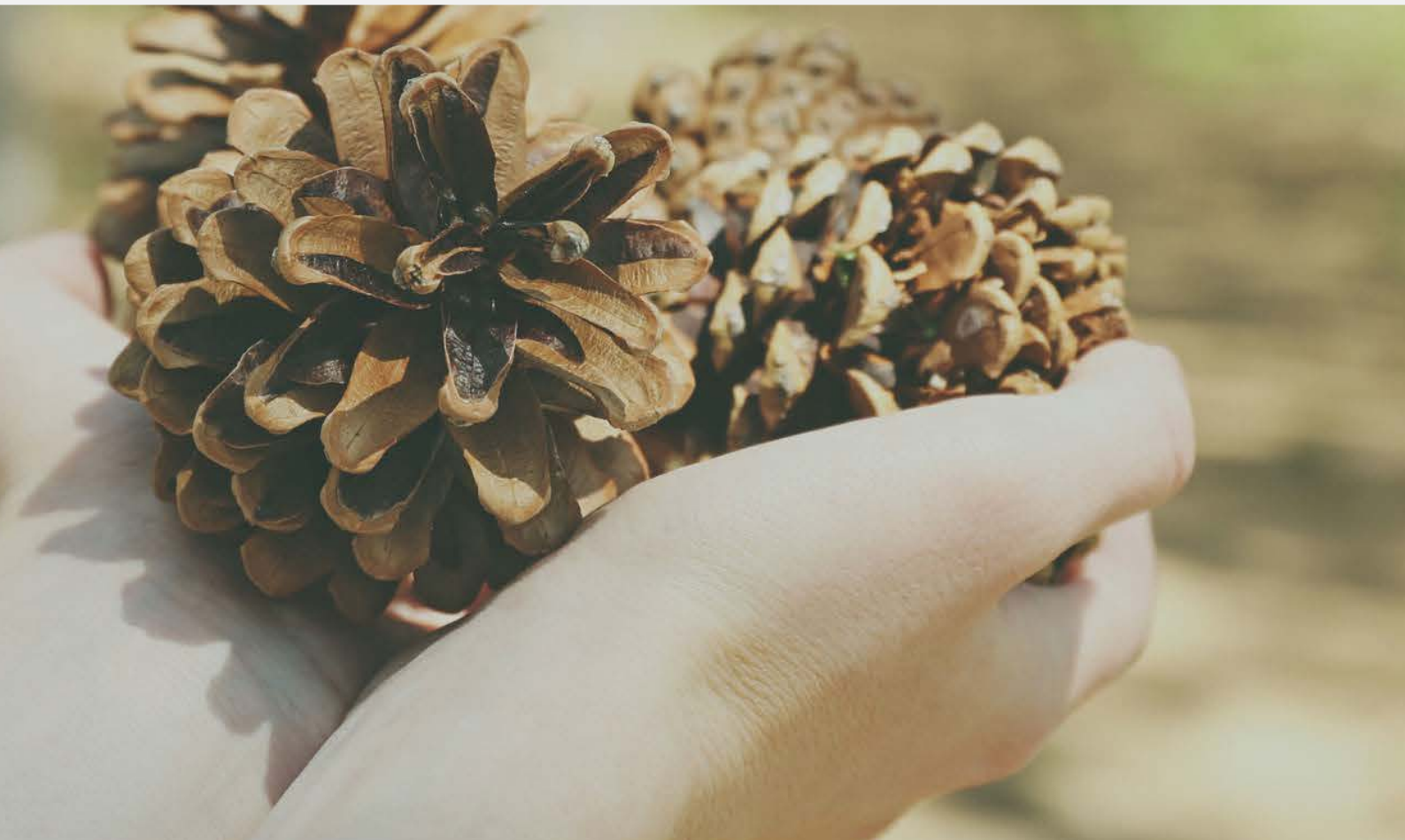


ECOSTAR
NATURAL TALENTS

TRAINING NEEDS ASSESSMENT
AMONG EU FOREST
AND ENVIRONMENTAL
UNIVERSITY DEPARTMENTS

**A study highlighting innovation and entrepreneurship
gaps in university education**



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ABSTRACT AND KEY-FINDINGS

The document reports the results of a training needs assessment (TNA) survey conducted in the field of entrepreneurship, markets and economics of ecosystems and biodiversity. It targets university students - undergraduates and graduates, including Ph.D. students- within European countries. The survey was conducted through an online questionnaire aiming to gain a better understanding of the level of entrepreneurship and innovation education within forestry and environmental university courses in Europe, in order to highlight existing skill gaps and emphasizing areas for future potential improvements. About 100 valid questionnaires were filled in by respondents with 23 different nationalities (European and non-European) currently enrolled in different BSc, MSc and PhD courses within 14 different academic institutions.

Main findings include:

- Most respondents are familiar with the concepts of “Ecosystem services” and “Green economy” although they might perceive and define them in different ways, according to their level of familiarity and specific field of study. Less familiarity is perceived with other concepts like payments for ecosystem services, innovation and entrepreneurship.
- About 80% of respondents are interested in entrepreneurship as a subject/topic for academic education. Awareness of entrepreneurship-related training offered by hosting universities (and even more by different ones), however, is low, and in most cases, limited to courses describing the state of the art for enterprises in the primary sector (e.g. trade in forest products or primary processing), rather than teaching students how to start and manage business activities.
- In general terms, satisfaction with the commitment of hosting universities in relation to entrepreneurship education is quite limited and it results even lower when scaling-down to training opportunities offered by hosting faculties/schools.
- According to the respondents, the 5 topics of key-importance within their field of study and future professional career consist of a combination of traditional technical topics within the domain of forest sciences -i.e. Forest Management Planning and Silviculture- and emerging/new topics, including Climate Change and Adaptation Tools/Policies, Good Governance of Natural Resources and Ecosystem Services Mapping and Assessment.
- Based on self-evaluation, respondents believe they are currently more skilled in the field of cultural services (e.g. forest recreation) and carbon sequestration rather than in water-related services and wild-products. At the same time, they perceive they have higher skill levels with regard to biophysical ecosystem service estimations and the identification of appropriate forest management solutions/operations aiming to improve the delivery of ecosystem services. On the other hand, skill-gaps emerged with regard to marketing, as well as specific and in depth technical/professional skills needed for the management of ecosystem services (e.g. carbon footprint, investment analysis for developing a business activity on wild-products, etc.).

- More than 60% of respondents declared they have already attended at least one course on ecosystem services. Courses mainly regard Management practices (i.e. forest management practices aiming to conserve and enhance ecosystem service delivery) GIS/Mapping tools and Economic assessment.
- Respondents, however, are interested in attending additional training both on the same issues (in particular Economic assessment of ecosystem services) -to gain further and more specific knowledge and professional skills- and on different ones (e.g. marketing and governance).
- Mixed training approaches and tools, for example combining short intensive courses with field visits/analysis of case studies and either the development of own case studies or an internship period, are the preferred option for additional training solutions.

ACRONYMS AND ABBREVIATIONS

BSc	Bachelor of Science
ECTS	European Credit Transfer System
EU	European Union
GIS	Geographical Information System
HEI	Higher Education Institution
MEEB	Market and Economics of Ecosystem and Biodiversity
MSc	Master of Science
NTFP	Non-Timber Forest Product
PES	Payment for Ecosystem Services
PhD	Doctor of Philosophy (i.e. doctorate)
TNA	Training Needs Assessment
WP	Work Package



1. INTRODUCTION

This document reports the results of a training needs assessment (TNA) conducted within the framework of the ECOSTAR Project, Work Package (WP) 3, Task 3.1. The assessment represents one of the first steps of the ECOSTAR project and tries to portray a picture of entrepreneurship and innovation education activities that are currently available in forestry and environmental university courses/institutions within the European Union (EU). It also tries to analyse what the training needs are with regard to entrepreneurship and innovation issues.

Based on Wright and Geroy (1992), within the framework of this report, TNA refers to a systematic process of collection, analysis and interpretation of data on individual, group and/or organizational skill gaps. The aim of this process is collecting and analyzing data that supports decision making about training and non-training opportunities to improve individuals' performances, define who should be trained, and exactly what content should be taught (Clarke, 2003; Gould *et al.*, 2004).

The TNA therefore aims at being a preliminary step towards the development of training opportunities for people wanting to gain appropriate knowledge and competences in the field of markets and economics of ecosystems and biodiversity (MEEB).

1.1 Objectives

The assessment was aimed at better understanding of the level of entrepreneurship and innovation education within forestry and environmental university courses and institutions in Europe, in order to highlight existing skill gaps and emphasizing areas for future potential improvements.

In particular, the survey was aimed at understanding:

- if and to what extent respondents are familiar with MEEB and MEEB-related issues,
- if and to what extent respondents are aware of existing training/supporting opportunities on entrepreneurship, business and innovation within their academic institutions,
- the level of present skills on MEEB - as perceived by respondents themselves - and existing knowledge- and skill-gaps, and
- the interest in attending additional training initiatives focused on MEEB.

While providing useful background information for project actions, as well as for daily activities by ECOSTAR academic and non-academic partners, the survey was intended to collect valuable information for the development of new training sessions to be delivered through the project.

1.2 Structure and contents of the report

The report consists of the following main sessions:

- *Session 1*, i.e. this session, introduces research background information and objectives. It also describes the structure and the main contents of the report.
- *Session 2* presents the methodological approach adopted for the aims of the research, highlighting the tools used during the survey.

- *Session 3* summarizes and discusses the main research findings, highlighting the most relevant results also by means of tables and charts.
- *Session 4* draws some conclusions based on findings presented within session 3.
- References session lists the main literature references mentioned within the text and that provide useful input for a better understanding of the research.
- Annexes provide additional materials, including the full questionnaire used for the survey.

2. METHODOLOGY

The TNA was performed through an online survey conducted in June 2016. Due to an overlap with examination sessions/period, and the consequent moderate response rate during the first weeks, the survey period was prolonged until July 15th 2016. The target audience of the survey comprised of university students - undergraduates and graduates, including Ph.D. students - in European countries. The survey was delivered in English via Google Forms, the questionnaire was structured into the following three parts:

1. Personal info and background
2. Cross-cutting skills and associated issues
3. Technical and specific skills

Part 1 was aimed at collecting personal information on respondents (nationality, age, gender etc.) and their current position as students. Moreover, it was intended to preliminarily assess respondents' familiarity with the topics addressed by the survey. This was done by asking respondents to self-assess and rank their familiarity with some key-topics and verified through a couple of concept-check questions.

Part 2 was aimed at investigating to what extent students are aware of entrepreneurship and business-oriented training courses and services offered by their Universities, as well as understanding their interest towards these training courses and services and if they had already attended any such course.

Part 3 was aimed at assessing how familiar respondents are with ecosystem services and entrepreneurship-related topics, what are the skills they perceive they have and those they would like to get or improve through additional training opportunities.

The questionnaire also included an opening session aimed at introducing the project and the survey to respondents, highlighting the aims, structure, expected duration and follow-up procedures of the survey.

A copy of the questionnaire used for the survey is available in Annex 1.

The questionnaire was circulated through different channels, in particular via:

- the stakeholder database created for the aims of ECOSTAR Project WP3, Task 3.1, with special focus on Higher Education Institutions (HEI),
- project partners, in order to circulate it among their institutions and other academic institutions at national and European level.

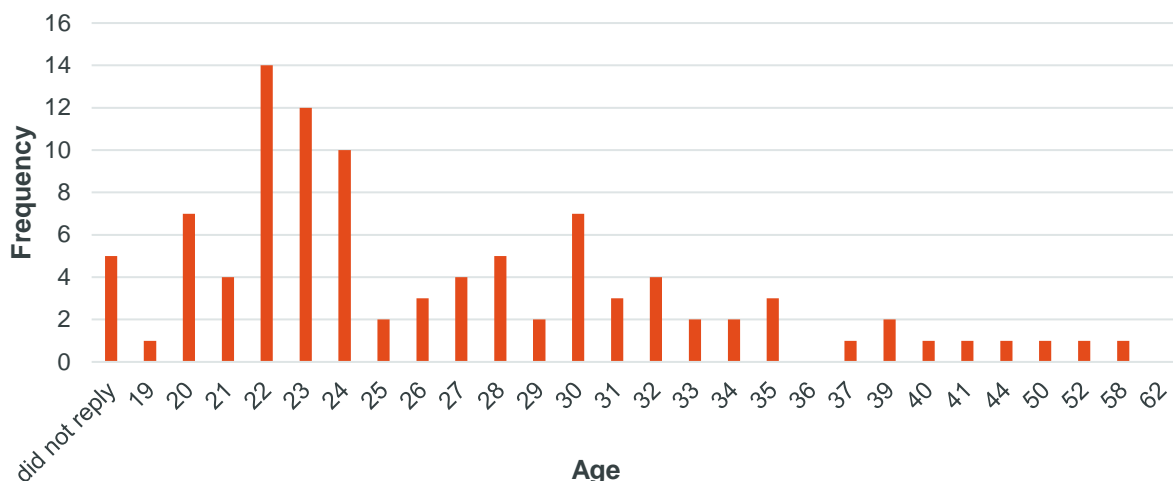
3. RESULTS AND DISCUSSION

A total number of 105 questionnaires were completely filled in by respondents. Among them, however, 6 respondents currently held a position that is not fully in line with survey requirements (professors, researchers and workers), therefore they were not taken into account. As a result, 99 questionnaires were considered: results from their analysis and elaborations are reported in the sub-chapters presented below.

