



STEP



Status and Trends of European Pollinators

Collaborative Project: Medium-scale focused research project

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STEP

Deliverable 6.1:

List of Governing Questions and the hierarchical sub-division into more detailed questions

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NON TECHNICAL SUMMARY

This report represents the most important governing questions relevant to the drivers and pressures of pollinator and pollination loss as identified in a stakeholder workshop organized in Brussels in September 2010. The workshop gathered 21 stakeholders together from national and EU levels (administration, entrepreneurs, NGO representatives and researchers). Three most important questions were: Loss of biodiversity; Loss of ecosystem services; Decline in Agricultural production. These three themes were sub-divided into a series of more specific sub-questions. The overarching conclusion of the workshop was that pollinator loss is a multiple sustainability issue and potentially has significant negative effects on human wellbeing from many perspectives (e.g. health, economy, and culture).

POLICY RELEVANCE

This report provides important information about the concerns and information needs related to pollinator and pollination loss. It reveals a major concern about how pollinator loss is profoundly linked to biodiversity loss in general, and the decline of ecosystem services in particular. Pollinator loss is a multiple sustainability issue and potentially has significant negative effects on human wellbeing from many perspectives (e.g. health, economy, and culture). Based on our stakeholder community, three general areas of concern about pollinator loss emerged which were thought to be of critical importance: negative impacts on wider biodiversity, food security, and wider ecosystem function and related services. The way pollinators interact within whole ecosystems, and indirectly affect other services, is poorly understood at present but was seen as a key area where we need to develop better knowledge.

Many of the key questions are still uncertain and the stakeholders experienced lack of knowledge in some areas such as: the relationship between pollination and the quality, quantity and stability of the agricultural production; the loss of genetic diversity; how managed species can increase agricultural production; the social and cultural aspects of pollinators; the stakeholders' role and motivation in pollinator issues; the impact of climate change, modern technology and chemicals on pollinators; the relation between landscape fragmentation and nesting options for wild pollinators; and the impact of diseases on wild pollinators.

The causes of pollinator declines are diverse and act at multiple scales, but some common pressures were identified including land use practices and beekeeping practices. Pollinator loss potentially affects a very wide range of stakeholders in Europe cutting across most sectors of society. Since the problem is dynamic, mitigation efforts require multi-scale analysis and multi-level governance approaches.

Identifying the most important governing questions related to the pollinator loss

A report on STEP Workshop

FP7 project
Status and Trends of European Pollinators
<http://www.step-project.net/>

28 September 2010

Venue: Brussels, KoWi

Outi Ratamäki¹, Pekka Jokinen², Peter Borgen Sorensen³ and Simon G. Potts⁴

A short introduction to the STEP-project

Halting biodiversity loss is a key international priority, and central to the Convention on Biological Diversity and European Union policy. The majority of global (and European) biodiversity is made up of insects and other invertebrate taxa, but little is known of the distributions and abundance of most such species, and even less is known about their dynamics and the threats they face. This lack of knowledge concerning the status and trends of the majority of Europe's species is worrying, but it is even greater concern for species that play important functional roles, such as pollinators. Pollination is an essential ecosystem service, vital to the maintenance both of wild plant communities and agricultural productivity. These pollination services depend on both domesticated and wild pollinator populations, and both may be affected by a range of recent and projected environmental changes, with unknown consequences.

The project **Status and Trends of European Pollinators** (STEP, www.STEP-project.net) is documenting the nature and extent of these declines, examining functional traits associated with particular risks, developing a Red List of important European pollinator groups, in particular bees and laying the groundwork for future pollinator monitoring programmes. **STEP** will also assess the relative importance of potential drivers of such change, including climate change, habitat loss and fragmentation, agrochemicals, pathogens, alien species, light pollution, and their interactions. The project will integrate the findings into a policy-relevant framework, creating Evidence-based Decision Support tools. **STEP** will also establish communication links to a wide range of stakeholders across Europe and beyond, including policy makers, beekeepers, farmers, academics and the general public. Taken together, the research programme will improve our understanding of the nature, causes, consequences and potential mitigation of declines in pollinator services at local, continental and global scales.

