Linking Biodiversity to National Economic and Social Priorities in the EU Member States

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Background Document

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Contents

1 How can biodiversity contribute to socio-economic priorities in EU Member States?

This background document summarises preliminary finding of an ongoing study on "Linking Biodiversity to National Economic and Social Priorities in the EU Member States" (European Commission Service Contract No 07.0202/2015/717714/SER/B.2). The following chapters present a synthesis of findings across the EU, notably for six promising areas where biodiversity has the potential to contribute to wider socio-economic priorities in Member States. These preliminary findings will be discussed at three regional workshops in Barcelona, Helsinki and Berlin. A fourth EU-wide workshop will take place in Brussels in September 2017 with a focus on EU funding and the European Semester process.

The aim of the workshops is to share the preliminary findings and build on them to develop the understanding of how nature-based solutions can address countries' socio-economic priorities, what the opportunities and drivers of change are, what barriers exist, and what measures are needed (at EU, national and regional levels) to help realise the opportunities for benefits.

1.1 Biodiversity contribution towards socio-economic priorities in EU Member States

Protecting biodiversity and enhancing multiple ecosystem services can, via their integration in a number of relevant sectors, contribute to economic and social priorities in EU Member States. While the multiple benefits of biodiversity and nature are increasingly understood, there exists ample scope to make better use of opportunities of working with nature across the European Union and realising these benefits.

The analysis of such opportunities requires both an overview of existing studies and research across Europe and an analysis of the specific situation in the Member States. Though some sectors such as tourism, agriculture or forestry have obvious links to nature and biodiversity, marked differences across Member States exist and need to be considered to identify promising areas in which biodiversity protection can contribute to current socio-economic priorities. For example, for a number of Mediterranean countries, there exist opportunities in sustainable fisheries and coastal management.

Socio-economic priorities in EU Member States and the role of biodiversity

This study departs from the current socio-economic challenges and priorities of the Member States both from a short-term and medium-term perspective (including, inter alia, the European Semester process, progress towards the objectives of the Europe 2020 strategy, and priorities of Member States as documented in Partnership Agreements under ESIF funding) and assesses the potential of biodiversity to support these priorities. The analysis covers six areas where biodiversity has the potential to contribute to socio-economic objectives:

- Economic growth
- Jobs, skills and innovation

- Public Health
- Regional development
- Urban development and regeneration
- Demographic change and social justice

The review of policy documents at the national level and wider literature consulted shows that the challenges that Member States face are of a short (e.g. impacts of recent economic crises on employment and growth), medium (e.g. regional economic decline) and long-term nature (e.g. demographic change, aging). Many of these challenges link to structural changes or weaknesses, for which investments into different forms of capital, including human and natural capital, are crucial.

Already today, nature-based approaches and investments into nature yield important benefits e.g. in the form of jobs created (at different skill levels), growth and regional development, or for public health. From an overarching EU-wide perspective, some integration of biodiversity and nature protection into other sector policies (to help reach sector goals) can be observed, though has not reached its full potential yet. For some areas of interest, comprehensive assessments of socio-economic benefits are not available yet (e.g. the employment creation potential around marine protected areas), especially from a quantitative perspective.

Country-level analysis and identification of potential priority areas

Based on an analysis of the socio-economic challenges and priorities in Member States and after systematically screening the relevant sectors (agriculture, forestry, rural development, fisheries, tourism, climate, health, and the built environment (construction, energy, transport)), three to four **promising areas** were identified, where biodiversity could contribute to current socio-economic priorities synergistically. Whenever country specifics pointed to other relevant sectors, they were included, too (e.g. the Arctic environment for Finland). In these promising areas, biodiversity and nature protection can help addressing country-specific priorities. The analysis focusses on the benefits today, the potential in future, drivers for realising the benefits and barriers that are in place. Whenever available, benefits and potential are expressed in quantitative terms, complemented with a qualitative assessment.

1.2 Emerging promising areas across EU Member States

While the focus of this study in on Member State level, several promising areas have been identified as cross-Member State issues. **Table 1** presents the promising areas where national socio-economic priorities could potentially be helped by nature-based solutions. This covers a range of socio-economic priorities (growth, jobs, public health, regional development, urban development and demographic change) across a range of sectors (e.g. agriculture, forestry, tourism).

Dark green cells mark areas identified in many countries, **light green cells** highlight areas that were identified often.

Table 1: Distribution of identified areas across socio-economic priorities and sectors

	Economic growth (incl. sector development / diversification, fiscal consolidation)	Jobs and skills (incl. innovation)	Public health	Regional development	Urban development/ regeneration & living environment	Demographic change and social justice (incl. social cohesion/equity)
Agro-ecology	AT, BG, HR, CY, CZ, DK, FR, DE, EL, HU, IE, IT, LT, LU, NL, PL, SK, SI, ES	AT, BE, BG, HR, CY, CZ, DK, FR, DE, EL, HU, IE, IT, LV, LT, LU, NL, SK, SI, ES	BE, HU	AT, BE, BG, HR, CY, CZ, DK, FR, DE, EL, IE, IT, LV, LT, LU, NL, PL, SK, SI, ES		PL
Sustainable forestry	EE, FI, IT, PT, SI, SE, SK	EE, FI, LV, IT, PL, PT, SI, SE, SK	PL	EE, FI, IT, PL, PT, SI, SE, SK		
Sustainable fisheries	HR, IT, ES	HR, IT, ES		HR, IT		
Eco-tourism	AT, BG, HR, CY, EE, FI, FR, DE, EL, HU, LT, LU, MT, PL, PT, RO, SK, SI, ES, SE	AT, BG, HR, CY, EE, FI, FR, DE, EL, HU, LT, LU, MT, PL, PT, RO, SK, SI, ES, SE		AT, BG, HR, CY, EE, FI, DE, EL, HU, LT, LU, MT, PL, PT, RO, SK, SI, ES, SE		
GI for climate change mitigation and adaptation	CY, CZ, DK, EE, FR, LT, LV, MT, NL, PT, RO, SK, ES, UK	AT, CY, DK, EE, FR, RO, ES, NL, PT	AT, CZ, LT, NL, SK, UK	LT, LV, MT, NL, SK, UK	CY, CZ, UK	FR
GI for health and wellbeing	BE, CZ, FI, FR, EL, UK	EL, MT, UK	BE, BG, CZ, DK, FR, DE, FI, IE, LV, MT, UK	FI	DE, EL, IE, MT, UK	BE, BG, CZ, DE, UK
GI for soft mobility	BE, LU		BE, LU	SE	LU	

While the specifics differ slightly across Member States, common relevant socio-economic objectives are **growth, employment, public health and regional development**, and to a lesser extent urban development and demography. In addition, the analyses concluded that biodiversity could contribute to some socio-economic priorities that are not captured by the above matrix of sectors and priorities, for example biodiversity-related research and development across sectors or country-specific circumstances (e.g. the role of biodiversity for livelihoods in the Arctic environment in Finland).

Though there exist nuances across countries, the promising areas generally fall into **agro-ecological practices** (often in the form of organic farming), **sustainable forestry**, **sustainable fisheries** (sometimes as part of wider sustainable marine and coastal development), **eco-tourism** (sometimes in combination with agro-tourism), **green infrastructure for climate change adaptation** (also in combination with climate change mitigation), **green infrastructure for public health and wellbeing**, and for supporting soft mobility.

The following chapters synthesise the key findings for these promising areas.

2 Agro-Ecology for jobs, growth and regional development

2.1 What is the status of the synergies & benefits?

The country-specific analyses have shown that agriculture has been recognised as a promising area that can contribute to socio-economic priorities and make better use of synergies with biodiversity objectives for almost all the Member States, with the exception of Estonia, Finland, Sweden and the UK.

In general, a number of socio-economic priorities can be supported through a shift towards more sustainable agricultural practices, but the most common relevant socio-economic objectives are found in economic growth, employment, regional development, and to a lesser extent public health. Sustainable nature-based agricultural processes are being increasingly recognised for their relevance to the protection of resources, biodiversity and ecosystem services. Such growing importance is amplified by the rising vulnerabilities of traditional farming activities to climate change as well as by the increasing concern for natural capital and ecosystem services (Borron, 2006; Scialabba & Müller-Lindenlauf, 2010; Müller, 2009).

Although many forms of sustainable agriculture exist, organic farming seems to be the most commonly adopted and the one that is developing at a faster rate. In fact, some countries show decreasing rates of agriculture, but increasing rates of organic farming, therefore suggesting a growing trend for this type of land use. Organic farming is in many cases less harmful to biodiversity than conventional agriculture and offers the potential for synergies with biodiversity protection goals (European Commission 2013).

The increasing focus on sustainable agriculture can be seen in the majority of the member states, but growth in such practices has been particularly rapid in countries such as Austria, Italy, France and Spain among others, where agriculture represents a particularly important sector for the countries' economies. Economic growth, employment, public health and regional development represent the main socio-economic priorities that can be enhanced by agro-ecological activities and measures.

Economic growth: The value and quality of agricultural produce is considerably enhanced through biodiversity conservation and management, therefore indicating that sustainable and less harmful forms of agriculture offer opportunities to introduce high quality regionally branded products and increase farm incomes.

- **Austria** is the European leader in organic agriculture, with organic farms covering 20% of the agricultural land in 2015 and representing the highest proportion amongst EU-MS (Eurostat 2015).

- **Italy** plays a leading role in the production of regionally designated products. The agricultural area devoted to organic farming increased by 7.5% between 2014 and 2015 (Unioncamere and Symbola, 2016, p. 109).

- **Luxembourg** is ranked fourth behind Switzerland, the UK and Denmark in terms of the consumption of sustainable products demonstrating the potential of the domestic market (Ministère du Développement durable et des Infrastructures, 2010).

Jobs and skills: Sustainable agricultural practices also contribute considerably to yearly revenues as well as to total employment through the need of skilled labour and the creation of biodiversity related jobs.

- In **Spain**, the number of jobs in organic farming has more than doubled since 1998, notably from 23,278 to approximately 50,000 in 2014 (Sustainlabour and Fundación Biodiversidad, 2012), being the **most promising sector among green jobs** (Fundación Biodiversidad and OSE, 2009).

Regional development: Biodiversity is one element contributing to the diversity and distinctiveness of regional produce therefore contributing to regional development.

- In 2014, the introduction and maintenance of organic farming in **Germany** was funded with € 158.5 million, thus supporting regional development and reaching a younger generation to work in rural areas (BMEL website, 2016).

Growing success of organic products: the experience of wine producers

Organic wine sales in Italy are growing fast: during the first six months of 2015, retail sales grew by 91%. This is a result of better variety of offer, and increased consumer demand. Between 2013 and 2015, the number of people who drank organic wine at least once during the previous year grew from 2% to 17%. There are opportunities to grow organic wine exports, which only represent 2% of all wine exports (Unioncamere and Symbola, 2015).

The Salcheto organic wine company represents a good example of this expanding sector. The company, located in central Italy, only uses sustainable wood products for their wine production. It was the first company in the world to certify the Carbon Footprint of a wine bottle (Unioncamere and Symbola, 2015).

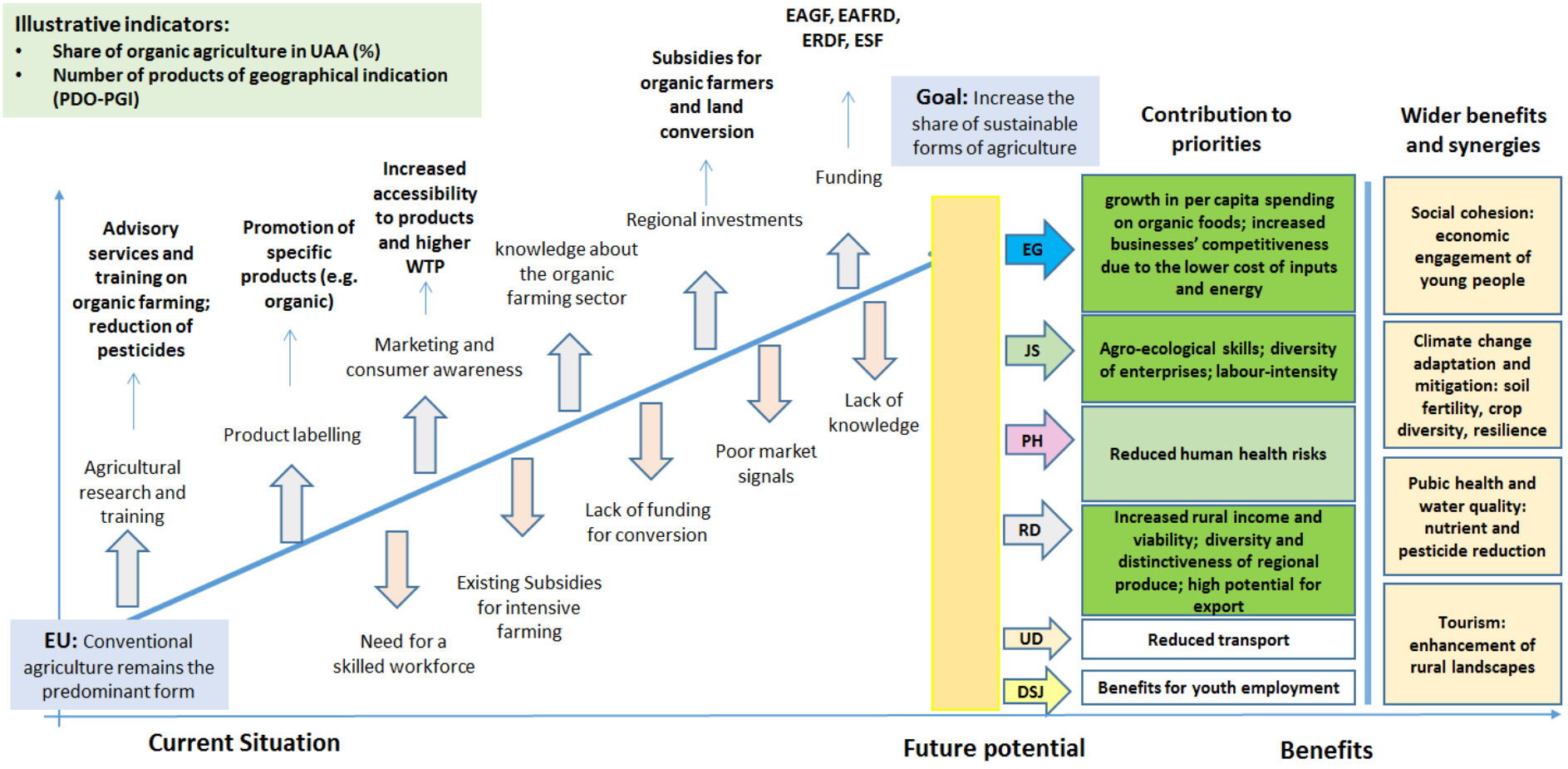
In addition to the aforementioned socio-economic priorities, agro-ecology offers opportunities for **wider benefits and synergies to other sectors**.

