★ESMERALDA★

Final stocktaking of EU member state needs

Deliverable 2.3

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ESMERALDA

Enhancing ecosystem services mapping

for policy and decision making

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Preface

The objective of ESMERALDA Work Package 2 is to develop and facilitate a stakeholder process throughout the project and to create a European network of researchers and stakeholders to facilitate a dialogue among relevant communities of ecosystem services mapping and assessment practice. To achieve this, the sub-objectives are:

- To identify relevant stakeholders engaged in ecosystem services research and practice from the scientific and user communities, as well as to identify national and international funding bodies, and to develop a stakeholder engagement roadmap;
- To identify and evaluate what is required in EU member states and in different sectors in order to achieve the EU 2020 targets;
- To create a functional collaborative network to support project activities, process of dialogue and knowledge co-creation;
- To develop both country and case study-specific profiles based on needs and opportunities;
- To cluster all member states by level of readiness for the implementation of ecosystem services mapping and assessment activities in terms of availability of data, tools and personnel with appropriate knowledge and expertise;
- To assess the practical means and provide guidelines to support EU member states in MAES implementation; and,
- To provide continuous support to responsible authorities in the EU member states and ensure the continuation of the network beyond ESMERALDA.

The aim of this Deliverable 2.3 is to present what are the current needs and challenges in EU member states to achieve the EU Biodiversity Strategy's Action 5 targets for mapping and assessment of ecosystems and their services (MAES) bearing in mind it is the final year of the ESMERALDA project.

Summary

National level stakeholders of the EU member states have been important throughout the ESMERALDA project in providing experience-based knowledge insights about opportunities, challenges, and policy needs regarding MAES. They have been surveyed twice during the project and many of the organised workshops have served as discussion fora with stakeholders as well. Panel discussions have given an opportunity for all participants of the workshops to interact with stakeholders and get feedback on many burning questions regarding the implementation of MAES. In addition, several break-out groups have been addressed to stakeholders to harvest in-depth experiences and recommendations from them to facilitate developing such support materials and guidelines that are attuned with real life policy questions.

This report presents the final stocktaking of EU member state needs. It shows the development of member states in MAES activities over the years 2015-2017. It also paves the way forward from MAES to national level ecosystem services accounting.

The previously reported support measures are revisited and sharpened for the period post-ESMERALDA. Based on the stakeholder knowledge, the most important things to do are to integrate ecosystems and their services to EU policies as well as national legislation, to create enthusiastic mappers' networks, to provide online support materials and guidance on the whole ecosystem service mapping and assessment process and to guide in the ways policies can benefit from the results.

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1. Introduction

The ESMERALDA project was set up to support EU member states in achieving Action 5 under Target 2 of the EU Biodiversity strategy to 2020. Action 5 calls on EU member states to map and assess the state of ecosystems and their services in their national territory. In order to give appropriate support to the member states, ESMERALDA first took stock of the different levels of implementation in the countries and identified the most relevant stakeholders for Mapping and Assessment of Ecosystems and their Services (MAES) activities.

This final report comprises a re-evaluation of the current level of progress in all of the member states. Additionally, we created a survey (Annex 1) for the stakeholders and support group members to evaluate whether the previously identified solutions and recommendations (see D2.2) were accurate and helpful and to gather what types of challenges remained for member states to progress in the mapping and assessment of ES in their countries. The final evaluation was complemented by a panel discussion with stakeholders held in the Plovdiv workshop at the beginning of October 2017.

2. Updates on the level of progress in mapping and assessment of ecosystem services

2.1. Current implementation of MAES at member state level

2.1.1. Introduction

Action 5 of the EU biodiversity strategy calls the member states, with the assistance of the Commission, to map and assess the state of ecosystems and their services in their national territory by 2014, assess the economic value of such services, and promote the integration of these values into accounting and reporting systems at EU and national level by 2020.

The work on MAES, the first part of MAES, started in 2013. This work is overseen by a dedicated Working Group on MAES and involves a close collaboration between the member states, stakeholders, research and the EU (European Commission and European Environment Agency).

Action 5 has triggered a clear response in many member states. There were ecosystem and ecosystem services mapping and assessment activities already before but the level of implementation varied a lot in different member states. Along with the working group of MAES and the guidance documents produced by it, countries have started proceeding with mapping and assessment projects.

This section of the report analyses the progress member states have achieved in mapping and assessment during a two-year-period (second semester of 2015 – second semester of 2017).

2.1.2. A frame for measuring progress of Action 5

ESMERALDA has developed a framework to evaluate progress by the member states with respect to the implementation of Action 5 (Kopperoinen et al. 2016). This frame is presented in ESMERALDA Deliverable 2.2 (see Annex 1 and Annex 2) which contains also a baseline situation assessed at the end of 2015.

The framework is based on 27 questions which can be used to assess the status of each country in the implementation of MAES; these questions survey the implementation at policy level, the involvement of stakeholders, the scientific progress, and the availability of resources. To evaluate progress, the questions were formulated in such a way that a positive answer (yes) indicates progress whereas a negative answer (no) indicates status quo or no progress. Every positive answer

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is scored with 1; a negative answer is scored with 0. The sum of all scores is assumed to approximate the state of implementation of MAES. Note that we have set the maximum score for a country at 26, not 27. Question 27 is obsolete for countries which finished the implementation of MAES before 2016. Therefore a score of 26 corresponds to the full implementation of MAES.

For completeness we include the set of questions in Table 1.

Table 1: Criteria for the assessment of MAES implementation status in EU member states.

1)   Status of MAES work
Q1: Is MAES currently implemented in the country?
Q2: Is there any policy in place for operationalizing the outputs of MAES (for nature-based solutions, for GI implementation, etc.)?
Q3: Is a national MAES report available?

2)   Status of networking and stakeholder involvement
Q4: Does a national platform facilitating ES work and bringing together stakeholders exist? A platform can be, for example, a specific website, an ES association, a working group or regular events, seminars or workshops.
Q5: Is the central administration (for example, ministries, state institutes) involved in the ES work?
Q6: Are governmental institutions involved (for example, an environment agency, a nature agency or research institutes under the ministry)?
Q7: Are regional administration and officials actively involved?
Q8: Are scientific organisations, such as universities or research institutes, actively involved?
Q9: Are non-governmental organisations involved?
Q10: Are business, companies or industry involved?
Q11: Are local communities involved?

3)   Resources available
Q12: Are financial resources for ES mapping and assessment activities sufficient?
Q13: Are human resources sufficient? (Explanation: Are there any problems in relation to lacking personnel with appropriate expertise or brain drain?)

4)   Status of national assessment work
Q14: Have any of the following assessment methods been used at national scale (literature review, expert judgment, statistical information, maps and models, workshops / interviews, economic valuation, conceptual thinking / models)? (Any of these results in a positive answer.)
Q15: Has a selection been made of ecosystems to be included in the mapping and assessment?
Q16: Is there a prioritization of ES to be included in a national assessment or has a classification been selected for the assessment (for example, CICES)?
Q17: Is there a national indicator framework ready and published for mapping, assessment or accounting?
Q18: Has underlying data been identified for such a framework?
Q19: Have EU Directive reporting indicators and data (or biodiversity / ecosystem data) been proposed or used to measure the condition of ecosystems?

5)   Status of mapping
Q20: Are maps available at national scale for some ecosystem services?
Q21: Are maps available at national scale for habitats or ecosystems?

6)   Status of data
Q22: Is there a national clearing house with data on MAES available? (With a clearing house it is meant that there is a website dedicated to MAES related activities, such as the http://www.biodiversity.fi/en/home or the Dutch atlas of natural capital.)
Q23: Is data available, updated and sufficient for ES mapping and assessment?
Q24: Is data compatible (for example, different databases and statistical sources)?
Q25: Is data streamlined, harmonized and used consistently (for example, no big regional differences, similar precision, etc.)?

7)   Case studies and projects
Q26: Are there case studies available that could serve as examples (upscaling) for a national assessment?
Q27: Is a nation-wide mapping and assessment project planned for 2016 or beyond?

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2.2. Baseline situation in December 2015

During the last three months of 2015 Kopperoinen et al. (2016) analysed the status of each country using a series of country fact sheets. These fact sheets contained information on the policy process, the relevant actors and executive agencies involved in Action 5, the problems encountered, the data needs, the research capacity, and the actual results and outcomes. These fact sheets have been made available on BISE, the biodiversity information system for Europe and can be downloaded from the country pages.

At the end of 2015 most EU member states were actively involved in mapping and assessing the state of ecosystems and their services on their national territory. However, differences in policy response to the ambitions set forward in the Biodiversity Strategy, lack of sufficient resources and research capacity, different levels of stakeholder engagement and problems related to data availability resulted in different implementation levels of Action 5 across the EU member states. Member states, on average, responded positively on 11.5 of the 27 questions.

2.3. Progress made during 2016 and 2017

Every six months – at each MAES working group meeting – an update was made on the progress at EU and member states' level. The six-monthly-updates are based on three data sources:

1. Reports by member states on the implementation of MAES on the Biodiversity Information System for Europe (BISE) which has a dedicated page for country updates[1].
2. Oral updates and presentations by the member states during the working group MAES meetings available in the minutes of the MAES working group meetings and publicly available on CIRCA BC (ecosystem assessment) for registered users.
3. Other sources, such as publications in the scientific literature or presentations in conferences and meetings.

