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A multilevel analysis on pollination-related policies

Outi Ratamäki [a,*], Pekka Jokinen [b], Peter Borgen Sørensen [c], Tom Breeze [d], Simon Potts [d]

[a] Department of Geographical and Historical Studies, Faculty of Social Sciences and Business Studies, University of Eastern Finland & Environmental Policy Centre, Finnish Environment Institute, PO Box 111, FI-80101 Joensuu, Finland
[b] School of Management, University of Tampere, FI-33014 Tampere, Finland
[c] Aarhus University, Institute of Bioscience, Vejlsovej 25, 8600 Silkeborg, Denmark
[d] Centre for Agri Environmental Research, School of Agriculture, Policy and Development, University of Reading, Reading RG6 6AR, UK

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ABSTRACT

The paper explores pollination from a multilevel policy perspective and analyses the institutional fit and interplay of multi-faceted pollination-related policies. First, it asks what the major policies are that frame pollination at the EU level. Second, it explores the relationship between the EU policies and localised ways of understanding pollination. Addressed third is how the concept of ecosystem services can aid in understanding the various ways of framing and governing the situation. The results show that the policy systems affecting pollination are abundant and that these systems create different kinds of pressure on stakeholders, at several levels of society. The local-level concerns are more about the loss of pollination services than about loss of pollinators. This points to the problem of fit between local activity driven by economic reasoning and biodiversity-driven EU policies. Here we see the concept of ecosystem services having some potential, since its operationalisation can combine economic and environmental considerations. Furthermore, the analysis shows how, instead of formal institutions, it seems that social norms, habits, and motivation are the key to understanding and developing effective and attractive governance measures.

1. Introduction

Pollination is an ecosystem function that indirectly affects several ecosystem services, among them provisioning services such as food production and recreation services, including landscape aesthetics (Kuussaari et al., 2008; Lindemann-Matthies et al., 2010). The loss of pollinators has received a lot of concern globally on account of its consequential meaning for human well-being (Aizen et al., 2008; Eilers et al., 2011; Lautenbach et al., 2012). According to the International Risk Governance Council, the loss of pollination can result in depletion of biodiversity; climate risks; and social and economic risks: threats to food security, rural development, and industry (IRGC, 2009).

The reasons for pollinator loss are not fully understood, but some drivers have been identified by Potts et al. (2010): changing land-use patterns, chemicals used in agriculture, diseases, invasive species, climate change, fire and overgrazing, and introduction of non-native plants. These drivers are mutually dependent, and the interaction among individual drivers is still poorly understood (Schweiger et al., 2010). These complexities, the intermediary role of pollination, and interaction among multiple drivers lead not only to intriguing scientific questions but also to challenging governance situations.

This paper explores pollination from a multilevel policy perspective. It addresses the policy status of pollination by posing three major questions. First, what are the major policies that frame pollination at the EU level? Second, how does this EU-level framing differ from the ways in which pollination is framed at the local and regional levels? Finally, what do these different framings mean for governance and for ecosystem services thinking? Our ultimate aim is to clarify whether the different pollination-related policy contexts fit together and, if they do not, what policy challenges these conjectural cases of imperfect fit create.

We begin by contextualising pollination in the framework of ecosystem services. After that, we will describe the theoretical and methodological approaches applied in the analysis, before illustrating the results and conclusions from the study.

2. Pollination leading to ecosystem services

One of the most studied links between pollination and ecosystem services is the connection between agriculture and pollination (Garibaldi et al., 2011; Scheper et al., 2013), and issues of economic valuation and concern over food safety have gained special attention (Gallai et al., 2009; Byrne and Fitzpatrick, 2009; Lautenbach et al.,

* Corresponding author. Tel.: +358 295 251 546.
E-mail addresses: outi.ratamaki@uef.fi (O. Ratamäki), pekka.t.jokinen@uta.fi (P. Jokinen), pbs@dmu.dk (P.B. Sørensen).

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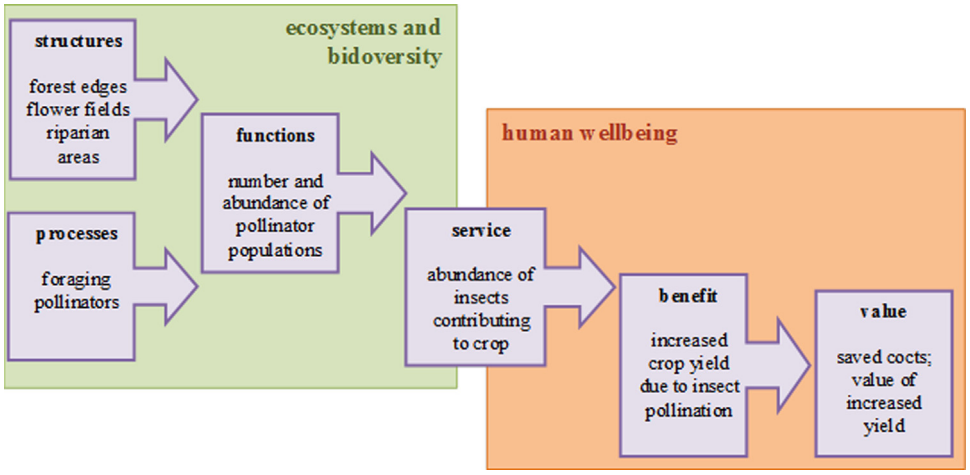

Fig. 1. Ecosystem-services cascade model applied for pollination (figure taken from Maes et al., 2012: 154).