Social cohesion: By contributing to rural diversification and providing new job opportunities for young people, land abandonment and population decline can be addressed. Similarly, investment in this sector supports the economic engagement of young people, therefore promoting social cohesion, particularly in rural areas.

Climate change mitigation and adaptation: Agro-ecological approaches and organic farming improve soil fertility, promote diversity of crops and increase the resilience of the sector to climate change.

- Organic farming prevents two of the main challenges faced by **Spain** in terms or climate change adaptation: water stress and desertification.

Promising Area: Agro-Ecology



Public health and water quality: A range of health benefits can be derived from the use of such agricultural practices as they promote the consumption of products of high nutritional quality as well as more balanced diets. The reduced use of chemical and pesticides also results in positive effects on health. Similarly, nutrient and pesticide reduction can improve the quality of water.

- Diffuse pollution from agriculture through nutrients and pesticides is one of the biggest pressures on water resources in **Austria** (EC, 2017, page 16).
- The **French government** wants to reduce the use of pesticides by 25 % in 2020 and by 50 % in 2025 (Ministère de l'Agriculture, de l'Agroalimentaire et de la Forêt, 2015b, p.6, 3).

Tourism: Sustainable agriculture and organic farming specifically, can enhance rural landscapes by making them more attractive through the protection of nature and biodiversity. This tends to attract tourists, therefore highlighting the potential synergies between the agriculture and the tourism sector.

2.2 What are the drivers of change?

Several drivers were mentioned in the country-specific analyses as supporting the development of sustainable agriculture. Although they differ from country to country, a few were identified as main drivers in several cases (see figure).

Agricultural research and training: In many countries, advisory services and training are provided for organic farming. Research can also contribute to development of such practices when applied to reduce the use of pesticides and fertilizers, as well as to protect natural resources such as soil, water and biodiversity (Ministère de l'agriculture, de l'agroalimentaire et de la forêt, 2014a, p.3).

- **Luxembourg** contributes widely to the **promotion of sustainable agricultural practices** through a number of tools, including farm fairs, demonstration farms, research and training courses in sustainable agriculture (Ministère de l'Agriculture, de la Viticulture et de la Protection des consommateurs, 2015).

- **France** offers multiple plans in its framework of agroecology policy for French agriculture, which focus on **putting agriculture on a more sustainable path.** Examples are the "Plan Écophyto", supporting biological plant protection products and bio-controls, the "Plan Écoantibio" to reduce antibiotics, and the "Plan Azote / Méthanisation", aimed at improving nitrogen management and supporting organic rather than mineral nitrogen (Ministère de l'Agriculture, de l'Agroalimentaire et de la Forêt, 2013b, p.10).

Increasing knowledge about the organic farming sector: Knowledge about organic farming is often limited. Financing promotion and research activities and improving statistics and publications dedicated to organic farming can lead to wider knowledge and therefore support the development of such practices.

Product labelling: National and regional labels exist within the EU scheme as well as not covered under the EU wide labelling scheme. These are used to promote specific products, for example produced in a specific area or for organic products.

- Since the establishment of the **German label for organic products** "Bio-Siegel" in 2001, 4,615 users of the label have notified the information centre of the labelling of 72,358 products (as of 31 January 2016) (BMEL website, 2016).

Marketing and consumers awareness: Sustainable agricultural practices can be promoted by making the derived products more widely accessible. For instance, accessibility to organic products can be enhanced through marketing practices. Moreover, increasing consumers' awareness about sustainable and local products can lead to higher willingness to pay.

Success in the merchandise and marketing of organic products: *Veritas*[i]

Veritas is the leading network of supermarkets distributing organic products in Spain. In 2016, there were 35 shops in Catalonia and it was planned to open 10 additional shops all around the country. In 2014, revenues reached EUR 33 million growing 36% in 2015, and employed more than 300 people. Their business model includes more than 4,500 different products of which 500 are of their own brand including fresh dairy bread. Veritas currently supplies 50,000 students in education centres.

Having their own brand has allowed Veritas to lower their prices, making the average shopping cart 50% cheaper in the last decade.

Regional investment: In some countries, subsidies are available for organic farmers. Alternatively, organic farming is incentivised through public funds. Organic farming has in fact been included within national and regional Rural Development Plans as required by the Common Agricultural Policy (CAP), which means that financial support to agro-ecology is to be increased through European financing tools (MAPAMA, 2016a).

- Organic agriculture features in **Italy's national policy documents**, emphasising the positive links between biodiversity and agriculture. **Italy's National Action Plan** for Organic Agriculture prioritises investment in innovative systems to enhance productivity while preserving biodiversity and reducing environmental impacts.

- In **Luxembourg**, a law has been approved in June 2016, establishing support for the promotion of rural sustainable development zones through the provision of outlines and guidelines for several issues, such as increasing competitiveness of the agricultural sector, increasing its viability, promoting the engagement of young farmers, biodiversity conservation, as well as climate change adaptation and agro-tourism.

Funding: Several European funds are aimed at increasing biodiversity within the agricultural sector. These include the **European Agricultural Guarantee Fund (EAGF), European Agricultural Fund for Rural Development (EAFRD),** the **European Regional Development Fund (EFDR)**, and the **European Social Fund (ESF).**

- Between 2014 and 2020, the **EU is committed to investing EUR 100 billion in rural areas across Europe** in order to support agriculture in improving soil and water quality, conserving biodiversity, and addressing climate change (EC, 2016b).

2.3 What is the potential?

Past and current trends in Europe demonstrate that sustainable agriculture is a growing sector, therefore presenting the potential to generate benefits for the EU, as well as for specific Member States. Quantitative and qualitative information is available across member states, covering national statistics and country analyses on agricultural areas, growth and employment. The scale of the potential differs among countries, although a common trend can be found in terms of economic growth, employment and regional development.

Growth: Organic agriculture is growing across the EU. The major market potential of this type of agriculture is supported by evidence showing a significant growth in per capita spending on organic foods in the EU (110% between 2005 and 2014) as compared to other food and non-alcoholic beverages (IFOAM EU Group et al. 2016, p.13). Some agro-ecological practices ensure businesses' competitiveness due to the lower cost of inputs and energy (Ministère de l'agriculture, de l'agroalimentaire et de la forêt, 2014a, p.8).

- Between 2003 and 2010 **organic area and holdings in the EU** increased by 55% and 50% respectively (European Commission, 2014).

Jobs and skills: Organic agriculture is generally more labour intensive than conventional agriculture and involves a greater diversity of enterprises. Employment opportunities can therefore be derived from the conversion of farms to organic (FAO, 2016, European Commission 2013).

- In **France**, it was estimated that approximately **50% more jobs** per farm could be generated in organic agriculture rather than other agricultural forms (Ministère de l'Agriculture, de l'Agroalimentaire et de la forêt, 2013a, p.7).
- The Ministry of Agriculture, Fisheries, Food and Environment in **Spain** foresees that in 2025, organic farming could create around **20,000 additional jobs**, in line with the foreseen development of the sector (MAPAMA, 2015e).

Regional development: The potential to increase the links between producers and consumers as well as the development of regional produce with high potential for export makes agro-ecology particularly relevant in promoting regional development (JRC, 2013). The adoption of agro-ecological projects can be further enhanced through the creation of groups among farmers and other partners with the aim of consolidating their production system and reaching a better environmental, economic and social performance (Ministère de l'agriculture, de l'agroalimentaire et de la forêt, 2014a, p.8).

- In 2016, there were 246 GIEE (groupement d'interet economique et environnemental) recognized in **France**. In total, they comprise more than **4,000 farmers and 300,000 hectares of UAA** (Ministère de l'agriculture, de l'agroalimentaire et de la forêt, 2016b, p.1).

2.4 What are the barriers to progress?

Despite the multiple benefits that can be derived from the agro-ecological activities and the drivers of its development and potential for growth, there still exists a number of barriers that can challenge the development of the sector in the desired direction. Among the barriers that have been identified in the country analyses, some of them result of greater concern due to their presence in a large number of member states (see figure).

Need for skilled workforce: As mentioned in the previous section, the employment potential of organic farming is derived from its labour intensity (FAO, 2016, European Commission 2013). Nevertheless, this type of farming differs in many aspects from conventional agriculture. Therefore, there are specific skills that need to be acquired in order to engage in such practice. It follows that the labour force needed for organic agriculture has to meet specific requirements in terms of skills, therefore representing a barrier to the development of the sector. Even though agricultural trainings are available in many countries in the EU, the need for skilled labour still represents an additional challenge compared to conventional forms of agriculture.

- Organic agriculture tends to be more labour intensive and involve a greater diversity of enterprises (FAO, 2016, European Commission 2013). Organic farmers tend to be younger than conventional farmers are. In 2010, farmers younger than 55 represented 61.3% of organic farmers but just 44.2% of non-organic farmers (European Commission, 2014).

Existing subsidies for intensive farming: Even though subsidies for organic farmers are available in some countries, they are still not as widely available as for traditional agriculture. The availability of subsidies for conventional, more intensive forms of farming works as a disincentive towards the development of sustainable forms of agriculture and therefore represents a significant barrier to the agro-ecological sector.

- The **EU agricultural policies** support all farming with funds, however, the larger farms benefit most (Greenpeace website, 2015).

Lack of funding for conversion: Conversion of agricultural areas from conventional to organic farming is generally associated with high costs. The potential for conversion is therefore highly dependent on the financial resources available. Even though financial support for such shift is expected to increase, the current lack of funding in member states lowers the incentives to bring the development of the agro-ecological sector forward.

Poor market signals/ lack of knowledge: The limited knowledge about organic farming and the lack of economic information on the relationship between prices of organic and conventional products tends to discourage consumers from buying the more expensive organic products. As interest in comparability between the organic and conventional farming sectors is increasing, such often-unavailable economic information works as a barrier to organic and in general sustainable forms of agriculture (LEI, 2005[1]).

Questions for discussion

What examples do you have on the current use of nature-based solution (NBS) that could interest other countries?

What do you see as the potential for NBS in your country?

What are the drivers and barriers to NBS?

Who can do what to respond to the drivers, address the barriers, and realise the opportunities of NBS? i.e. what at the EU level, what at MS level (and within MS at national, regional, local levels across stakeholders)?

[1] http://ageconsearch.tind.io//bitstream/29130/1/re050003.pdf

3 Sustainable forestry for jobs, growth and regional development

3.1 What is the status of the synergies & benefits?

The analysis of promising areas where biodiversity could contribute to socio-economic priorities in Member States showed that sustainable forestry is relevant in a number of countries across the EU, notably in Northern and Eastern Europe (Estonia, Finland, Latvia, Poland, Slovakia, Sweden), but also in several countries in the Southern Europe (Italy, Slovenia, Portugal). In all of these countries, the contributions to socio-economic priorities focus on economic growth, jobs, and regional and rural development, but also come along with wider benefits for public health and climate change adaptation and mitigation.

Currently, about a quarter of European forests are protected under Natura 2000. Forests provide multiple benefits including economic activities such as wood industry, tourism, or biomass for energy (half of the total EU renewable energy consumption) (EC, 2013b). Forests also deliver significant ecosystem services, including water management, carbon storage and temperature cooling (Bonan, 2008), hence contributing to climate change mitigation and adaptation. Sustainable forest management and biodiversity protection require a number of measures. One element is the third-party certification of forests, which has gained of importance in the last decades, globally and in the EU (MacDicken et al., 2015). Fernholz and Kraxner (2012) estimate that around 95 million ha of forest were certified in the EU in 2012, with marked differences in the share of certified forest area across EU Member States.

The contributions of sustainable forestry have strong links to sustainable agriculture and agroforestry systems in many Member States, especially in the Mediterranean.

Economic growth: The contributions of a sustainable forest sector are based on traditional forest products as timber and subsequent value chains, as well as wider efforts to transition to a bioeconomy, notably in Northern Europe. Agroforestry plays an important role in agriculture and land use in several countries.

- In **Finland**, with a share of 19% of Finnish exports and 10% of the output, the contribution of the forestry sector for the national economy is significant. The national forest strategy stresses economic growth, employment and diversification of the sector's livelihoods, but also sustainable use of natural resources, recreational use of nature and healthy living environments.
- In **Latvia**, forestry, wood processing and furniture manufacturing represented 5.2% of GDP in 2014.
- In 2012, **Portugal** had the fifth largest absolute extension of agroforestry area of EU-27 (1.2 million ha), and with 32% the second largest share of agroforestry area over the total utilised agricultural area (UAA), after Cyprus with 40%.

Jobs & skills: The forestry sector plays an important role for employment in rural areas and remote regions in a number of Member States. Job effects are not only limited to direct jobs in forest management, but also indirect jobs e.g. in associated industries, but also other ecosystem services provided by forest areas.

- In 2014, the basic forestry and wood, pulp and paper industry offered jobs for about 76,000 workers in **Finland**, which is around 3% of the employed workforce.
- The forest sector in **Latvia** employed directly around 52,000 people in 2010 but there are also around 30,000 jobs, which are indirectly related to the sector. In Poland, around 50,000 people are directly employed in forestry.
- In **Sweden**, the forest products industry provides direct employment for almost 60,000 people in Sweden. Together with its sub-contractors and the forest operations, including transportation, the sector is the source of 200,000 jobs, which is over 4% of the employed labour force.

Regional development: The role of sustainable forestry for regional development is closely linked to its potential for growth and employment in forest-rich, sometimes remote, and economically disadvantaged regions of member states.