3.1 Part A: personal information and background of respondents

Part A provides general information on respondents. Five respondents did not indicate their age, while age distribution of the remaining 94 is reported in Figure 3.1. More than 76% of respondents are 30 years old or younger, with 39% ageing between 22 and 24. The weighted arithmetic mean for age corresponds to 27.1 years.

Figure 3.1 - Age distribution of respondents



About 57% of respondents are male and the remaining 43% are female.

Respondents indicated 23 different nationalities from four different continents (Africa, America, Asia and Europe) (Figure 3.2). Europe dominates with some 87% of the total, 96% of which is represented by 9 EU countries. Spain, Romania and Italy are the three most represented countries in terms of nationality: altogether they cover about 77% of total respondents. Apart from these three nationalities, all remaining nationalities range between 1 and 2% of total. Non-EU nationalities include Bosnia Herzegovina, Moldova, Russia and Ukraine, while non-European nationalities include Bangladesh, Brazil, the People’s Republic of China (PRC), Ecuador, Indonesia, Liberia, Malaysia, Nigeria, Pakistan and the United States of America (USA).

As regards the current academic status/position held by respondents, a good balance among undergraduate degree (i.e. Bachelor -BSc- or equivalent) (34%), Master of Science -MSc- (35%) and Doctorate -PhD- (30%) students can be observed. In addition, 1 post-doc position was also reported (Figure 3.3).

Most respondents belong to the field of forestry and environmental sciences, covering a wide range of specific disciplines (policy, ecology, environmental economics, forest management and silviculture, etc.), nonetheless, different fields of research/study are represented as well (though marginally, i.e. less than 6% of total respondents), including economics and business studies, social anthropology, politics, and teaching and education.

Figure 3.2 - Nationalities of survey respondents (percentage of total) (n =99)

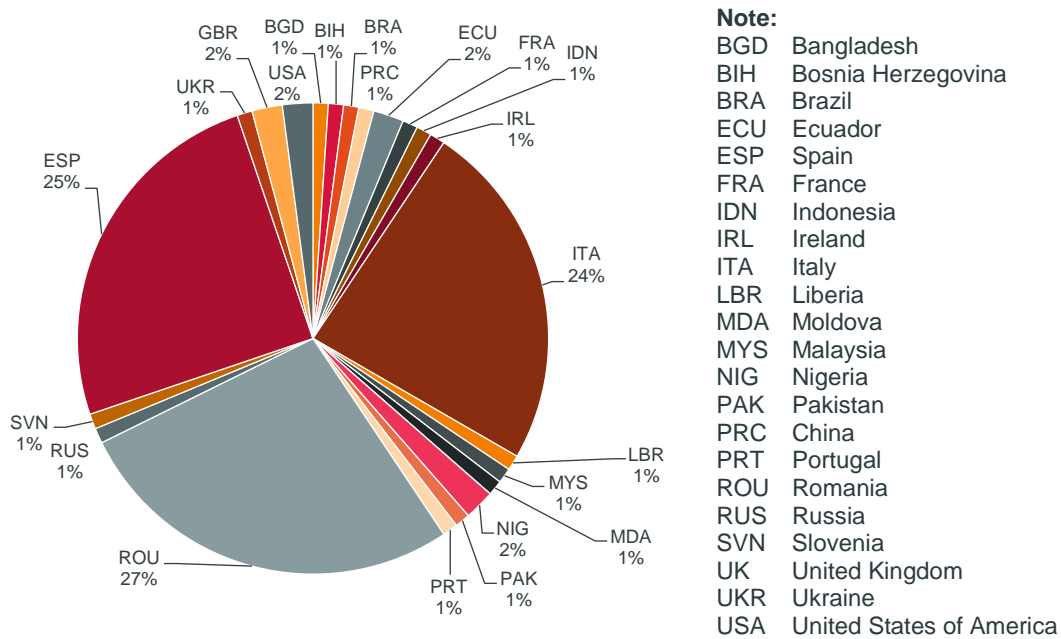
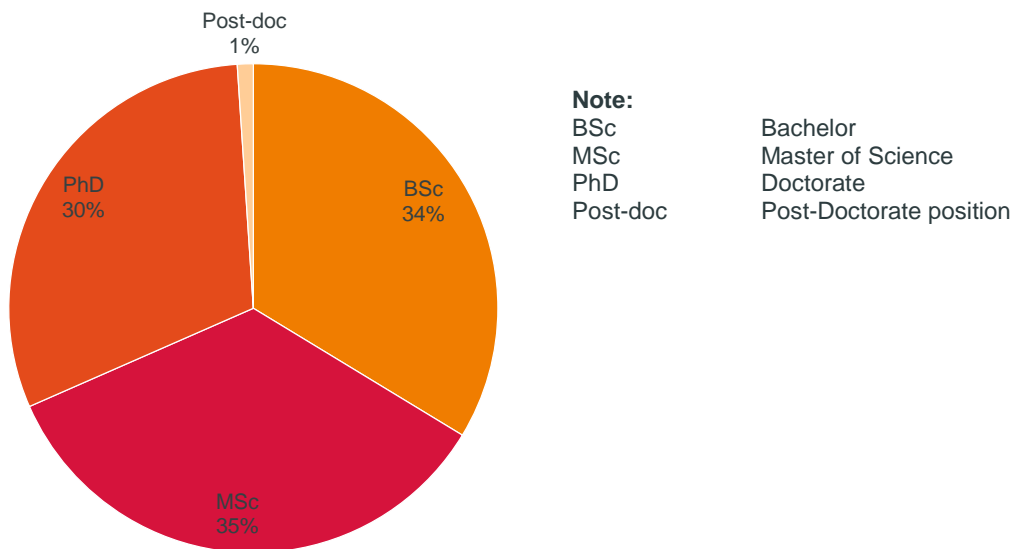


Figure 3.3 - Current position of survey respondents (percentage of total) (n =99)



Respondents represent a total number of 14 institutions (i.e. universities), from eight different European countries and one non-European country (Ecuador). A list of the represented institutions is reported in Table 3.1 below.

Table 3.1 - Institutions to which respondents belong

#	Institution name	Department/Faculty/School	Course(s)	Country	N.
1	Dresden Technical University	Institute of International Forestry and Forest Products	MSc	Germany	2
2	International University of La Rioja	Department of Education sciences (CV in environmental education)	MSc	Spain	1
3	Polytechnic University of Madrid	School of Forestry Engineering	BSc, MSc, PhD	Spain	22
4	Private Technical University of Loja	Faculty of Environmental Engineering	BSc	Ecuador	1
5	Transilvania University of Brasov	Faculty of Silviculture and Forest Engineering	BSc, MSc, PhD	Romania	23
6	Sapienza University of Rome	Landscape and Environment PhD School (Department of Architecture and design)	PhD	Italy	3
7	Tuscia University (Viterbo)	Department for Innovation in Biological, Agrofood and Forest systems	PhD	Italy	4
8	University of Geneva	Institute for Environmental Sciences	PhD	Switzerland	1
9	University of Ljubljana	Biotechnical Faculty	PhD	Slovenia	1
10	University of Manchester	Departments of Environmental and Resource Economics and Politics and International Relations	BSc, MSc, PhD	United Kingdom	12
11	University of Molise	Department of Forest Ecology and Environmental Technology	PhD, Post-graduation	Italy	4
12	University of Padova	Department of Land, Environment, Agriculture and Forestry	BSc, MSc, PhD	Italy	14
13	University of Sarajevo	Faculty of Forestry	PhD	Bosnia and Herzegovina	1
14	University of Turin	Forestry and Environmental Sciences	BSc	Italy	1

When requested to indicate their familiarity with some key-topics to be addressed by the ECOSTAR project, respondents show different profiles (Figure 3.4). About one third of respondents declared they are very familiar (5) with the concept of ecosystem services and nearly 60% stated they are familiar (4) or very familiar (5). This is the only key-topic where the “very familiar” statement prevails on the other statements. In addition to this, the percentage incidence of respondents indicating they are “very familiar” with the concept of ecosystem services is two times higher than the percentage of people declaring they are very familiar with each of the other topics taken into account by the survey. These figures probably reflect the large visibility gained by ecosystem services in recent years. On the other hand, only 13% of respondents believe they are not familiar at all (1) or poorly familiar (2) with this concept: this is the lower percentage value observed among the 6 investigated key-topics. Not surprisingly, about 40% of respondents who declared they have limited or no familiarity with ecosystem services correspond to undergraduate students attending courses in politics, business and economics, and teaching and education, however, the remaining 60% corresponds to undergraduate or Master students, and some PhD candidates attending courses in forestry, natural resource management and ecology.

The “payments for ecosystem services” concept is lesser known than “ecosystem services”: about 37% of respondents declared they are familiar (4) or very familiar (5) with it. They tend to coincide with MSc students and PhD candidates in forestry, environmental sciences and environmental economics.

Familiarity with “green economy” has a similar profile as “ecosystem services” however, quite familiar (3) and familiar (4) conditions prevail, corresponding to 62% of total respondents. This issue seems to be a cross-cutting topic, since this 62% include respondents attending different courses in different institutions. The remaining proportion is more or less equally distributed among respondents declaring they are not familiar at all (1) or poorly familiar (2) with this concept (altogether accounting for 15%) and respondents stating they are very familiar (17%).

“Entrepreneurship” and “marketing” are the two topics with which respondents declared they are less familiar: about one third of people filling in the questionnaire reported they are not familiar at all (1) or poorly familiar (2) with these concepts. Forestry and environmental science students -with no significant differences among undergraduate, MSc and PhD candidates or among countries- are those who reported lower familiarity conditions.

As regards “innovation”, the profile is similar to the one observed for the “green economy”, but the total incidence of respondents declaring they are not familiar at all (1) or poorly familiar (2) with this concept is higher (20%). Similarly, to “entrepreneurship” and “marketing”, innovation is apparently less present within the domain of forestry and environmental science students, while students operating in different fields (e.g. economics and business studies, politics etc.) seem to show higher familiarity with these concepts.

Although exceptions can be observed, in general terms PhD candidates in forestry and environmental sciences tend to indicate higher (i.e. 4 to 5) familiarity with all these topics, including entrepreneurship, innovation and marketing, while undergraduate and (to a lower extent) MSc students normally declare a low to medium familiarity with the surveyed concepts.

Figure 3.4 - Familiarity of respondents with key-topics to be addressed by ECOSTAR Project (Likert scale: 1= not familiar at all; 5 = very familiar)



In order to double-check respondents' stated familiarity with some concepts, they were asked to indicate the definitions for "ecosystem services" (Figure 3.5) and "innovation" (Figure 3.6). As regards the former, about 43% chose a definition that basically corresponds to the well-known one provided by the Millennium Ecosystem Assessment (MEA, 2005), according to which ecosystem services consist of the "*multiple benefits provided by ecosystems to humans*" (option B). This seems to (partly) confirm the high familiarity with the ecosystem service concept declared by respondents. However, about 24% of respondents believe ecosystem services consist of benefits provided by ecosystems to other (natural or artificial) ecosystems,

and another 20% consider ecosystem services as benefits that mankind and ecosystems mutually provide to each other. Finally, the remaining 10% define ecosystem services as benefits provided by mankind to natural ecosystems: this option has mostly been chosen by the same people who declared no or limited familiarity with the ecosystem service concept, in particular undergraduate students attending courses in politics, business and economics, and teaching and education. In summary, it can be noticed that results more or less confirm familiarity levels declared by respondents. Although only 43% indicated the MEA definition (compared to 60% who previously stated they are familiar (4) or very familiar (5) with the ecosystem service concept), it should be noticeable that discussions and debates on the most appropriate definition exist also within the scientific, academic and policy arenas. Whereas, ecologists have generally advocated biocentric perspectives based on intrinsic ecological values (this partly reflects on option D), economists adopt anthropocentric perspectives that focus on instrumental values and are based on utilitarian principles (Muradian *et al.*, 2010).

When considering the definition for innovation, different positions emerge. About 22% of respondents chose the definition provided by OECD in 2005 within the so-called Oslo Manual (option C). Forestry and environmental science students mostly chose this option. About 28% preferred to focus on new or improved products (goods or services) or processes (option A) and another 30% considered innovation as directly linked to new technology aiming to solve specific needs within the business sector (option B). Preference to option B was mostly expressed by students in politics, environmental economics, and business and economics. Finally, 17% of respondents associated innovation to the research on and development of patentable new solutions.