2012). The total economic value of insect pollination globally has been estimated at €153 billion, equivalent to 9.5% of the value of crop production. Within Europe, the estimate is that ~10% of the total economic value of food production, or €22 billion, including €14.2 billion for the European Union, is dependent upon insect pollination. Complete pollinator loss would translate into a production deficit of 40% for fruits and 16% for vegetables, on top of current consumption levels (Gallai et al., 2009). Fig. 1 illustrates well how ecosystems and biodiversity are linked to the provisioning of these services, benefits, and values (cf. Cowling et al., 2008; Braat and De Groot, 2012).

The cascade model[1] shown by Fig. 1 focuses on wild pollination, but insect-mediated pollination can take two forms: (1) managed bees (mostly honeybees but also bumblebees) kept for the purpose of pollination and/or honey production and (2) wild pollination involving the biodiversity of native pollinating insects, including bees, hoverflies, butterflies, etc. It is possible to take a societal perspective on the benefit of pollination by making a division between (1) the benefit for agriculture in terms of improved crop yield and (2) the benefit for the wild pollinator community in supporting of wild plants' biodiversity. It is clear that the improvement in crop yields is a simple economic benefit for society, while the societal benefit for wild plant biodiversity depends on how this issue is valued from a societal perspective. The interaction between the individual elements and generic scale is shown in Fig. 2.

In Fig. 2, the unbroken arrows represent pollination and the broken arrows refer to drivers threatening pollinating insects. The arrows can be explained thus: Arrow 1 means that the pollination delivered by native insects facilitates high plant biodiversity in areas of nature. Arrow 2 refers to native pollinating insects' facilitation of crop and tree pollination. Arrow 3 indicates that managed pollinators can facilitate crop and tree pollination. The arrow labelled '4' refers to how managed pollinators may facilitate pollination of wild plants and thereby enhance plant biodiversity. Arrow 5 represents the potential for managed pollinators to outcompete native pollinators, transmit infections, and disturb the dynamics of the complex pollinator–plant interaction network and thereby impair biodiversity. Arrow 6 points to the possibility of agriculture and forestry threatening natural habitats' biodiversity via physical land use, pesticide application, nutrients, etc. Finally, arrow 7 indicates that agriculture and forestry may threaten managed pollination by such means as pesticide application.

[1] Introduced by Haines-Young and Potschin (2010).

We will return to the topic of ecosystem services when analysing the various ways of framing the pollination. Before this, we describe the theoretical tools we have used in our analysis.

3. Governance, framing and institutional fit, scale, and interplay

Governance is a concept with multiple meanings (Rhodes, 2000; van Kersbergen and van Waarden, 2004; Schout and Jordan 2005). Here we favour the approach presented by Kooiman (2003): 4:

> Governing can be considered as the totality of interactions, in which public as well as private actors participate, aimed at solving societal problems or creating societal opportunities; attending to the institutions as contexts for these governing interactions; and establishing a normative foundation for all those activities. Governance can be seen as the totality of theoretical conceptions on governing.

Such an approach highlights the role of multiple stakeholders, their values and the interconnectedness between these (Pierre, 2000). It also pays attention to the institutional background of the governance issues and the multilevel character of governance processes. Yet we will also challenge Kooiman's definition, by exploring the idea of a societal problem. The above definition does not highlight the fact that societal problems can have multiple meanings, which may be quite different between actors.

We will approach this issue with the concept of framing. According to Entman (1993): 52, framing is '[t]o select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation'. Entman emphasises conscious choice-making by actors as do also Schön and Rein (1994): xiii by stating that individuals and institutions draw on frames '[i]n order to give meaning, sense, and normative direction to their thinking and action in policy matters'. As noted by van Hulst and Yanow (2014): 1, frame is an important analytical tool for understanding mismatches between policy intentions and practices. By utilising the concept of framing, our aim is to show how reality and problem definitions are tied to various actors' values and bodily involvement yet also to the ways governance institutions have been organised.