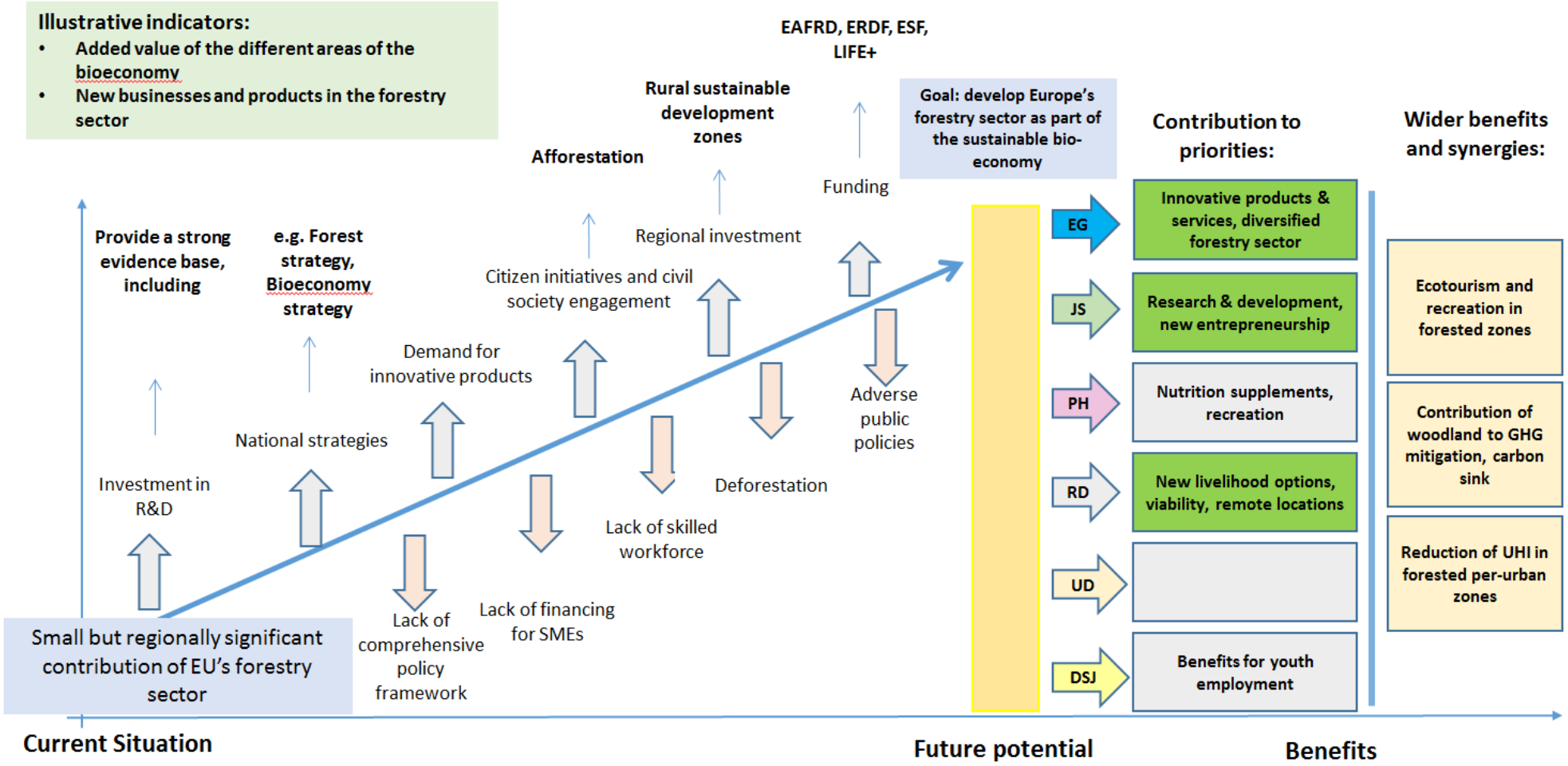
- In **Portugal**, agroforestry areas are concentrated in inner mainland regions, which, in general, present a more rural profile, and, in some cases, reveal socio-economic disparities in comparison with coastal (urban) areas.
- There exist strong links to restoring degraded ecosystems, not only to protect biodiversity, but also for wider regional development benefits. **Estonia** aims at restoring, preserving and improving agricultural and forestry ecosystems. The aim is to diversify the rural economy and to create alternative employment opportunities for labour force released from agriculture.

Afforestation in Zilupes District, Latvia

In the Zilupes district there is not very much forested land. With the help of the project, carbon has been able to store by planting 120,000 trees. “People are employed to manage the new woodland which will produce high quality timber. This will in the future be used for construction, paper and furniture. The forest is also a popular recreational object used by people for picking berries and mushrooms.” “Environmental benefits will be produced as forests purify the soil and air. The woods are home for many species of insects, birds, mammals, amphibians, mosses, and other plants. Lastly, an informal benefit will be a supply of fresh green birch branches, traditionally used in Latvia as decorations at the midsummer folk festival, weddings and other cultural celebrations.” (European Network for Rural Development 2011).

Sustainable forestry practices have a high potential for realising benefits in other sectors and to wider socio-economic priorities. Accessible forest areas rich in biodiversity can support (eco-) tourism, recreational and health related activities, and contribute to climate change mitigation and adaptation. In some Member States (e.g. Poland, Finland, Estonia), the forest are seen as an important carbon sink and thus considered as an element of national climate policies. Realising these benefits requires a careful integration of biodiversity considerations into the forestry sector.

Promising Area: sustainable forestry for jobs, growth, and regional development



3.2 What are the drivers of change?

While drivers that support the role of biodiversity for realising socio-economic benefits through sustainable forestry vary across the member states, some recurring mechanisms are in place that are of importance for several countries (see figure).

Sector policies and strategies: Policies and strategies directly related to forestry or agroforestry are of relevance, as well as other sector policies, which influence forestry practices and investment decisions.

- The national forest strategy and the bioeconomy strategy in **Finland** stress the significance of new, bio-based products in enhancing and diversifying the sector's production and exports, and in creating new jobs.
- In **Slovenia**, the National Forest Programme has at its core the principle of sustainable management of forests, and sets out the objectives for sustainable forest management. The Slovenian National Action Programme 'Wood is beautiful' aims to increase the competitiveness of the forest-wood supply chain by 2020 (MKGP, 2012).

National and EU funding: Funding and investment are of relevance for maintaining or introducing sustainable forestry practices, but also for the diversification of the forestry sector. Funding can also be triggered through other sectors (e.g. tourism or recreation) and is composed of both public and private sector sources. Rural development programmes (RDP) play an important role.

- In **Poland**, sustainable forest management and utilisation are funded under biodiversity protection objectives through LIFE+ and ERDF (European Commission, 2016). Under new and continuing commitments over €300 million will be available as afforestation grants to cover areas of roughly 82,000 ha.
- Total funding for the **Latvian** Rural Development Programme is around € 1.5 billion of public money that is available from 2014-2020 (nearly € 1.08 billion from the EU budget and nearly € 500 million from national funding) (EC, 2015c). Funds tentatively allocated for carbon promoting carbon conservation and sequestration are over 30 million € (EC, 2015c).
- **Portugal's** RDP mentions various examples covering, inter alia, the areas of the promotion of agroforestry (Ministério da Agricultura e do Mar, 2014). A particular example addressing agroforestry systems refers to the "Operation 8.1.2 – Establishment of Agroforestry Systems", which focus on the support in terms of the installation and maintenance costs of these systems (Ministério da Agricultura e do Mar, 2014, p. 261-264).

Innovation and competitiveness: Research, development and education activities play an important role for sustainable forestry.

- In **Estonia**, the need for research and innovation within the bioeconomy sectors is especially stressed in the new rural development plan (Ministry of Rural Affairs 2014).
- The **Portuguese** National Strategy for Forests highlights the need to promote research and innovation. It provides examples associated with the areas of biomass renewable energy production, control of forest pests and diseases, adaptation to climate change, promotion of new products, and competence centres in the existing forest productive segments (Conselho de Ministros, 2015).

The country analyses have revealed further drivers, which are of relevance in some Member States. *Climate change policies* can refer to the role of sustainable forestry for carbon capture and storage as part of wider strategies for climate change mitigation. Equally, the role of forest areas for climate change adaptation are of importance in some Member States, notably for flood control and for urban and peri-urban forests as one means of mitigating urban heat islands and their negative impacts on public health.

3.3 What is the potential?

Many Member States acknowledge the potential of sustainable forestry to contribute to key socio-economic priorities, however, estimates of the potential often are of a qualitative nature, while a few quantitative estimate or policy objectives are available.

Economic growth: Generally, the role of forestry is acknowledged, often with an emphasis on new products and processes. Diversification of forestry activities and higher value added are objectives in countries such as Poland, Estonia or Sweden. In **Finland**, it is expected that by the year 2030 new products contribute half of the forestry sector's export income (VNK 2015c). Today the share is 21.6%.

Jobs & skills: The job potential is expected to be significant in a number of countries, especially with regard to diversified forestry-based activities, but also within other sectors for which forest environments provide ecosystem services relevant for example in eco-tourism, for bio-based fuels or agro-forestry. Forests can also provide the setting for educational and research activities. Promotional forest complexes in **Poland** attract about 30 percent of participants of the educational programmes organised by foresters. They employ qualified and experienced educators. Promotional forest complexes are also important centres for science and interdisciplinary research (State Forests, 2015).

Regional development: The sustainable use of forest environments for related products and services opens up entrepreneurial options and can create an enabling environment for economic activities with important regional benefits. These activities are not only related to the direct use of forests for harvesting timber and non-timber products. They can cover a wide range of activities related to tourism, recreation and health.

In several Member States, policies and strategies aim for an increased use of forest areas for climate change adaptation and mitigation (carbon storage). Generally, there exist good synergies with biodiversity objectives, for example around the restoration of degraded areas such as forests or peatlands. However, the links between climate change policies and biodiversity policies need to be developed carefully. Some short-term oriented activities such as fast rotating plants for bio-fuels or monocultures for storing capturing carbon could not be in line with long-term biodiversity considerations.

3.4 What are the barriers to progress?

The country analyses have pointed to several barriers for biodiversity to contribute to socio-economic priorities through forestry-related activities. These barriers refer to the better use

of existing forest areas for traditional and new uses, to the restoration and further development of degraded and/or abandoned land, or the protection of agro-forestry systems as one element of rural viability (see figure).

Skilled workforce: A workforce with up-to-date skills is essential for both traditional and new economic activities in forest areas. For some countries, the analyses hint to a general lack of qualified workforce, partially due to demographic developments. In other cases, specific skills are lacking for new entrepreneurial activities where forests are embedded in wider value chains for timber and non-timber products, but also services. The specific skills gaps vary across Member States. For example, in Latvia this relates to skills needed to manage abandoned land, while in Finland the skills gap refers more to the technical and managerial skills linked to a bio-economy.

Lack of knowledge and awareness: Sustainable forestry requires knowledge among forest managers and the different user groups for which forests provide an environment for economic activities. While the multiple benefits of forest areas are generally acknowledged, there exists some lack of awareness about the role of biodiversity, for example for climate resilience and adaptation for climate change, for agro-forestry practices, or specific knowledge gaps on sustainable afforestation of degraded or abandoned land. The awareness-raising lack often refers to the benefits over the long-term, which require specific investments, similar to the development of skills.

Adverse public policies: In spite of a general recognition of forests as important multi-use ecosystems, there exist adverse policies and practices in some Member States that work as a barrier for realising more of the multiple benefits. Biodiversity considerations can support sustainable forestry practices based on long-term strategies and objectives, while this is less the case for short-term objectives (e.g. fast rotating products). For example, biodiversity-rich and complex forests can play an important role for capturing and storing carbon (as can other activities such as the protection and restoration of peatlands) and for supporting climate resilience.

Environmental stressors: Unsustainable forestry practices can be exacerbated by environmental stressors such as air or water pollution, pests or diseases. In combination with not suitable management practices, forest areas cannot provide their full potential of ecosystem services.

Generally, to better contribute to socio-economic priorities in EU Member states, the country-specific contributions of forestry would need to be integrated into across different sector policies and strategies, including synergistic contributions in areas such as tourism development, recreation and health, as well as climate change adaptation and mitigation.

Questions for discussion:

- What examples do you have on the current use of nature-based solutions (NBS) that could interest other countries?
- What do you see as the potential for NBS in your country?
- What are the drivers and barriers to NBS?
- Who can do what to realise the opportunities of NBS?

4 Sustainable fisheries for growth, jobs and regional development

4.1 What is the status of the synergies & benefits?

The country-specific analyses have shown that sustainable fisheries and coastal management have been recognised as a promising area that can contribute to socio-economic priorities and make better use of synergies with biodiversity objectives for three EU Member States: Croatia, Italy and Spain. Coastal management has also been identified as an important area of analysis in Cyprus, Greece, Malta and Portugal, within the tourism sector.

In general, a number of socio-economic priorities can be supported through a shift towards more sustainable fisheries, but the country cases indicate that the most common relevant socio-economic objectives are found in economic growth, employment and regional development. National statistics have been reported with the aim of quantifying such benefits in terms of economic growth and jobs created, together with qualitative assessments of the sector development.

The Committee of the Regions (CoR, 2014) recognized the necessity to preserve marine ecosystems, as well as their potential for both growth and employment. One of the strategic priorities of the fisheries sector is achieving long-term sustainable production. The growing concern for overfishing and for the livelihoods of fishing communities calls for the development of more sustainable fishing practices with the aim of addressing issues of low productivity and ensure the continuation of fishing activities (Ibid., p. 311). Although fishing trends differ among countries, such concerns are common in the three country cases that have identified sustainable fisheries as a promising area. The integration of a sustainable approach to fishing is found to contribute largely to the countries' economies, and therefore warrants priority, together with the management of marine and coastal ecosystems.

Growth: The achievement of long-term sustainable production processes in the fisheries sector and the derived promotion of diverse high quality products with low environmental impacts significantly boost the sectors' competitiveness (*ibid.*). Even though for some countries (Croatia and Spain) the production of fishing products is growing, there is still a need for creation of additional value for the fish market (De Leo et.al 2014). Higher demand for fish products creates a good opportunity for development of the sector, increasing its share to national GDP (Ministry of Agriculture 2014).

- The cluster of "maritime activities" in **Italy** represents approximately 3% (EUR 39.5 billion) of the GDP and 2% of the labour force (EC, 2014).

Jobs and skills: Despite its small contribution to GDP, the sector provides occupation and year-round income for small communities, therefore representing a relevant sector for the improvement of the socio-economic situation of countries (Ministry of Agriculture, 2014). Sustainable fisheries safeguard existing jobs and contribute to employment generation by increasing yields over time. Moreover, job opportunities are created in the management of the marine environment (EC, 2014, p. 2; Dipartimento per lo Sviluppo e la Coesione Economica, 2014a, p. 92).

- Artisanal fisheries employed 11,367 work units in **Spain** in 2015, which represents 33% of total direct and indirect, land-based and marine employment. Aquaculture employed 18,076 people in 2015.

Regional development: Fisheries are of particular importance for coastal areas and islands, especially in Croatia (EEA, 2015). Here, small communities highly depend on the sector. Therefore, achieving long-term sustainable production in the sector reduces the depopulation trend in these regions (Flanders investment and trade market survey, 2016).

Marine Stewardship Council (MSC) certification in Italy
MSC certification was only recently introduced in Italy: the first MSC audit process was launched on an Italian company only in 2015. Since then, certification has been extended to 25 companies and about 400 different products (MSC, 2016b). According to MSC, both Italian producers and consumers are showing an increasing interest towards sustainable fishing products. Interviews with Italian consumers found that 77% of respondents valued the need to consume certified products in order to support biodiversity protection. Furthermore, 33% declared that they had purchased more sustainable seafood as compared to the previous year. This suggests that the sustainable fishing sector may expand rapidly (MSC, 2016a).

In addition to the aforementioned socio-economic priorities, sustainable fisheries offer opportunities for wider benefits and synergies to other sectors.

Tourism: There is a growing integration of the fisheries sector with other activities, such as fishing tourism and recreational fishing (Ministero delle Politiche Agricole Alimentari e Forestali, 2015b, p 18). These result to contribute to increasing demand for tourism activities. Moreover, better management of coastal and marine habitats can attract tourists. This is particularly the case in countries where coastal tourism is a relevant area.