Figure 3.5: Definition of “ecosystem services” according to respondents (n =99)

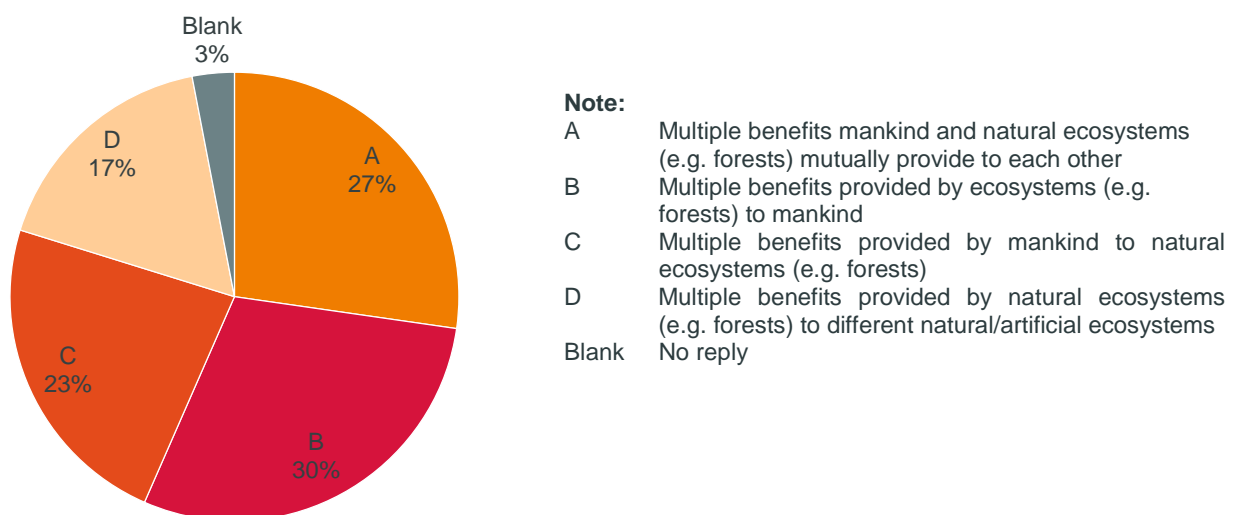
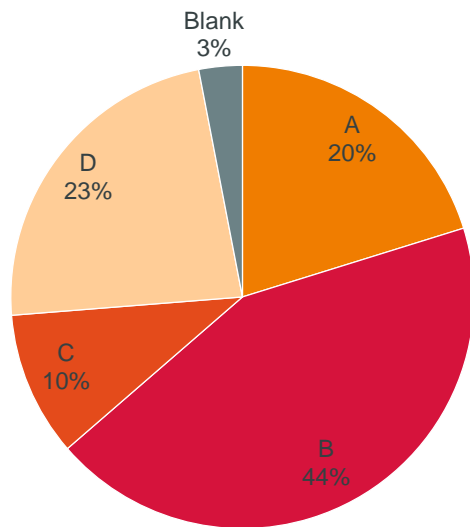


Figure 3.6 - Definition of “innovation” according to respondents (n =99)



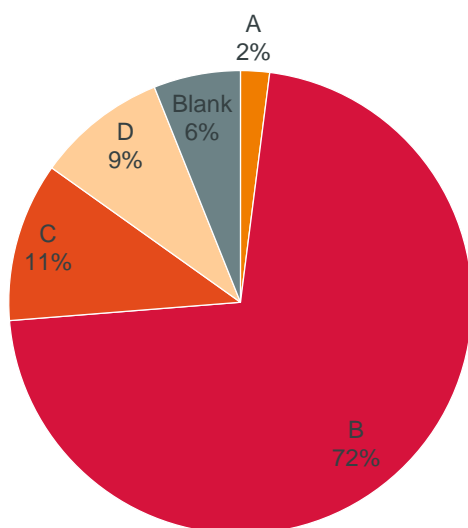
Note:

- A The development and implementation of new or improved products (goods or services) or processes in the for-profit or not-for-profit sectors
- B The identification, development and implementation of new or improved technologies to address specific problems and needs of business (i.e. for-profit) activities
- C The implementation of a new or improved product (good or service) or process, a marketing method, an organizational method in business practices, workplace organization or external relations
- D The research on and development of patentable new solutions in terms of products, service and processes
- Blank No reply

3.2 Part B: crosscutting skills and associated issues

Respondents largely perceive the term entrepreneurship as the activity of “*converting an innovative idea into a profitable business model*” (Option B, 72%) (Figure 3.7). About 20% of respondents associate this term to either the creation (Option C, 11%) or the successful management (Option D, 9%) of organizations. The incidence of those who believe entrepreneurship is associated with being risky in business is marginal (Option A, 2%) and lower than the incidence of those who did not select an option among the four available ones.

Figure 3.7 - Definition of “entrepreneurship” according to respondents (n =99)



Note:

- A Being risky in business
- B Converting an innovative idea into a profitable business model
- C Creation of new organizations
- D Successful management of a for profit organization
- Blank No reply

With reference to the importance of selected key-factors in characterising the concept of an entrepreneur (Figure 3.8), most respondents agreed to indicating that these factors -i.e. risk taking, innovation, investment, sustainability and profit-making- are relevant. All the factors, but sustainability, were indicated as relevant (4) or very relevant (5) by more than 60% of respondents, with innovation (72%) and risk taking (68%) being the most preferred ones. Less than 50% of respondents believe sustainability is a key factors characterising the concept of entrepreneur. Moreover, all respondents recognised at least some importance in investment: this was the only factors showing zero preferences for “very little” option.

In short, respondents seem to consider the entrepreneur as a player linked to innovation -thus confirming preferences expressed for option B in Figure 3.7- taking risks and depending on investments to make profit, but not necessarily committed to sustainability.

Figure 3.8 - Factors characterizing the concept of entrepreneur (Likert scale: 1 = very little; 5 = very much)



Respondents seem to be interested in entrepreneurship as a subject/topic to be addressed during their academic education. About 80% of them, indeed, consider that entrepreneurship could be a useful field of study within their university curriculum, while only 3% clearly express the opposite opinion, and 13% do not have a specific position regarding this issue (Figure 3.9). However, interest towards entrepreneurship does not go together with appropriate awareness of training opportunities on this topic offered by hosting university institutions: only 27% of respondents declared they are aware of specific courses made available by their university and quite surprisingly all of them are students either in forestry or environmental sciences and only one respondent is enrolled in business studies (Figure 3.10).

Figure 3.9 - Do you think “entrepreneurship” could be a useful field of study within your university curriculum? (n =99)

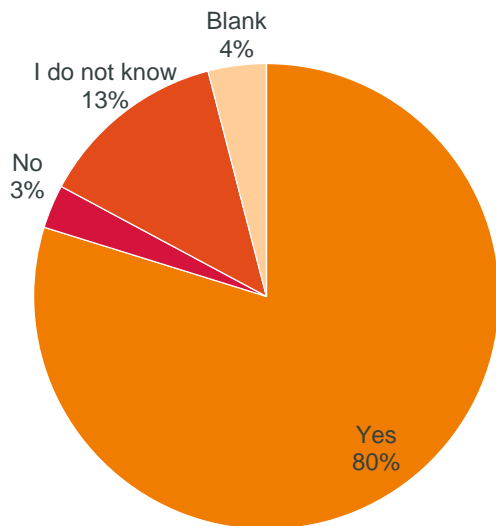
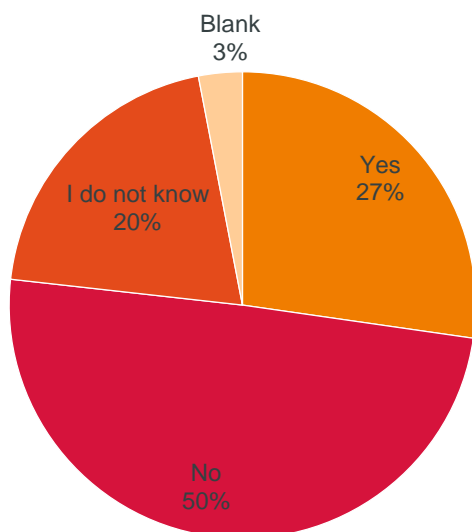


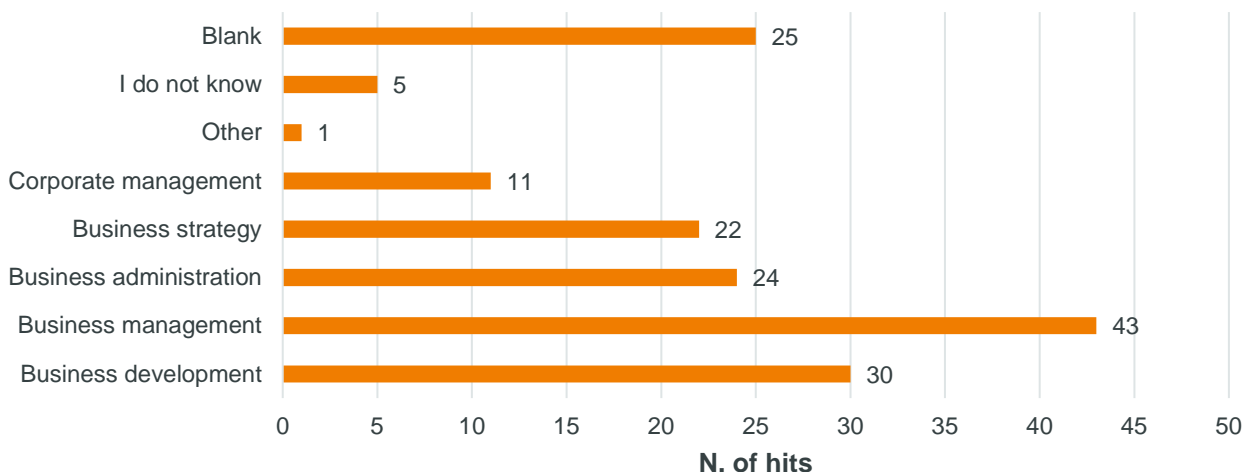
Figure 3.10 - Awareness of specific entrepreneurship education training courses offered by the hosting university (n =99)



When requested to indicate the name of the courses, respondents reported a broad range of different names, with only a few being really specifically focused on entrepreneurship: “Business Management”

(University of Brasov), the MSc in “Innovation Management and Entrepreneurship” (University of Manchester) and the Master in Business Administration offered by the Polytechnic University of Madrid. In some cases, reference was made to specific, but one-shot events, rather than systematic training courses, such as for example the Bio-Entrepreneurship Crash Course organised by Tuscia University (Viterbo) within the framework of BIOINNO Project¹. All other courses mentioned by respondents, partly linked to entrepreneurship, (e.g. Management and Entrepreneurship in Forestry at the University of Brasov), just focused on trade/commercial issues (e.g. Trade in Forestry Products) or are not clearly linked to entrepreneurship (e.g. Silviculture and Forest Management). These courses are found also in replies to question A10 of the questionnaire (see Figure 3.14 below), focused on specific training offered by the School/Faculty where respondents are enrolled. In a few cases, reference was made to initiatives that do not qualify as training courses *sensu stricto*, although they might include training on entrepreneurship: this was the case of Actua UPM, an initiative promoted by the Polytechnic University of Madrid to encourage and support the development of start-ups and business ideas that are then assessed, selected and awarded. With reference to awareness of some specific entrepreneurship-related courses being organised by their universities (a list of relevant courses was provided), 70% of respondents mentioned at least one course and 48% of these mentioned two or more courses. The most quoted courses include Business Management (43 hits) and Business Development (30), while the least quoted was Corporate Management (11 hits) (Figure 3.11). None of the respondents selected courses on Leadership and Management of Human Resources.