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Introduction to Workpackage 6 of STEP: Policy tools and integration of knowledge

The overall objective of workpackage 6 (WP6) is to integrate and synthesize knowledge from all the other research workpackages from sources outside STEP in order to provide the best possible evidence to support the most relevant decision questions relating to the declines of pollinator and animal-pollinated plants across Europe and beyond. It will assess the strengths and weaknesses of current European Union policies governing pollinator conservation and the management of pollination services, and will assess national policies potentially able to mitigate the impacts of pollinator loss. Throughout, WP 6 strives to assure quality documentation and manage uncertainties. Specific objectives are:

1. To identify and analyse the most important governing questions relevant to the drivers and pressures of pollinator and pollination loss;
2. To derive and apply Evidence-based Decision Support (EDS) to map state of the art knowledge onto the governing structures behind the drivers and pressures which lead to pollinator loss;
3. To identify, analyse and develop innovative policy instruments and mechanisms at the European Union and national level to address pollinator-related problems.

The first task in WP 6 is “***setting up a set of hierarchical governing questions that cover all relevant aspects of the drivers and pressures of pollinator shifts and related impacts on pollination***”. We have aimed at identifying the most important Governing Questions (GQ) to address for effective decision-making relating to:

- The status of pollinators and pollination including interpretation of existing data and the planning of activities for gathering of new data;
- The temporal trends including interpretation of empirical data for trends through time and modeling future predictions;
- The most important drivers and pressures, individually and in combination, on pollinators;
- The economic importance of pollination for society and future risks;
- The ecological importance of pollination for natural populations and communities and future risks;
- Strategies for mitigating pollinator and pollination loss.

These questions are best addressed from different stakeholder perceptions using an international workshop as a suitable method for gathering information.

The workshop

STEP workshop 28 September 2010 in Brussels

Programme:

| | |
|-------|--------------------------------------------------------------------|
| 10:00 | Welcome, coffee and introductory round Simon Potts |
| 10.30 | Introduction and background Simon Potts |
| 10:45 | Aims and methods of the workshop Outi Ratamäki & Peter Sorensen |

- 11:00 1st group work session
 1st task: Identifying all the possible stakeholders related to pollinator loss (10 min.)
 Method: Discussion + listing on a flip chart (very quick, free association)
- 2nd task: Identifying the problems related to pollinator loss (30-45 min)
 Method: Discussion + listing on a flip chart (free association, all different ways to formulate the problems are allowed. From different perspectives and at different scales)
- [3rd task: Cluster the listed problem that are associated (5-10 min)]
 [If we have time and the group wants to bring structure to the list]
- 4th task: Prioritizing the problems (10 min)
 Method: Voting most important problems to address - three categories: red color = three points, yellow color = two points, green color = one point
- 12:15 Lunch
- 13:00 Results of the 1st group work - Plenary
 Introducing the voting results, combining possible overlaps, and reorganizing the groups
 Method: We will introduce the results of the vote + discussion + participants will write their name on a post-it and place it next to the problem they are most interested in.
- 13:30 2nd group work session
 1st task: Analyzing the problem in relation to the list of stakeholders (10-15 min)
 Method: discussion: a) which stakeholders are important b) why/how + results on a flip chart
 2nd task: To identify sub-questions = breaking down the problem into smaller questions. (1 hour 30 minutes)
 Mind mapping method: first round = break down the problem into "first level questions" + list on a flip chart as a "checklist". Second round = break down the 1st level questions into second, third etc. level questions.
- 15:15 Coffee break
- 15:30 3rd group work session
 1st task: What information has been available related to the questions listed previously? (20 min)
 Method: discussion + listing e.g. on a flip chart
 2nd task: What kind of information has been lacking? (20 min)
 Method: discussion + listing e.g. on a flip chart
 3rd task: What has been most critical? What is/will be most critical? (20 min)
 Method: discussion + listing e.g. on a flip chart
- 16:30 An overview of the work, discussion
 Method: a short introduction to the discussions in the group + general discussion
- 17:00 Final comments and feedback
 Method: A round with these questions: a) What is the key message you want to make based on the work today b) What did you learn, what was most unexpected?
- 17:30 Closing the workshop

After round table introductions, the STEP coordinator, Simon Potts, presented an overview of the project. We then introduced the workshop aims and methods to the participants. The day continued with a mixture of group sessions with different tasks and general discussions and breaks.