Based on these updates progress on mapping and assessment of ecosystems and their services in the EU member states has been tracked (Figure 1; Table 2).
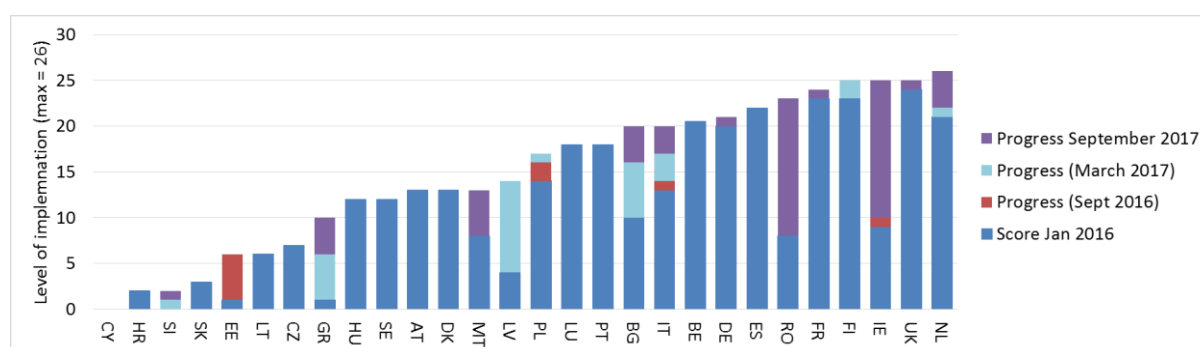
Figure 1: MAES barometer. Implementation status of MAES in the EU member states 2016-2017.

Almost all countries have started the implementation of Action 5 and MAES but the state of implementation varies widely. Here are a few key observations per country starting with countries with low implementation:

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[1] http://biodiversity.europa.eu/maes/maes_countries

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- Cyprus, Croatia, Slovenia and Slovakia have made little progress or at least reports are lacking. The ALPES project, funded under the Interreg scheme, aims at mapping ecosystem services for the entire Alpine space which may support the MAES activities in Slovenia.
- Estonia, Lithuania and Czech Republic can get support from experience from local and regional cases but a nation-wide MAES type initiative has not been reported.
- Greece has made progress since 2016 and developed a plan for implementation to 2020. Efforts are mainly carried out by the research community and not by the competent administration.
- Hungary has just finished a scoping phase for MAES and will start implementation in 2018 and 2019.
- Sweden, Denmark and Austria have not reported during 2016 and 2017.
- Malta can rely on its main research institute for mapping and assessment at national scale but the outcome of the assessment work still has to be reported.
- Latvia has pioneered a MAES assessment for the coastal and marine areas.
- Poland and Luxembourg have carried out ecosystem services mapping projects but the uptake of MAES in national policies remains undocumented.
- Portugal has carried out a regional MAES assessment (Alentejo) but upscaling to the national level is still lacking. There is integration of MAES in the territorial planning policy.
- Bulgaria and Romania have profited from funding under the grants provided by Norway and the European Economic Area to set up national projects on mapping ecosystems and their services. Substantial progress has been achieved during 2016 and 2017.
- Italy has mapped its ecosystems and recently published a report on the state of its natural capital
- For Germany a recent article in One Ecosystem outlines the progress made. Germany has published several TEEB studies as well.
- Belgium did not report progress during 2016 and 2017. In the Flemish region MAES has been implemented through the 2014 nature report; in the Walloon region the work on MAES has been on stand-by with a low level of uptake by the regional administration.
- France is currently carrying out a national ecosystem assessment (EFESE).
- Ireland has implemented MAES and is one of the few countries with a GIS service for data on ecosystems and ecosystem services.
- Finland has been very active on MAES and TEEB and is close to complete the implementation. A comprehensive national report on ecosystems and their services is lacking, however.
- The United Kingdom and Spain have implemented MAES already before 2016 through the national ecosystem assessments and have progressed also on the second part of Action 5 (economic valuation and accounting).
- The Netherlands has implemented MAES via Atlas Natural Capital and is leading efforts on ecosystem accounting.

Table A in Annex 1 contains summary statements on the progress on MAES measured at three points in time.

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2.4. Update of the implementation assessment framework

The present implementation assessment framework is focused on measuring progress on the first phase of Action 5. It was originally not designed to track progress of how countries have assessed the economic value of ecosystem services, and how they can use MAES outcomes for integration into accounting and reporting systems at EU and national level.

Countries, such as the United Kingdom, Spain and the Netherlands, have applied monetary and non-monetary values in their national assessments whereas across Europe several member states are experimenting with setting up ecosystem accounts. In particular the KIP INCA[2], an initiative of the European Commission on the development of natural capital and ecosystem accounts, provides incentives for member states to develop accounts.

A special workshop during the mid-term project meeting in Plovdiv has developed a set of additional questions to measure progress on the second phase of MAES. The workshop included both project partners and stakeholders. The following set of questions was proposed at the workshop and discussed at a later stage with the participants.

For economic valuation processes at the national level:

- Is there at least one nationwide economic value available for one ecosystem service in each broad category (provisioning, regulating and cultural) for communicating the broad stakes of ecosystem services?
- Is at least one economic value for one ecosystem service in each broad category (provisioning, regulating and cultural) mapped at the national level so that localized stakes are properly recognised?
- Are there any completed or ongoing projects which have developed or used economic values for informing planning processes at different policy levels?
- Are there actions taken to include ecosystem service values into the decision-making processes or in policy impact assessment (in particular cost-benefit analysis and environmental impact assessment)?

For promoting the integration of these values into accounting and reporting systems at EU and national level:

1. Is there at the competent governance level[3] a natural capital committee or working group which oversees the implementation of natural capital accounts in the country or region?
2. Are there any pilot accounts on economic valuation of natural capital taking place in your country (including the grants from Eurostat)?
3. Are any of the following accounts available at the national level: Ecosystem extent, ecosystem condition, ecosystem services (with at least an account for one service) or thematic accounts on biodiversity or carbon?

It is important to stress that these questions complement the framework of Table 1. So, to avoid overlap, no additional questions are raised about the involvement of stakeholders in natural capital accounting or the status of datasets.

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[2] The Knowledge Innovation Platform on Integrated System for Natural Capital and Ecosystem Services Accounting

[3] This depends on the governance level which is competent or responsible for natural capital accounting and can thus differ per country.

Table 2: Status update of the member states in implementing MAES based on 27 questions, recorded on 13 September 2017. Blue (=1) stands for a positive answer. For the questions see Table 1.

Questions / EU countries		AT	BE-FL	BE-WAL	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK
Status of MAES work	Q1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1
	Q2	1	1	1	1		1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1		1	1
	Q3						1	1	1	1	1	1	1			1	1	1	1	1	1	1	1	1	1	1	1			1
Status of networking and stakeholder involvement	Q4	1	1	1	1		1	1		1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1		1	1	1
	Q5	1	1	1	1		1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1				1
	Q6	1	1	1	1		1	1	1	1	1	1	1	1		1	1	1	1	1	1		1	1	1	1				1
	Q7	1	1	1	1		1	1	1	1	1	1	1	1		1	1	1					1	1	1					1
	Q8	1	1	1	1		1	1	1	1	1	1	1			1	1						1	1	1					1
	Q9	1	1	1	1			1	1	1	1	1	1			1	1	1	1				1	1	1					1
	Q10	1	1	1	1		1	1	1	1	1	1	1	1		1	1	1	1		1	1	1	1	1					1
	Q11	1	1	1	1		1	1	1	1	1	1	1		1		1	1	1			1	1	1	1	1				1
Available resources	Q12		1	1	1		1				1		1	1			1					1	1	1	1	1				1
	Q13		1		1		1										1		1		1	1	1	1	1					1
Status of national assessment work	Q14		1	1				1			1	1					1						1	1	1					1
	Q15				1			1		1	1						1					1	1	1				1	1	1
	Q16	1	1		1		1	1			1	1	1			1	1					1	1	1						1
	Q17		1		1			1			1	1	1			1	1					1		1						1
	Q18		1		1			1			1	1	1				1					1		1						1
	Q19		1		1			1			1	1	1				1					1		1						1
Status of mapping	Q20		1	1	1		1		1		1		1			1	1					1			1					1
	Q21		1	1	1				1		1		1			1	1					1			1					1
Status of data	Q22	1	1		1						1					1	1		1		1	1	1	1						1
	Q23		1		1			1			1						1					1		1						1
	Q24	1	1		1		1	1			1	1	1			1	1				1	1	1	1						1
	Q25		1		1			1			1						1					1	1	1						1
Case studies and projects	Q26		1	1	1			1			1	1	1				1					1	1	1	1					1
	Q27		1	1				1			1						1					1		1	1					1

3. Revisiting the identified recommendations and solutions

An extensive list of detailed and concrete recommendations for all "solution themes" (justification, communication, capacity building and technical support) was identified earlier in the workshop held in Riga and presented in Deliverable 2.2. To assess whether these solutions remained relevant and whether there were additions to be made we created an online survey for stakeholders (Annex 2). The survey concentrated on the currently available ways in which ESMERALDA can support the member states and asked for ideas and recommendations that would support the implementation of MAES beyond the project. Here we also address the ideas and comments brought up in the break-out sessions and panel discussion held during the workshop of Plovdiv.

3.1. An on-line survey to national level stakeholders of ecosystem services mapping and assessment activities

The planning of the survey began already in the spring of 2017 in collaboration with ESMERALDA participants engaged in WP2. The objective was to build on the recommendations detailed in Deliverable 2.2 and give the support groups and stakeholders one more opportunity (1) to share what they viewed as the most pressing issues that could still be addressed before the end of ESMERALDA, (2) give an idea of their needs for support beyond the project and (3) discuss how to build sustainability of the project activities (the last two feeding Deliverable 2.5).