Figure 3.11 - Awareness of selected entrepreneurship education training courses offered by the hosting universities (multiple choices allowed)

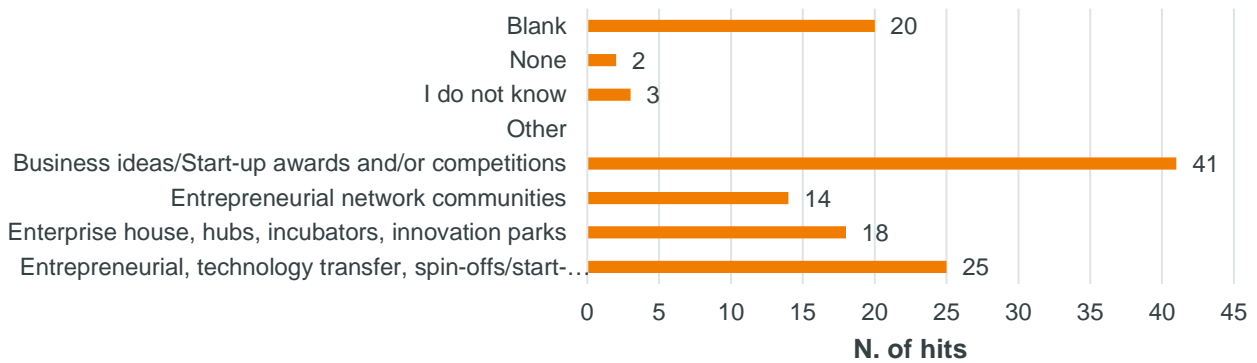


As regards entrepreneurship-related support services offered by hosting universities, the most common and known ones consist of competitions and awards for new business ideas and start-ups promoted by students or by mixed teams made-up of students and university staff (41 hits) (Figure 3.12). Examples include -among others- initiatives like Actua UPM, at the Polytechnic University of Madrid, and Start-Cup, at University of Padova. Support

¹ See: <http://www.bioinno.eu/education-training/bioinno-tuscia-crash-course>

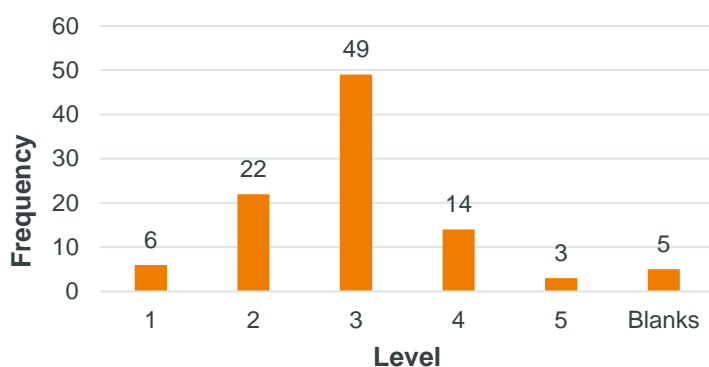
to the creation of start-ups and spin-offs (25 hits), as well as business hubs, incubators and innovation parks (18 hits), and entrepreneurial network communities (14 hits), are less frequently reported by respondents.

Figure 3.12 - Awareness of entrepreneurship-related support services offered by the hosting university (multiple choices allowed)



All in all, respondents evaluated their university commitment to entrepreneurship education as of average quality: about 50% of them expressed a value equal to 3 on a likert scale ranging from 1 to 5. The incidence of those who reported a negative or very negative opinion, however, is higher than the incidence of those who reported a positive or very positive one (28% vs. 17%). Respondents belonging to different institutions and countries, in any case, have expressed both positive and negative opinions, and no clear correlation emerges between the level of satisfaction/dissatisfaction and the institution/country (Figure 3.13). In general terms, while a large interest in entrepreneurship and related topics is declared by respondents, they show limited familiarity with specific training opportunities offered by hosting universities. Whether this depends more on a limited awareness of respondents, or on a poor offer by the hosting institutions, it is hard to say, however, if this reflects the attribution of a medium-low value of entrepreneurship education services offered by universities. Finally, this suggests there is room to improve both the presence and quality of specific training activities and their visibility, operating on people's awareness through specific information and communication activities.

Figure 3.13 - Overall evaluation of host university commitment in relation to entrepreneurship education (Likert scale: 1 = very bad; 5 = very good)



The level of awareness of any specific entrepreneurship education training course offered within the faculty/school where students are enrolled is very low: only 12 respondents, i.e. about 12% of the total, declared they are aware of such courses (Figure 3.14). Most of them (60%) are MSc students at the University of Brasov. When requested to indicate the names of these courses just 9 respondents out of 12 provided additional information, listing courses like Forest Entrepreneurship (University of Brasov and University of Ljubljana), Entrepreneurship (Polytechnic University of Madrid), Trade in Forestry Products (University of Brasov), Professional Skills and Competences (University of Padova), and in one case even Forest Management (University of Brasov).

Curiously, however, when requested if courses on topics like for example Business development, corporate management etc. are offered within the School/Faculty where respondents are enrolled, they reported a large number of hits (Figure 3.15). It is not clear if this is the result of questions being misunderstood or at least not completely understood by respondents, or if they believe these courses do not qualify as entrepreneurship education training courses. When courses offered by Faculties and Schools are assessed in depth, the total incidence of “I do not know” and blank responses is higher in this case than in the case of Figure 3.12, suggesting that there might be a lower awareness of -and perhaps interest in- specific courses offered by the hosting Faculty/School than in courses offered by other faculties/schools within the same university. The incidence of negative replies (“None of the courses”) is also quite relevant. Business management remains the most indicated course and hits on a Business strategy course more or less coincide with those reported in Figure 3.12. Hits on Business development, Business administration and Corporate management are lower than those observed for Figure 3.12: this is consistent and seems to suggest that a sub-part of courses offered by host universities are offered by faculties/schools where interviewed students are enrolled. Finally, “Management of human resources” and “Leadership” courses were also identified. As regards information on names of courses, they were provided just in three cases and coincide with information already indicated with regards to courses offered by host universities (i.e. Forest entrepreneurship and Bio-Entrepreneurship).

Figure 3.14 - Awareness of specific entrepreneurship education training courses offered by the host faculty/school (n =99)

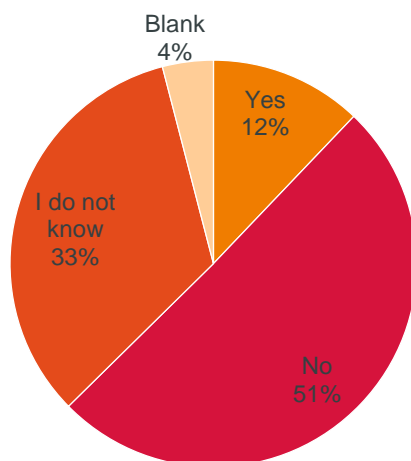
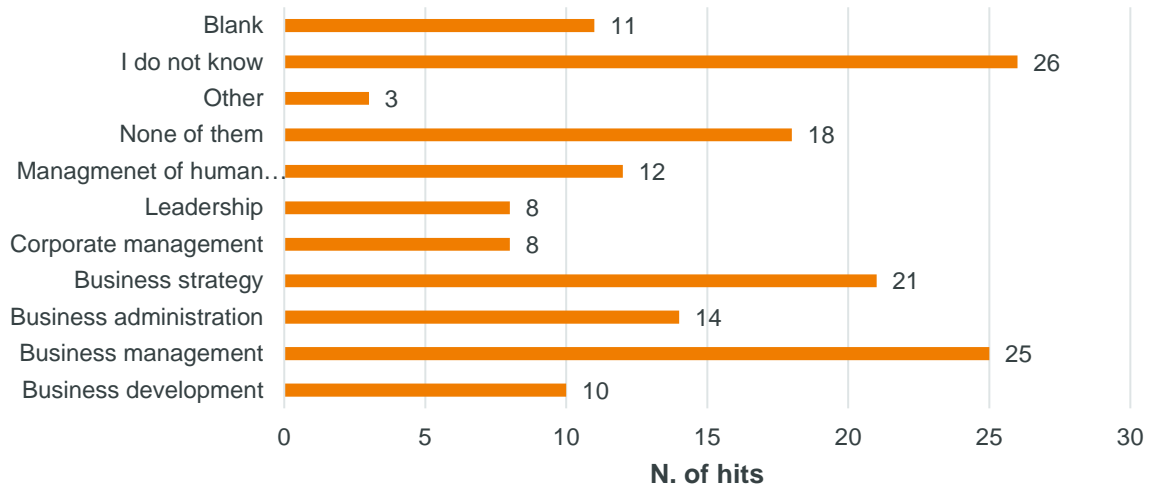
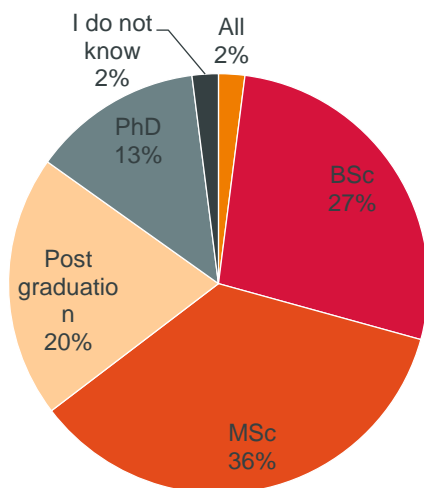


Figure 3.15 - Awareness of selected entrepreneurship education training courses offered by the host faculty/school (multiple choices allowed)



Courses identified and assessed before (Figure 3.15), are mainly offered to BSc and MSc students while Post-graduation students and PhD candidates account for lower percentages (Figure 3.16). These figures might suggest that in many cases courses are not advanced and very specific as they remain within the general framework of academic teaching for undergraduate or MSc students. Only 2% of the courses are offered to all kind of students.

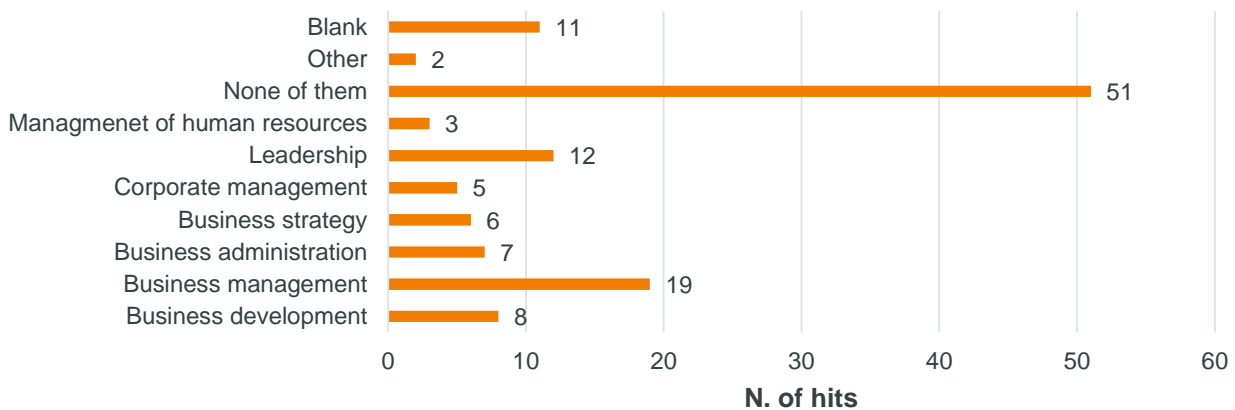
Figure 3.16 - Students who can potentially attend selected entrepreneurship education training courses offered by the host faculty/school (multiple choices allowed)



Courses are more often optional/elective -i.e. it is up to students to decide whether they want to attend the courses or not- (56% of total), rather than compulsory (44%). The prevalence of optional courses might contribute both to limited attendance rates by respondents (51% declared they never attended such courses another 11% left the question blank) and to low general awareness about their existence. Among the existing

courses, Business management (19 hits) and Leadership (12) are the most attended (Figure 3.17). It is important to notice that those who attended these courses normally attend two or more (up to 4) of them (64% of total attendants) rather than only one.

Figure 3.17 - Number of respondents who attended one or more selected entrepreneurship education training courses offered by the hosting faculty/school (multiple choices allowed)



When focussing on respondents who declared they attended entrepreneurship education training courses offered by their faculty/school:

- 75% of them reported that the courses include the development of a business plan/idea, however no additional information were provided on this issue;
- 50% reported seminars by academic and non-academic lecturers as the most common activity within the courses, followed by the development of case studies (41%), group work (30%) and field visits, and analysis of existing case studies (28%);
- They highlighted that courses normally lasted between 20 and 40 hours, thus corresponding to an educational effort in terms of class hours ranging between 2 and 4 European credit transfer system (ECTS) credits;
- They believed that the entrepreneurship education training courses attended mostly cover skills regarding leadership and management (31 hits, corresponding to 42% of total responses) followed by planning and development (14 hits, i.e. 19% of total responses), and financial skills (14 hits, i.e. 18% of total responses) (Figure 3.18).

The overall evaluation of the commitment of the hosting faculty/school in relation to entrepreneurship education is prevalently medium to low (Figure 3.19). About 40% of total respondents, expressed an evaluation equal to 1 (i.e. very bad) or 2 (i.e. bad), and only 19% indicated a positive (4) or very positive (5) evaluation. Finally, about one-third of total respondents gave a medium evaluation (3)². However, figures are different when only respondents who declared they attended entrepreneurship-related courses offered at their faculty/school resulted in: no one

² 10 blank replies were given as well

reported a very-bad (1) evaluation, and similar incidence is observed for both of bad (37%) and positive to very positive evaluations (34%), with the remaining 29% indicating a medium evaluation.