Task 1: Identifying the stakeholders

For the first group work session we had assigned individuals to one of three mixed groups, i.e. mixture of stakeholders from different organizations and backgrounds. Each group had a facilitator and a scribe. Our first assignment was to: identify all the possible stakeholders related to pollinator loss. Our method was an open discussion and a free association. The outcomes were:

Group 1: policy makers (regional, national, international (European Union, global)); rural populations; veterinary authorities; agricultural authorities (lobby/implementation); farmers (fruits, glasshouses, seeds, ecotourism); producers of managed pollinators; beekeepers (associations of); private veterinarians; future generation (people); educational institutions/advisory; producers of veterinary medicines; consumers of apicultural products; nature conservation organizations (national parks, NGOs etc.); agrochemical industry; seed companies; scientists; food industry (e.g. producers of honey); wildlife; nature lovers, gardeners; press/media.

Group 2: policy makers (European Union, national, local); government/politicians (agriculture, human and animal health, land planning, capital accounts); farmers (organizations, horticulturalists); NGOs (nature conservationists, consumer protection); scientists (agronomists/advisors, academics, natural + social); incident report agency; science-policy-interface (IPCC, local governments); industry (agri-food processors, bio-economy based, pharmaceuticals, pesticides); business "in general" (tourism, transport, water); beekeepers (individuals, associations-training); regulators (EFSA, national schemes); public (awareness, education, consumers); media; conservationists (local organizations, e.g. WT).

Group 3: farmers; agricultural researchers; EPAs; European Union; all policymakers; regulation; farmer consultancies; beekeepers; beekeeper organizations; private people; NGOs (all levels); agricultural legislative; veterinarians; landscape managers.

Task 2: Identifying and prioritizing the problems

Our second task was to: identify the problems related to pollinator loss. We used the same method as above and urged the participants to innovate different ways to formulate the problems, from different perspectives and at different scales. This assignment was followed by a request to prioritize the problems using a voting method, i.e. we posed the question "what are most important problems to address". Three categories were assigned using colored Post-its: **red color = 3 points**, **yellow color = 2 points**, **green color = 1 point**. Each participant got to place these three post-its on the list of the problems. The outcomes were:

Group 1:

- Loss of biodiversity (trophic interactions/stability, pollinators, species depending on pollinators, taxonomists) [17 votes];
- Decline in agricultural production (yield, quality, narrowing development options) [13 votes];
- Decline in apicultural products [5 votes];
- Loss of ecosystem services related to pollinators [5 votes];
- Loss of income of beekeepers [2 votes];
- Changed competition (managed vs. wild pollinators) [1 vote];
- Increased need for public policy interventions/resources [1 vote];
- Reduced amenity value (countryside) [1 vote];
- Scale dependency (geographically different to policy response) [no votes];
- Loss of indicators [no votes];

- Increased risk of Bee disease spread (trade) [no votes].

Group 2:

- Nutrition (health [vitamins, obesity], matter of choice, food security) [12 votes].
- Ecosystem (interaction, webs, function – service, leading to potential collapse) [9 votes];
- Food/feed production (quantity, quality/diversity, swift in production systems [GMO]) [6 votes];
- ESS (provisioning [food, fibre, fuel], regulation [soil, water, fertility]) [4 votes];
- Biodiversity loss (species, communities [pollinators, wild flowers, birds, mammals, other insects]) [4 votes];
- Non-market values (aesthetic and cultural values) [1 vote];
- Ability to "adapt" to the climate change [no votes];
- Seed business (food, flower industry) [no votes];
- Animal welfare (grazers) [no votes];
- Beekeeper livelihoods [no votes];