In Kooiman's theory of governance, the concept of image is relevant for framing. Images, which are based on values, are needed for steering the goal-setting, and they aid in orientation to the

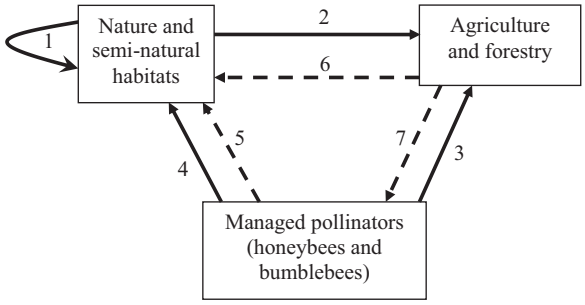

Fig. 2. Diagram of the overall interactions between land use of various types and the natural habitats.

future. Also, Jentoft (2007): 361 cites images as an important tool in design of policies:

> Images, metaphors, assumptions, visions, generalizations – or whatever we call them – have a programmatic effect: reality is not only represented in our mental models, its social construction is also based on them. They become a norm and an outline for social action. […] [O]ur ability to play with alternative images will to a great extent determine our ability to change, improve and innovate, since it is essential to institutional learning.

We will show that pollination as a governance issue is framed in many, quite different ways, which depend on the societal context and scale. As Mol (2002) has stated, 'reality is multiple'. This is to say that values, norms, and practices of diverse stakeholders affect the framing of a societal question. Furthermore, the framing affects how the institutional setting aimed at solving of the problem ends up being imagined or constructed.

The concepts of institutional fit, scale, and interplay aid us in analysis of the complexities created by multiple ways of framing the problem of pollination service loss and instability. The concept of fit as addressed by Young (2002, 2008a) has to do with the congruence between bio-physical systems and governance systems. Poor fit between pollination as a bio-physical system and regulation could be created when, for example, regulation fails to take into account the temporal seasons or daily cycles of pollinators' activity. Such lack of fit can be resolved by regulating such matters as the time of day at which pesticides may be spread.

Alongside that of fit, Young (2002, 2008a) introduces the ideas of interplay and scale as important elements for understanding governance. Interplay is about how the various governance systems operate in interaction. Interactions can take place horizontally (e.g., among diverse regulations at the EU level) or vertically (from local to national and international level). Vertical interplay draws attention to the scales of governance. Young (2008a) asks whether and how the locally determined problems or solutions can be scaled up to international level and vice versa. Furthermore, he identifies that it may be in stakeholders' interest to determine and frame societal problems at a certain level, locally or globally.

Some scholars find the division between the concepts of fit and interplay problematic (see, for example, Vatn and Vedeld, 2012; Haller et al., 2013). The questions related to institutional fit and interplay are intertwined (Hiedanpää, 2013), and examining fit should focus on adaptation not only to natural but also to culturally modified ecosystems, because one cannot separate the institutional context from the ecosystem context: they are intertwined; in other words, they have co-evolved to form the ecosystem now in place (Haller et al., 2013). For example, agricultural practices in some developing countries have been strongly influenced by religious practices. Managing bio-physical systems is not only linked but more deeply enmeshed with habits, motivations, and intentions, which again are institutionalised in societal rules. However, Young is not blind to the links between bio-physical and social systems, for he states: 'Importance of fit has increased along with the growing role of anthropogenic forces in biophysical systems […]. As anthropogenic forces rise and begin to take centre stage, the problem of fit comes to the fore' (Young 2008a: 27).

4. Data and methods

This article utilises data from three case studies, analysing, first, data produced by an international stakeholder workshop; second, stakeholder interviews at regional and local level in Finland; and, third, policy documents at EU level[2].

The international workshop (WS) was held in Brussels (BEL) in September 2010. Its expected output was stated as this:

> To identify the most important governing questions related to pollination and provide this information for the decision-makers and researchers. This information is needed in order to identify and plan the policies that affect pollinators and to design future research. The most important aim is to find a connection between scientific information and policymaking.

The workshop had 21 participants, from various levels of government and organisations, including research institutes, NGOs, and national and EU entities (for details, see Appendix A and Ratamäki et al., 2011). Participants were found through the networks of an EU-funded project titled 'Status and Trends of European Pollinators' (STEP), which encompasses 21 participant organisations, from 16 European countries. We started with a letter addressed to all STEP partners, asking them (1) to identify the most important stakeholders and (2) to inform us about a possible contact person who would be able to identify further stakeholders. Ultimately the WS participants either were directly invited or responded to an open invitation sent to an organisation. The selection of the final participants entailed an attempt to cover organisations from a broad spectrum of countries and levels of policymaking.

The WS participants were divided into three groups and given their first task, to identify all possible stakeholders related to pollinator loss. The method used was free association and discussion+listing on a flipchart. Second, they were asked to identify the problems related to pollinator loss. In this connection too, they were allowed to associate freely and discuss the topic within the group. All of the various ways one might formulate the problems were allowed, from different perspectives and at different scales. After identifying the problems, they were asked to select the most important ones for further elaboration. Each topic chosen was then divided into sub-questions—i.e., broken down into smaller questions (see Figs. 3 and 4).