Figure 3.18 - Skills covered by entrepreneurship education training courses attended by respondents (multiple choices allowed)

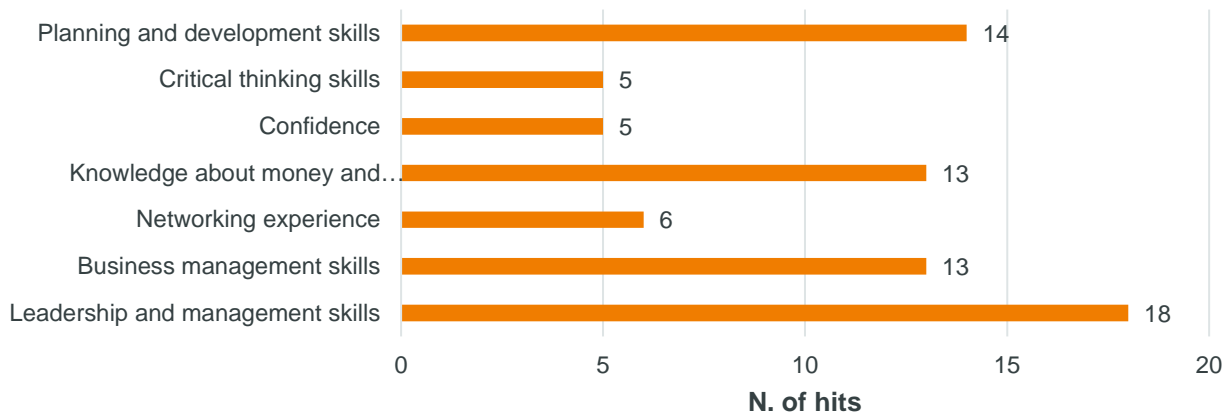
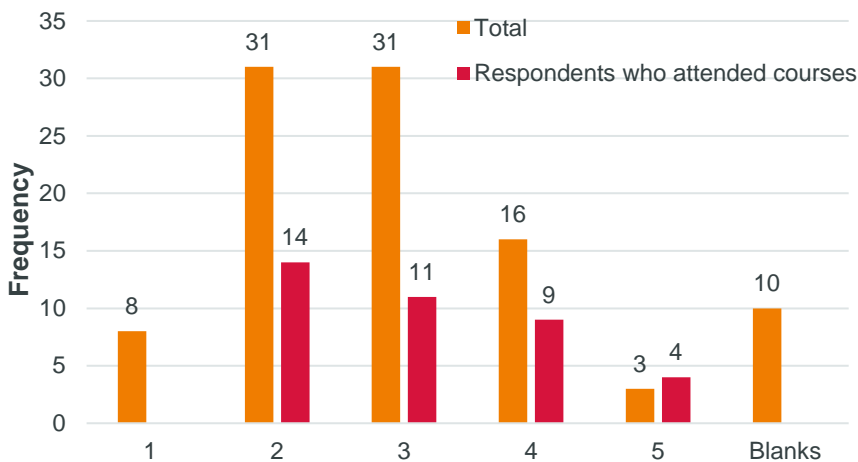


Figure 3.19 - Overall evaluation of the host faculty/school commitment in relation to entrepreneurship education (Likert scale: 1 = very bad; 5 = very good) (n=99)



3.3 Part C: Technical and specific skills

When requested to indicate the 5 topics they believe to be of key-importance within their field of study and for their future professional career, respondents identified a combination of traditional and technical topics within the domain of forest sciences -i.e. Forest Management Planning, and Silviculture and Forest Management Operations- and emerging/new topics, including Climate Change and Adaptation Tools/Policies, Good Governance of Natural Resources and Ecosystem Services Mapping/Assessment (Figure 3.20).

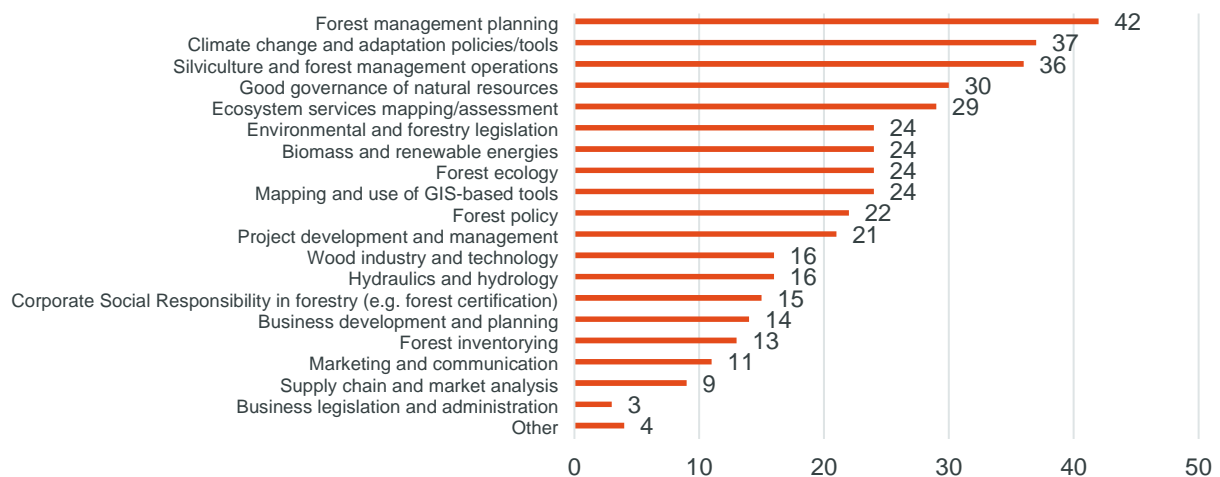
Besides the top-5 topics, a large set of relevant issues can be identified. It consists of two sub-sets:

- A first sub-set includes topics scoring at least 24 (i.e. Environmental and forestry legislation, Biomass and renewable energies, Forest ecology, and Mapping and use of Geographical information systems (GIS)-based tools), and
- A second sub-set consisting of topics scoring between 20 and 21 (i.e. Forest policy and Project development and management).

Once again topics selected by respondents include both traditional (e.g. Legislation) and more recently emerged issues (e.g. Biomass and renewable energies), as well as sectoral (e.g. Forest ecology) and intersectoral ones (e.g. Project development and management).

Respondents have selected additional topics that, although showing a lower number of preferences, cannot be completely ignored. As for previous sets of topics, the selection consists of both traditional forestry or forestry-related issues, such as Wood industry, Forest hydraulics and hydrology, and Forest inventory, and relatively new topics, such as, for example, Corporate Social Responsibility applied to the forestry sector. The incidence of topics more linked to entrepreneurship issues is limited: Business development and planning, Marketing and communication, Supply chain and market analysis and Business legislation and administration remain lower in rank.

Figure 3.20 - 5 key-topics in the field of study and future professional career (up to 5 choices allowed)

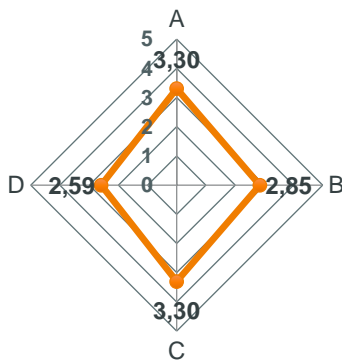


Respondents were then requested to perform a self-assessment of their skill levels with regard to professional activities linked to different forest-based ecosystem services (i.e. carbon sequestration, cultural services -with special emphasis on recreation-, non-timber forest products (NTFPs) (or wild products), and water-related services). Skill levels range between 1 (i.e. very low) and 5 (very high). In order to summarise results, weighted average values are reported in Figure 3.21. Spider-charts reported from Figure 3.21.1 to Figure 3.21.4 show a similar trend independently from the type of ecosystem service taken into account. Respondents declared higher skill levels with regard to (A) ecosystem service estimations and (C) the identification of appropriate

forest management solutions/operations aiming at improving the delivery of the ecosystem services being considered. On the other hand, the lowest skill levels were always declared with reference to (D) marketing and promotion skills, as well as (B) technical/professional skill specifically related to ecosystem services (e.g. assessment of the carbon footprint or estimating investments needed for developing a NTFP business activity).

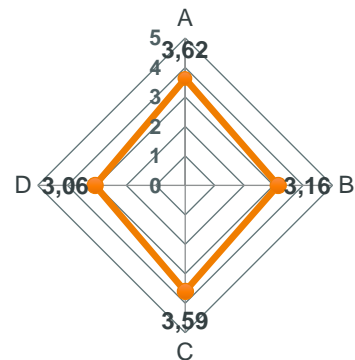
Figure 3.21 - Declared skill levels regarding professional activities with reference to different ecosystem services (weighted average values) (1= very low; 5 = very high)

1. Carbon



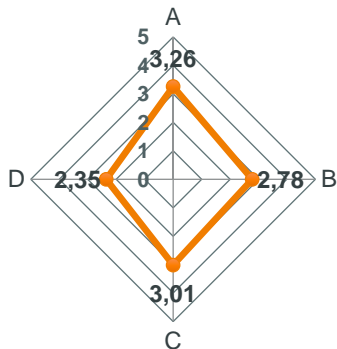
- Can you...
- A. estimate the amount of carbon sequestered by a forest?
 - B. assess the carbon-footprint of a certain activity/product?
 - C. identify appropriate forest management operations to improve carbon sequestration potential?
 - D. select the most appropriate channels for marketing and promoting carbon credits?

2. Cultural services/Recreation



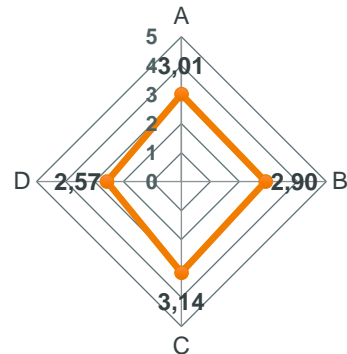
- Can you...
- A. estimate cultural/recreation potentialities of a forest/area?
 - B. facilitate networking of key-actors for developing cultural/recreation services?
 - C. identify appropriate forest management operations to improve cultural/recreation services?
 - D. select the most appropriate targets for marketing cultural/recreation services?

3. Non-timber forest products (wild products)



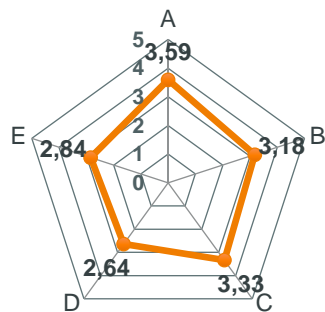
- Can you...
- A. estimate potential non-timber forest product (NTFP) production by a forest/area?
 - B. estimate investments needed for developing a NTFP business activity?
 - C. identify appropriate forest management operations to improve NTFP production?
 - D. select the most appropriate channels for marketing and promoting NTFP?

4. Water-related services



- Can you...
- A. estimate potential delivery of water-related services by a forest (e.g. water purification, water infiltration...)?
 - B. facilitate networking of key-actors for developing water-related services?
 - C. identify appropriate forest management operations to improve water-related services?
 - D. select the most appropriate mechanisms for marketing and promoting water services?

5. Various



Can you...

- A. identify potential bundles of ecosystem services delivered by a forest?
- B. assess potential trade-offs within ecosystem services delivered by a forest?
- C. assess alternative forest management scenarios in terms of ecosystem service delivery?
- D. develop marketing strategies for trading ecosystem services from a forest?
- E. develop/manage an accounting system for ecosystem services from a forest?

Based on values they have declared, respondents seem to perceive they are more skilled in cultural services (total average skill level 3.36, with a 3.62 peak for the estimation of cultural/recreation potentialities of a forest/area) and carbon (3), rather than in water-related services (2.91) and NTFPs (2.85).

When considering various cross-cutting issues, not specifically linked to a specific type of ecosystem service (Figure 3.21.5) the average skill level declared by respondents is 3.12, while the lower skill levels are those related to (D) the development of marketing strategies for trading ecosystem services, and (E) the development/management of accounting systems for ecosystem services delivered by a certain area (e.g. a forest). Similarly, to what is observed for single ecosystem service types (Figure 3.21.1 to 3.21.4), higher skill levels are reported with reference to technical skills including the identification of potential bundles of ecosystem services delivered by a forest (3.59), the assessment of potential trade-offs within ecosystem services delivered by a forest (3.18) and the assessment of alternative forest management scenarios in terms of ecosystem service delivery (3.33).