In June 2017 the entire list of identified stakeholders from member states and the three additional non-EU countries (Israel, Norway and Switzerland) was updated to ensure that the survey was targeted at all the relevant people. The first draft of the survey was sent for a round of comments to the ESMERALDA Executive Board in June 2017. The survey was planned to be rather long requiring some time and thought since we wanted to take advantage of this final opportunity for stocktaking. Some questions from the stakeholder survey of 2015 were repeated to gather information on the changes in needs.

The sending of the survey was lifted until after the summer break to increase participation thus it was sent out in September 2017 to a total of 314 recipients. Initially the deadline for answering was set for the September 22nd. However, due to lack of responses the deadline was first extended by about a week and an email reminder was sent. By the beginning of October the number of answers still remained very low, with only 19 answers representing only 12 EU countries. These numbers were presented in the Plovdiv workshop and another round of reminder emails was sent out. The on-line survey was finally closed on 16 October 2017. One final response was received via email in November 2017. The final number of respondents was 38, with 35 answers from EU countries and three from non-member states.

The response rate was rather low and not all member states are thus represented. Some reasons as to why people did not answer was perhaps the length of the questionnaire. We also received a comment about the survey not being anonymous, which in some cases apparently led to not answering. During the panel discussion in Plovdiv, the idea about whether surveys in general are a meaningful method for communicating with stakeholders was brought up. The worry of misunderstandings and not being able to express oneself satisfactorily and not always being sure of the purpose of the surveys were reasons behind the comment. On the other hand, carrying out interviews with even just one person from each member state would need remarkable effort.

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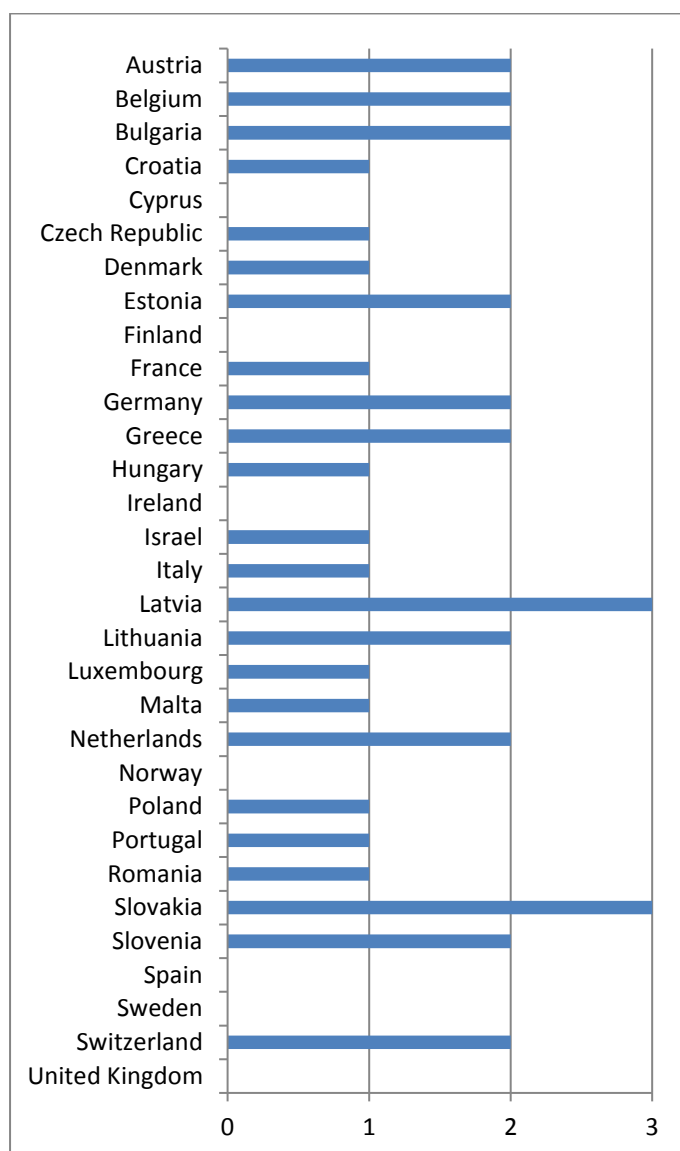
Figure 1: Number of answers according to country.

3.2. Insights from break-out group sessions at Plovdiv workshop

ESMERALDA arranged a mid-term workshop and project meeting in Plovdiv, Bulgaria, on 2-5 October 2017. The aim of the project was to present and discuss the final version of the ecosystem services mapping and assessment methods with project partners, various stakeholders and members of the ESMERALDA Science-Policy-Society Advisory Board (SPSAB). The feedback on the achievements so far was collected during interactive sessions.

The stakeholders were selected and invited based on prior ESMERALDA Workshops (such as Riga October 2015, testing workshops, other events), from the European Commission, the MAES (Mapping and Assessment of Ecosystems and their Services) working group, the SPSAB and from ESMERALDA (consortium members who are at the same time official MAES representatives of their country).

During a plenary session on ESMERALDA networking and stakeholder involvement, participants were informed about the stakeholder network that had been initiated by ESMERALDA and the activation

and maintenance of the network during the last months of the project and beyond was discussed. The idea was to make clear the purpose and significance of networking and stakeholder involvement to all participants, as well as to inform about how to participate and contribute to network activities.

After the plenary session there were two break-out sessions in which it was brainstormed how the national support groups could activate themselves and build national actor networks that could carry on the support actions and provide discussion fora over the long-run. Four discussion points were presented:

1. How can national support groups be activated?
2. What kind of help would be beneficial from frontrunner networks?
3. Guidance and guidelines: what guidance could be beneficial to activate national support groups' work?
4. How to ensure the continuation of national networks beyond the project?

The method used in the break-out sessions was based on two steps: (1) pair discussions on the given topics and identification of concrete solutions on sticky notes and thereafter (2) organising the solutions on big flap papers and discussing them with the whole group to go even deeper in terms of concrete recommendations.

Participants of the workshop representing national Ministries or Agencies were especially invited to these break-out groups. In addition, a number of researchers complemented the groups.

3.3. Panel discussion at Plovdiv workshop

In addition to break-out groups a facilitated stakeholder panel discussion was also arranged as a plenary session (see Annex 3 for the list of panellists). The aim was to discuss support options and concrete products that ESMERALDA can provide to EU member states and the European Commission to efficiently implement MAES and support policy and decision making.

The discussion was led by one of the SPSAB members, Neville Crossman, and it focused firstly on expressing some of the current struggles related to MAES in the different countries and then moved on to more solutions, ideas and examples of successful mapping activities.

The panel discussion was recorded and later transcribed for the purpose of qualitative content analysis. The viewpoints brought up in the panel are presented here anonymously.

The fact that the different countries are at different stages of the mapping was brought up several times during the panel discussion. This was seen both as a challenge for ESMERALDA to provide general solutions but also as an opportunity for front-runner countries to share their positive experiences and help mid-level and beginner countries to avoid making the same mistakes.

4. ESMERALDA support mechanisms

One of the initial ideas of the survey was to get a clearer idea of whether stakeholders were aware of the support measures and activities of ESMERALDA and what they saw as the most important measures provided. For all support measure themes a set of questions with concrete examples were provided and lastly the opportunity to bring out new issues was given in an open text question. In all themes many already previously recognized issues were brought up. Here we aim to analyse which solutions and recommendations have already existed through the implementation of ESMERALDA and which ones are missing and need to be developed in the future.

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4.1. Justification

4.1.1. The need of ESMERALDA experts for promoting MAES

In Deliverable 2.2 the option of inviting an ESMERALDA expert to promote MAES was presented as a solution to the issue of justifying MAES activities in EU countries. Upon asking whether this would still be useful 65% of the respondents answered "Yes". The respondents presented various reasons as to why this would be helpful. Here the reasons have been grouped under themes that arose from the answers to the open question:

Approaching policy-makers, authorities and government in order to

- Convince them of linkages of ES and other themes such as Natural Capital and climate change.
- Facilitate dialogue about the challenges and obstacles of MAES for policy uptake.
- Show the value of using the most appropriate methods for national assessment.
- Increase the policy relevance of MAES.
- Get more local authorities and people involved in mapping.

Improving awareness of MAES

- Especially of those who are in charge of MAES at the national level.
- Of different stakeholders apart from MAES experts.
- To raise the prestige of national MAES projects and revitalize already started projects.

For learning and sharing knowledge

- From front-runner countries to countries at earlier MAES stages.
- On how to conduct ES mapping in conditions where resources are lacking.
- In order to have more precise methodologies and knowledge about choice of data and methods.

Bringing legitimacy from research at international level

- External experts promoting a European agenda might seem more convincing to national authorities.

The respondents who did **not find ESMERALDA promotion of MAES necessary (35%)** provided reasons and suggestions such as:

- The country already has experts or other projects related to the topic.
- There is sufficient awareness of MAES.
- Outsiders will not understand the local conditions and thus cannot help.
- More useful would be support from the EC, politicians and NGOs.

In general, the support hoped for justification of MAES activities revolved around communication especially with policy sectors and knowledge sharing among everyone. These answers give us ideas on how to build the capacity of the members of national networks for mapping and assessment activities so that they can promote the different aspects related to the mapping and assessment of ecosystem services in the different countries. Not surprisingly, the front-runner countries expressed less need for help in promoting MAES, with 67% responding that promotion was not necessary.