Group 3:

- Loss of biodiversity [15 votes];
- Cascading effects through the ecosystem (function) [7 votes];
- Agricultural production (decrease) [6 votes];
- Beekeeping (decreasing number of beekeepers and of colonies) [4 votes];
- Negative effects on human health and consumer welfare [4 votes];
- Economic competition (honey bees [managed bees], seed production) [1 vote];
- Habitat change [no votes];
- Indirect effects on additional ESS [no votes];
- Transfer of diseases and pathogens to other pollinators [no votes];
- Negative feedback (economy-pollinators) [no votes];
- Changed agricultural demands [no votes];
- Decreasing cultural value [no votes].

Overall analysis across groups. The most voted for problems were:

1. Problems related to the loss of biodiversity, 36 votes
2. Problems related to agricultural production and/or products, 30 votes
3. Problems related to the ecosystem and/or loss of ecosystem services, 25 votes
4. Problems related to health, 16 votes

After these sessions we introduced the results to the whole group and reorganized where participants could to choose which of the above problems they wanted to work on further. We ended up with three groups: *Theme 1. Loss of biodiversity, Theme 2. Loss of ecosystem services, Theme 3. Decline in Agricultural production.*

Task 3: Breaking down the themes and identifying sub-questions.

In this group session our task was to identify sub-questions = breaking down the problem into smaller questions. We used a mind mapping method: first round = break down the problem into “first level questions”, second round = break down the 1st level questions into second, third etc. level questions. The outcomes were:

Theme 1. Loss of biodiversity:

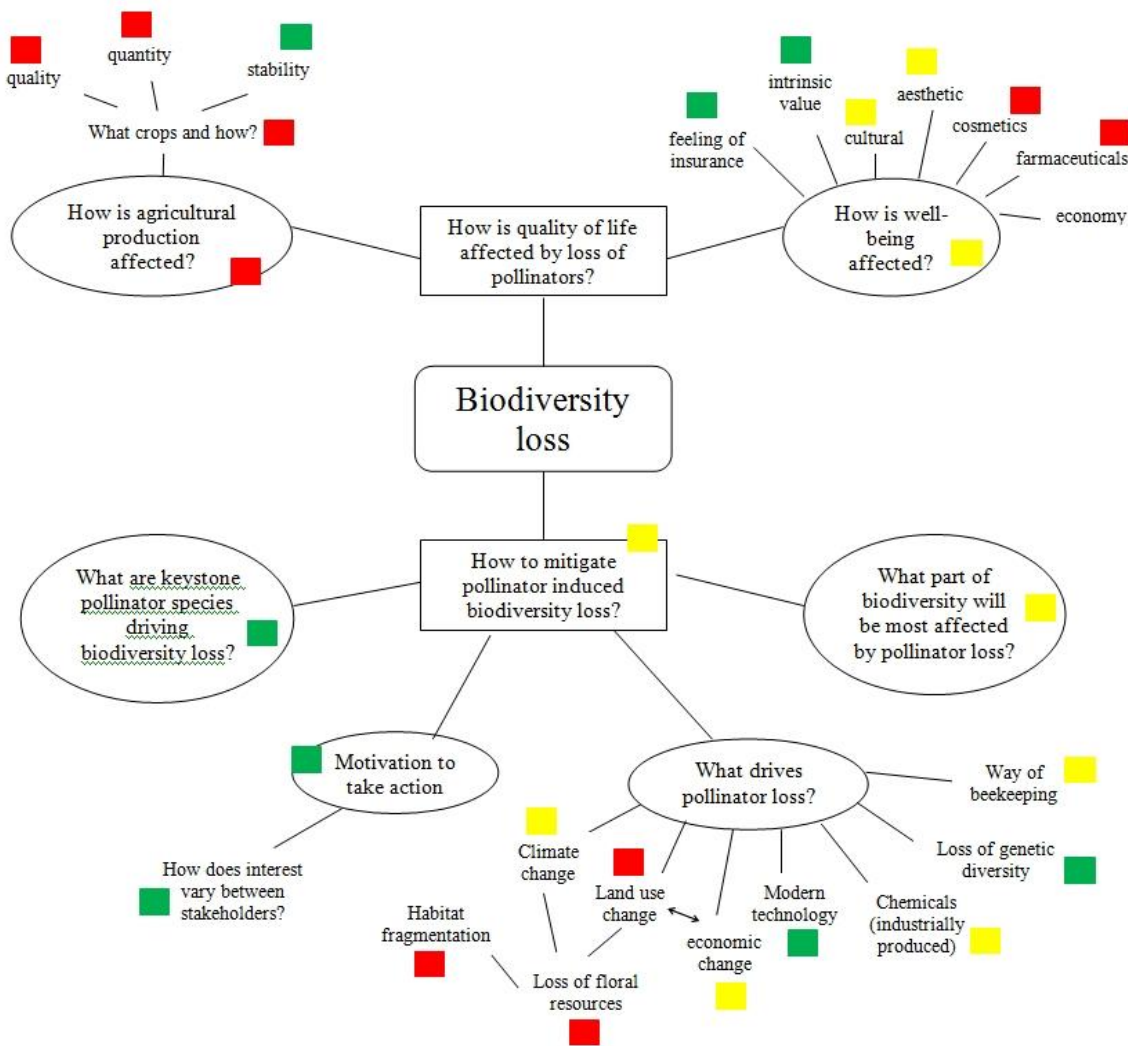


Figure 1. Mind map of the theme "loss of biodiversity".

When considering what kind of questions need to be asked when studying the connection between biodiversity loss and the loss of pollinators, the group ended up with two lines. The first line approaches the question of quality of life, i.e. effects on humans well-being. In this group many non-material issues were identified as important elements in well-being: intrinsic, cultural and aesthetic values as well as feeling of insurance. Biodiversity and pollinator loss also affect the economy in negative ways and thus needs to be studied. The question of pollinator and biodiversity loss also has a connection to the cosmetic and pharmaceutical business. These connections also need to be studied further. The group also identified some sub-questions to the question: how is agricultural production affected? Agricultural production can be connected to many of the well-being aspects listed previously. There are surely many aspects to this theme but here the group discussed whether we know which crops are affected and how? It is not only quality and quantity that matter but stability is also a long term sustainability issue.

The second line of sub-questions addressed a theme: how to mitigate pollinator induced biodiversity loss. The starting point is to ask what part of biodiversity will be most affected. Also we need to know what are the keystone pollinator species driving biodiversity loss and what are the elements

driving the pollinator loss. The group identified many drivers, listed in the figure above. One more interesting theme is the motivation of the stakeholders. Since stakeholders are key actors in both causing the loss of pollinators and also in mitigation, it would be important to study their motivation and interests.

Theme 2. Loss of ecosystem services:

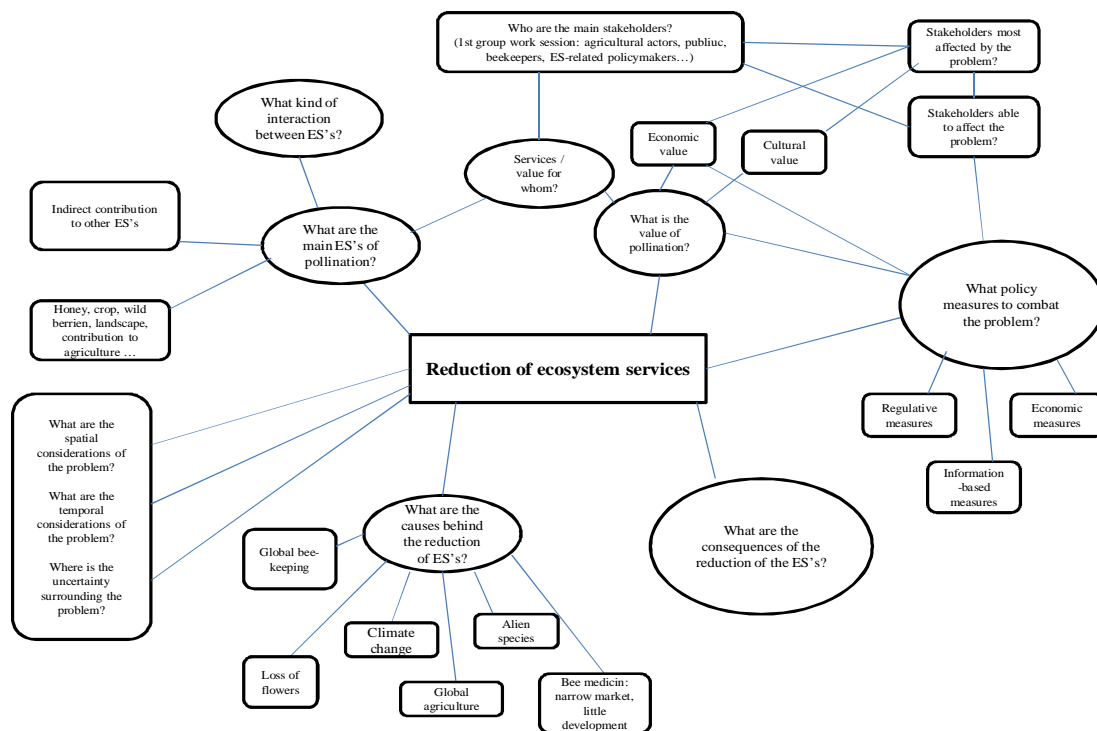


Figure 2. Mind map of the theme "reduction of ecosystem services".

The breakdown of the theme “Reduction of ecosystem services” resulted in five main questions and following sub-questions:

1. What is the value of pollination? In order to find useful substance for the concept of ecosystem services by pollination, a key question concerns the value of pollination. This is to be divided further into two sub-questions: Value for whom and what kind of value? The former implies identifying the main stakeholders, the latter the different value categories (ecological, economic, social, and cultural). The next level of sub-questions then deals with the negative effects of the ES loss for different stakeholders.

2. What are the main ecosystem services of pollination? This key question was further divided into three sub-questions: What is the indirect contribution of pollination to other ecosystems services? What kind of interaction is there between the different ecosystem services? For whom is pollination, basically, a service? As illustrated by Figure 2, several ESs by pollination were also brought up.

3. What are the causes behind the reduction of ecosystem services? When discussing the causes of the loss of ecosystem services, the group realised that these causes, to a large extent, overlap with the causes of biodiversity loss. As shown by Figure 2, several causes were identified.

4. What are the consequences of the reduction of ecosystem services? It was recognized that the consequences of the decline in ecosystem services coincide markedly with the decrease in food production. Due to the time limits, this main question was not developed further.

5. With which policy measures can the reduction of ecosystem services be delayed, even halted? The first sub-level of this key question addresses the main types of policy instruments, which are regulatory, economic, and information-based instruments. This is followed by the sub-level of two questions: one is giving attention to the effectiveness and acceptability of different basic policy tools, the other to the stakeholders able to affect the policy problem (yet, the group did not have time to develop this question path further).

Theme 3. Decline in Agricultural production:

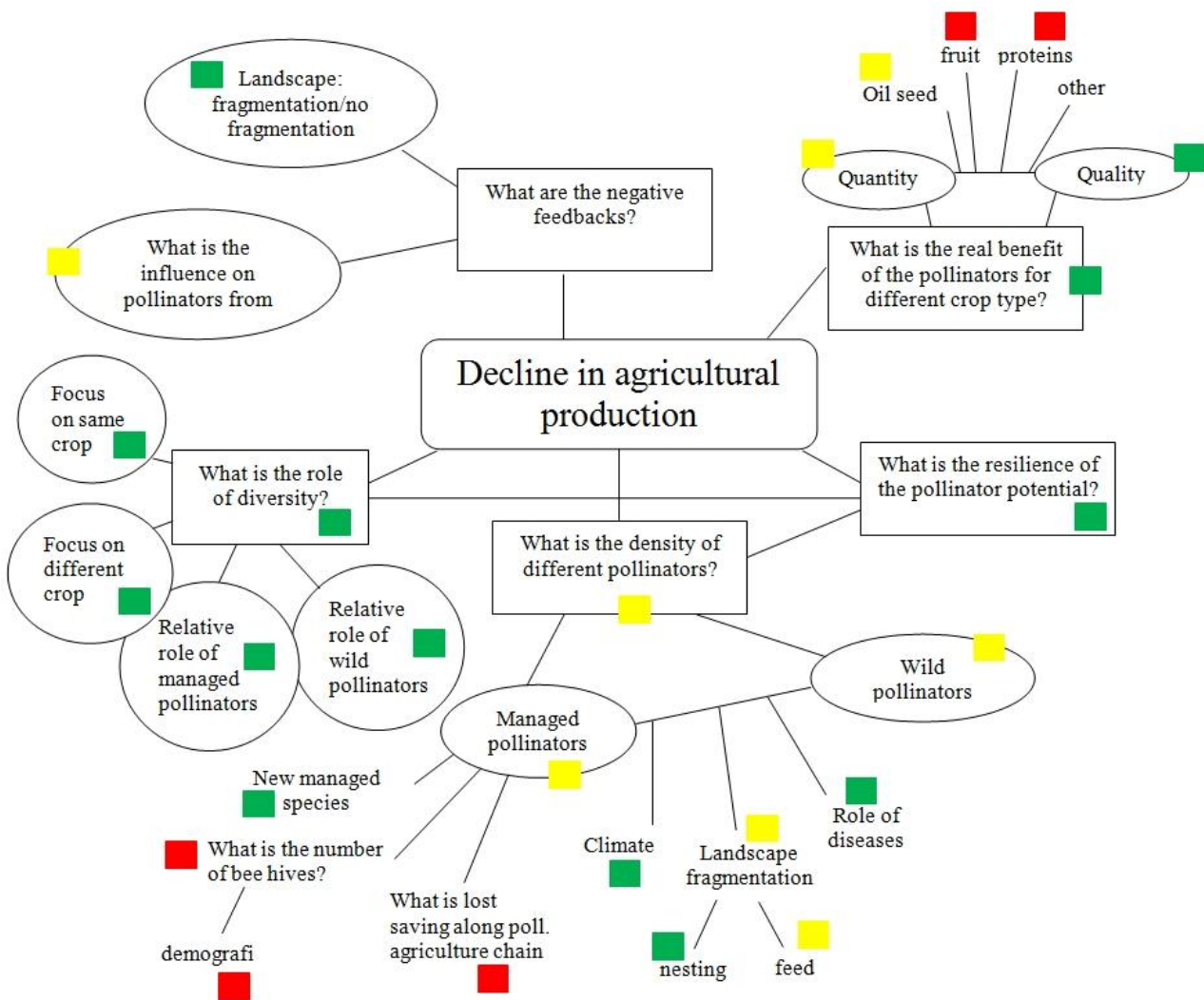


Figure 3. Mind map of the theme "decline in agricultural production".

Task 4: Prioritizing information needs

In our last group work session we aimed to answer: a) What information has been available related to the questions listed previously? b) What kind of information has been lacking? c) What has been most critical? What is/will be most critical? Again, we used a voting method: **red color = we already know a lot**, **yellow color = we know something/medium**, **green color = we don't know anything/much**. (See the figures 1. and 3. above). The outcomes were:

Theme 1. Loss of biodiversity:

red color = we already know a lot: cosmetics, pharmaceuticals, how agricultural production is affected, which crops are affected (quantity and quality), loss of floral resources, habitat fragmentation, land-use change.

yellow color = we know something/medium: How wellbeing is affected, cultural and aesthetic values, how to mitigate pollinator induced biodiversity loss, climate change, economic change, chemicals (industrially produced), way of beekeeping, what part of biodiversity will be most affected by pollinator loss?

green color = we don't know anything/much: intrinsic value, feeling of insurance, stability of the crop, what are keystone pollinator species driving biodiversity loss, motivation to take action, how does interest vary between stakeholders, modern technology, loss of genetic diversity.