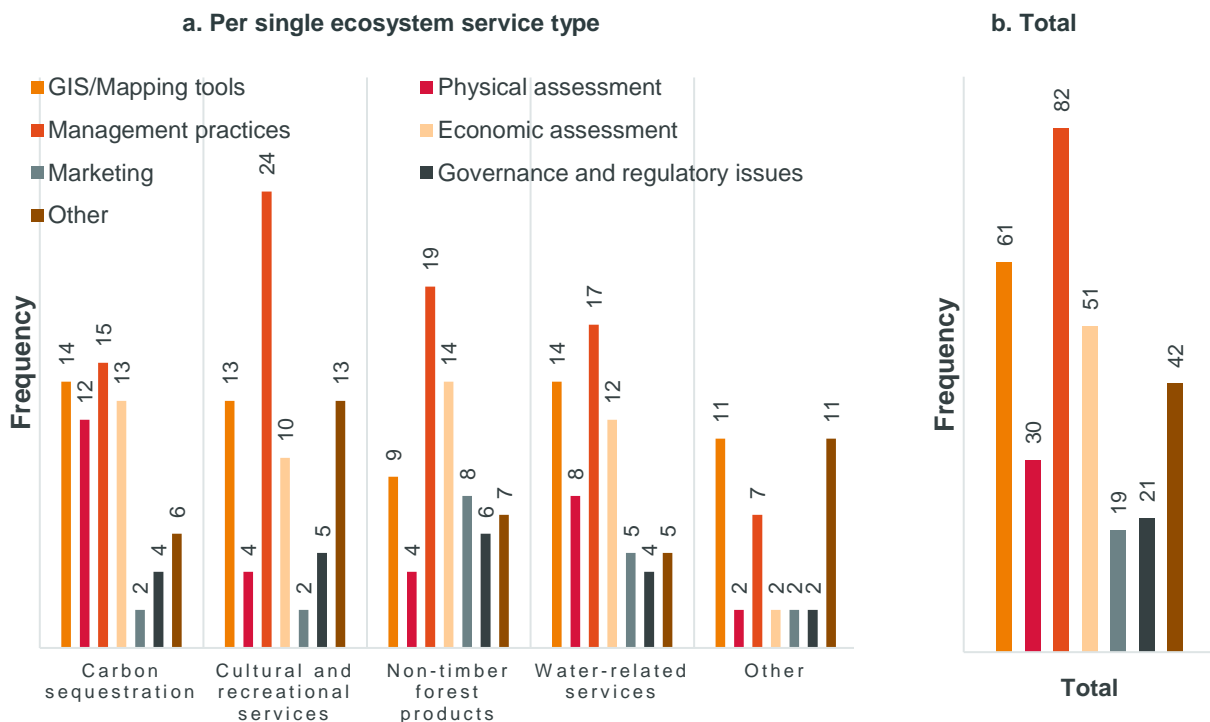
More than 60% of respondents declared they have already attended at least one course on ecosystem services. As can be observed from Figure 3.22.b, three course-topics prevail in all cases: Management practices (i.e. forest management practices and operations aiming to conserve and enhance ecosystem service delivery) (82 total hits), GIS/Mapping tools (61) and Economic assessment (51). Marketing, as well as Governance and regulatory issues, are the less selected course-topics in all cases. The distribution among different ecosystem service types is more or less uniform, with a slight prevalence of Water-related services (32 total hits) and a lower relevance of Cultural and recreational services (28 total hits). Carbon sequestration and NTFPs lay in between (31 total hits each). When considering single ecosystem services in detail, Management practices prevail in all cases, however, different profiles can be observed (Figure 3.22.a):

- *Carbon sequestration* - four different course-topics show similar levels (between 12 and 15 total hits), with Management practices ranking first, followed by GIS/Mapping, Economic assessment and Physical assessment,

- *Cultural and recreational services* - Management practices dominate (nearly anyone who attended a course on this ecosystem service selected this topic) with GIS/Mapping, Economic assessment ranking second and third respectively, with about half the number of hits registered for GIS/Mapping,
- *NTFPs* - Management practices rank first also in this case, followed by Economic assessment, while GIS/Mapping tools ranks third (although with less preferences compared to those obtained within other ecosystem services), with Marketing being very close,
- *Water-related services* - the profile tends to be similar to the one observed for Cultural and recreational services, but the role of Management Practices is much less dominant.

In Figure 3.22 (as well as 3.23), the label “other” referred to ecosystem services (i.e. on the horizontal axis) means that respondents have indicated one or more specific course-topics (e.g. GIS/Mapping tools or Management practices) but without making reference to one or more specific ecosystem service. When single bars read “other” it means that respondents made reference to a well-identified ecosystem service, but did not explicitly indicate a specific course topic.

Figure 3.22 - Attended courses on ecosystem services



Respondents reported they would be interested in additional training courses on ecosystem services and the three main topics they have identified coincide with the top-3 topics already identified in Figure 3.22 (i.e. already attended courses). However, Economic assessment ranks first (69) followed by Management practices (66) and GIS/Mapping tools (65). There is some limited overlapping among responses given by the same people with regard to “courses already attended” and “courses they would like to attend”. This confirms

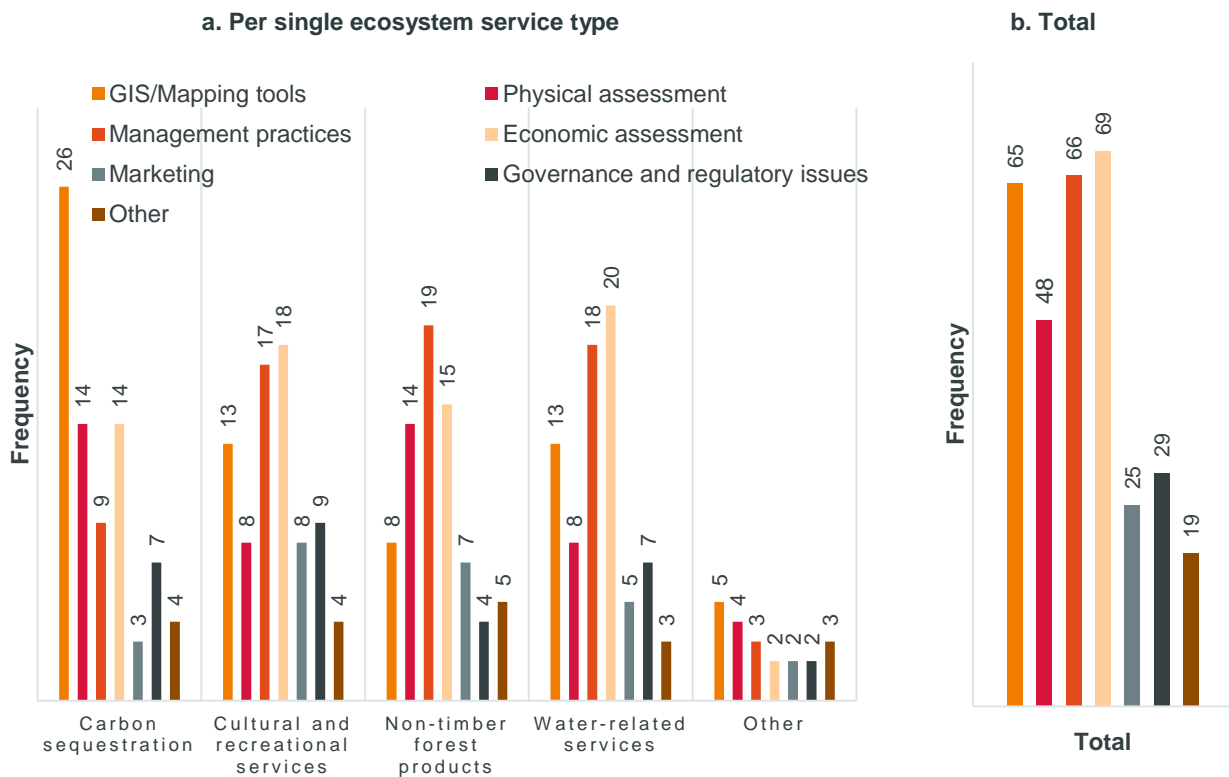
respondents tend to select courses that are complementary or additional to those they have already attended. Nonetheless, it is curious to notice that about 10% of those who declared they have already attended training activities on GIS/Mapping tools would be interested to attend additional training: this could be probably interpreted as a wish to take advantage of more specific and/or up-to-date training opportunities.

Marketing (25) as well as Governance and regulatory issues (29) remain the least selected course-topics, however the gap with other course-topics is less pronounced than in Figure 3.22.

When attention is paid to ecosystem service types, once again preferences are more or less evenly distributed, however NTFPs (27 total hits) and Water-related services (25 total hits) prevail on the other ecosystem services. If single ecosystem services are considered, then:

- *Carbon sequestration* - this is the only case where GIS/Mapping tools prevail and Management practices show a limited number of hits (9). Both Physical assessment and Economic assessment rank second,
- *Cultural and recreational services* - Management practices dominate (nearly anyone who attended a course on this ecosystem service selected this topic) with GIS/Mapping and Economic assessment ranking second and third respectively, with about half (or less than half) preferences,
- *NTFPs* - Management practices rank first followed by Economic assessment and Physical assessment, followed by GIS/Mapping tools and Marketing which are also very close to each other,
- *Water-related services* - the profile tends to be similar to the one observed for Cultural and recreational services, however in this case the relevance of both Economic assessment and Management practices is a bit higher, while Marketing and, partly, Governance and regulatory issues have a lower incidence.

Figure 3.23 - Interest in attending courses on ecosystem services



With regard to the courses respondents would prefer to attend in the case where they have to choose three of them, results are shown in Table 3.2.

As a first remark, only one-third of respondents filled this part of the survey. Such a low response rate might be linked to the fact that the question was quite challenging and posed almost at the end of the questionnaire. Moreover, the response rate was lower among those who declared they have already attended some training.

Cultural and recreational services, Carbon sequestration and NTFPs (wild products) are the three ecosystem services that received the higher number of preferences.

Economic assessment is by far the most selected topic, followed by GIS/Mapping tools and Management practices that, however, do not show such a big gap with Marketing, and Governance and regulatory tools. A more in depth analysis, however, seems to indicate a more nuanced situation, with different topics emerging as relevant with regard to different ecosystem services. In particular: GIS/Mapping tools prevail for Carbon sequestration, Economic assessment for Cultural and recreational services, and, together with Marketing, for NTFPs. Economic assessment is the main choice also for Water-related services, where Governance and regulatory issues tend to emerge a bit in comparison to alternative topics.

Table 3.2 - Selected courses that respondents would like to attend (Course 1) N. of preferences

Course 1	GIS/ Mapping tools	Physical assessment	Management practices	Economic assessment	Marketing	Governance & regulatory issues	Other	Total
Carbon sequestration	4	2	2	4	-	1	5	18
Cultural and recreational services	1	-	-	1	1	2	3	8
NTFPs (wild products)	-	1	1	-	1	-	2	5
Water-related services	1	-	2	2	-	3	1	9
Other	1	-	-	3	-	-	-	4
Total	7	3	5	10	2	6	11	44

Course 2	GIS/ Mapping tools	Physical assessment	Management practices	Economic assessment	Marketing	Governance & regulatory issues	Other	Total
Carbon sequestration	-	1	-	-	1	-	2	4
Cultural and recreational services	1	-	3	5	1	-	6	16
NTFPs (wild products)	-	1	-	3	3	-	-	7
Water-related services	1	-	-	4	-	1	2	8
Other	2	-	-	-	1	1	1	5
Total	4	2	3	12	6	2	11	40

Course 3	GIS/ Mapping tools	Physical assessment	Management practices	Economic assessment	Marketing	Governance & regulatory issues	Other	Total
Carbon sequestration	3	-	-	-	-	-	2	5

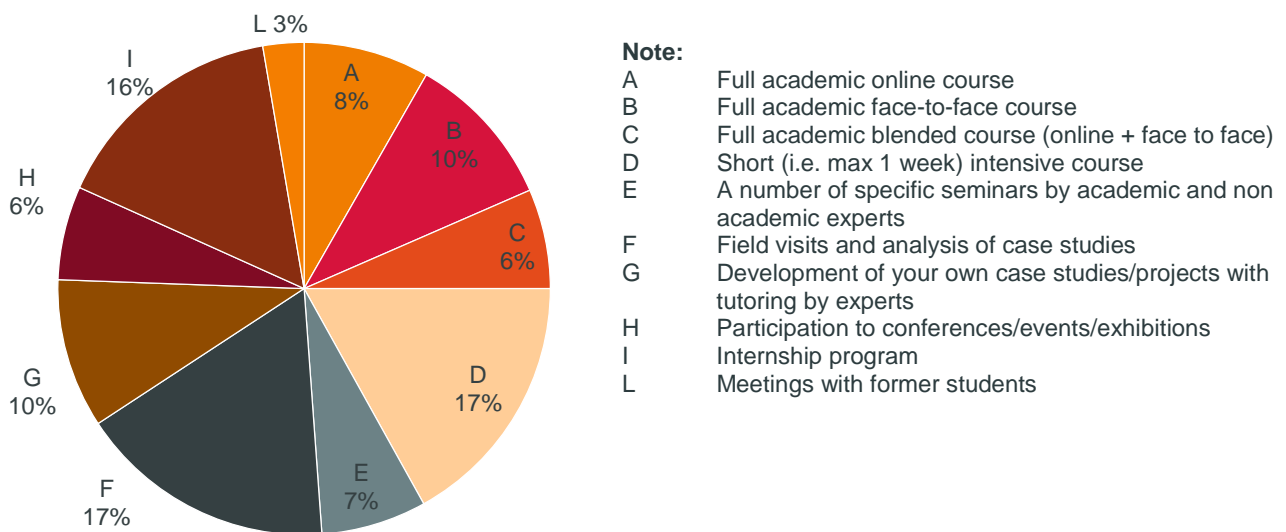
Cultural and recreational services	-	-	1	3	-	-	1	5
NTFPs (wild products)	-	1	3	2	1	2	3	12
Water-related services	1	-	1	1	-	-	3	6
Other	-	-	1	-	1	-	1	3
Total	4	1	6	6	2	2	10	31
<i>Total</i>	<i>GIS/ Mapping tools</i>	<i>Physical assessment</i>	<i>Management practices</i>	<i>Economic assessment</i>	<i>Marketing</i>	<i>Governance & regulatory issues</i>	<i>Other</i>	<i>Total</i>
Carbon sequestration	7	3	2	4	1	1	9	27
Cultural and recreational services	2	-	4	9	2	2	10	29
NTFPs (wild products)	-	3	4	5	5	2	5	24
Water-related services	3	-	3	7	-	4	6	23
Other	3	-	1	3	2	1	2	12
Total	15	6	14	28	10	10	32	115

With reference to “other” training courses, in most of the cases, they were just expressed as generic training needs within the domain of a certain ecosystem service (e.g. Training on Carbon) or topic (e.g. Training on GIS tools). When they have been made more explicit they include both additional proposals with respect to the topics suggested by the survey (e.g. Carbon Policy and Carbon Markets, or Business development and planning for recreational ecosystem services) and very specific issues reflecting the training needs/research profiles of single respondents (e.g. GIS tools for mapping ecosystem services in dry-tropical forests) and which might represent specific modules/parts within a broader course rather than stand-alone courses.