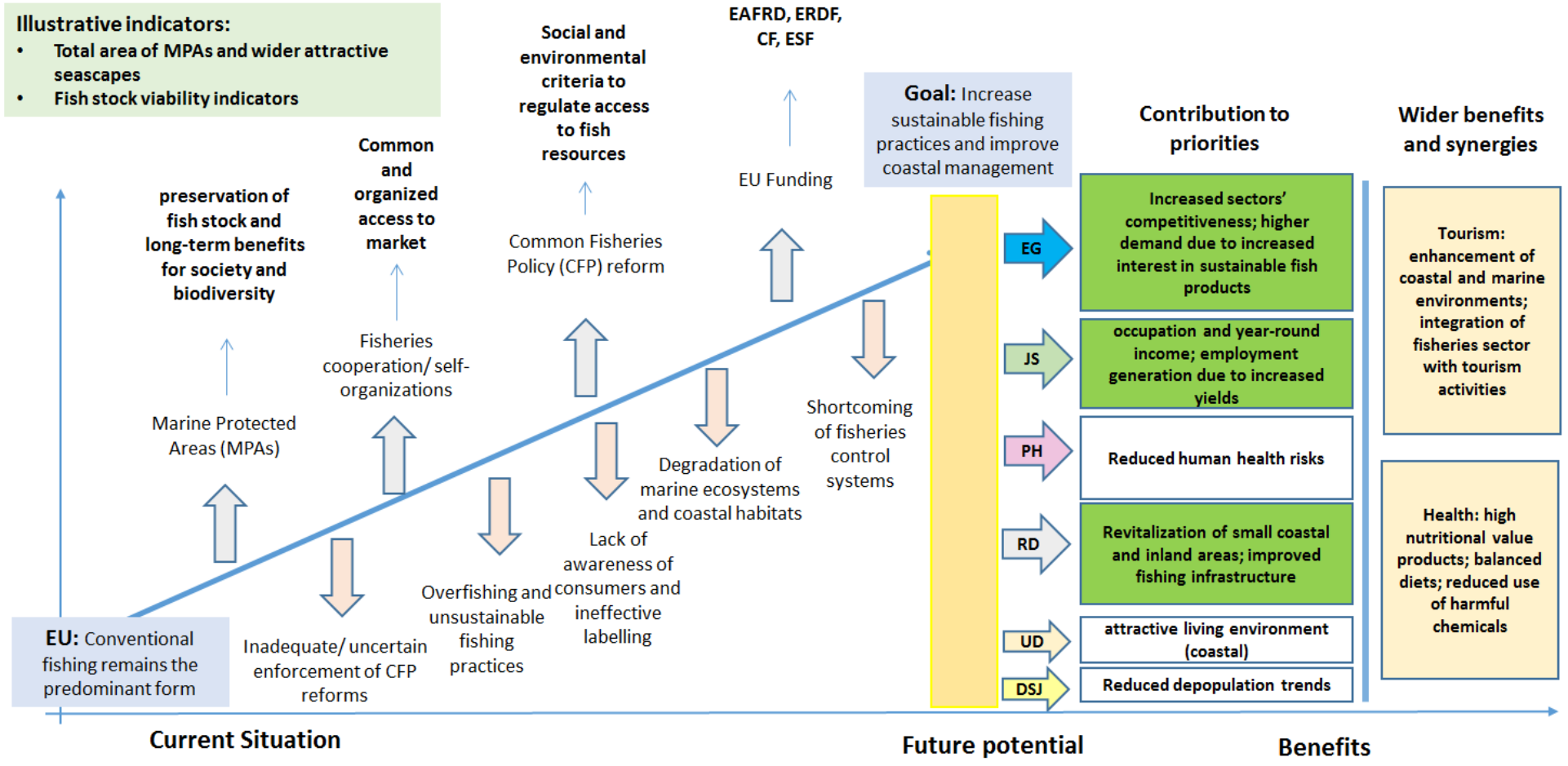
- **Greece** ranked third in the world in the "Blue Flag" programme for holding 430 beaches and 9 marinas that were recognised for their excellent seawater quality, litter management, organisation of the swimming area, and safety procedures for bathers and protection of the environment (Visitgreece, 2016).

- Unpublished statistics reveal that 14,120 SCUBA diving certifications were issued in **Greece** in 2007 (data from the Greek Ministry of Mercantile Marine).

- **Cyprus** 'coastal zone', the area that extends 2km inland from the coastline covering 23% of the country's total area, hosted about 50% of the total population and 90% of the tourism industry in 2008 (Coccossis et al., 2008).

Health: Fish products supplied by sustainable fisheries and organic aquaculture tend to be of high nutritional value and contribute to a more balanced diet. Moreover, organic aquaculture avoids the use of harmful chemicals. The promotion of such fisheries products has positive effects on public health.

Promising Area: Sustainable fisheries and coastal management



4.2 What are the drivers of change?

Several drivers were mentioned in the country-specific analyses as supporting the development of sustainable fisheries and coastal management. Although they differ from country to country, a few were identified as main drivers in more cases (see figure).

Marine Protected Areas (MPAs): Marine protected areas can play a relevant role in promoting the development of sustainable fishing practices. For instance, MPAs may allow access for sustainable artisanal fishing only, promoting the preservation of fish stock and generating long-term benefits for society and biodiversity (WWF, Sunce and MAVA, 2012).

- **Croatia** is increasingly implementing "No take zones" within MPAs (WWF, Sunce and MAVA, 2012).
- **Cyprus**' Protected Areas (PAs) under implementation of the Habitats Directive now cover 130.18 km^2 of marine areas (CBD, 2014).

Marine protected areas and artisanal fishing in Spain
In Spain, there are several successful examples of the interaction between marine conservation through marine protected areas (MPA) and artisanal fisheries. Regulating the access to fish in specific areas through management plans have allowed fish stocks to recover and revitalise local artisanal fisheries (López-Ornat et al., 2014):
Columbretes MPA: Artisanal fishing is allowed at the borders of the protected areas, where abundance of fish and other species is higher than in the surrounding non-protected fishing areas.
Cabo de Gata MPA: The abundance of key commercial species has ceased decreasing since the creation of this marine protected area.
Cabo de Palos: In this area, 6,000 kg of fish were captured before the protected area was put in place. In 2012, artisanal fisheries captured 40,000 kg in 2012.

EU funding: The European Regional Development Fund (ERDF), the Cohesion Fund (CF), the European Social Fund (ESF) and the European Agricultural Fund for Rural Development (EAFRD) can provide funding for implementation of measures in the fishery sector.

- European Maritime and Fisheries Fund (EMFF) offers **252.6m EUR investment package for fisheries.**

Fisheries cooperation/ self-organizations: Fishermen are often organised in cooperatives for sustainable fishing, which aim for a common and organised access to market. For example, in Spain, these organizations called "cofradías" can facilitate decision-making and engagement with public administration and scientists.

- In 2014, there were 18 fishing cooperatives in **Croatia** approved by Directorate of Fisheries of Croatian Ministry of Agriculture (De Leo et.al 2014).

Common Fisheries Policy Reform: The recent reform of the Common Fisheries Policy, put in place in 2014, promotes the achievement of a sustainable fisheries sector. Several social and environmental criteria have been introduced in order to regulate the access to fish resources. Catches are limited to achieve maximum sustainable yield, and a ban on discards has been

introduced, requiring fishermen to land and market all of the fish caught. These measures work as drivers for the development of less harmful fishing practices, such as artisanal fishing.

4.3 What is the potential?

Past and current trends in three country cases that present sustainable fisheries as a promising area demonstrate that the sector presents the potential to generate benefits for the EU, as well as for specific Member States. Quantitative and qualitative information is available for the three countries, covering national statistics and country analyses on growth and jobs creation from sustainable fishing practices. The scale of the potential differs among countries, although a common trend can be found in terms of economic growth, employment and regional development.

Growth: Evidence suggests that the sustainable fishing sector is expected to expand rapidly due to the increased interest of both producers and consumers towards sustainable fishing products. This is particularly the case in Italy, where statistics show a significant increase in sustainable seafood purchased.

- A significant growth in aquaculture is foreseen for the **EU**, from 266,684 tons in 2012 to 527,766 tons until 2030 (Fundación Observatorio Español de Acuicultura, 2013).

- In **Spain**, organic aquaculture is projected to grow from 0.85 tons in 2012 to 9.4 tons in 2030 (Fundación Observatorio Español de Acuicultura, 2013). A specific action features within the Multiannual Strategic Plan of Spanish Aquaculture, which aims at shifting from conventional to ecological aquaculture (Fundación Observatorio Español de Acuicultura, 2013, pp265).

- The inappropriate management of fisheries was calculated to have a cost, measured as the net revenues from the maximum sustainable yield minus actual revenues, of 102.5 million in 2012 only in the Atlantic areas (New Economics Foundation, 2012).

Jobs and skills: The employment potential of sustainable artisanal fishing derives from the labour intensity of the techniques used (New Economy Foundation, 2012).

- Aquaculture is expected to generate **23,000 new jobs in the EU** by 2030 (Fundación Observatorio Español de Acuicultura, 2013).

- **Croatia** presents significant potential in the sector as 7.5% of the budget under the Operational Programme for Maritime Affairs and Fisheries (2014-2020) is expected to be allocated for the promotion of the maintenance of the economic and social sustainability of Croatian fisheries, aquaculture areas and job creation (Ministry of Agriculture, 2014).

- The inappropriate management of fisheries was calculated to have a cost, measured as the net jobs derived from the maximum sustainable yield minus actual jobs, of 3,500 jobs in 2012 only in the Atlantic areas (New Economics Foundation, 2012).

- Sustainable fishing methods will require **new skills**, particularly given the challenges introduced by the Common Fisheries Policy reforms. There will be **new job opportunities** in the management of MPAs, and in diversification of the sector, such as in marine tourism (EC, 2014, p. 2; Dipartimento per lo Sviluppo e la Coesione Economica, 2014a, p. 92).

Regional development: Investments in the sector are particularly relevant for the promotion of regional development. These include improved fishing infrastructure, accommodation for fishing tourism and biodiversity conservation. Such investments opportunities can revitalize small coastal and inland areas.

- Investing in **Greece**'s natural coastal heritage can generate spill over benefits for regions facing decline by revitalising local economies.

4.4 What are the barriers to progress?

Despite the multiple benefits that can be derived from the sustainable fisheries sector and the drivers of its development and potential for growth, there still exists a number of barriers that can challenge the development of the sector in the desired direction. Several barriers have been identified in the country analyses.

Inadequate/uncertain enforcement of CFP reforms: Although the reform of the Common Fisheries Policy contains several environmental and social criteria that regulate the access to fish resources, enforcement of such measures needs to be ensured. Inadequate or uncertain enforcement can undermine the effectiveness and compliance with the criteria and lead to overfishing.

- Information and monitoring systems represent an essential tool for securing fish stock and their sustainable use in **Croatia**.

Overfishing and unsustainable fishing practices: Overfishing represents a crucial challenge for the fishing sector. Imbalances between fish stock and fishing capacity can lead to a decline in the fishing population. The issue is amplified by the use of aggressive forms of extraction and unsustainable fishing practices. This compromises the development and expansion of sustainable artisanal fishing (MAPAMA, 2015d).

Lack of awareness of consumers and ineffective labelling: Even though consumer demand for sustainable fish products is growing, awareness is still limited. Lack of knowledge regarding the fishing practices used and the potential benefits of sustainable forms of fishing can compromise consumers' choices. An ineffective use of product labels contributes to the lack of consumer awareness and misleading information.

Degradation of marine ecosystems and coastal habitats: The degradation of marine ecosystems, for example due to the presence of marine litter, compromises the quality and quantity of fish stock. Therefore, in order to meet the necessary catch levels, fishing activities

and imbalances between fish stock and fishing capacity increase, leading to unsustainable catches.

Shortcoming of fisheries control systems: The implementation of regulations on catch levels as well as bans on discards and limitations on access to fish resources represent powerful tools for the achievement of sustainable fishing. Nevertheless, enforcement is not guaranteed. Lack or poor fisheries control systems contribute to ineffective enforcement.

Questions for discussion:

- What examples do you have on the current use of nature-based solutions (NBS) that could interest other countries?
- What do you see as the potential for NBS in your country?
- What are the drivers and barriers to NBS?
- Who can do what to realise the opportunities of NBS?

5 Eco-tourism for jobs, growth and regional development

5.1 What is the status of the synergies & benefits?

Tourism is an important economic sector in all member states, contributing in particular to economic performance, employment and regional development:

Growth: Tourism is widely reported to be an important and growing sector in Europe. Many member states have experienced and forecasted growth in the tourism sector. Often growth in the tourism and leisure industries is faster than overall growth in a country. The contribution of tourism to a member state's economic performance varies significantly from country to country. **Eco-tourism is estimated to be growing six times faster than tourism in general** (UNWTO, 2007). Within the tourism sector, eco-tourism still contributes a small but growing share of revenues.

- In **Austria**, the tourism and leisure industry contributed €45.7 billion in value to the economy in 2015, about 13.5% of Austria's GDP (WKO Bundessparte Tourismus und Freizeitwirtschaft 2016, pp.7–8).
- In **Finland**, tourism counted for 2.3% of Finland's GDP (Ministry of Employment and the Economy 2010), whilst Tourism-related sectors represent 31% of the Maltese economy and 11% of jobs (Ministry for Rural Affairs and the Environment, 2012).
- In **Bulgaria**, sustainable tourism makes 4.6% of the total touristic product (MoE, 2014, p. 69).

Jobs: Tourism is labour intensive, generating employment in a broad range of activities, in different levels of education and qualification and primarily for young people (Organisation of Athens, 2011). Additionally the tourism sector supports a range of enterprise sizes, including SMEs. Including indirect jobs, the employment impact of the tourism sector can be significant. However, very little data is available on the specific contribution of eco-tourism to employment.

- In **Bulgaria**, it is estimated that in 2015 tourism supported directly the creation of 92,500 jobs. Whereas, the indirect effect of tourism on the job market was the creation of 338,500 jobs in 2015 with an estimated increase to 389,000 jobs in 2016 (WTTC 2016, p. 1).
- In **Finland**, tourism offers jobs for 130,500 employees, i.e. 5.2% of the employed workforce (VNK 2015a; VNK 2015c; Ministry of Employment and the Economy 2010, p6).
- In **Greece**, the contribution of tourism to employment is much higher, and the total number of people directly and indirectly employed in the tourism sector was equivalent to 822,000 people in 2015 (23% of total employment) (WTTC, 2016).

Regional development: regional tourism and the development of tourism products that are associated to a particular region or geography can help to support the economic growth of a given region within a member state. Greening the tourism sector can contribute to regional development and poverty reduction, by involving local communities (UNEP, 2011). In many member states, particular regions demonstrate strong tourism sectors; this is often given to

particular natural and cultural characteristics of that region. Nature based tourism can provide new economic opportunities in rural areas.

- Mountainous regions in particular are able to exploit opportunities for winter sports. For instance, the southwestern region of **Bulgaria** is an area with developed winter/ski tourism and winter sports. Five of the mountains that offer activities for winter tourism are situated in this part of the country (MoE 2014, p. 41).
- Many coastal regions exploit opportunities for tourism linked to the marine environment. For example, **Greece** has long based its tourism development primarily on mass-market models adopted by popular sea-sun-sand destinations. Hence, regions can drive local economic development through the marketing of niche products as well as adding value to local resources and agriculture.