Workshops of this sort are good for creating science–policy dialogue (Paloniemi et al., 2012; cf. Dicks et al., 2012), although local stakeholders were difficult to reach with the invitation. This deficiency was rectified through interviews of regional and local stakeholders in Finland[3]. The interview questions used are

[2] These case studies are part of the STEP and PRESS projects—that is, Status and Trends of European Pollinators (see http://www.step-project.net/) and Peer Research on Ecosystem Services (see http://www.peer.eu/projects/press-project/).

[3] These interviews were of six stakeholder representatives: (1) for MTT Agrifood Research Finland, a professor and plant production research and horticulture researcher with a Dr. Sc. (Agr. & For.) degree; (2) an individual responsible for matters of the environment and natural resources at the South-west Finland Centre for Economic Development, Transport and the Environment and with the Association for Traditional Rural Landscapes in South-west Finland, a NGO; (3) an environmental planner in the field of the natural environment for the Regional Council of South-west Finland; (4) a pollination-services representative with the Finnish Association for Beekeepers; (5) a beekeeper involved in honey production; and (6) owners of a berry farm (growing raspberries, blackcurrants, red currants, highbush blueberries, and gooseberries).

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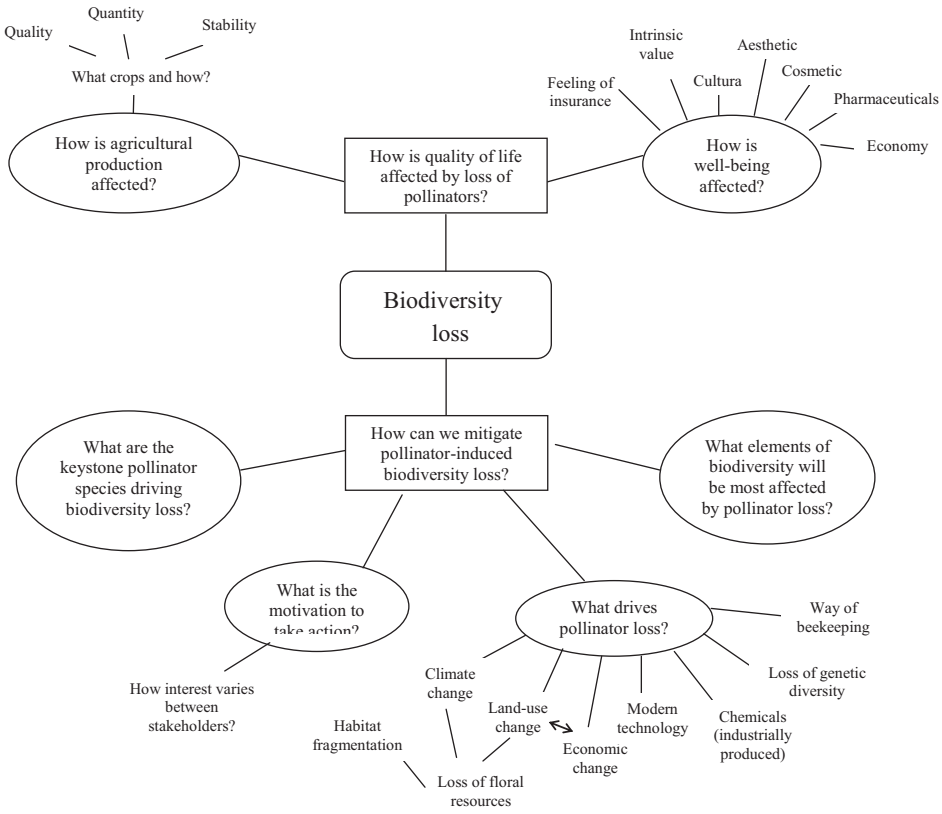

Fig. 3. Mind map for the theme 'pollination and loss of biodiversity'.

reproduced in Appendix B. The selection of these stakeholders enabled us to gain information on farmers' day-to-day practices and on the relations among regional administration, researchers, and nature conservationists and between beekeepers and farmers.

For analysis of policy documents, the relevant EU policies on pollination were identified via a keyword search. 'Policies' in this case refers either to explicit policy or legal documents such as the Habitats Directive or to a more vague collection of initiatives, stated targets, and related reports or policy briefs (e.g., on the topic of climate change). A basic search with the terms 'pollination' and 'pollinator' would have resulted in a collection of only those documents explicitly mentioning these words. Therefore, a decision was made to start the search with keywords describing the drivers behind pollinator loss. This enabled identification of those policies that have or may have an effect on pollination and pollinators even if they are not mentioned specifically. The list of drivers introduced by Potts et al. (2010) was utilised as a starting point because of its overarching approach: changing land-use patterns, agrochemicals, diseases, invasive species, climate change, fire and overgrazing, and introduction of non-native plants (see Section 1). These keywords were used for searches of various Web sites of the European Union. The search developed in a snowball effect, with one result leading to further keywords and/or search areas (new Web sites or documents). Once a potentially relevant source of information (a policy or other document) was identified, this information source was read and evaluated from the perspective of its potential effects on pollination. The search was deemed complete when nothing new came up.

