years, the world has talked about primary education for Africa, but Africans are telling a different story. Frankly, they have the capability to provide primary education — it is higher education and research skills that they require to compete on international markets and the needs to connect universities with higher-band width, low-cost internet so that new intellectual leadership can grow for Africa and its burgeoning academia can share in the information economy and keep up-to-date on advanced knowledge.

The G8 countries can make a difference by investing in higher education. Interestingly this

sentiment is reflected through a G8 concept of “brain circulation”, where more researchers from the developing world need to be invited to come to G8 countries, and G8 researchers should go to Africa to make their knowledge relevant to today’s problems.

GENERAL COMMENTS AND ANALYSIS

The last part of this document consists of a questionnaire on the dynamics of global change at the local scale, close to the university. One more step to obtain useful information for the development of the master, and that is interesting for its territorial and socio-environmental context.

The responses seek a local context, and therefore, can show particular or endogenous dynamics. But many of the responses, as we can see, are similar and shared.

Thus, on the first question, *What are the main manifestations of environmental change ?*, the answers are diverse, but some are repeated. In particular, references to the water issue are important, in different ways, either from scarcity or from risks derived from floods. Also, secondly, pollution is equally from different perspectives, in the environment or in urban contexts. The impacts on traditional agriculture are mentioned, and derived from it, changes in the landscape and cultural practices.

The second question, *What present and future impacts and risks can be associated (both environmentally, economically and socially)?* It also shows a similar pattern. The question of water emerges from multiple perspectives, but also the impact on the landscape and agriculture. They are collected as aspects with great concern. Also urban aspects and social changes, aggravated by pollution. This aspect is also related to other impacts and risks, including health, but also economic development and sectors such as tourism, important in some territories of the participating states.

Next, when asking *What possibilities of adaptation exist?* Some of the responses show some skepticism. Even so, three types of dominant responses are consolidated. In the first

place, those that propose new models for agriculture, capable of adapting to change. Also the references derived from better planning and governance of the adaptation processes between the multiple actors and processes. And it also highlights the role of education, as a tool for change. To a lesser extent, proposals are provided in the infrastructure line to manage elements such as water or different risks.

The fourth question, *What mitigation possibilities exist ?*, also provides measures in three main sections. One referring to green areas in a broad sense, from agriculture to urban spaces. Another area related to rehabilitation and savings, in aspects such as water and energy. Also, and no less important, the different aspects related to education and social consciousness as engines of change.

Fifth, the question: *Which actor (especially local) would be involved in adaptation and mitigation actions ?*. For this question the answers have been very similar in all cases. They stand out above all public agents and actors, not only local, but also at the state level with different ministries for example. Social agents and actors also stand out in some cases, such as universities and non-governmental organizations, as well as civil society as a whole.

Lastly, an open section for other *reflections to consider*. In this block, two aspects stand out. On the one hand, the necessary promotion of networking between stakeholders, and on the other, and more prominently, the importance of education and awareness. Two key elements to achieve a social transformation necessary to adapt to the transformations that are coming, and the challenges that arise.

With all this information, the different profiles are completed to adapt the offer of the master's degree, in order to give a good response to the needs of the participating countries, their current realities, but above all their future horizons with many challenges of great importance for the social fabric and environment.