Supporting eco-tourism can indirectly present **synergies with other sectors as well as wider socio-economic priorities**. Growth in the tourism sector can be used to offset economic decline in other sectors, such as agriculture or industry where these affect specific regions of communities. Eco-tourism might be used to complement or revitalise existing economic activities, for instance where artisan products are linked to particular regions and marketed in the context of tourism they can support the development of that region. The development of nature tourism can contribute to rural development in a region or protected area by supporting rural economies and employment opportunities.

- In **Malta**, agro-tourism offers increased income for cooperating farmers through artisanal production and farm shops (Malta's Rural Development Programme 2014 – 2020).

Some member states are also **exploiting the links between the health and tourism sectors**, notably nature-based health and well-being services offer possibilities to further expand the tourism services.

- Hungary's current tourism strategy puts an emphasis on the potentials in health tourism – primarily linked to thermal waters – it also recognises the importance of eco-tourism and its links to health tourism (Nemzetgazdasági Minisztérium 2014). In Sweden, particular attention is given to LOHAS (Lifestyles of Health and Sustainability) consumers, referring to a relatively upscale consumer segment interested in healthy and environmentally friendly consumerism.

As well as supporting other sectors, activities linked to **eco-tourism can also contribute to wider socio-economic priorities**, which might not be primary objectives for that activity. For instance, as well as the health sector, nature contributes to public health and the outdoor activities promoted in **eco-tourism offer solutions to health problems, such as physical inactivity and obesity** (Metsahallitus, 2016). In addition, a greening of the tourism sector can contribute to climate change mitigation and adaptation, such as **reducing emissions from tourism**, and preserving natural barriers to extreme events (UNEP, 2009).

Education can also be supported or linked to tourism infrastructure and facilities. This can often be seen in protected areas in Member States. **Educational aspect of ecotourism can help promote sustainable development values**, raising public awareness of activities detrimental for the environment and cultivating environmentally friendly choices.

- Educational facilities in **Polish** forests comprise a network of 58 forest education centres, 991 educational trails and 1,914 educational sites (State Forests, 2015).

Linking tourism and health in Hungary
One of the main aims of Hungary's current tourism strategy is to further build on the country's potential to become a top health tourism destination in Europe. This objective is also present in Hungary's Health Sector Strategy for 2014-2020 (Emberi Erőforrások Minisztériuma 2014a). Nevertheless, the links between health tourism and eco-tourism have been also noted. Health tourism can promote eco-tourism, for instance in cases where thermal waters are situated in nature areas. Furthermore, eco-tourism can promote more active holidays, which in turn can have positive impacts on human health.

Activities that actively seek to preserve biodiversity can provide dividends for the tourism sector.

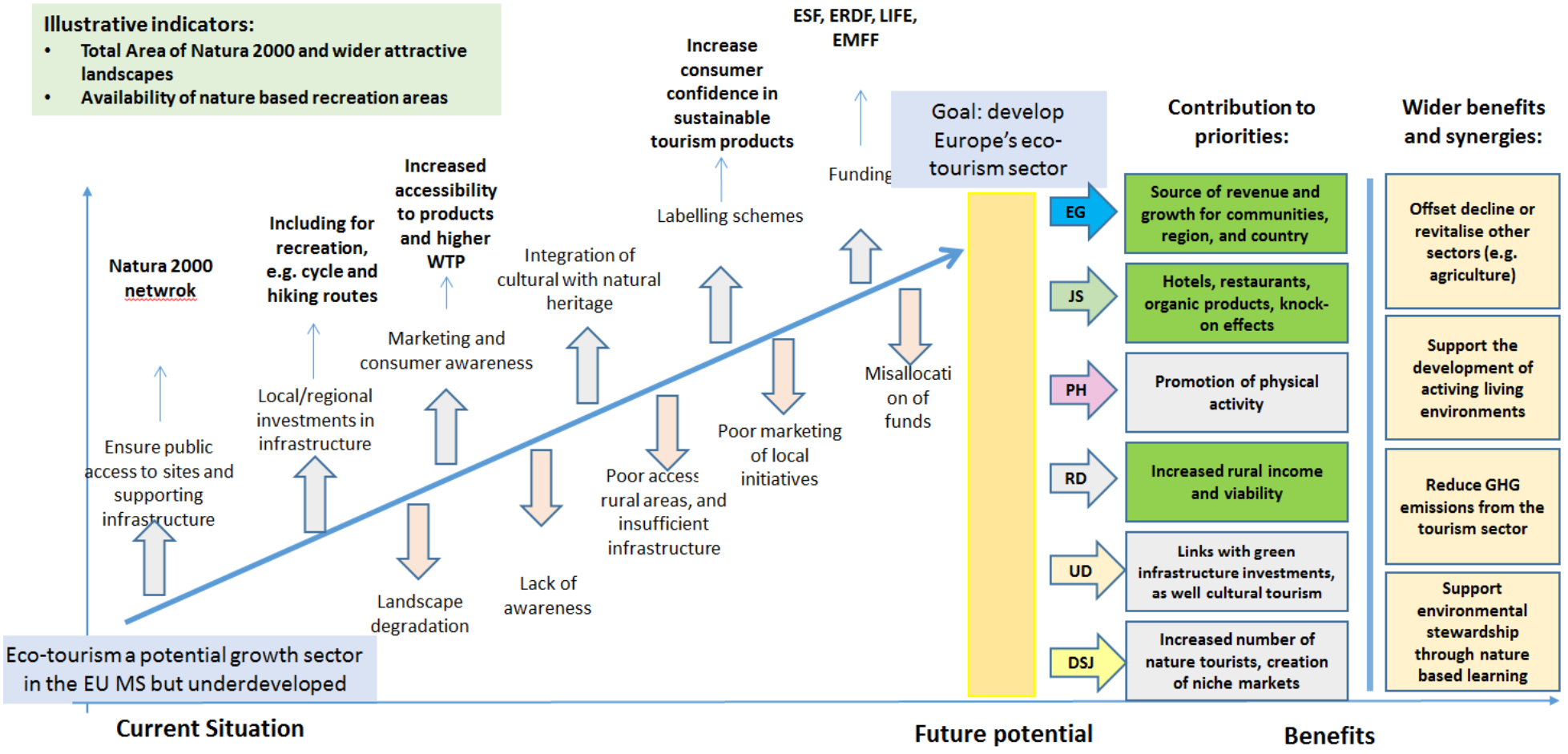
- An example of where biodiversity and eco-tourism have shown synergies in the Mediterranean can be found in **Greece**, an MPA the National Marine Park of Zakynthos (NMPZ), has supported diving activities. Three dive sites within the NMPZ are annually visited by more than 6,500 SCUBA divers through four diving centres (Gerovassileiou et al. 2009).

The evidence on the contribution that tourism to Europe's socio-economic priorities is significant, however rarely are these contributions disaggregated between eco-tourism and other activities. Indeed, **there is very little evidence that provides data on member state or Europe wide activities that are explicitly classified as eco-tourism**. Whilst a number of national level documents promote eco-tourism as a growth sector, evidence tends to focus on activities within the sector (e.g. forms of recreation). Most of the country fiches refer to wider literature (incorporating a range of tourism types) in order to illustrate the benefits developing eco-tourism.

Questions for discussion:

- What examples do you have on the current use of nature-based solution (NBS) that could interest other countries?
- What do you see as the potential for NBS in your country?
- What are the drivers and barriers to NBS?
- Who can do what to realise the opportunities of NBS?

Promising Area: Eco-tourism



5.2 What are the drivers of change?

Natural assets: are key drivers of eco-tourism as a result of the ecosystem services that natural environments provide. Member States across Europe can capitalise on their unique natural assets to create niche tourism products, which might not be available or feasible elsewhere (see figure).

- A **Swedish** investment agency, who supported Sweden's Strategy for tourism and travel 2020, argue that "Sweden is a country where natural luxuries like wide-open spaces, fresh air, clean water and beautiful, pristine nature and wilderness exist in abundance — for everyone" (VIA 2016).

Protected areas: various designation schemes or programmes can preserve natural environments and facilitate their contributions to socio-economic priorities. The Natura 2000 network, via the Birds and Habitats Directive, provide the most significant network of protected areas in Europe.

- In **Greece,** the total coverage of nationally protected areas amounted to 2,500,000 ha in 2011 (19% of land surface). On top of that, Greece hosts 90 areas of special community interest (SCI) within the national protected areas of the Natura 2000 network (YPEKA, 2014).
- In **Hungary**, more than 70% of nature trails and visitor centres were located in national parks. In 2013, Hungary's 10 national parks were visited by 1.39 million people (Magyar and Sulyok, 2014).

Eco-tourism in the Northern Area of Piatra Craiului National Park, Romania

Before 1997, Zarnesti had no tourism-related infrastructure at all. Therefore, the main challenge that CLCP (Carpathian Large Carnivore Project) faced involved stimulating the development of eco-tourism services, starting from the ground up. Over the years of the project, an increasing amount of infrastructure was developed, including several guesthouses, a tour operator, 10 trained and licensed nature guides, a bike rental business, horse-cart transport services and a handicraft shop for the merchandising of local crafts.

In 2001-2002, the local portion of the total revenue generated by the eco-tourism programme was about 46%. This demonstrates that a substantial amount of money — EUR 400,000 (about 140,000 EUR in 2001 and 260,000 EUR in 2002) — remained at the local community level. In 2001-2002, the average income in Zarnesti did not exceed 1,800 EUR per year. Thus, the local money generated through eco-tourism represented the equivalent of more than 100 full time jobs over two years. [2]

Regional promotion and accessibility: At the local or regional level, efforts can be made to market particular eco-tourism products.

- In **Croatia**, different regional marketing campaigns were launched to raise awareness of local attractions including protected areas, leisure opportunities as well as accommodation base. At the same time, the awareness of consumers of the impacts of consumption can also promote ecological stewardship, and thus increase the demand for sustainable tourism products (The Government of Republic of Croatia 2013, p. 9).

[2] http://www.ceeweb.org/piatra-craiului-national-park/

Linking natural and cultural heritage: successful eco-tourism activities often link aspects of local or regional cultural and natural heritage in order to develop attractive products for visitors. This can be seen in rural areas where cultural heritage, such as historical buildings, are located in pristine or managed rural locations.

- In **Romania**, heritage sites such as painted monasteries, wooden churches, Saxon fortified churches and Dacian fortresses can be found within sites of natural heritage such as Bucovina, Maramures, Danube Delta and Transylvania. Hence, rural accommodation stock, activity operators and specialist agro-tourism and eco-tourism suppliers are consequently well positioned to benefit from the identified increasing interest in rural tourism (Romania National Tourism Master Plan 2007 – 2026, p. 33).

EU funds: European funds are available to support sustainable tourism through a range of funds including the European Social Fund, European Regional Development Fund, as well as LIFE, EAFRD and the European Maritime and Fisheries Fund (EMFF).

- In **Hungary**, during the 2007-2013 EU programming period with the help of EU Cohesion Policy funds 37 eco-tourism projects were supported with HUF 11 billion (approximately EU 35 million) (Nemzetgazdasági Minisztérium 2014).

As well as investments in infrastructure, **EU funds can also be used to support capacity building and training.**

- **Malta's** Operational Programme II for Cohesion Policy 2014 – 2020 states that the European Social Fund can be used to provide training that contributes towards the development of the green economy and environmental protection (Parliamentary Secretariat for the EU Presidency 2017 and EU funds, 2014c, p. 135).

Other funding sources: as well as EU funds, investments might also be leveraged from other sources to support the development of sustainable tourism activities. National investments are often linked to or can complement EU funding.

- In **Romania**, The National Programme for Rural Development, in its third Pillar – "Quality of life in rural areas and diversifying the rural economy", supports investments in agro-tourism. In Poland, institutions such as the Agency for Restructuring and Modernisation of Agriculture offer loans that can be used to set up tourist business around agricultural holdings.

UNESCO World Heritage Sites provide significant pull for tourism, and designate sites are able to draw upon UNESCO funding.

- In **Poland**, UNESCO funding was invested in the World Heritage Site Bialowieza National Park to boost its tourist activity (Pabian and Jaroszewicz, 2009).

National strategies: many member states integrate tourism within their overarching socio-economic priorities and strategies for economic development.

- The **Greek** authorities perceive tourism as one of the key priority areas of the 2016 growth strategy (EC, 2016a). Some member states have developed specific strategies in order to promote eco-tourism.
- According to the National Strategy of Eco-tourism Development of **Romania** (Strategia Naţională de Dezvoltare a Ecoturismului în România), Romania will focus on three main aspects: (i) increasing the quality of tourism, providing a valuable experience for

visitors, as well as improving the quality of citizens' life, (ii) reducing poverty and protecting the environment, (iii) promoting sustainability – sustainable tourism ensures the sustainability of natural resources, and balances between the needs of the tourist industry and environmental concerns.

- In **Portugal** nature tourism is one of the priority products mentioned in the National Strategic Plan for Tourism, together with other strategic products with strong links with biodiversity (e.g., food and wine, sun and sea) (Ministério da Economia e do Emprego, 2013, p. 15-21).

Labelling schemes: **labelling can help support sustainable purchasing by increasing awareness and consumer confidence in the qualities of a specific product**. More generally, the creation and establishment of eco-labels and eco-certifications in tourism will enhance the growth and employment in this sector since the environmental contribution of touristic sites is better acknowledged (AFPA-Aten, 2014e, p.3).

- In 2016, **Greece** ranked third in the world in the "Blue Flag" programme for holding 430 beaches and 9 marinas which were recognised for their excellent seawater quality, litter management, organisation of the swimming area, and safety procedures for bathers and protection of the environment (Visitgreece, 2016).
- **Luxembourg** currently hosts 84 tourist establishments for cycle-tourism. Four of these establishments received the "bed+bike" label in 2016. Today, the country offers 600 km of cycle routes (Grand-Duché Luxembourg, 2016c). The cycle paths are generally found in remote locations, away from traffic (Grand-Duché Luxembourg, 2016b). Moreover, 42 tourist establishments in Luxembourg have been certified with an Eco Label for their environmentally friendly management, accounting for 8% of the total tourist establishments in the country (Oekozenter Pafendall, 2016).

5.3 What is the potential?

Economic growth: tourism is considered a growth sector in most member states. Having said this, the status of member states in terms of developing themselves as a location for tourism is heterogeneous. Cyprus has been a very popular location for tourism since the 1980s, in contrast Croatia is only recently but now rapidly establishing itself as one of Europe's most popular destinations. In other member states, tourism only plays a less significant but important role in the national economies. Hence, member states have different perspectives on the potential for economic performance in the tourism sector.

- In **Croatia**, where tourism already has a share of 12.2% of GDP in 2014, it is expected that tourism will attract investments of approximately 7 billion Euro will be attracted until 2020 (OECD 2016, p. 326). Due to this investment, the tourist spending in 2020 is expected to reach 14.3 billion Euros (The Government of Republic of Croatia 2013, p. 63).