As regards training approaches and type of courses preferred by respondents, about one-fourth of them would like to be offered a full academic course. This could be delivered as a face-to-face course (the most preferred option within this segment), a fully on-line course (second best-option) or a blended course (Figure 3.24). However, alternatives to full-academic courses are widely supported by respondents. These include intensive courses, lasting maximum 1 week (17%), field visits and analysis of case studies (17%), and Internship programs (16%) allowing students to spend some time working and training at hosting organizations (companies, non-government organizations, public agencies, etc.). Another appreciated option consists of the possibility to learn by developing case studies and projects with the support of experts.

It is important to notice, that in most of the cases, respondents indicated a combination of different training approaches rather than a single approach. The most common combinations include short intensive courses combined with field visits/analysis of case studies and either the development of own case studies or an internship period. Even when asking for a full academic course people tend to prefer a combination of different approaches, combining pure theoretical sessions (frontal lessons and individual/group study) with more practical activities like the analysis and development of case studies, seminars by specialists/experts and internship opportunities.

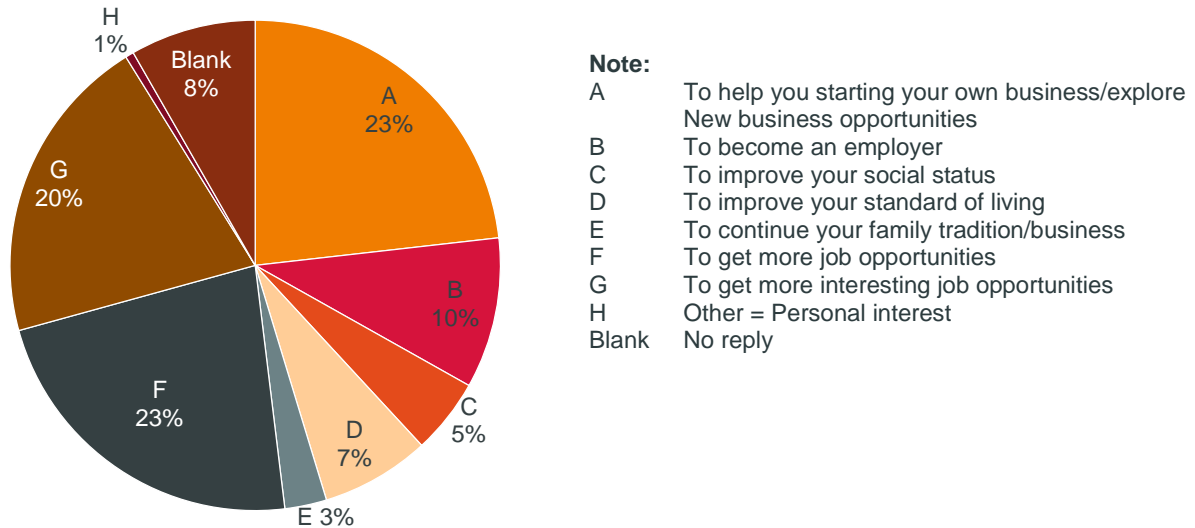
Figure 3.24 - Training approaches preferred by respondents



Motivations for attending training courses on ecosystem service-related issues can mostly be grouped into two main blocks: on the one hand, one-third of the respondents would be motivated by the possibility of getting useful information allowing the development/exploration of a new business and the possibility to become an entrepreneur and employ people; the other training is seen by 43% of respondents as a way to increase job opportunities, either in terms of a wider range of job-positions that might be addressed (23%) or more attracting/interesting opportunities that might be considered (20%) (Figure 3.25). Other motivations seem to play a less relevant role, nonetheless, it is worthwhile mentioning that training is also considered as a way to improve the social status and standard of living (10%) -likely by obtaining more favourable,

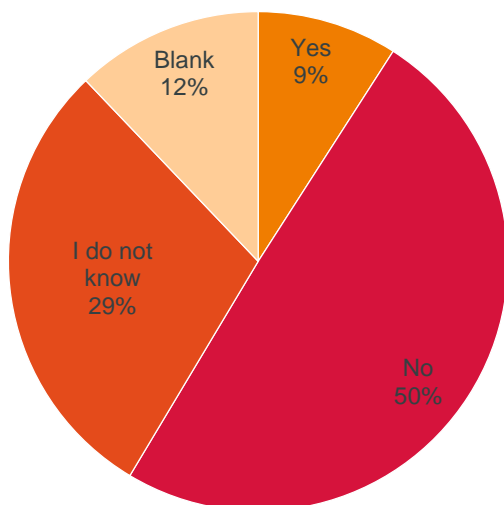
interesting and remunerative job conditions- and in a few cases as a way to continue (and improve) already existing family business activities.

Figure 3.25 - Motivations for attending training courses



Although the survey highlighted that there is a general interest in training opportunities on MEEB-related issues, respondents have very poor awareness of training opportunities currently offered by other institutions. Only 9% of respondents are aware of existing courses dealing with topics/issues identified in the previous questions or otherwise relevant within the framework of MEEB. Moreover, only 3 respondents were able to indicate the name of these courses: climate change, water footprint and GIS-tools.

Figure 3.26 - Awareness of existing courses on topics of interest regarding ecosystem services



4. CONCLUSIONS

The survey provides an overview of existing training opportunities in the field of MEEB and highlights gaps and needs based on perceptions by students enrolled in several universities across Europe.

Some gaps emerged with reference to basic concepts representing the backbone of MEEB, i.e. ecosystem services, payments for ecosystem services, innovation and entrepreneurship. Although different perceptions of these concepts reflect different education backgrounds for respondents, it seems quite clear that there is not a complete or fully common understanding of their meaning. Therefore, it is believed that training activities in the field of MEEB cannot avoid starting from a basic, crosscutting session/module providing learners with basic concepts and definitions that while enabling them to address more operational and specific issues, contributes to the adoption of a common and consistent language and terminology.

As regards entrepreneurship-related training offered by host universities, there are very few training opportunities within forestry and environmental/natural science courses. Moreover, although exceptions might exist, they seem to be courses aiming at describing the state of the art for enterprises in the primary sector and/or in related-sectors (e.g. trade in forest products or primary processing), rather than teaching students how to start and manage a new business activity. It should also be noticed, however, that students also show limited awareness of training opportunities offered by other faculties/schools within the same university and almost none of them are aware of opportunities offered by other universities. The final result, among others, is a medium to low level of satisfaction with the commitment of hosting universities and, in particular, schools/faculties in relation to entrepreneurship education. Additional investigation on the causes for this would be needed, however there seems to be a combination of limited offers and poor promotion of specific initiatives by universities and scarce proactivity by students. On the other hand, support services to entrepreneurship offered by hosting universities are quite well-known by respondents, in particular, with regard to competition and awards for the development of business ideas and start-ups.

The perception of topics of key-importance within the field of study and for future professional career is multifaceted. According to respondent's opinion the 5 key-topics on average consist of a combination of traditional technical topics within the domain of forest sciences -i.e. Forest management planning and Silviculture- and emerging/new topics, including Climate change and adaptation tools/policies, Good governance of natural resources and Ecosystem services mapping and assessment. Additional important topics identified include both traditional (e.g. Forest and environmental legislation) and more recently emerged issues (e.g. Biomass and renewable energies), as well as sectoral (e.g. Forest ecology) and intersectoral ones (e.g. Project development and management).

Respondents seem to be interested in training opportunities both in the field of entrepreneurship and innovation, and in the field of ecosystem services. As for the latter, although 60% of respondents declared

they have already attended at least one course, they indicated some knowledge and skill-gaps. In particular, based on self-assessment, they perceive their current skills are stronger with reference to biophysical ecosystem service estimations and the identification of appropriate forest management solutions/operations aiming to improve the delivery of ecosystem services, which have mostly been acquired during traditional university courses. On the other hand, perceived skill-gaps mostly regard economics and marketing related to ecosystem services, as well as specific and in depth technical/professional skills needed for the management of ecosystem services (e.g. carbon footprint, investment analysis for developing a business activity on wild-products, organisation of networks of actors for the development of ecosystem service-based activities, etc.). Not surprisingly, then, interest for attending additional training opportunities goes in the direction of filling these gaps: Economic assessment of ecosystem services is the most selected topic. The selection of Management practices and GIS/Mapping tools can be interpreted both as a request to improve knowledge in these fields by those who did not attend such courses yet and the will to acquire additional skills on these topics with specific regard to ecosystem services by those who might have already acquired generic skills. It might also be noticed that these topics can be seen as interlinked and complementary to each other, for example GIS tools can be used for identifying, analysing and representing ecosystem services both in biophysical and economic terms. Although with less preferences, Marketing and Governance of natural resources have also been identified as potentially relevant topics for additional training.

The survey also provides interesting information regarding teaching approaches and methods to be preferred for training activities. As a first remark, about 25% of respondents would like to have a full academic course, an issue that confirms huge training needs and at the same time suggests there might be the need to improve and up-date existing programs for university courses in forestry and environmental disciplines. However, another 25% of respondents would prefer either short seminars by experts or short intensive courses. This seems to indicate that an alternative approach could consist of complementing existing university courses with dedicated training sessions, less demanding in terms of time and more focused on relevant and specific issues. In this perspective, the use of online resources could be a valid solution, facilitating the delivery of part of the training sessions and materials. In any case, whether it is a full academic course or a short and intense one, respondents tend to agree on the opportunity to combine different training tools. In particular, field visits and discussions of case studies, as well as internship experiences, are the most preferred options, suggesting that besides receiving an appropriate theoretical background, students would like to see how these issues could be implemented in practice and to meet real cases and operators having experience and working in the MEEB sector.

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ANNEX 1: TNA QUESTIONNAIRE USED FOR ECOSTAR PROJECT WP3, TASK 3.1

The Project

ECOSTAR is a project co-funded by the Erasmus+ Programme of the European Union that aims to develop entrepreneurship and innovation skills and opportunities in nature-based economies with a special focus on innovative, forest ecosystem-based activities. The project focuses on promoting and fostering the links among higher education institutions, businesses and start-ups supporting services in the field of Marketing and Economics of Ecosystems and Biodiversity (MEEB). Italy, Spain, England and Romania are the focus countries; however, results will have a strong EU dimension and transferability potential.

University curricula lack knowledge transfer initiatives that allow the real commercialization of new processes, methods and services related to MEEB. Most innovative businesses base their success on creating value through better use of intangible assets. Ecosystem Services constitute the most valuable intangible assets on earth and forests are the largest example of “green infrastructure” in Europe. ECOSTAR aims to make a knowledge triangle a reality in the field of MEEB, providing sustainable business opportunities and real benefits for environmental and global economic growth.

Within the project, special emphasis is given to the development and delivery of training opportunities for learners. In order to do so the project wishes to perform a training needs assessment to identify training gaps and opportunities to be covered.

Discover more at: <http://www.ecostarhub.com>

The Survey

The questionnaire will take you through innovation and entrepreneurship in ecosystem services in the context of your current student career as well as in the perspective of your future professional life.

Filling the questionnaires in will require about 20 minutes of your time. The questionnaire consists of 3 main parts:

1. Personal info and background
2. Cross-cutting skills and associated issues (governance, entrepreneurship and soft skills)
3. Technical and specific skills

Follow-up and next steps

We are aware that your time is important, therefore we want to thank you for dedicating time to the survey by sharing ECOSTAR's experience and findings with you. Information collected through the questionnaire will be analysed and elaborated by ECOSTAR project staff. Results will be published anonymously in the form of a publicly-available final report. Moreover, survey outcomes will improve the development and delivery of training sessions by academic and non-academic ECOSTAR project partners.

Are you interested in entrepreneurial innovation in ecosystem services? Would you like to know more? Would you like to develop your own business idea and be supported to make it viable? Do not miss this opportunity: keep informed on ECOSTAR's unique training platform and apply for the training sessions!