The interview data and the policy documents alike were examined by means of qualitative content analysis. Since the ideas of governance, fit, scale, and interplay steer our analysis, we can call the analytical approach a *directed content analysis*. This means that pre-existing theoretical concepts were used to identify the relevant elements within the dataset, and then the theory and related discussions guided the analysis of the elements identified (see Hsieh and Shannon, 2005). This analytical approach has potential to lead to two distinct kinds of outcomes. First, it can aid in describing the governance problems at issue, and, second, it can be used to put the theoretical tools to the test and possibly evolve them. The WS data were developed into mind maps, but also the discussions were recorded. This made it possible to bring together visual material and oral explanations. The results from the WS have also been contentually analysed from the perspective of our theoretical tools.

In the following discussion, we start with analysis of the policy documents and proceed to the stakeholder analysis and then evaluation at the local and regional level. While we describe the empirical results, we also discuss them from the perspective of framing. After this, we will turn to the questions of governance, institutional fit, scale, and interplay. The final step is to consider the findings from the perspective of the ecosystem-services concept.

5. Various ways of framing the pollination question

5.1. Pollination as affected by multiple governance systems

Our first task for this article was to shortly explore the major policies that frame pollination at the EU level. The relevant policies directly or indirectly affecting pollination at EU level were identified to be the Common Agricultural Policy, rural development policies at EU and national level, the Convention on Biological Diversity, the International Pollinator Initiative, the nature directives (on habitats and birds), the EU 2020 Biodiversity Strategy, the Invasive Alien Species Strategy, forest policies, the Plant Protection Products Directive, the Climate Change Policy, the Environmental Impact

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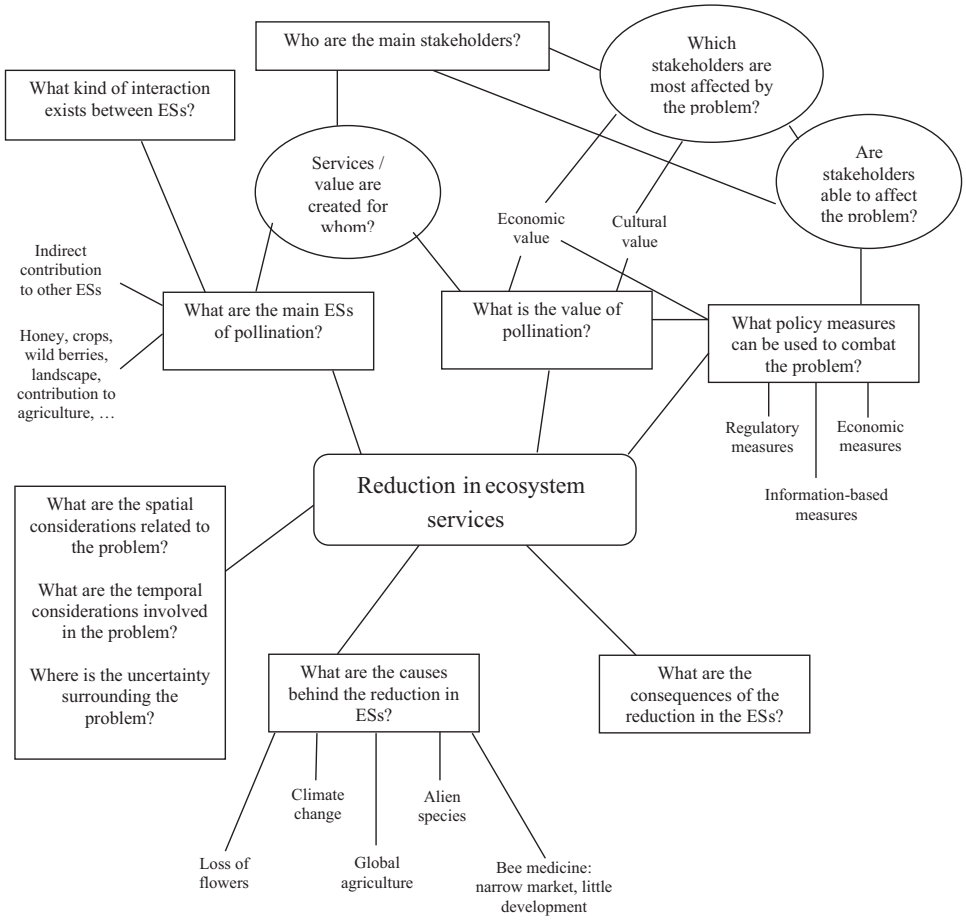

Fig. 4. Mind map for the theme 'reduction in ecosystem services'.