Tourism Policy Guidelines recognise that sustainable tourism policy is key for ensuring long-term competitiveness of the German tourism industry, as consumer interest in sustainability is expected to continue to rise, and explicitly acknowledges that biodiversity protection and protected areas are a major competitive advantage (BMWI 2009).

Jobs: according to UNEP & UNWTO (2012), one job in the core tourism industry creates about one and a half additional or indirect jobs in the tourism related economy. Sustainable tourism is expected to reinforce the employment potential of the sector with increased local hiring and sourcing and significant opportunities in tourism oriented toward local culture and the natural environment (UNEP & UNWTO, 2012). **Eco-tourism offers opportunities for job creation, especially in remote areas where it is a bigger challenge to provide for** jobs (Ministère de l'Écologie, de l'Énergie, du Développement durable et de l'Aménagement du territoire, 2009, p.3).

- In **Greece**, the tourism employment multiplier was equal to 1.87 in 2009 according to SETE (2012).
- In **Sweden**, exploiting the opportunities related to local culture and natural environment, nature-based tourism is expected to increase further the employment potential. Extrapolating the employment data from 2013 with yearly growth rate of 6.1% in 2020 the number of employees within tourism industry is expected to be 261, 851 (full time equivalent) meaning an increase of over 50% compared to that in 2013.

Regional development: eco-tourism contributes to regional development by allowing the local population to develop activities in their area and stay in their local community (Ministère de l'Écologie, de l'Énergie, du Développement durable et de l'Aménagement du territoire, 2009, p.3). **Sustainable tourism provides economic alternatives to local people in order to reduce the exploitation of wildlife resources and support biodiversity conservation** efforts on an individual basis (UNEP, 2009 Marine protected areas (MPAs), which are established in areas characterized as biodiversity 'hot-spots', constitute popular diving destinations.

- The **Croatian** Tourism Development Strategy 2013-2020 sets as a priority the improvement of the quality and diversification of tourist services in order to attract more local and international tourists. The Ministry of Tourism and the Croatian National Tourist Board (CNTB) are supporting the diversification of the tourist services and products for the development of cultural, sport, gastronomic and cycling tourism products (OECD 2016, p. 327).

5.4 What are the barriers to progress?

Environmental degradation: **Negative externalities associated with mass tourism can deduct from the qualities of a particular environment, which make them suitable for eco-tourism**. Locations that are already highly developed from the perspective of tourism face challenges in developing a brand as a location for eco-tourism, particularly in contrast to pristine or less developed environments (see figure).

- This can be said for some locations for example in **Spain**. The country as a whole was the third world tourist destination in 2014 (World Bank, 2016) and occupied the first position of the travel & tourism competiveness index of the World Economic Forum in 2015[ii]. The Sectoral Plan of Nature Tourism and Biodiversity 2014-2040 considers that the rich biodiversity of Spain should be integrated in the national nature tourism policy, referring to its importance in terms of economic growth, employment and regional development.[iii]

Land use change and access: Popular locations for tourism are often threatened by land use change, which affects the quality of the natural environment.

- In Croatia, coastal areas are suffering from overbuilding, which pose threat to ecosystems and may lead to degradation and serious environmental impacts (Institute for Tourism 2016, p. 7). Despite the efforts of the government and the non-governmental sector to diversify the touristic services, the share of coastal tourism takes about 85% of the overall touristic services (The Government of Republic of Croatia 2013, p. 8).

In contrast, locations for eco-tourism are often hindered by a lack of access or do not have access to marketing channels in order to publicise their activities.

- The **Slovenian** Tourist Agency has identified a number of barriers to further development of green tourism, including limited overnight 'green' capacities, limited integration of the supply chains for green tourist products, and limited public transport options for tourists.

National disparities: Although many member states have locations that are popular with tourists, they also have regions that attract less attention; this can drive socio-economic disparities on the national level.

- This has been experienced for example in **Portugal** where, despite the increase in rural areas' accommodation establishments in terms of its number and overnight stays in the past decades, the metropolitan areas of Lisbon and Oporto, and the regions of Madeira and Algarve still prevail as the main touristic destinations. In 2013, approximately 82% of total nights were spent in these areas.[21]

Questions for discussion:

- What examples do you have on the current use of nature-based solutions (NBS) that could interest other countries?
- What do you see as the potential for NBS in your country?
- What are the drivers and barriers to NBS?
- Who can do what to realise the opportunities of NBS?

6 Green infrastructure for climate resilience and adaptation

6.1 What is the status of the synergies & benefits?

Green infrastructure can be an important element for increasing climate resilience, for example as part of flood protection measures. It can be designed in a synergistic way that promotes biodiversity, for example through restoration of degraded ecosystems. An important benefit of climate change adaptation measures are the avoided economic costs compared to the cost of inaction (Agência Portuguesa do Ambiente, 2015, p. 8). In addition, compared to traditional engineering approaches, nature-based solutions form cost-effective alternatives for climate change adaptation. The development and maintenance of green infrastructure for climate change adaptation can contribute to economic growth and employment. Furthermore, green infrastructure can reduce negative health impacts from climate change.

Economic growth and avoided economic losses: Climate change can affect the economy negatively through damages to infrastructure and additional costs in a number of sectors. Ecosystem-based approaches are a means to adapt to climate change and can provide cost-effective and more durable solutions than grey infrastructure (EC, 2013b). Next to avoiding losses, green infrastructure for climate change adaptation contributes to economic growth through the development of existing and new markets such as ecological engineering (AFPA-Aten, 2014c, p.1-2).

- In the **Czech Republic**, damage caused by floods between 1990 and 2010 was calculated at 170 billion CZK, which is approximately 8.5 billion CZK (~314.5 million Euro) annually for flood damage compensation only (Ministry of Environment, 2013, p. 140).
- The management and restoration of ecosystems contributes to economic growth. In 2012, there were between 150 and 200 small and medium-sized enterprises of ecological engineering in **France**. This market of ecological engineering activities amounted to around 2 billion euros in 2012 (AFPA-Aten, 2014c, p.1-2).
- Economic losses are also due to physical and mental health impacts of climatic extremes. For example, during the heat wave of 2003, the economic costs due to the, on average, loss of one year of life, was estimated to be 500 million euro (ONERC, 2009, p.8-10).
- **Portugal** presented a total cost of 6,783 million euros equivalent to 665 Euros per capita, and 0.14% of GDP between 1980 and 2013 due to climate-related hazards (EEA, 2017, p. 123).
- Projections until 2050 in **Slovakia** predict a slowdown in economic growth of 0.4 to 0.7% of GDP, if adaptation measures will be not taken. If preventive measures will be implemented, the impact could be reduced to 0.1 - 0.15% of annual GDP (SHMU, 2011).
- According to the EEA (2017), economic losses related to climate change in the period 1980-2013 in **Spain** cumulated to 32.8 million euro, which represent EUR 800 per capita until 2013, and 0.12% of GDP (Ciscar et al., 2010).

Jobs and skills: The growth of new markets for climate change adaptation has a potential to maintain and create new and local jobs. For example, jobs in research, technology, the infrastructure and construction sector, landscape architects, ecological engineers, the insurance sector, etc.

- A job directly related to green infrastructure in general and in protected areas, is ecological engineering. In 2014, about 28,000 professionals had a job to enhance ecosystem functioning in **France**. Around 11,000 worked directly for the management and restoration of natural environments and 2,200 people were ecological engineers (AFPA-Aten, 2014c, p.1).
- Policies intended to create green jobs are creating new opportunities in the sustainability and adaptation sector. The programme "Emplea Verde" of **Spain** has channelled 42 million Euro of investment from EU funding, creating 500 jobs and training 60,000 people until 2015.

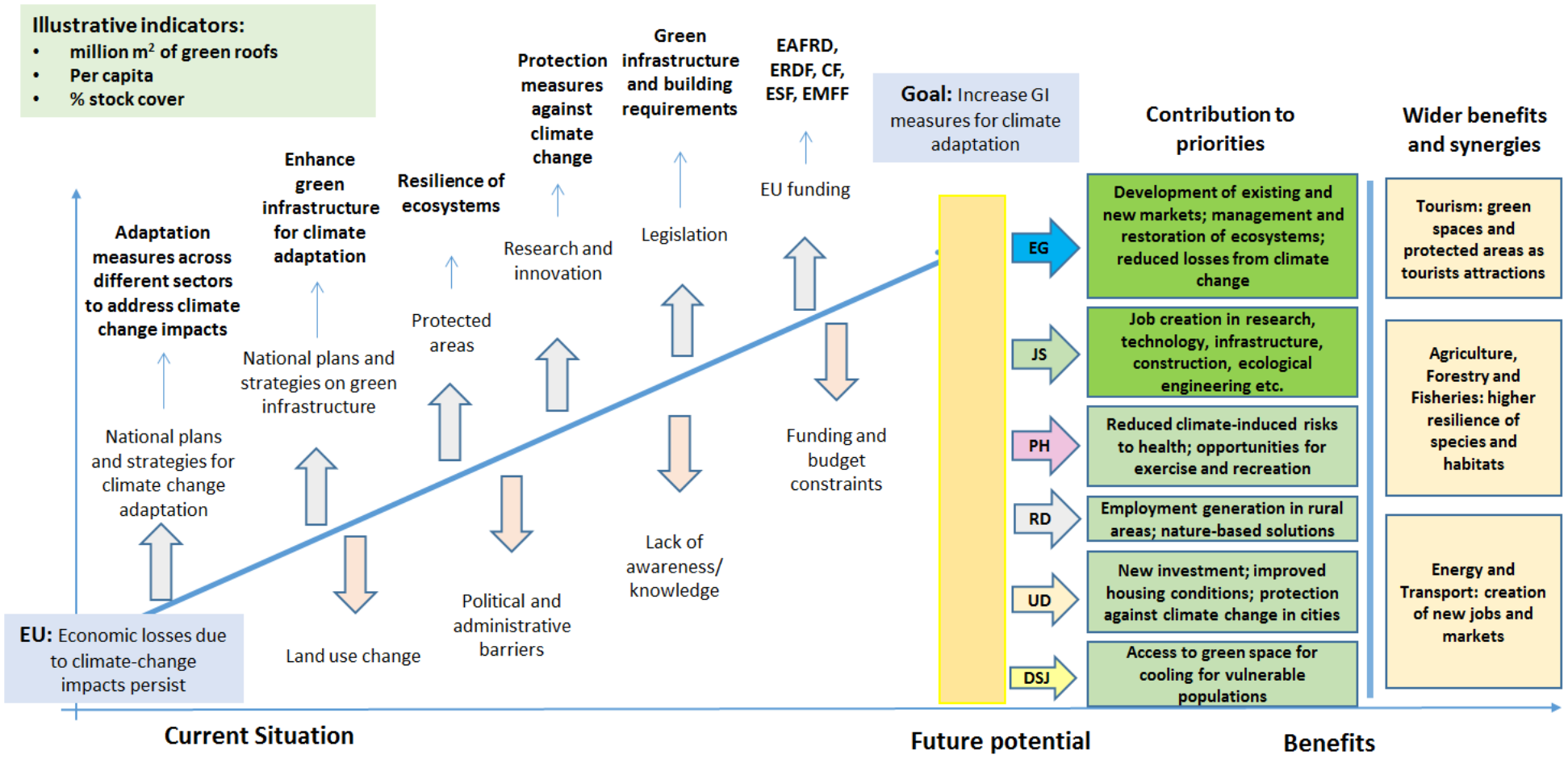
Network of Natura 2000 sites in Languedoc-Roussillon
A green infrastructure project in France supported by the LIFE+ program was the lagoon and dune Natura 2000 sites network in Languedoc-Roussillon, which lasted between 2009 and 2013. The coastline of Languedoc-Roussillon contains some 40,000 hectares of wetland. It hosts several Natura 2000 sites with lagoons and dunes. The LIFE+ project consisted of the creation of a network of 5 Natura 2000 sites with lagoons and dunes to improve the management of the sites. The activities consisted of restoration works, management of human activities and invasive species control. The restoration and improved management of the lagoon and dunes increases their adaptation to climate change. In addition, more employment was created through the works and activities in a region that has economic difficulties. Services of local economic operators during the project were estimated at 908,000 euros. In addition, 27 full-time equivalent contracts were signed over 5 years (EC, 2009).

Public health: Green infrastructure with biodiversity for climate change adaptation helps cooling urban and peri-urban areas and mitigates climate-induced dangers to public health (Bowler et al., 2010), such as poor air quality, high temperatures (e.g. urban heat islands) and noise pollution. In addition, green areas offer opportunities for exercise and recreation, which help address physical and mental health problems.

Regional development: Green infrastructure works for climate change adaptation carried out in rural areas promote local development through the creation of employment in infrastructure and construction as well as through creating opportunities for tourism, recreation and local retailers. In addition, green infrastructure provides appealing places to live and work (EC, 2013b).

Urban development: Green infrastructure for climate change adaptation in cities protects cities against increased runoff of water, heat waves, prolonged periods of drought and hence increased dustiness etc. (Ministry of Environment, 2013). In addition, green infrastructure delivers health-related benefits such as clean air and better water quality (EC, 2013b).

Promising Area: Green Infrastructure for Climate Adaptation



Demographic change and social justice: Climate change impacts will be different according to regions and depending on the economic and social situation of individuals. The most disadvantaged people will be probably the most vulnerable (ONERC, 2009, p.13). Addressing these vulnerabilities can increase social justice. In addition, green infrastructure for climate change adaptation offers opportunities for social cohesion trough increased exchanges between individuals from different social communities and fosters their interactions (Bell et al., 2008; Weldon et al., 2007).

Several country analyses point to the synergies between green infrastructure for climate change adaptation and tourism opportunities. Green spaces and especially protected areas can attract tourists. Coastal zones that are important for tourism are threatened from flooding events. Other sectors that will benefit from green infrastructure for climate change adaptation are agriculture, forestry and fisheries through the promotion of higher resilience of species and habitats that support the viability of these economic sectors. In addition, the energy and transport sectors can benefit through the creation of new jobs, supporting the growth of new markets or creating savings for the economy.

6.2 What are the drivers of change?

Drivers that were often identified in the country analyses are plans and strategies, and funding received from the EU. Other drivers mentioned are protected areas and Natura 2000 sites, research and innovation, legislation and public awareness (see figure).

National plans and strategies for climate change adaptation: A number of countries have specific national strategies or plans to prepare and adapt to climate change, many referring to the role of green infrastructure and biodiversity.