4.1.2. Activating the support groups or national networks for mapping and assessment

National support groups for the implementation of ecosystem services mapping and assessment activities were formed in each country earlier in ESMERALDA, but in some cases stakeholders still felt that they needed more help in activating these support groups. This type of support is possible

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to receive from ESMERALDA. Echoing the results in 4.1.1 above, only 22% of the front-runner representatives felt the need for help to activate support groups or national networks for ES mapping in their country, whereas 56% of the total answers responded "yes" to this support measure's usefulness. As reasons to why it could be helpful respondents mentioned similar issues as above for the promotion of MAES. It was hoped that activating the support groups could:

- Create pressure to make things happen
- Raise attention at higher levels of government
- Strengthen capacity for carrying out MAES activities on both local and national levels
- Create linkages between different entities and experts on both national and international levels
- Strengthen the communication of MAES to authorities
- To get support for other projects related to MAES

The answers above also echo comments that were given in the panel discussion. The idea of broadening the stakeholder network and narrowing the focus to specific policy issues was brought up by several panellists.

Lack of resources as an obstacle to activating or developing national networks and thus financial support was also mentioned as a solution by some respondents. One person also mentioned the idea that it is the responsibility of the member state to build the national network and thus ESMERALDA help would not be required.

4.1.3. Other solutions for justification

From the open question related to any other solutions to justify MAES activities, the need for **clear real life examples and case studies including success stories** was called for in several responses. These were seen as raising public awareness and more importantly showing the benefits and potential for smarter decision making. Organizing a national event was also noted as a measure for justification by a respondent. As many of the other solutions related to communication, they will be mainly discussed in the following section.

Among the further suggestions to justify MAES activities there were not any clear ones to which ESMERALDA does not currently provide support for. The answers to the questions show that the problems remain similar to the ones identified previously and vary according to country, thus the range of solutions should be more context-specific. Some countries expressed that ESMERALDA may not be able to address all locally specific problems and thus developing the nations' own capacity to address them was key. However, rather than lacking support from ESMERALDA, it seems that respondents were not perhaps aware of all the support measures for the justification of MAES. Ways for improving both internal and external communication of ESMERALDA activities are presented in Chapter 6.

4.2. Communication

Communication was an issue for which support was required from many perspectives; nationally, internationally, among experts, to policy makers and the general public, etc. In Deliverable 2.2 the identified solutions that ESMERALDA could provide were mainly related to acting as an intermediary between stakeholders and other institutions, especially internationally. The new recommendations and solutions arising from the survey as to what ESMERALDA could improve in terms of communication were mainly related to amplifying messages and outputs and more efficiently communicating issues and solutions (see 4.2.3)

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4.2.1. ESMERALDA as an intermediary for the EC and clarification of the ES concept

The responses to whether ESMERALDA could help as an intermediary between the European Commission and Member States were very divided (yes= 53%, no= 47%). Listed below are some of the reasons for why respondents thought it could help. Where the responses overlap with answers given in the previous section (justification) they have not been repeated here.

ESMERALDA could help as an intermediary by:

- Making the need for more detailed (remote sensing) data known to EU policy levels.
- Initiating urgent activities in member states.
- Improving bilateral conversation and knowledge sharing with member states and the European Commission.
- Harmonizing the different systems of mapping across EU member states.
- Facilitating and improving the organisation of meetings between member states and the European Commission.

The respondents who answered that an intermediary role by ESMERALDA was not necessary justified it by noting that additional actors might lead to misunderstandings and direct communication would be better. Some also mentioned that the MAES working groups already have good communication with the European Commission. For countries that already have a functioning communication channel with the European Commission, ESMERALDA has thus little to offer in terms of brokerage, but for countries still developing their relations to the European Commission for MAES activities, ESMERALDA could serve as the initiator of communication.

We also inquired whether help was needed to clarify the ecosystem service concept to policy makers since the issue of building and communicating policy relevance of MAES activities had been noted as an obstacle previously. Seventy-four per cent (74%) answered that this type of clarification would be useful. There were doubts to whether policy makers have a clear understanding about how to implement mapping and assessment into policy. In the panel discussion also the observation that instead of talking about ES as something obvious we should focus more on how to explain the concept itself and the reasons we talk about it so much. A panellist noted that similarly to the Natura 2000 process, maybe for MAES, activities regarding clear communication plans should be put in place.

During the panel discussion also the doubt of whether the ES concept and assessment would really work as an additional argument, for example in nature conservation policy, was presented. Thus despite clarifying the concept there was uncertainty whether it would actually make a difference for certain sectors.

4.2.2. Creating linkages between other projects

The most useful solution for communication was seen as the possible linkages that ESMERALDA could offer with other international projects related to ecosystem services and their mapping and assessment activities (e.g. MESEU, TRAIN, OPERAS, OpenNESS) (94% answered yes). Regarding related networks, only two respondents felt that linkages would not be beneficial and one person responded negatively regarding linkages with related international networks and initiatives (97% saw them useful). The perceived usefulness of different networks is presented in Table 3.

There was no meaningful preference as to which network people wished to have access to, rather all networks and their materials were seen as useful. Finding ways to create meaningful linkages with these other projects and networks is perhaps something ESMERALDA could focus on for synergy benefits, increasing the stakeholder network and sharing of knowledge. The idea that knowledge

sharing was the greatest benefit of ESMERALDA was also projected in the panel discussion, where it related especially to when and how to use different methods for data collection and mapping.

Table 3: Which networks or materials would you be interested in having linkages or access to?

Network	YES	NO
ESP[1]	91 %	9 %
IPBES	79 %	21 %
MEA	85 %	15 %
TEEB	85 %	15 %

[1]Ecosystem Service Partnership

4.2.3. Other solutions for communication

As unique solutions for communication and for which ESMERALDA currently does not provide support the following were mentioned:

- EU wide media campaigns.
- Announcing promptly the publications of ESMERALDA guideline materials.
- Policy briefs and disseminating the latest news and updates regarding ES for easy access of policy-makers.
- Materials in more understandable language, not "MAES jargon".
- Showing where ecosystem service assessments have influenced existing policies.

As to the other solutions that already are available but need to be better used and communicated the following responses came up in the open question:

- Showing the charts of progress of other countries (creates pressure for countries who are behind)
- Clear guidance materials for MAES implementation
- Case studies and practical uses and examples

The suggestions on how to improve ESMERALDA communication internally and externally are presented in Chapter 7.1.

4.3. Capacity building

ESMERALDA has identified a wide range of concrete solutions for support measures related to capacity building. The project offers various types of materials in different formats that are available to the member states. 97% of respondents noted the 2017 "Mapping ecosystem services" open access handbook as relevant or helpful for capacity building of mapping and assessment of ecosystem services in their country.

4.3.1. Training and education

The solutions identified in Deliverable 2.2 report put across options of possibly available materials and courses that ESMERALDA could provide. In the survey we enquired which practices stakeholders found would be the most useful (Figure 2).

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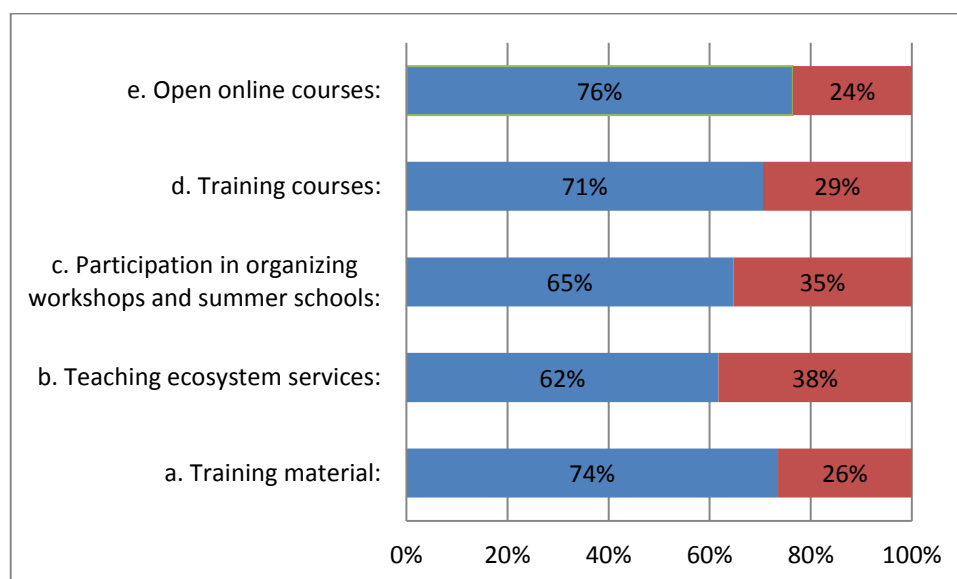
Figure 2: Materials and courses found relevant or helpful for capacity building

All options were considered useful by over 61% of respondents. The general option of "training material" and the option for "open online courses" were seen as the most relevant and helpful. Regarding the materials the following ones were specified in the open question:

- Material and courses on mapping and assessment methods on national and local levels.
- Ecosystem service mapping and assessment related tools and their use.
- Materials with detailed method descriptions, decision keys and without inconsistencies
- Regional ESP conferences
- Online courses for GIS and data processing (with examples)

A helpful next step could be identifying the different types of courses and content stakeholders require and seek organizers of such courses and provide this information to stakeholders where ESMERALDA is not able to provide the courses itself.