Assessment Directive, the Environmental Liability Directive, the Animal Health Strategy, the European Health Strategy, and EU trade policy (see also Maes et al., 2012).

It seems at first blush that policies related to agriculture and biodiversity conservation create important hubs, or governance systems, related to pollination. However, other – perhaps less overtly connected – policies matter also. These policies could easily go unidentified if we do not have a proper understanding of the drivers and pressures behind pollinator loss. Therefore, recognising the complexity of drivers and pressures contributes to understanding governance.

The strong link between pollination and agriculture means that agricultural policies have a particularly significant influence. Within the European Union, the Common Agricultural Policy (CAP) is the main policy governing agricultural production. Under the CAP, which originally was designed to stabilise agricultural markets and increase the stability of production (Jokinen, 2002), producers historically were paid to maximise their output, which led to significant increases in agrochemical use and reduction of semi-natural habitats as fields were expanded and livestock grazing and feeding regimes were modernised (Stoate et al., 2009). This intensification has been accorded the blame for significant declines in farmland wildlife across Europe, including pollinators, and overproduction of many foods (ibid.; Carvalheiro et al., 2013). Recent revisions to the CAP have been introduced in attempts to reduce these effects, with measures such as instating 'Good Agricultural and Environmental Conditions' (GAEC) requirements and removing links between production and subsidy payments (Stoate et al., 2009). From the theoretical standpoint, this is a matter of changing the policy framing by introducing new tools and images.

Alongside policy influencing production, the European Agricultural Fund for Rural Development (EAFRD) is particularly relevant for pollination. This entity provides funds and guidelines for schemes to improve and maintain biodiversity in Member States, providing the basis for agri-environment schemes (AES). These provide financial compensation for farmers who opt to undertake biodiversity-beneficial measures on their holdings. Although AES can be beneficial for pollinators (Scheper et al., 2013), they often lack stated objectives, which renders their effectiveness questionable (Kleijn et al., 2011). The most recent iteration of the EAFRD continues to support several production practices that benefit pollinators, such as organic farming and agroforestry.

It is also possible to detect how the policies aimed at ensuring biodiversity are linked to pollinator loss or pollination. The Convention on Biological Diversity, Habitats Directive and Birds Directive, and 2020 Biodiversity Strategy affect biodiversity depletion and landscape change, which have been shown to be significant drivers behind pollinator loss (Garibaldi et al., 2011; Cranmer et al, 2012; Kremen et al., 2007). Invasive alien species are recognised as another pressure potentially affecting pollinator losses (Vanbergen et al., 2013). Also, the EU's 2020 Biodiversity Strategy has combating invasive alien species as one of its targets (European Union, 2011). Whilst forest policies are not harmonised at EU level, any regulation affecting forest management at Member State level has potential to affect pollination—for example, because forest edges provide important nesting sites for pollinators.

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The Plant Protection Products Directive governs the release of plant protection products and regulates the sale of pesticides and herbicides within the EU. The directive is aimed at ensuring that the products marketed do not pose a threat to human, animal, and environmental health. Several pesticides, including some that do not target insects, are known to have lethal or sub-lethal impacts on pollinators and pollinator populations (Pettis et al., 2012; Gill et al., 2012). Furthermore, although the impacts of pesticides are typically tested only on honeybees, these effects can vary greatly between species (Gradish et al., 2012).

The connections between climate change and pollination remain relatively unknown (Hegland et al., 2009), although some research results have been reported by, for instance, the Food and Agriculture Organization (FAO) (Kjøhl et al., 2011). Climate change may threaten the delivery of pollination services by creating mismatches between flower blooming and pollinator emergence (Schweiger et al., 2010; Earthwatch Institute, 2006).

Environmental impact assessments may have positive effects, but these depend on whether the drivers behind pollinator loss are identified as criteria in assessments and on how this is done. The Environmental Liability Directive was designed to ensure the prevention or remedying of future environment damage in the EU and that those who cause it are held responsible. It could be applied in cases related to pollinator loss. The European Health Strategy does not mention pollination or pollinators but does discuss the strong link between public health and food security. The Animal Health Strategy too has been discussed in relation to honeybee health (European Commission, 2010). Since agricultural products are part of the world economy, also EU trade policy has indirect links to pollinators, through creation of pressure (with respect to, for example, population growth and demand for food supplies), which, in turn, influences the direct drivers of pollinator loss, such as intensifying agriculture.

Next, we describe how the participants in the Brussels WS chose to frame the pollination question after free association and voting for the most important questions. Furthermore, we also refer to illustrative material representing the results of the local-level interviews.