- The National Strategy on Adaptation to Climate Change in the **Czech Republic** (Ministry of environment, 2015) provides an assessment of the climate change impacts, vulnerabilities, and suggested adaptation measures across different sectors to address the adverse anticipated impacts of climate change.
- The national plan for climate change adaptation of **France** mentions that the effect of climate change on biodiversity has to be taken into account when managing territories. One of the means to do this is by developing and preserving the green and blue infrastructure and by considering climate change when developing protected areas. Another objective is to integrate climate change adaptation into strategies and plans for biodiversity preservation (Ministère de l'Écologie, du Développement durable, des Transports et du Logement, 2011b, p.31-32).
- The National Climate Adaptation Strategy of the **Netherlands** ('Nationale klimaatadaptatiestrategie', Ministry of IenM 2016) stipulates that the effects of climate change need to stay manageable and be reduced. The Deltaprogramma (Ministerie van IenM and Ministerie van EZ 2016) is the most important policy for adapting the country's water systems to climate change. EU policy driving climate adaptation in the Netherlands includes the flood directive (EU Directive 2007/60/EC) which requires MS to further flood risk management and the EU adaptation strategy, which promotes climate proofing and encourages MS to produce climate adaptation strategies.

Room for the River Programme, Netherlands
The room for the river programme was initiated in 2007 in response to growing water levels in the rivers due to more intense precipitation and meltwater. With the aim to provide more room for rivers to accommodate the increasing amounts of water, the programme relocated dikes, restored floodplains and revived old river branches in the river basins of the IJssel, Waal, Rhine and Lek. Next to flood protection, all spatial interventions were designed to serve other purposes such as recreation, green neighbourhoods, and the local economy (Rijkswaterstaat 2017).

National plans and strategies on green infrastructure: National plans exist to enhance green infrastructure that have climate change adaptation among their objectives.

- The program Nature 2050 of the "Caisse des dépôts biodiversité" of **France** endeavours to adapt territories to climate change and to enhance their biodiversity by 2050 (CDC biodiversité, 2016, p.19).
- The Landscape and Biodiversity Conservation Action Plan 2015-2020 in **Lithuania** introduces the term "Green Infrastructure" and states that it is implemented through the "natural frame" development. The Action Plan acknowledges that green infrastructure solutions could contribute to solving problems caused by climate change (LR Aplinkos Ministerija 2015).

Protected areas: Protected areas are a means for climate change adaptation. They increase the resilience of ecosystems by reducing the impact of climate change and by maintaining ecosystem services (Ministère de l'environnement, de l'énergie et de la mer, 2011, p.23).

- In **Cyprus**, 1.2% of the total land area is designated for the protection of birds while 5% is designated for rare species and habitats, with some overlap between some designated areas. The European Commission has included 61 areas in Cyprus to the Natura 2000 network (ANEL, 2012).

Research and innovation: Research and innovation on climate change adaptation will improve measures that protect against climate change.

- Between 2007 and 2011, the Ministry of the Environment of the **Czech Republic** has supported two research and development projects in regards to climate scenarios. A major outcome from a project resulted in the creation of local Early Warning System that provides detection of flash flood occurrence based on a combination of several risk factors (ME, 2015).

Legislation: Laws can encourage green infrastructure measures for climate change adaptation taken by governmental institutions or individuals.

- In **Austria,** legislative texts were adjusted or developed on new building requirements including for green roofs and on urban land use planning policies.

- The **Romanian** Law no. 1466/2010 obliges municipalities to elaborate a Green Spaces Register. The main objectives of these Green Spaces Registers are to protect and preserve green urban spaces, to maintain the protective function of green spaces against floods, landslides and climate effects, to identify deficient areas and to take action in order to develop them.

European funding: European funds mentioned for climate change adaptation are the five European Structural and Investment Funds (ESI Funds): the European Regional Development Fund (ERDF), European Social Fund (ESF), Cohesion fund (CF), European Agricultural Fund for Rural Development (EAFRD), and European Maritime and Fisheries Fund (EMFF). Other funds are the research and innovation funding programme Horizon 2020 and the LIFE+ instrument or the EU Solidarity Fund for natural disasters. The European Structural Funds 2014–2020 – ESF, ERDF and CF envisage measures directly related to climate change within the National thematic objective 5 "Promoting climate change adaptation, risk prevention and management". 1.3 billion Euro will be allocated from the budget in support of this thematic objective.

- The "PO SEUR" – "Operational Programme for Sustainability and Efficient Use of Resources" (one of the 16 programmes of the **Portugal** 2020 strategy) includes an operational axis focusing on the "Promotion of climate change adaptation, and risk prevention and management". This axis has a total budget of 401 million Euros, divided in coastal protection (200 million Euros), climate change adaptation and risk prevention (144 million Euros), air firefighting media (50 million Euros), and natural and human action risk prevention and management (7 million Euros). One investment priority is identified under the following category: "Support investment for the adaptation to climate changes, including approaches based on ecosystems".

6.3 What is the potential?

The information on the potential of climate change adaptation for the socio-economic priorities (economic growth, jobs and skills, regional development, public health, urban development, demographic change and social justice) are mostly qualitative rather than of a quantitative nature.

Economic growth: The potential of climate change adaptation measures for economic growth is recognized by several countries. The potential of green infrastructure for climate change adaptation include economic savings against potential damages. Green infrastructure and biodiversity protection will safeguard the ecosystem services offered by biodiversity and its economic contribution (ONERC, 2009, p.9). Protecting green areas and its biodiversity is economically sensible, since biodiversity provides every year two times the value of goods and services than what we produce ourselves (Ministère de l'environnement, de l'énergie et de la mer, 2016b). Several other growth opportunities are recognized as well, but not quantified.

- **France** estimated that the market of ecological engineering would grow to 3 billion euros in 2020 in this country (AFPA-Aten, 2014c, p.2).

Jobs and skills: The construction, maintenance and restoration of green infrastructure contribute to the maintenance and development of new local jobs and skills. Planning green infrastructure requires skilled individuals, such as architects, designers and engineers but its implementation also requires 'green collar' jobs in construction, maintenance and installation. In addition, education and training needs to be developed.

- The **French** government wants to increase the amount of jobs concerning the enhancement of ecosystem functioning to 40,000 by 2020 (AFPA-Aten, 2014c, p.1).
- According to a green jobs study of 2013 in **Romania**, performed by the European Employment Observatory, the ecological sectors could represent 25% of total occupancy. The largest number of green or ecological jobs will be created in agricultural and energy production sectors, but even without these sectors, the share of green sectors/activities could reach 4,7% of the total occupancy in Romania, which in 2010 was about 9,239,390 (Anghel et al, 2014, p. 7).

Regional development: There is an opportunity of nature-based solutions for climate change adaptation and regional development. These include the reduction of water stress, eco-touristic opportunities and a potential for rural areas.

Public health: Most countries consider de potential of green infrastructure for public health on a qualitative and not on a quantitative level, but Romania included some numbers.

- In **Romania**, green areas in cities can reduce pollution by up to 20% and can decrease temperatures in cities by up to 10°C. Building facades covered with plants, could consume carbon dioxide and produce oxygen. The direct benefit could be the absorption of up to 10-20% of particulate matter pollution resulting from transport, industrial or commercial activities[3].

Urban development: Investments in green infrastructure for climate change adaptation are opportunities to increase the attractiveness and liveability of urban spaces. Ecosystems and biodiversity in green infrastructure can play an important role to ensure resilience of the cities against climate change (Mutafoglu et al., 2016 and ten Brink et al., 2016). Furthermore, green spaces in a residential community attract tourism and investment and improve employment and income potential.

6.4 What are the barriers to progress?

Land use change: A barrier that was mentioned in the country cases was the competition for land use, mostly in urban areas. This trend is often accompanied with a short-term perspective and priority on delivering instant economic benefits rather than taking the long-term benefits of green infrastructure into consideration. Consequently, this situation tends to favour grey infrastructure over green infrastructure (see figure).

[3] http://www.green-report.ro/beneficii-fatade-verzi/

Political and administrative barriers: Other barriers exist on a political level. Some county analyses mention that local authorities lack power and autonomy for green infrastructure implementation and that bureaucratic obstacles exist.

Lack of awareness: There is a lack of awareness in some countries among the public and politicians on the broader context and impacts of climate change.

Lack of knowledge: Furthermore, there are knowledge gaps on the functioning and importance of green infrastructure and a lack of reliable sectoral and regional cost-benefit studies on climate change measures. In addition, education programmes and professional trainings are insufficient in some countries.

Funding and budget constraints: Funding needs to be improved in some countries, especially in Romania, Portugal and Spain. In Portugal and Spain, this is mostly due to national budget constraints and the country's economic and financial vulnerability.

Questions for discussion:

- What examples do you have on the current use of nature-based solutions (NBS) that could interest other countries?
- What do you see as the potential for NBS in your country?
- What are the drivers and barriers to NBS?
- Who can do what to realise the opportunities of NBS?

7 Green infrastructure for health, growth, jobs and regional development

7.1 What is the status of the synergies & benefits?

Nature and biodiversity in cities support human health by decreasing the impact of air pollution, noise and augmenting physical activity. Soft mobility, including walking and cycling, can be linked to the health benefits of nature by reducing the drivers of pollution and supporting public participation in recreation, integrating an increasing share of green rather than grey infrastructure in urban environments (Mutafoglu et al., 2016 and ten Brink et al., 2016). In this context investing in green infrastructure can support economic growth, improve public health, support sustainable transport systems, and urban development.

Economic growth: Investing in GI has been shown to contribute to the recovery of Europe's economy by fostering innovative approaches and creating new green businesses. According to the European Commission, green jobs already represent around 5% of the job market (EC, 2013a). The health sector represents one of the most significant public expenditures for all of the member states.

- In 2014, the private and public health expenditures in **France** were high with about 257 billion euro, which represents 12% of GDP.
- In the **United Kingdom**, public health system is a significant contributor to the national deficit. Total healthcare expenditure in the UK reached £150.6 billion in 2013, equivalent to £2,350 per capita, more than two and a half times the level in 1997 (ONS, 2015). Improving access to nature and promoting nature-based activities including exercise can reduce the burden of disease. A UK Department of Health study estimated that a 10% increase in physical activity in adults would bring an overall economic benefit to England worth at least £500 million per year, of which 17 per cent (or £85 million) would be a direct saving to the NHS4.

Public health: Respiratory disease linked to air pollution, obesity and idleness, as well as mental health issues are key drivers of poor health across Europe. **Poor physical and mental health has far-reaching socio-economic consequences, and ensuring access to good health remains a priority in all member states, particularly in the context of changing demographics**. Citizens across Europe already benefit from ecosystem services provided by green infrastructure.

- Researchers from the Universities of Bristol and East Anglia found that people living closer to green spaces were more physically active, and were less likely to be overweight or obese, and people who lived furthest from public parks were 27% more likely to be overweight or obese.[5] Research also demonstrates that access to green space and the natural environment plays an important role in tackling mental ill health, which is increasing and estimated to affect significantly one in four people in the UK each year[6].

[4] Foster, J., Thompson, K. and Harkin, J. (2009) Let's Get Moving Commissioning Guidance: A physical activity care pathway, London: Department of Health.

[5] E. Coombs, A. Jones, & Hillsdon. M., 2010. Objectively measured green space access, green space use, physical activity and overweight.' Society of Science and Medicine. 70(6):816-22

[6] Natural England (2016) A review of nature-based interventions for mental health care

Concerning soft mobility, in **areas with a high modal research has been used to demonstrate a range of benefits, including for public health**. Even though there are no detailed numbers on the use of the bicycle and walking.

- 20 % of Flemish inhabitants use their bicycle daily (Vlaamse overheid, 2012, p.29). This has major health benefits, which is also recognized by the Walloon government. The mortality risk of people who cycle is reduced by 28 % for all ages (Gouvernement Wallon, 2014b, p.10).

Transport: Many urban and peri-urban areas in Europe suffer from congestion and pollution linked to motor and fossil fuel based transport. **Member states that have a higher model share of soft mobility options, demonstrate the multiple benefits of reducing dependencies on car transport in particular.** The use of soft mobility is often closely linked to urban planning which plays a greater attention to un-motorised transport and green infrastructure. Urban congestion primarily linked to motorised transport costs Europe's economy EUR 100 billion each year, or 1% of the EU's GDP.

- The modal share of cycling in Europe's cities varies between 3 and 28% (European Commission, 2015). EU27 average for cycling as a main mode of transport was 7.4%, with the highest share found in the Netherlands, 31.2% (Gallup Organisation, 2011).

Urban development: High rates of urbanisation in Europe present challenges to development sustainable urban environments, which can support healthy populations. At the same time, **urban spaces are economic powerhouses and home to most of Europe's populations, so there is a significant interest and political will to support sustainable urban development**. At the national level and amongst regional as well as municipal authorities, there are existing activities that promote urban development integrating green infrastructure recognising its multiple benefits.

GREENLINKS – Green infrastructure to promote cycle commuting between Belgium and France

Greenlinks was an Interreg IV Project, carried out between April 2011 and March 2015 with the aim to create a network of green cycling routes within Eurométropole (the triangle of Lille-Kortrijk-Tournai). The objective was to, through investment in green soft mobility infrastructure, facilitate the movement of people across the Franco-Belgium border, and increase the use of cycling as a means for commuting. Additionally the Eurométropole aims to increase its popularity as a location for hiking, cycling and equestrian recreational and tourism activities. A total of 60km of cyclable routs were created which are integrated as part of the Euro 5 trans Europe cycle network (connecting London to Brindisi). The total cost of the project was EUR 4.5 million, with EUR 1.1 million of EU regional funds (Lille Metropole, 2015; Interreg IV, 2014).

Synergies with other sectors and priorities: As well as contributing to the above socio-economic priorities, investments in green infrastructure that target health and sustainable mobility can indirectly deliver wider benefits and support a range of wider economic sectors.

Social cohesion: Much burden of disease is unevenly distributed amongst social groups within Europe. For example, in many member states socio-economic status is closely linked with

levels of physical activity. Likewise, evidence suggests that access to green space or opportunities for recreation are also dissected along socio-economic lines.

Economic growth in wider sectors: Green infrastructure can support the growth in a range of sectors; this includes tourism and emerging industries.

- In **Germany,** it was reported that city tourism and local businesses, gardening, urban planning and the sports industry all profit from green urban areas (BMUB, 2015). In 2014, the green roof coverage in Germany was 86 million m^2 and growing at 9% increase per year with an annual sales figure of €254 million (EFB 2015).

Green corridors for promoting environmental awareness in Bulgaria

Much in the spirit of European cycling networks such as EuroVelo[7], the Municipality of Burgas under the project "Green corridors - promotion of natural, cultural and historical heritage in the region of Burgas and Kirklareli" has developed a one-stop-shop for cycling routes and areas of interest in the Burgas Province[8].

While in this case principally developed with tourism in mind, such green infrastructure has the potential for promoting environmentally-conscious behavioural change (Panter and Ogilvie, 2015), and Burgas can also be noted for its cycling infrastructure incl. its exemplar bike renting scheme[9].

Outside of indirect (behavioural) impacts, such infrastructure can also have direct benefits for emissions of both air pollution and greenhouse gas emissions, as well as for conservation of biodiversity (ten Brink *et al*, 2016).

Tourism: Green infrastructure and national networks for cycling and hiking linked to green infrastructure are notable drivers of growth in the tourism sector.