Most critical/needs to be studied further, results of the vote within the group:

- 5/6 points: land-use change (important even though we already know much);
- 4/6 points: what part of biodiversity will be most affected by pollinator loss;
- 3/6 points: chemicals (industrially produced), modern technology, loss of genetic diversity, stability of the crop;
- 2/6 points: climate change, economic change, motivation to take action;
- 1/6 points: habitat fragmentation, what are keystone pollinator species driving biodiversity loss (mutually we agreed that this is important even though it did not get many votes here)

The group noted that voting for the priority was difficult.

Theme 2. Loss of ecosystem services:

When discussing information needs on the reduction of ecosystem services, it was realised that the novel concept of ecosystem service is familiar to the group members mainly due to the United Nation's Millennium Ecosystem Assessment. It was also recognised that even though the concept is already relatively well-known as a macro-level approach, it is not well defined yet. This is particularly evident from the view point of local actors and communities. It follows that the topic of the loss of ecosystem services was rather challenging for the task to prioritise information needs. The main result of the group work is that further research work should be overtaken to develop ecosystem services as an analytical concept able to create concrete and context-dependent knowledge. For instance, how to identify the most valuable ecosystem services by pollination at the local level? Further, how should various preferences by different stakeholders be connected to the concept of ecosystem services? No voting on the most critical priorities was made.

Theme 3. Decline in Agricultural production:

red color = we already know a lot, least uncertain: what are the number of beehives, demography, what is lost saving along poll. agriculture chain, quality and quantity of seeds and fruits.

yellow color = we know something/medium: what is the influence on pollinators from crops, what is the density of different pollinators, landscape fragmentation and its relation to feed.

green color = we don't know anything/much, most uncertain: negative feedbacks from landscape fragmentation/not landscape fragmentation, difference on focusing same/different crops, relative role of managed and/or wild pollinators, new managed species, what is the resilience of the pollinator potential, what is the real benefit due to pollinators for different crop type, quality (especially others than fruits and seed), landscape fragmentation and its relation to nesting, climate change.

No voting on the "most critical" priorities was made.

Conclusions

This workshop has shown a great concern about how pollinator loss has profound links to biodiversity loss in general and the decline of ecosystem services in particular. Pollinator loss is a multiple sustainability issue and potentially has significant negative effects on human wellbeing from many perspectives (e.g. health, economy, and culture). Based on our stakeholder community, three general areas of concern about pollinator loss emerged which were thought to be of critical importance: negative impacts on wider biodiversity, food security, and wider ecosystem function and related services. The causes of pollinator loss are diverse and act at multiple scales, but some common pressures were identified including land use practices and beekeeping practices. Pollinator loss potentially affects a very wide range of stakeholders in Europe cutting across most sectors of society.

The factors by which pollinators affect biodiversity loss and food security were reasonably well defined, however, the way pollinators interact within whole ecosystems and indirectly affect other services is less well understood at present but was seen as a key area where we need to develop better knowledge. "Ecosystem services" is a promising approach for the theoretical and practical exploration of pollinator loss which needs to be developed further in order to pay attention to various contexts of pollination.

The stakeholder community identified many uncertainties when information needs were analysed. Many of the key questions are still uncertain and the stakeholders experienced lack of knowledge e.g. about the relation between pollination and the quality, quantity and stability of the agricultural production; about the loss of genetic diversity; about how managed species can increase agricultural production; about several social and cultural aspects as well as about the stakeholders' role and motivation; the impact of climate/climate change, modern technology and chemicals on pollinators; the relation between landscape fragmentation and nesting options for wild pollinators; and the role of diseases to wild pollinators. Furthermore, we need to know much more about how to mitigate the loss of pollinators.

Attachment / List of attendees

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