5.2. The Brussels workshop

In the international workshop, the participants identified the following themes as the main concerns related to pollination: (1) problems related to the loss of biodiversity, (2) problems related to agricultural production and/or products, (3) problems related to the ecosystem and/or loss of ecosystem services, and (4) problems related to (human) health. These four themes are not mutually exclusive. This was shown, for example, when the theme 'loss of biodiversity' was investigated further. In their discussion, the stakeholders found a connection between the issue of health and quality of life, on one hand, and biodiversity loss, on the other (see Fig. 3). The participants in the WS were divided into three groups and thus the first three themes received development in detail. For this article, we have selected two themes for closer analysis: the loss of biodiversity and the loss of ecosystem services. The justification is that, in relation to the framing of the pollination question, it is interesting to compare the biodiversity approach to the ecosystem-services one.

The results of the WS are quite consistent with the policy document analysis. The connections between agriculture and biodiversity were emphasised in both contexts. However, health issues gained considerable attention, though EU policies seem not to respond directly to this demand. As is noted above, the EU Health Strategy does not explicitly target pollination, but it acknowledges the connection between environment and public health. Also, the wider connections between agriculture and the public good have been discussed within the EU (Cooper et al., 2009; Nunes et al., 2011; European Parliament, 2011).

The theme 'loss of biodiversity' was reduced to two main governing questions by the WS participants: 'How is quality of life affected by loss of pollinators' and 'How can pollinator-induced biodiversity loss be mitigated?' (see Fig. 3). The approach chosen is anthropocentric and emphasises the fact that the stakeholders identified strong links among biodiversity, human welfare, agriculture, and pollination. The first guiding question was divided into the sub-questions (1) 'How is agricultural production affected?' and (2) 'How is well-being affected?' With regard to the second question, attention was focused on basic research undertaken for understanding of the multiple links between biodiversity and pollinators and for identification of the drivers and key pollinator species. Additionally, needs associated with more 'sociological information' were identified. In particular, stakeholders and their motivation to take action was identified as an area of little knowledge.

When pollination was discussed as an ecosystem service (under theme 3) or, rather, when links between pollination and other ecosystem services were explored, the issue became more complicated. In the EU policy context, the stakeholders found that the concept of ecosystem services is familiar to them mainly on account of the UN Millennium Ecosystem Assessment (2005). It was also recognised that, even though the concept is already relatively well known as a macro-level approach, it is not yet defined well from the standpoint of local actors and communities. It follows that the topic of loss in ecosystem services is challenging in terms of prioritisation of information needs. A major finding by the stakeholders was that further research should be undertaken to develop ecosystem services as an analytical concept through which concrete and context-dependent knowledge can be developed. For instance, how can the most valuable ecosystem services of pollination be identified at the local level? A further question is how various preferences of individual stakeholders should be connected to the concept of ecosystem services (see Fig. 4).

5.3. Regional and local-level analysis

When this discussion was taken to the regional and local level for interviews, the connection between agriculture and pollination was identified as the most critical, if not the only, element in pollination governance. The stakeholders, regardless of their position, automatically framed the pollination theme in the context of agricultural production. The CAP was identified as the key policy affecting pollination. None of the regional or local stakeholders started their reflections from the nature-conservation point of view or mentioned the Convention on Biological Diversity or the Habitats or Birds Directive. The research questions did not in themselves lead the discussions toward either of these options (see Appendix B).

The second important result emerging from the region- and local-level interviews was the finding that agricultural production and pollination was further framed in the context of economy. This reveals the everyday context wherein farmers and representatives of regional administration but also researchers in applied sciences make decisions and plans for the future. Developing good farming practices was given strong focus in all interviews. Good practices in this case mean win–win solutions for both the environment and the agricultural business.

The third finding from the interviews was that the most attention was directed at managed bees. Wild pollinators were discussed only in the context of picking wild berries, which is an important recreation activity in Finland. According to Vaara et al. (2013), more than 50 % of all Finnish households are engaged in berry picking. The role of wild pollinators in agriculture was perceived to be less important. This is in strong contrast with

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the suggestion of the current literature that wild pollinators are major service providers for most global crops (Garibaldi et al., 2013). Instead, the role of managed bees was considered very important and perceived as likely to grow with future commercialisation of pollination services. However, recent studies have indicated that honeybee stocks in Finland are significantly below the level required of a sole provider of pollination services (Breeze et al., 2014), likely as a result of sharp declines in beekeeper numbers (Potts et al., 2010).

These results are linked with each other. Pollinators are considered important for successful agricultural business, and their level of abundance is a concern when and if business is affected. While conservation is recognised as a concern, measures for conservation must not become an obstacle to business. The subordinate position of the environmental concerns is reflected in the pronounced role seen for managed bees as opposed to wild pollinators. Again, this does not mean that conservation is not of interest but shows how the local-level reality is bound to the pragmatic requirements of farming as a business and a lifestyle.