We also inquired whether ESMERALDA could help in curriculum development in institutions. This was found not to be relevant or helpful by the majority (65%). The reason for the low rate of positive responses might be due to the vagueness of the questions as it was left unclear where (in which institution for example) and how ESMERALDA could help. This confusion was also reflected in the open answers given. However, institutions such as forestry, agriculture, biology and social-economic sciences were mentioned as possibly benefitting from this type of activity. Additionally, help for curriculum development at university was suggested as well as just having ESMERALDA experts give guest lectures at summer schools, for example.

4.3.2. Other recommendations for capacity building

Many of the additional recommendations and solutions provided for capacity building overlap with the technical support measures and will be detailed in the following subchapter. Some of the answers to the open questions, however, give clues to what the contents of the capacity building materials could include:

- GIS data available at the EU level.
- Open access models that can be run at the national scale.

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Innovative methods such as video games were mentioned as novel materials for capacity building. These could be useful also for the communication of the MAES activities to the wider public.

The curiosity of how mapping and assessment began "out of order" in Europe was also mentioned. This related to the fact that the mapping started in countries before actual monitoring or guidelines were set up, thus making the development of the processes happen simultaneously to the actual activities. This was seen not necessarily as negative, but as very challenging. Echoing these thoughts one panellist mentioned that completing the work on guidelines and methodology was seen as something crucial for ESMERALDA's activities in last months of the project. Capacity building is reliant on the materials and guidelines and thus disseminating them in order to have coherent and consistent practices in MAES is important. As noted earlier, stakeholders mention knowledge exchange frequently and it can thus be seen as one of the key functions of ESMERALDA. Therefore, this should be facilitated in all aspects of MAES activities.

4.4. Technical support

The technical support that ESMERALDA could provide is also related to making linkages and connections to already existing platforms. Additionally, the need for various types of guidance materials and technical help for data and methods and their use had been voiced in the Riga workshop.

4.4.1.   Data and platforms

A total of 88% of respondents said that making information, data and maps available via open-source platforms would be helpful and relevant. Details as to why and how this would be helpful included:

- Make available model codes and maps at regional and European scales.
- One harmonized platform or database with all the necessary information and a network of people doing mapping.
- Ready-to-use time series datasets of large numbers of variables.
- Spatially referenced socio-economical information.
- Data for ecosystem service indicators.
- High resolution remote sensing data and geoinformation.

As one can see from these responses, some of the needs are very detailed and specific. As possible sources for some of this information we had listed the platforms EU BISE, ESP-VT[4] and OPPLA. Upon asking whether people had used these platforms, the EU BISE stood out as the most well-known (53% had used it) whereas ESP-VT had only been used by under one fifth of the respondents (Table 4). Whether people were aware of the platforms and had just chosen not to use them cannot be deduced from the answers in the survey. However, in one open answer the respondent clearly expressed that authorities responsible for mapping had not been aware of the possible tools and data available.

Table 4: Have you used any of the following platforms?

Platform	YES	NO	N
EU BISE	53 %	47 %	34
ESP-VT	18 %	82 %	34
OPPLA	44 %	56 %	34

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[4] Ecosystem Service Partnership – Visualisation Tool

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Forty-four per cent (44%) of stakeholders had used OPPLA and one person also referred to it when answering to an open question in the previous section about capacity building. Seemingly, maintaining OPPLA and the Q&A section was found useful for supporting teams in charge of mapping. One respondent said that it would be useful to have more information in general about the different platforms and their use for diverse stakeholders.

4.4.2. Guidelines and guidance

Connected to the previous section (4.4.1) the guidelines and guidance needs for mapping and assessment include many similar issues as linked to the platforms:

- Scaling (downscaling, for example).
- Selection of ecosystem services, indicators and methodology.
- Ecosystem services in different areas (urban, forests, protected habitats) and their capacity.
- Cross walk tables to EUNIS categorization and ecosystem services.

The majority (94%) responded that guidance on, for example, available models, data needs, indicators, scale issues and ecosystem service selection was helpful and many specified in their response to the open question that all type of guidance, be it indicators or data etc., would be necessary. Some respondents did not find guidance as relevant since they felt the current guidelines were helpful enough. One respondent also pointed out that perhaps guidance in itself was not necessary, but guidelines as an outcome of ESMERALDA could be valuable for comparing national approaches and filling gaps.

Even though the areas in which guidance was required were relatively diverse, 62% of the respondents did not see that they needed guidance from ESMERALDA in using CICES, the Common International Classification of Ecosystem Services[5]. The ones who responded that they needed assistance in the application of CICES mentioned challenges in harmonising data with other systems, the use of different versions of CICES, adapting classifications to national contexts and obtaining locally / regionally relevant classifications.

4.4.3. Other recommendations for technical support

The final question on support provided on what support ESMERALDA could still develop included the following:

- QGIS plugin with guided access to all different sources of maps.
- Stakeholder engagement guidelines (falls more under communication).
- Practical workshop.

Altogether is seemed that the supporting activities for all themes (justification, communication, capacity building and technical support) had been well identified. The problem does not seem to be that there is not enough help available but rather that there was not enough knowledge of the support options and materials. These issues are more closely addressed in Chapter 7.

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[5] https://cices.eu/

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4.5. Knowledge of available support from ESMERALDA

We wanted to know whether national stakeholders of ecosystem service mapping and assessment were aware of the support options which ESMERALDA project could provide for them. Forty-two per cent (42%) of stakeholders knew about the possibility for support but only 16% (= six respondents) requested it. The issues to which support was requested were related to, for example, communication and capacity building, and technical mapping information about the appropriate scale for a national assessment and the type of raster data that should be used. We also asked whether the needed support was received. Here the interpretation of the survey results is a bit difficult because only six respondents had reported about requesting help but altogether 17 respondents said they had received the needed help and 21 replied that they had not got help. This was despite we clearly linked the latter question with the previous one by asking "If yes, did you receive the support you needed?"

As a summary of this chapter we clearly see that the communication of available support measures should be improved. The Final Guidance Material in a web platform must be well promoted and disseminated across the EU member states and especially to the national stakeholders responsible for ecosystem service mapping and assessment activities.

4.6. The most pressing and relevant policy questions related to ecosystem service mapping and assessment in the countries

Throughout the ESMERALDA project there has been an aim to provide help especially in how MAES activities can be used to inform policymaking and policy questions. For this final stocktaking we found it would be beneficial to give the opportunity for stakeholders to express the most pressing policy themes that need attention about ecosystem service mapping and assessment. Through the survey currently crucial policy questions were collected to help understand whether the previously identified themes resonate with what the stakeholders see as pressing questions. The following policy themes were previously identified by ESMERALDA:

- Nature conservation
- Climate, water and energy
- Marine Policy
- Natural risk
- Urban and spatial planning
- Green infrastructure
- Agriculture and forestry
- Business, industry and tourism
- Health

Respondents' policy relevance related remarks were classified under these themes. When these did not seem appropriate, new themes were identified. The findings are presented below in the order of decreasing number of remarks.

Urban and spatial planning
Ecosystem services should be integrated in spatial planning and its processes at all levels (local / municipality, regional, national). MAES is valuable for regional planning and it can provide an interlinkage between already institutionalised (but rather weak) landscape planning on the local and state level and ecosystem condition and ecosystem service mapping on the state level. However, it was asked how the results of MAES could be properly integrated into planning processes.

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MAES can support the development of policies for the sustainable urban expansion and sustainable development in metropolitan areas. Many questions still arose:

- How to develop strategies that integrate ecosystem services in site-specific and sustainable land use?
- How to enhance ecosystem services in urban areas?
- How to halt land sealing and unsustainable land use change?

Nature conservation

The negative impacts of biodiversity loss on human well-being increase. It requires the development of policy and governance to preserve key ecosystem services that impact strongly our well-being. That is why the efforts should be focused on answering the questions "why, when, where, and how" so that we can better manage and restore our ecosystems. These are crucial questions to promote alternative regimes combining conservation, sustainable use and restoration of ecosystems in the country.

MAES can support the development of policies for the habitat and biodiversity conservation (showing linkages between ecosystem conditions and ecosystem services). MAES has a special value for protected areas; for example, there is pressure to do more forest clear cutting and simple arguments about others forest ecosystem services do not work. Ecosystem services should be integrated in the planning of protected areas.

MAES has supported the Strategy and Action Plan for nature protection of the Republic of Croatia for the period 2017-2025.

Questions still remain:

- Will ecosystem services assessment be beneficial to nature conservation in different types of areas (in special protected areas, for particular species, as well as for areas without any special conservation concerns)?
- The topic of ecosystem services mapping and assessment is not policy relevant enough as there are no "formal" consequences (such as infringement). Therefore, other issues like Natura 2000 and UNESCO (problems with UNESCO publicized in the media) are given priority. (Nevertheless, ecosystem services can be integrated into Natura 2000 and UNESCO sites management and designation.)

Climate, water and energy

The negative impacts of climate change on human well-being increase, too. Same issues as with nature conservation regarding the development of policy and governance to preserve key ecosystem services imply also here, as well as the focus on questions "why, when, where, and how" we can better manage and restore our ecosystems.

Here is a list of some policy-relevant questions, without presuming which are most pressing:

- What is the real potential of nature-based solutions for climate change adaptation (water flow regulation, etc.)?
- What is the real contribution of ecosystems to mitigate water and air pollution?
- How can we use ecosystem services in climate adaptation strategies?
- How to improve climate regulating ES?

Business, industry and tourism

Mapping and assessment of ecosystem services related to business, industry and tourism raised many questions:

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- What is the potential of genetic resources to foster research and development in different sectors (medicines, cosmetics, etc.)?
- What is the potential for ecotourism development?
- What are the values of the goods collected in ecosystems, including non-market goods? How is ecosystems' potential of supplying goods evolving? What is the potential for the development of other types of use?
- How to use and enhance ecosystem services in relation to the goal to develop *a circular economy*?