- Today, **France** counts around 10,000 km of cycle paths and green tracks (Ministère des affaires étrangères et du développement international, 2015, p.2-4). Between 2013 and 2014, the use of touristic cycle routes increased by 12 %. Thus, the development of the eco-touristic sector has potential and will contribute to economic growth. On the other hand, the pressure of tourism is reduced since eco-tourism allows developing tourism in other places. Furthermore, more profit per tourist will be made since eco-tourists spend on average more money per day (Ministère des affaires étrangères et du développement international, 2015, p.2-4).

Job: Soft mobility can support jobs in both developing infrastructure and those sectors that directly support soft-mobility.

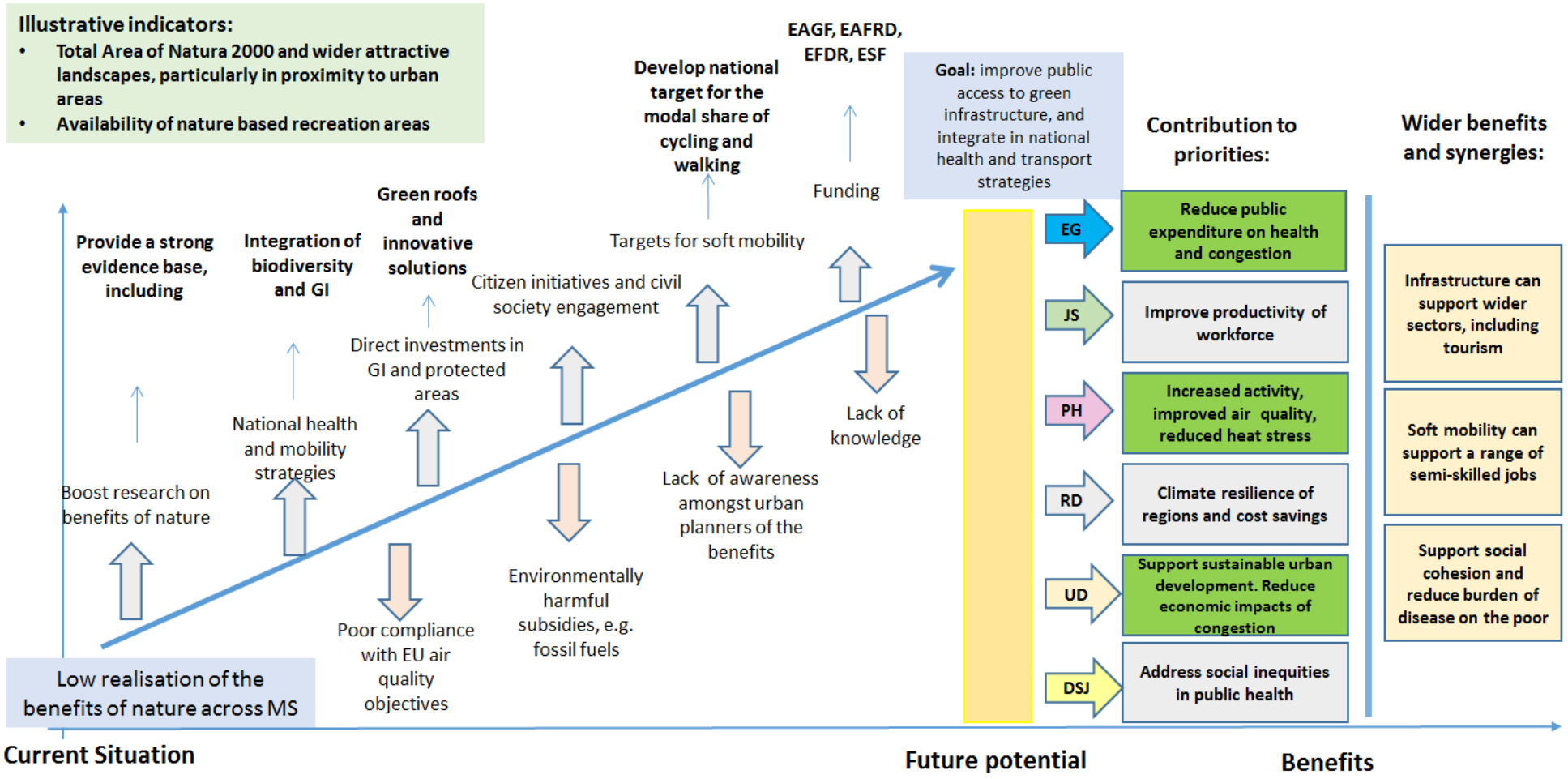
- The cycling sector for Luxembourg City, which has a low modal share for cycling, currently employs 78 people (WHO, 2016). Groningen, **Netherlands** has the highest number of cycling-related jobs per 1000 residents, at 2.2.

[7] http://www.eurovelo.com/en

[8] http://greencorridors.burgas.bg/

[9] http://gotoburgas.com/en/index/static/31

Promising Area: green infrastructure for health and mobility



7.2 What are the drivers of change?

Urban planning: City strategies and urban planning can support the development of living environments that promote physical and mental wellbeing as well as soft mobility.

- In **Germany**, currently the daily land-use change rate for urban areas is 73 ha per day, but the Germany government plans to lower that rate drastically to 30 ha per day by 2020 (StBa, 2015, page 9), indicating their intention to reduce the loss of green spaces nation-wide.

Many member states apply specific strategies for socio-economic priorities, which incorporate biodiversity and green infrastructure.

- **Luxembourg's** National Action Plan for Soft Mobility (Grand-Duché de Luxembourg, 2008) provides a national level strategy to promote a greater modal share of soft mobility. Tools identified include investment, urban and land-use planning, transport infrastructure, supporting services, legal instruments, promoting safety, data collection and communication and markets. Luxembourg supports the implementation of "integrated road spaces" which are based on soft mobility (for both walking and cycling) and green infrastructure.

Investments in green infrastructure: In contrast to grey infrastructure, which is typically linked to motorised transport, **investment in green infrastructure can facilitate citizens to switch to soft-mobility options by increasing sense of security, improving aesthetics and environmental health.** This in turn can promote the development of cycling as a sector supporting the economy, as well as lending to a range of public health benefits.

In addition, soft-mobility can contribute to employment and support wider sectors of the economy, notably tourism and recreation.

- In **France**, the region Île-de-France, the objective is to reach 10 m^2 of nearby public green spaces per citizen in urban areas (Cours des comptes, 2016). In addition, a Regional green plan 2016-2021 (Plan vert régional 2016-2021) has been presented to the regional parliament.

Protected areas: **Protected areas located in both rural and urban locations improve access to nature, and represent an important facet of Europe's green** infrastructure. The Natura 2000 network can mitigate habitat fragmentation, and maintain the functioning of ecosystems, safeguarding the benefits of ecosystem services (CBD, 2014).

- Forests in **Latvia** take up totally 52% of the country´s territory and due to afforestation, the amount of forestland is expanding.

Public strategies and research in health and physical activity: **Strategies and plans which explicitly state the multiple benefits of green infrastructure help to provide political salience to efforts to support health and transport priorities through investments in nature**.

- GI was highlighted under the **Greek** Biodiversity Strategy under Target 13 (YPEKA, 2014), and the ecological functions associated with the green infrastructure in urban overpopulated areas, creating and maintaining biodiversity islands within the urban fabric were considered as a priority.

As well as public health strategies, there is a growing body of research highlighting the multiple benefits of nature and nature based activities for public health. Further research and innovation on how green urban areas increase climate mitigation, habitat for biodiversity,

and coincidently public health drives investment and public acceptance/awareness towards green areas (EC, 2012; ten Brink et al., 2016).

European funding: A number of EU funding programmes support investments in green infrastructure for health and transport. The EU contributes to the funding of green infrastructure through two of the Structural Funds (Chapter 4 of the European Regional Development fund and the European Social Fund), the European Agricultural Fund for Rural Development, LIFE+ and the research funding programmes. Urban green spaces are eligible for several of these programmes.

Concerning transport, the Connecting Europe Facility (CEF) made EUR 24.05 billion available for decarbonising transport in the EU. Other European funds such as EFSI and ESIF also have funds for transport projects. Parts of Horizon 2002 also promote "smart, green, and integrated transport". Interreg funding can also be invested where transport issues are linked to the existence of borders (see example above).

URBACT III is a European Territorial Cooperation programme (2014-2020) jointly financed by the European Union (through the European Regional Development Fund, nearly € 75 million). It acts as European exchange and learning programme promoting sustainable urban development. It will enable European cities to work together to develop solutions to urban challenges and share good practices, lessons and solutions with all stakeholders involved in urban policy throughout Europe. The programme will cover all of the 28 Member States of the European Union as well as the 2 partner countries of Norway and Switzerland (OECD 2016). In addition, a number of EU funding programmes support investments in urban and rural development.

7.3 What is the potential?

There exist significant opportunities for reducing public healthcare expenditure by introducing nature and biodiversity into cities, as well as improving the protection and management of public spaces.

Economic growth: Reducing public expenditure in health care can help to leverage finances for investments which provide value added to Europe's economy. For example, air pollution is not only a health problem, but also an economic issue. Treatments, hospitalizations, and disability pensions put a burden on already stretched health budgets. In addition, there are economic costs for absence, productivity losses etc.

- The costs for the health system of the treatment of diseases related to air pollution is estimated to be between 1 and 2 billion euros per year in **France**. The costs for the health system of the treatment of diseases related to air pollution is estimated to be between 1 and 2 billion euros per year in France. This is between 15 % and 30 % of the expenditures of the "diseases" branch of the social security system. Together the total cost for the French health system of air pollution is calculated to be at least 3 billion euros per year (Senat, 2015, p.93, 96-97).

- The Natural Capital Committee (2015) estimates that improved urban greenspaces in **England** could provide recreational benefits and improvements in physical and mental health, which could reduce health treatment costs by £2.1 billion.

Public health: Improvements in public health can help to reduce the negative economic impacts of disease, including to productivity. Data from across Europe highlights the impacts of poor lifestyles and the quality of living environments on public health.

Transport: Sustainable, carbon neutral and efficient transport systems can help to reduce congestion, as well as air and noise pollution. In some member states, addressing congestion and the negative externalities of unsustainable transport systems is a national priority.

- In **Luxembourg**, emissions from the transport sector as well as high costs linked to congestion are highlighted as being priority issues (EC, 2016b, p. 46). Luxembourg has both the highest motorisation rate (672 passenger cars per 1000 inhabitants) and rate of diesel usage for passenger cars (62%) (eurostat, 2015).

Urban development: Greening urban areas can have a multitude of valuable positive effects for Europe's cities, such as moderating urban climates, improving air quality, reducing noise pollution, supporting physical and mental health and creating space for social interactions and communication (BMUB 2015). Investments in urban ecosystem-based adaptation help with urban regeneration, and thus increase the image and attractiveness of a city. Green urban areas are highly important for the regional and international competitiveness of a city, as a number of city rankings prove that the general population and employees rate greenness as a higher quality of living (BUMB 2015, page 15).

7.4 What are the barriers to progress?

Access and education: Facilitating individuals to have access to green spaces and nature is not only a question of physical access, but also one of education and awareness raising.

- Reportedly, **French** citizens rarely visit parks and forests. Only 25 % of the French population frequent a park once a month and only 23 % of the French population visit a forest once a month (Val'hor, 2013). In contrast, More than 80% of **Latvia's** residents regularly visit the forest to participate in sports, hunt for mushrooms or pick berries (Meža Attīstības Fonds 2011).

Land use change: Competing land uses and high demand for property in urbanised areas puts pressure on green spaces. A trend towards developing green space for other uses is not uncommon in European cities. The conversion of green spaces to other uses can reduce public access to spaces for recreation, as well as associated health benefits.

- More three quarters of **Germans** live in dense or medium-dense populated areas (StBa, 2014) and even in these urban areas, land-use change and sealing continues at 73 ha per day (StBa, 2015).

Demographic change: Several European countries have ageing populations. **Changing demographics can place pressure on public services as the dependencies are increased**. These impacts are notable in the health care sector, where the demand on specific age related resources are anticipated to increase in the near future.

- Currently, 5% of **Germans** are 80 years and older, which is predicted to more than double by 2050 (Destatis, 2009, page 5).

Air pollution and legislation: **Many member states continue to fail to meet European standards on air quality**, including nitrous oxide and particulate matter. This includes many cities, such as London, Brussels and Stuttgart.

- **Bulgaria** continues to be amongst the worst performers in terms of air quality in Europe (EEA, 2015, p. 22, 40), with implications for public health (MoH, 2014a, p.20) and biodiversity (Harmens et al., 2013). It has been referred to the EU Court of Justice due to persistent non-compliance with limits on PM10 emissions (EC, 2015).

Research into benefits: although environmental health is an established field, many of the links between access to nature and public health or wellbeing are either poorly understood or only recently being researched. The nature of the health sector is that there is a significant research burden that must be overcome before significant investments can be made. **More research is needed to better understand the links between investments in green infrastructure and soft-mobility can be mutually reinforcing and contribute significantly to sustainable urban development.**

Questions for discussion:

- What examples do you have on the current use of nature-based solutions (NBS) that could interest other countries?
- What do you see as the potential for NBS in your country?
- What are the drivers and barriers to NBS?
- Who can do what to realise the opportunities of NBS?

8 The workshop and next steps

8.1 Aim of the workshop

The aim of the workshop is to share the preliminary findings of the ongoing study with Member State officials and experts, and build on the findings to develop the understanding of how nature-based solutions can address countries' socio-economic priorities.

It is aimed at a venue for exchanging experience as to what works in a country and region – as this might inspire other countries and regions.

It also aims to share and develop together insights on the opportunities and drivers of change, the barriers, and what measures are needed to help realise the opportunities for benefits. The way forward can usefully distinguish what can be done at EU level (e.g. funding, improved integration and policy coherence, capacity building) using what processes (e.g. European Funds, European Semester process, dialogues), and what at national, regional and local levels given competencies and suitability of processes and stakeholders for the challenges and opportunities.

It is therefore meant as an open exchange to help progress a common agenda, with country specific ways forward, of seeing how national socio-economic priorities can be furthered by nature-based solutions.

Questions for discussion:

- What examples do you have on the current use of NBS that could interest other countries?
- What potential exists for nature to support socio-economic priorities? Where are the opportunities?
- What are the drivers and barriers to NBS?
- Who can do what to respond to the drivers, address the barriers, and realise the opportunities of NBS?
  - What can national ministries and other stakeholders do?
  - What can the EU do?

8.2 Next steps

This is the first of three regional workshops and will be complemented by an EU wide workshop on 6 September (linked to the European Semester and focusing on financing.) The other two regional workshops will be held in Helsinki (19 May) and in Berlin (19 June).

The study team will share presentations and workshop minutes with the participants.

[i] http://www.economiadigital.es/es/notices/2015/09/veritas-abrira-10-tiendas-en-2016-y-entrara-en-madrid-76465.php

[ii] https://reports.weforum.org/travel-and-tourism-competitiveness-report-2015/economy-rankings/ (accessed 27th February 2017)

[iii] Royal Decree 416/2014 of 6 June: https://www.boe.es/diario_boe/txt.php?id=BOE-A-2014-6432 ((accessed 27th February 2017)