Do you agree to the above terms? By clicking "Yes, I agree", you agree with the terms and consent that you are willing to answer the questions in this survey

- Yes, I agree
- No, I do not agree

PART 1: PERSONAL INFO AND BACKGROUND

A. Personal info

A1. Age

Please give your age (2-digit number > 18)

A2. Sex

- Female
- Male

A3. Nationality

Please select your nationality

A4. Position

Please select your current position

- BSc Student
- MSc Student
- Post-graduation Course Student
- PhD Candidate
- Other: _____

A5. Course

Please indicate the name of the course in which you are currently enrolled (e.g. name of Master Course, PhD School, etc.)

A6. Year

Please indicate the stage of the course you are currently in

- 1st year
- 2nd year
- 3rd year
- 4th year
- 5th year
- Other: _____

A7. Institution

Please indicate the name of the institution delivering the Course in which you are currently enrolled

A8. Country

Please select the Country where you are currently attending the Course

A9. E-mail address

Please indicate your e-mail address. Stay tuned and get ready to join the first worldwide specialized training courses, scholarships and business plan awards in the field of Marketing and Economics of Ecosystems and Biodiversity!

_____ @ _____

Do you give your consent to your e-mail being included in the ECOSTAR mailing-list?

- Yes
- No

B. Background

B1. How familiar are you with the following concepts?

Please select one option for each row (1= not familiar at all; 5 = very familiar)

	1	2	3	4	5
Ecosystem Services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Payments for Ecosystem Services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Green Economy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Entrepreneurship	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Innovation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marketing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

B2. To the best of your knowledge, ecosystem services are:

Please select one option

- Multiple benefits provided by mankind to natural ecosystems (e.g. forests)
- Multiple benefits mankind and natural ecosystems (e.g. forests) mutually provide to each other
- Multiple benefits provided by ecosystems (e.g. forests) to mankind
- Multiple benefits provided by natural ecosystems (e.g. forests) to different natural/artificial ecosystems

B3. To the best of your knowledge, innovation is:

Please select one option

- The implementation of a new or improved product (good or service) or process, a marketing method, an organizational method in business practices, workplace organization or external relations
- The identification, development and implementation of new or improved technologies to address specific problems and needs of business (i.e. for-profit) activities
- The research on and development of patentable new solutions in terms of products, service and processes
- The development and implementation of new or improved products (goods or services) or processes in the for-profit or not-for-profit sectors

PART 2: CROSSCUTTING SKILLS AND ISSUES

A. Entrepreneurship

A1. What does entrepreneurship mean to you?

Please select one option

- Creation of new organizations
- Successful management of a for profit organization
- Converting an innovative idea into a profitable business model
- Being risky in business
- Other: _____

A2. In your opinion, how much do the following features characterize the concept of "entrepreneur"?

Please select one option for each row (1= very little; 5 = very much)

	1	2	3	4	5
Risk taking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Innovation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Investment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sustainability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Profit-making	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

A.3 Do you think “entrepreneurship” could be a useful field of study within your university curriculum?

- Yes
- No
- I do not know

A.4 Are you aware of any specific entrepreneurship education training courses in your University?

Please select one option. If you reply "Yes" please go to A.5, otherwise please proceed to A.6

- Yes
- No
- I do not know

A.5 In the case where your reply to question A.4 above was "Yes", could you please indicate the name of the training courses you referred to as well as the Schools/Faculties that are offering/organizing them?

A.6 Are you aware if any of the following entrepreneurship-related courses exist in your University?

Multiple options

- Business development
- Business management
- Business administration
- Business strategy
- Corporate management
- Other: _____

A.7 Are you aware of any entrepreneurship-related support services in your University?

Multiple options

- Entrepreneurial, technology transfer, spin-offs/start-ups support offices
- Enterprise house, hubs, incubators, innovation parks
- Entrepreneurial network communities
- Business ideas/Start-up awards and/or competitions
- Other: _____

A.8 Overall, how do you evaluate your University commitment in relation to entrepreneurship education?

Likert scale: 1 = very bad, 5 = very good

1	2	3	4	5
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

A.9 Are you aware of any specific entrepreneurship education training course in your own School/Faculty?

Please select one option. If you reply "Yes" please go to A.10, otherwise please proceed to A.11

- Yes
- No
- I do not know

A.10 In the case where your reply to question A.9 above was "Yes", could you please indicate the name of the training courses you referred to?

A.11 Are you aware if any of the following related training courses exist in your School/Faculty?

Multiple options

- Business development
- Business management
- Business administration
- Business strategy/Operations
- Corporate management
- Leadership
- Management of human resources
- None of them
- I do not know
- Other: _____

A.12 To which of the following do these courses apply?

Multiple options

- BSc Students
- MSc Students
- Post-graduation course Students
- PhD candidates
- Other: _____

A.13 How are these courses offered in the education curricula at your School/Faculty?

- Compulsory courses
- Optional/elective courses
- Other: _____

A.14 Have you attended any of the following courses?

Multiple options

- Business development
- Business management
- Business administration
- Business strategy/Operations
- Corporate management
- Leadership
- Management of human resources
- None of them
- Other: _____

A.15 Do these courses include the development of a potential business plan/idea?

- Yes
- No
- I do not know

A.16 Do these courses provide any of the following practical activities?

Multiple options

- Seminars by academic and non-academic experts
- Field visits and analysis of case studies
- Development of your own case studies/projects with tutoring by experts
- Participation in conferences/events/exhibitions
- Group works
- Meetings with former students
- No courses attended
- Other: _____

A.17 What is the educational effort in terms of class-hours or European credit transfer and accumulation system (ECTS) credits of the courses you have attended according to A.14 above?

Please select one option

- 20 hours (i.e. about 2 ECTS credits)
- 30 hours (i.e. about 3 ECTS credits)
- 40 hours (i.e. about 4 ECTS credits)
- 60 hours (i.e. about 6 ECTS credits)
- 80 hours (i.e. about 8 ECTS credits)
- No courses attended
- Other: _____

A.18 To the best of your knowledge, which of the following does your entrepreneurship education cover?

Multiple options

- Leadership and management skills
- Business management skills
- Networking experience
- Knowledge about money and financing
- Confidence
- Critical thinking skills
- Planning and development skills
- No courses attended
- Other: _____

A.19 Overall, how do you evaluate your School/Faculty commitment in relation to entrepreneurship education?

Likert scale: 1 = very bad, 5 = very good

1	2	3	4	5
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

PART 3: TECHNICAL AND SPECIFIC SKILLS

3.1 In your opinion, what are the 5 key topics in your field of study and future professional career? Please tick your preferred options and/or indicate additional ones you believe are relevant but not listed here

Multiple options (up to 5)

- Forest management planning
- Silviculture and forest management operations
- Business development and planning
- Project development and management
- Wood industry and technology
- Forest policy
- Mapping and use of GIS-based tools
- Forest inventorying
- Marketing and communication
- Hydraulics and hydrology
- Environmental and forestry legislation
- Business legislation and administration
- Supply chain and market analysis
- Forest ecology
- Good governance of natural resources

- Climate change and adaptation policies/tools
- Biomass and renewable energies
- Corporate Social Responsibility in forestry (e.g. forest certification)
- Ecosystem services mapping/assessment
- Other: _____

3.2 Based on your university education and experience, can you...

Please select one option for each row (1= not at all; 5 = yes very well)

	1	2	3	4	5	I do not know
...estimate the amount of carbon sequestered by a forest?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...assess the carbon-footprint of a certain activity/product?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...identify appropriate forest management operations to improve carbon sequestration potential?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...select the most appropriate channels for marketing and promoting carbon credits?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...estimate cultural/recreation potentialities of a forest/area?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...facilitate networking of key-actors for developing cultural/recreation services?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...identify appropriate forest management operations to improve cultural/recreation services?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...select the most appropriate targets for marketing cultural/recreation services?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...estimate potential non-timber forest product (NTFP) production by a forest/area?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...estimate investments needed for developing a NTFP business activity?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...identify appropriate forest management operations to improve NTFP production?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...select the most appropriate channels for marketing and promoting NTFP?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...estimate potential delivery of water-related services by a forest (e.g. water purification, water infiltration...)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...facilitate networking of key-actors for developing water-related services?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...identify appropriate forest management operations to improve water-related services?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

...select the most appropriate mechanisms for marketing and promoting water services?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...identify potential bundles of ecosystem services delivered by a forest?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...assess potential trade-offs within ecosystem services delivered by a forest?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...assess alternative forest management scenarios in terms of ecosystem service delivery?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...develop marketing strategies for trading ecosystem services from a forest?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...develop/manage an accounting system for ecosystem services from a forest?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3.3 Have you ever attended any of the following training courses (columns), and in which ecosystem service area did it relate to (rows)?

Please tick options you believe might be relevant for you. Multiple selection is possible.

Notes:

GIS/Mapping tools = analysis/representation of ecosystem service flow, value, stock...through GIS-based tools

Physical assessment = estimation of ecosystem services in bio-physical terms

Management practices = identification and planning of specific management techniques and/or activities aimed to improve the delivery of ecosystem services

Economic assessment = estimation of the ecosystem services in monetary terms

Marketing = identification/development of tools and mechanisms to facilitate/improve access to market for ecosystem services

Governance and regulatory issues = identification/analysis of agreements, contracts, property rights...

	GIS/Mapping tools	Physical assessment	Management practices	Economic assessment	Marketing	Governance and regulatory issues	Other
Carbon sequestration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cultural and recreational services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Non-timber forest products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Water-related services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you selected "other", please specify: _____

3.4 Would you be interested in attending one or more specific training course on one of the following and in which ecosystem service typology?

Notes:

GIS/Mapping tools = analysis/representation of ecosystem service flow, value, stock...through GIS-based tools

Physical assessment = estimation of ecosystem services in bio-physical terms

Management practices = identification and planning of specific management techniques and/or activities aimed to improve the delivery of ecosystem services

Economic assessment = estimation of the ecosystem services in monetary terms

Marketing = identification/development of tools and mechanisms to facilitate/improve access to market for ecosystem services

Governance and regulatory issues = identification/analysis of agreements, contracts, property rights...

	GIS/Mapping tools	Physical assessment	Management practices	Economic assessment	Marketing	Governance and regulatory issues	Other
Carbon sequestration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cultural and recreational services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Non-timber forest products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Water-related services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you selected "other", please specify: _____

3.5 In the case where you could attend up to 3 training courses among those you have selected in question 3.4, which ones would you choose?

Please rank the 3 courses (e.g. "Governance and regulatory issues in Water-related services", "Business development and planning in Recreational ecosystem services"...) from the most relevant to the least relevant for you and select from the list the kind of training approach you would prefer.

Course 1: _____

Please select the kind of training approach you would prefer for training course 1 (max 3 preferences allowed)

- Full academic online course
- Full academic face-to-face course
- Full academic blended course (online + face to face)

- Short (i.e. max 1 week) intensive course
- A number of specific seminars by academic and non academic experts
- Field visits and analysis of case studies
- Development of your own case studies/projects with tutoring by experts
- Participation to conferences/events/exhibitions
- Internship program
- Meetings with former students
- Other: _____

Course 2: _____

Please select the kind of training approach you would prefer for training course 1 (max 3 preferences allowed)

- Full academic online course
- Full academic face-to-face course
- Full academic blended course (online + face to face)
- Short (i.e. max 1 week) intensive course
- A number of specific seminars by academic and non academic experts
- Field visits and analysis of case studies
- Development of your own case studies/projects with tutoring by experts
- Participation to conferences/events/exhibitions
- Internship program
- Meetings with former students
- Other: _____

Course 3: _____

Please select the kind of training approach you would prefer for training course 1 (max 3 preferences allowed)

- Full academic online course
- Full academic face-to-face course
- Full academic blended course (online + face to face)
- Short (i.e. max 1 week) intensive course
- A number of specific seminars by academic and non academic experts
- Field visits and analysis of case studies
- Development of your own case studies/projects with tutoring by experts
- Participation to conferences/events/exhibitions
- Internship program
- Meetings with former students
- Other: _____

3.6 Of the following, how would best describe your motivation for attending such courses:

Multiple options

- To help you starting your own business/explore new business opportunities
- To become an employer
- To improve your social status
- To improve your standard of living
- To continue your family tradition/business
- To get more job opportunities
- To get more interesting job opportunities
- Other: _____

3.7 Are you aware of training courses/opportunities relating to one or more of the approaches/motivations you identified as relevant at previous points (3.5 and 3.6)?

If you reply "Yes" please go to 3.8, otherwise please proceed to 3.9

- Yes
- No
- I do not know

3.8 In the case where your reply to question 3.7 above was "Yes", could you please indicate the name of the training courses/opportunities you referred to as well as the institutions that are offering/organizing them?

3.9 Please give any additional info or comment on what you believe might be useful/relevant for this survey

END OF SURVEY

Thanks for participating in the survey: your input will contribute to improving activities within the ECOSTAR project.

The ECOSTAR virtual research-enterprise hub aims to promote entrepreneurship and innovation skills in the field of Marketing and Economics of Ecosystems and Biodiversity by creating university-business links and opportunities among research institutes and companies across Europe. www.ecostarhub.com

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