Health and well-being

As already noted above, there are increasing negative impacts of biodiversity loss and climate change on human well-being. Developing policies and governance to preserve key ecosystem services is crucial in ensuring health and well-being of the global population.

A more specific question is what are the effects of current global megatrends (climate change, urbanisation, etc.) on the attractiveness of natural habitats and landscapes and do they have indirect impacts on people's health and well-being.

Marine Policy

Ecosystem services should be integrated in spatial planning of coastal areas as they have a role in the protection and management of sea and coastal resources.

Green infrastructure

In identifying key green infrastructure of an area, ecosystem service demand versus supply assessment and mapping are needed. Disservices need to be outlined and finally ecosystem services valuated.

Agriculture and forestry

Ecosystem service mapping and assessment supports rural development programming (farming and forestry measures) and CAP greening beyond 2020. The question is how to develop strategies for site-specific and sustainable land use, especially in agro-ecosystems.

Social issues / social justice / environmental justice

What are the current *environmental inequalities* and what is the contribution of ecosystems in mitigating or enhancing them? Mapping and assessment of both ecosystem service demand and supply help in identifying such inequalities.

Natural risk management

Where and how to improve flood regulating ecosystem services?

Other themes

Other policy related themes raised by respondents were:
- Translation of ecosystem service mapping and assessment into specific policy tools, especially SEA or EIA.
- Payments for ecosystem services and monetary valuation.
- Legislation support for ecosystem services.
- Official support.
- Added value of ecosystem service approach compared to previous approaches in environmental management.

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5. Activating support groups and national networks of practice

The support groups or national networks of practice in ecosystem service mapping and assessment act as links between the ESMERALDA project and stakeholders related to the MAES action in each country. It is wished that these groups or networks would sustain their activities after the end of the ESMERALDA project.

There are some very active networks already but many countries still need boosting for getting active. In the survey, 56% of the respondents thought **it would be beneficial to receive help in activating the support group work** in their country.

The break-out group participants saw the activation of support groups to be fundamentally based on **keeping the ecosystem services concept and approaches high at EU agenda** and thus also **stimulating member states to keep it at national agenda**. The ESMERALDA could also be highlighted in Directorate level meetings. To activate national networks it is important to know at which stage they are in ecosystem service mapping and assessment. **Political willingness and personal resources** are missing from the less advanced countries – to keep them motivated there should be **regular meetings where member states could share experiences**. Sharing within MAES, as has been in related projects about ecosystem services, good practices and progress works as a motivator. **Knowledge sharing** could well work for policymakers who may not have been so interested in the scientific part in the beginning of the MAES process.

It was brought up that **national support groups** might not have identified all interested stakeholders. The core groups **should include representatives from across sectors** – economy, transport, tourism, for example – preferably **since the beginning of the support group work, to engage them** and make them to understand that sustainability requires changes in their policies and way of thinking. Also **incentives** could be needed to get "the donkey moving". It was suggested that **big companies could showcase ecosystem services in their business** and ESMERALDA could persuade them to **release small grants** to such initiatives. It is currently a good time for this and even small money could create change.
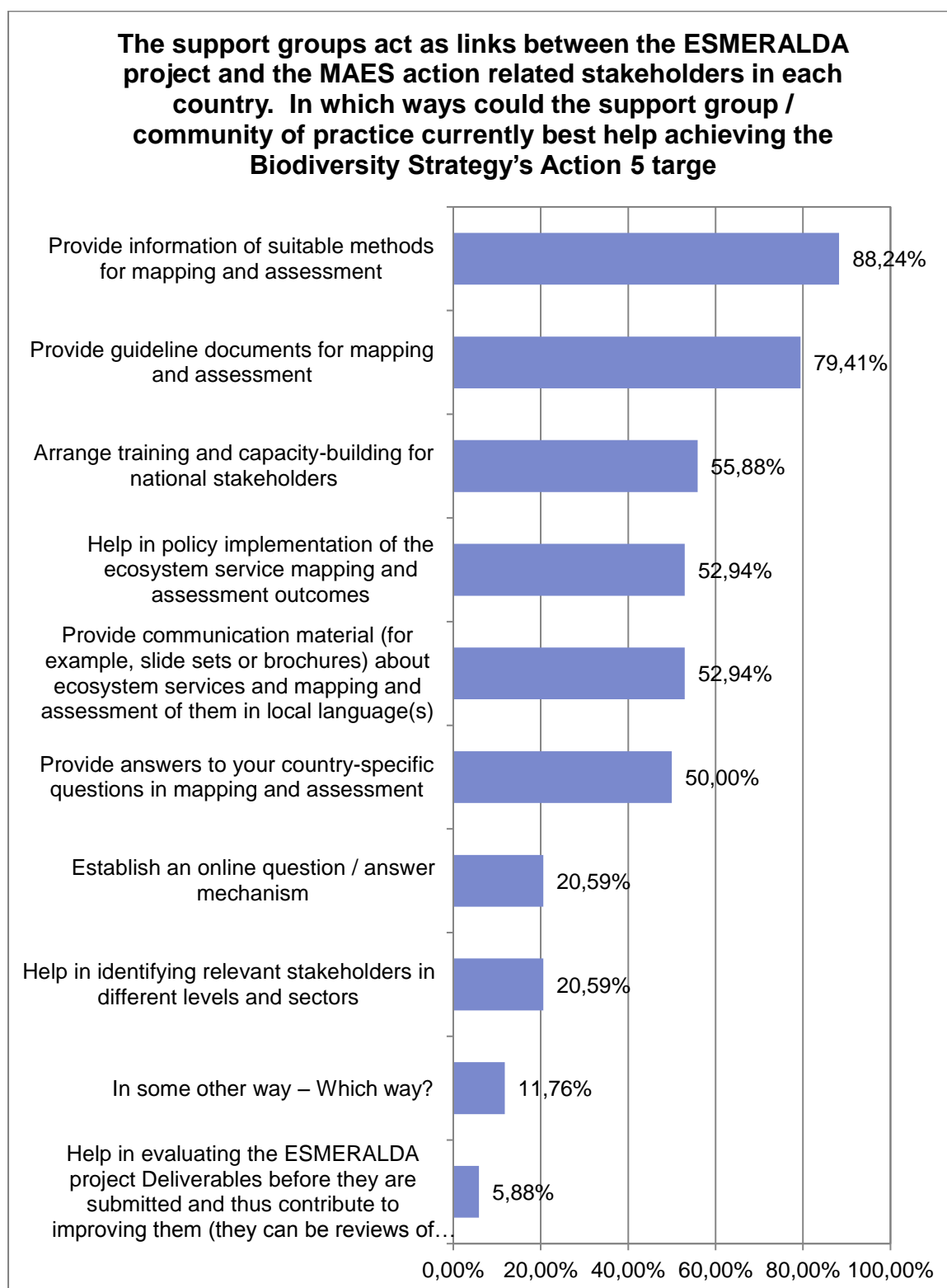
ESMERALDA was perceived to have **an important role as a facilitator and knowledge broker between European Commission and national governments**. ESMERALDA researchers could promote the ecosystem service agenda by **contacting the national governments** which usually appreciate being approached **by international level representatives** and discussing with them in meetings, for example. Support from national ministries for ecosystem service mapping and assessment could also be received **by organising regional or international events**. Because the cost of such events or meetings can be an issue, they could be arranged **as separate side meetings back-to-back with, for example, ESP or MAES meetings**. In each meeting the organiser of the next meeting could be sought for and this would create a loop or chain in organising the events. As at least in MAES the people pay themselves for travel, it would not necessarily be very expensive to arrange such events.

Based on the survey results, providing **information of the suitable methods** (88% of respondents) as well as providing **guideline documents** (79%) **for ecosystem service mapping and assessment** were **the most important ways** the support groups could help in achieving the Action 5 targets (Figure 3). About half of the respondents also appreciated **training and capacity building for national stakeholders** (56%), **help in policy implementation** (53%), **communication material** (53%) and getting **answers to country-specific questions** (50%).

In addition to the pre-listed support options respondents suggested that the national support groups could provide the already **well institutionalised landscape planning communities** with **good examples on ecosystem condition and service mapping** as well as **write post-ESMERALDA joint**

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publications for case studies in order to calibrate and improve methods. Also **making available detailed remote sensing data** was suggested as well as providing **knowledge for actual policy uptake**.

Seventy-nine per cent (79%) of the survey respondents wished **help from ESMERALDA to get in contact with other countries' support groups** or communities of practice. As the most suitable means for this was arranging **knowledge sharing sessions for national support groups as side events in ecosystem service related conferences**, for example, **once a year** (85% of survey respondents). One third of the respondents would like to see ESMERALDA as a facilitator between different countries. One respondent proposed that **MAES meetings** should be improved by making them **more interactive**: instead of many people listening to few others, time should be efficiently used in knowledge exchange formats.

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The support groups act as links between the ESMERALDA project and the MAES action related stakeholders in each country. In which ways could the support group / community of practice currently best help achieving the Biodiversity Strategy's Action 5 targe

Provide information of suitable methods for mapping and assessment	88,24%
Provide guideline documents for mapping and assessment	79,41%
Arrange training and capacity-building for national stakeholders	55,88%
Help in policy implementation of the ecosystem service mapping and assessment outcomes	52,94%
Provide communication material (for example, slide sets or brochures) about ecosystem services and mapping and assessment of them in local language(s)	52,94%
Provide answers to your country-specific questions in mapping and assessment	50,00%
Establish an online question / answer mechanism	20,59%
Help in identifying relevant stakeholders in different levels and sectors	20,59%
In some other way – Which way?	11,76%
Help in evaluating the ESMERALDA project Deliverables before they are submitted and thus contribute to improving them (they can be reviews of…	5,88%

0,00% 20,00% 40,00% 60,00% 80,00% 100,00%

Figure 3: Ways in which the support groups are seen to best help achieving the Biodiversity Strategy's Action 5 targets.

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6. Next steps and life after ESMERALDA project

As one of the outcomes of the survey we perceived that even though stakeholders participated in the many workshops organised by ESMERALDA and gave their active input in them the follow-up of the workshops was almost non-existent, meaning that people remained unaware of the support measures available to them and were not thus able to benefit from the measures. We received comments such as:

- "Responsible authorities had no information about all possible tools and available data for use."
- "Didn't use this information because no one in nature protection sector has a project about ecosystem services (therefore no time to study this approach)."

The solutions, recommendations and measures provided were presented in the Deliverable reports and were openly available to everyone on the ESMERALDA website. Additionally, items, such as the open access handbook for Mapping Ecosystem Services, were expressed in the survey as potentially helpful, but whether people were previously aware of such measures was unclear. However, it seems that the Deliverable reports have not been an efficient means of communicating the results of the workshops and ESMERALDA activities.

There is thus a need to develop more efficient dissemination and communication platform of the various guidance materials providing solutions and recommendations as well as support options produced by ESMERALDA. It should be communicated better when the different reports and guideline materials come out and what they contain, why they are important and in what they can help. Also clearer connections are asked about for whom (which stakeholders) certain tools and guidelines are directed, how they can be used and for what purpose. *The help and support must be actively offered to stakeholders.*

In conclusion perhaps it is not only a question of a lack of information but rather of not being able to find or disseminate information for specific needs (and perhaps in one's own language). On the technical side the problem is also the non-existence of open databases – hopefully availability of open access good quality data will improve quickly in the near future.

One recognised way forward would be to establish networks of mappers. The existence of enthusiastic individuals having the capacity to activate others is the key behind the best practice examples of national networks (e.g. Belgium and Poland). Such people should be identified in each country. However, activities should not depend on just one person but the responsibility needs to be shared between several people in the optimal case. People in the panel discussion in Plovdiv remarked that MAES activities should also be fun in general and keep up enthusiasm among the people involved because that is the glue between people to continue activities post-project (cf. ALTER-Net which has continued and enlarged after the actual project ended).

The coming online Final Guidance Platform offering versatile information on ecosystem service mapping and assessment ranging from topics about stakeholder identification through methods selection to policy implementation, will most probably improve the accessibility of concrete support materials.

We must also find new methods to offer information and help to stakeholders. It was suggested that a list of existing support activities and support persons in each country could be created and dissemination material based on that could be developed and distributed to all relevant actors. An ESMERALDA social media group could also serve as a platform for sharing experiences and mutual

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support. These groups exist within the ESP, the Ecosystem Services Partnership, and could be further endorsed.

Moreover, presenting more tailored policy and case specific solutions would be beneficial. One panelist in Plovdiv mentioned ecosystem service mapping and assessment success stories in cities as a way to create enthusiasm.

In the survey we asked what type of *continuous and permanent support* would be the most beneficial for one's country's efforts in ecosystem service mapping and assessment beyond the project. The needs for support beyond the project varied a lot and some were similar to the ones already identified in the Riga workshop and D2.2. The presented support needs can be crystallised in the following:

- Ecosystem services monitoring.
- Quality control of ecosystem services mapping / assessments.
- The availability of detailed data and computation resources.
- Updated teaching and education material.
- Incorporation of ecosystem services in national and European policy.
- Pressure from the European Union on the national authorities to continuously implement the ecosystem services approach.

The most important support measure would, however, be the introduction of ecosystem service mapping and assessment approach to national legislation of the EU countries. That would provide the justification for giving ecosystems, their condition and the ecosystem services the role that they deserve in policy making.

7. Acknowledgements

We gratefully acknowledge the active and lively contribution of ESMERALDA's national level stakeholders in both break-out group and panel discussion in the workshop in Plovdiv. We also warmly thank all those who took time to answer the online survey.

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Annex 1. Summary statements on the progress on MAES by the member states

Table A: Summary statements on the progress on MAES by the member states recorded one week before the MAES working group meetings of September 2016 and March and September 2017.

MS	Update September 2016	Update March 2017	Update September 2017
AT	No progress update available	No progress update available	No progress update available
BE-FL	No progress update available	No progress update available	No progress update available
BE-WAL	No progress update available	No progress update available	A website is now available but mapping and assessment project is lacking
BG	No update on BISE, a national conference is planned in February 2017 where progress can be measured	No progress update on BISE but substantial progress made; no single Bulgarian ecosystem assessment (but assessments per ecosystem type); METECO conference with presentations of national MAES output (5-6 February)	Bulgaria is making a lot of material available on ecosystem services; several scientific papers and assessments to be published in One Ecosystem; the METECOSMAP project is the main driver; Ministry is the promotor. Still pending: a national assessment (based on the 7 separate assessments) and clearing house mechanism
CY	No progress update available	No progress update available	No progress update available
CZ	No progress update available	No progress update available	Submission of a LIFE project to implement MAES
DE	No progress update available	No progress update available	A good overview available here: https://oneecosystem.pensoft.net/article/14021/ No national ecosystem map, progress on the indicator framework. Progress on ecosystem condition
DK	No progress update available	No progress update available	No progress update available
EE	Progress report on BISE	No progress update available	No progress update available
ES	No progress update available	No progress update available	No progress update available
FI	No progress update available	Progress report was send but not uploaded on BISE yet	Update available on BISE
FR	No progress update available; EFESE is ongoing	EFESE is ongoing	France is doing an assessment and reports are available here: https://www.ecologique-solidaire.gouv.fr/levaluation-francaise-des-ecosystemes-et-des-services-ecosystemiques A national report is expected in

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			2018; an interim report is available
GR	No progress update available	A paper with a national assessment of ES delivered by Natura 2000 ready; the HESP network is under development	There is a good deal of information in this article but BISE is not updated; several scientific publications on mapping ES have been submitted but the role of the state remains difficult to assess. https://oneecosystem.pensoft.net/article/13714/ HESP is leading the initiative
HR	No progress update available but a national habitat map is possibly ready	No progress update available	No progress update available
HU	No updates reported;	no progress update on BISE;	No updates of any further information is available There is currently a project ongoing but we need some updates here. They will do an update during the meeting
IE	Added science as stakeholder (also because of EPA research call); more updates soon as results of mapping project will become available; EPA funds several relevant mapping/assessment projects.	A national report is ready	Update on BISE; MAES is implemented in Ireland and further action on local reginal scale is ongoing; forum on natural capital established; clearing house available
IT	No further progress reported on BISE; paper on MAES published in Plant Biosystems	Italy updated BISE; there is no national full scale ES assessment ongoing but substantial work has been done and is coordinated by La Sapienza university in Rome.	Report on natural capital published
LT	No progress update available	No progress update available	No progress update available
LU	No progress update available	No progress update available	No progress update available
LV	No progress update available	Progress report has been sent after the previous MAES meeting; substantial progress realised an planning for the coming years	No progress update available
MT	No progress update available	No update provided, substantial unreported progress	BISE update available with planning. MCAST has done mapping and assessment but the

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			results are not publicly available yet.
NL	Last BISE update 15 Sept. 2015	No progress update available	Further updates based on BISE. First phase of MAES is completely implemented
PL	ECOSERV meeting useful to provide update	BISE report available	No progress update available
PT	No progress update available	No progress update available MAES implementation at regional level.	Inclusion of MAES in territorial planning strategy
RO	No progress update available	No progress update available but substantial progress made. A dedicated meeting to report progress on 17/03/2017	Romania presented the outcomes of the EEA grant project N4D at the MAES working group meeting
SE	No progress update available	No progress update available	No progress update available
SI	No progress update available	Slovenia has updated BISE; national mapping through the ALPES project;	The interreg project ALPES is likely to cover most of Slovenia and will deliver basic material for a national assessment
SK	No progress update available	No progress update available	No progress update available
UK	No progress update available	No progress update available	No progress update available

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Annex 2. Support group survey

Support group survey

Introductory text:
ESMERALDA is a support and coordination action funded by EC DG Research & Innovation to support EU member states in Biodiversity Strategy's Action 5 tasks.

ESMERALDA project wants to support EU member states (MS) in implementing ecosystem services mapping and assessment in their territory. This is done by assessing practical means as well as providing guidelines and continuous support to responsible authorities. The longer-term target of ESMERALDA is to develop active national communities of practice for sharing knowledge and expertise in the field of ecosystem service mapping and assessment activities.

ESMERALDA started with an evaluation of the status of mapping and assessing ecosystem services in the EU MS. We collected a list of stakeholders in each MS and together with some of them identified the barriers to and knowledge gaps of mapping and assessment work. We also discussed possible solutions together with them.[1,2] The status of each MS has since then been updated regularly over MAES meetings.

The goal of this survey is to check whether we identified all significant barriers and gaps and whether the proposed solutions need updating and if so in what manner. We want to reach out to the whole support group regarding the implementation of ecosystem services mapping and assessment in each MS. As a recipient of this survey, you are considered to belong to the support group of your country. We also like to hear your opinion on what type **of continuous support** you or your country needs, not only method-wise but also in terms of the **stakeholder support group work in MS** and **relevant policy questions**.

To be able to provide the most appropriate support for each member state, we hope you bring out the most critical and relevant issues and *challenges for the <u>final year</u> of the ESMERALDA project.* Answering the survey will take 15 to 30 minutes. By taking this time and giving your insights you ensure your own country's needs will be heard!

Note! The survey contains links to deliverables, project pages, networks etc. in certain questions in order to provide more information on the mentioned project or subject. However, you need not follow the links to answer the survey.

We greatly appreciate your contribution!

[1]Clustering of EU Member States according to their prerequisites and needs to perform ES mapping and assessment (2015)
[2]Ecosystem service mapping and assessment gaps in EU member states and recommendations to overcome them (2016)

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Survey question 1:
Please, select your country
[Drop-down list of countries]

Survey question 2:
Name of the respondent
[FIRSTNAME] [SURNAME]

Survey question 3:
Affiliation of the respondent
[Free text box]

We have developed recommendations and solutions with stakeholders to address the needs and challenges brought up by them. They were grouped under four topics: 1) Justification, 2) Communication, 3) Capacity building and 4) Technical support.

The following questions are aimed at assessing whether the suggested solutions are still relevant or if they need updating and/or additions. We are also interested in your awareness regarding the solutions and support measures provided.

Survey question 4:
Justification. Please indicate whether the following solution provided by ESMERALDA could be relevant or helpful for the justification of the Mapping and Assessment of Ecosystem Services in your country:

1. Inviting an ESMERALDA expert to your country to promote MAES: [YES / NO]
Please specify how this would or would not help: [Free text box]

2. Receiving help in activating the support group or national networks for ES mapping in your country: [YES / NO]
If you answered yes, please specify what type of help is needed: [Free text box]

5. Are there other solutions and support measures from ESMERALDA for the **justification** that you feel could be relevant/critical for your country during the last year of the project?

If yes, please specify: [Free text box]

Survey question 5:
Communication. Please indicate whether the following solutions provided by ESMERALDA would be relevant or helpful in communications of Mapping and Assessment of Ecosystem Services in your country:

1. ESMERALDA partners acting as intermediates or brokerages between   [YES / NO]
EU member states and the European Commission:
If you answered yes, please specify how this could help: [Free txt box]

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2. Offering linkages with other related projects and their materials? (e.g. MESEU,
TRAIN, OPERAS, OpenNESS)   [YES / NO]

3. Offering linkages with other related international networks and initiatives (ESP,   [YES / NO]
IPBES, TEEB)

4. Which networks or initiatives and their materials would you be interested in having linkages or
access to?:
ESP: [YES / NO]
IPBES: [YES / NO]
TEEB: [YES / NO]
BISE: [YES / NO]
Other, which?   [Free text box]

5. Receiving help for clarifying the Ecosystem Service concept to policy-makers   [YES / NO]

6. Are there other solutions and support measures from ESMERALDA for the **communication** of the
Mapping and Assessment of Ecosystem Services that you feel could be relevant/critical for your
country during the last year of the project?   If yes, please specify: [Free text box]

Survey question 6:
Capacity building. Please indicate whether the following solutions provided by ESMERALDA would
be relevant or helpful for capacity building related to the Mapping and Assessment of Ecosystem
Services in your country:

1. The "Mapping ecosystem services" open access handbook, published in 2017.   [YES / NO]

2. Any of following materials/courses
a. Training material: [YES / NO]
If you answered yes, please specify the type/topic of material needed: [Free text box]
b. Teaching ecosystem services: [YES / NO]
If you answered yes, please specify the type/topic of teaching needed   [Free text box]
c. Participation in workshops and summer schools: [YES / NO]
If you answered yes, please specify the type/topic of workshops or summer
schools needed: [Free text box]
d. Training courses: [YES / NO]
If you answered yes, please specify the type/topic of course needed: [Free text box]
e. Open online courses: [YES / NO]
If you answered yes, please specify the type/topic of course needed: [Free text box]

3. ESMERALDA helping in curriculum development: [YES / NO]
If you answered yes, please specify what type and for what institution would this be helpful: [Free
text box]

5. Are there other solutions and support measures from ESMERALDA for **capacity building** in the
Mapping and Assessment of Ecosystem Services that could be relevant / critical for your country
during the last year of the project?   [Free text box]

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Survey question 7:

Technical support. Please indicate whether the following solutions provided by ESMERALDA would be relevant or helpful regarding the technical support of the Mapping and Assessment of Ecosystem Services in your country:

1. Making information, data and maps available via open-source platforms
(e.g. EU BISE, ESP-VT, OPPLA):   [YES / NO]
If you answered yes, please specify what information is most needed   [Free text box]

Have you used any of the following platforms?:
EU BISE: [YES / NO]
ESP-VT: [YES / NO]
OPPLA: [YES / NO]

2. Providing guidelines and guidance for mapping and assessment (e.g. available models,
data needs, indicators, scale-issues, ES selection):   [YES / NO]
If you answered yes, please specify in what area you need guidance: [Free text box]

3. Providing guidance in ecosystem service classification (CICES) and its application:
                                                                            [YES / NO]
If you answered yes, please specify what type of expertise is needed: [Free text box]

5. Are there other solutions and support measures for **technical support** in the Mapping and Assessment of Ecosystem Services that you feel could be relevant/critical from ESMERALDA for your country during the last year of the project?
[Free text box]

Survey question 8:

1. Did you know about these options for support that ESMERALDA could provide?   [YES / NO]
If you answered no ~~yes~~, please specify which measures were unfamiliar to you: [Free text box]

2. Did you ever request support from ESMERALDA partners regarding any topic listed in the survey (justification, communication, capacity building, or technical issues)?   [YES / NO]
If yes, did you receive the support you needed?   [YES / NO]
Please specify: [Free text box]

According to your experience, what are the most useful support measures to advance the Mapping and Assessment of Ecosystem Services in your country? They can be the ones mentioned above or any other.
[Free text box]

Survey question 9:

What are *currently* the most pressing and relevant **policy questions** related to Mapping and Assessment of Ecosystems and their Services in your country?
[Free text box]

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Survey question 12:
The support groups act as links between the ESMERALDA project and the MAES action-related stakeholders in each country. In which ways could the support group / community of practice *currently* best help achieving the Biodiversity Strategy's Action 5 targets of ecosystem service mapping and assessment **in your country**? Please, tick appropriate.

1. Help in identifying relevant stakeholders in different levels and sectors [TICK BOX]
2. Provide communication material (for example, slide sets or brochures) about ecosystem services and mapping and assessment of them in local language(s) [TICK BOX]
3. Provide guideline documents for mapping and assessment [TICK BOX]
4. Provide information of suitable methods for mapping and assessment [TICK BOX]
5. Provide answers to your country-specific questions in mapping and assessment [TICK BOX]
6. Establish an online question / answer mechanism [TICK BOX]
7. Help in evaluating the ESMERALDA project Deliverables before they are submitted and thus contribute to improving the Deliverables (they can be reviews of methodologies, descriptions of exemplary case studies, for example) [TICK BOX]
8. Arrange training and capacity-building for national stakeholders [TICK BOX]
9. Help in policy implementation of the ecosystem service mapping and assessment outcomes [TICK BOX]
10. In some other way – Which way? [Free text box]

Survey question 10:
Would you like ESMERALDA to help you get in contact **with other countries'** support groups / communities of practice? [YES / NO]

If you answered yes, how could ESMERALDA help:
1. Act as a facilitator between different countries [TICK BOX]
2. Arrange knowledge sharing sessions for national support groups as side events in ecosystem service-related conferences, for example, once a year [TICK BOX]
3. Do something else – What? [Free text box]

Survey question 13:
Finally,
what type of **continuous and permanent** support do you feel would be most beneficial for your countries efforts in Mapping and Assessment of Ecosystem Services **beyond** the ESMERALDA project?
[Free text box]

Concluding text:
Thank you very much for your important input! We will also conduct in-depth interviews with some stakeholders regarding the most critical issues regarding policy questions and support measures.

If you have any questions regarding the support groups / communities of practice, please contact:

Leena Kopperoinen, Finnish Environment Institute   Joachim Maes, Joint Research Centre
leena.kopperoinen@ymparisto.fi   joachim.maes@ec.europa.eu

In questions regarding the survey, please contact:
Liisa Varumo
liisa.varumo@ymparisto.fi

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Annex 3. List of stakeholders in panel discussion in Plovdiv

Bálint Czúcz	European Topic Center of Biological Diversity, Museum Nationale d'Histoire Naturelle, Paris, France
Branka Tavzes	Ministrstvo za okolje in proctor, Slovenia
Corina Gheorghiu	WWF Romania
Florian Bodescu	Romanian Space Agency
Giulia Capotorti	Sapienza University of Rome, Italy
Iva Hönigová	Nature Conservation Agency of the Czech Republic
Karsten Grunewald	Leibniz Institute of Ecological and Urban and Regional Development, Germany
Lauri Klein	Estonian Environment Agency
Markus Erhard	European Environment Agency
Miglena Zhiyanski	Bulgarian Academy of Science
Neville Crossman	University of Adelaide, Australia
Radoslav Stanchev	Executive Environment Agency, Bulgaria
Rayka Hauser	European Commission
Sander Jacobs	Belgian Ecosystems & Society
Yann Kervinio	French Ministry for the Ecological and Inclusive Transition / Office of the General Commissioner for Sustainable Development