6. Problems of misfit, scale, and interplay and their implications for pollination as a policy issue

6.1. Problems of horizontal and vertical interplay

Our results show that pollination is a multi-faceted policy issue. At EU level, pollination is framed first and foremost as a conservation issue, and at the local and regional level it is framed as one of agriculture-related business. What creates the governance challenge is the fact that these goals are dissonant. This seems to imply a problem of institutional interplay, since several governance systems regulate biodiversity loss and agricultural production.

The EU-level policy analysis was guided by the results of scientific research addressing the drivers behind pollinator loss. Multiple policies touching upon biodiversity, land use, and utilisation of natural resources have, or might have, an effect on pollination. On the other hand, the local stakeholders identified the CAP as, if not the only policy affecting their practices related to pollination, at least the most important one. Much of the information encompassed in the planning and formulation of EU policies fails to have significant meaning at the local level, when a farmer makes choices as to the management of his business and farming.

It follows that, in addition to the vertical interplay between local/regional and EU level, there is a problem of horizontal interplay at the EU level. The CAP has its roots in economic grounds and has been found to be in conflict with overall goals of biodiversity conservation (Hildén et al., 2012). Concerns over biodiversity conservation have been incorporated into the CAP, albeit indirectly through agri-environment schemes, and by the Single CMO Regulation. Lately, however, there have been efforts to mitigate this problematic interplay. In particular, recent reforms to CAP direct payments require performing several environmental activities. These 'greening' activities consist of (1) crop diversification on farms with $>75\%$ cropped area and the planting of at least three crops within a year, none of which may cover $>75\%$ of the claimant's holdings; (2) maintaining the proportion of semi-natural grassland seen at a national/regional scale; and (3) in certain areas of ecological focus, maintaining $\geq 5\%$ of the claimant's land as ecologically beneficial habitat such as fallow land, non-commercial forest, or buffer strips. Each of these activities may have beneficial influences on pollinators by diversifying the available nesting and food resources. Also a factor is that the horizontal interplay problem may be exacerbated by the fact that many regulations/policies do not target pollination or pollinators specifically so much as target biodiversity in general.

6.2. Which factors basically shape the policy position of pollination?

At the local level, the first and most prominent concern related to pollination is the actual ecosystem process of pollination as a service, especially its role in agricultural production. Because pollination is at the centre of focus, it is only natural that many of the stakeholders directed their attention to the ways in which they can make the pollination process secure: via managed bees. Yet, this can also be interpreted as a challenge of fit or interplay. At the EU level, the loss of biodiversity, including pollinators, has been identified as a serious problem and many rules aimed at biodiversity conservation have been created to mitigate the problem. However, to farmers, the problem is not so much about the loss of wild pollinators as one of a decline in pollination services. Since farmers and beekeepers believe this can be corrected with managed bees, the institutional solutions developed at EU level do not create a good fit with the local practices. Locally, the governing of pollination is attached more concretely to biophysical systems, among them the practices of pollination as an ecosystem function, than it is at the EU level.

On the other hand, our stakeholder interviews show that pollination as a governance question is not linear and that the biggest problems, according to the interviewees, do not lie in lack of knowledge. Rather, the most important problems, from their perspective, involve the gaps and discontinuity between administrative scales (see also Aakkula et al., 2006). Furthermore, the interviewees stated that scientific research does not address the practicalities at farm level. Nor does it mesh with the social or cultural institutions embedded in rural ways of life.

Rural ways of life are best understood in this connection as a combination of practices developed for the management of biophysical systems and the day-to-day practices steered by values, customs, and habits. For example, the interviewees commonly identified a general lack of 'connectivity' in creation of effective mitigation of pollinator loss. The term refers to, for example, connectivity between fields owned by farmers but more to connections among policies, various ecosystem services, local practices, and diverse stakeholders. It was realised that this calls for more collective action, but at the same time it was seen as a cultural challenge. Some interviewees speculated that such co-operation is particularly difficult for 'the Finnish mentality'.

The fact that it is difficult to separate the management of biophysical elements from the social and cultural motivations of everyday practices also means that it becomes trickier to identify whether the problem has to do with institutional interplay (fit between governance systems) or, instead, lack of institutional fit (i.e., fit between governance systems and bio-physical systems). This problematic gives us a reason to be cautious about overemphasising the role of institutions, especially when these are delineated in a narrow sense. Institutions may consist of clusters of rights, rules, and decision-making procedures, imposed by such factors as EU regulation (Young, 2008a: 13–15), but institutions of these kinds are not the only factors that contribute to the supply of governance. Belief systems, norms, culture, and sense of community work together with institutions in guiding the behaviour of actors. One interviewee stated: 'The value of mitigation efforts must be reasoned from the farmer's perspective, not from the ecosystem's perspective.' Many scholars have found a need to examine closely the role of these 'other factors', a concept used by Young (2008b): 143. True understanding of ways of affecting local practices tied to socio-material conditions demands that these 'other factors' of human adaptation to the past and present political environment be considered as drivers of fit (Haller et al., 2013). Habit, motivation, and choice have been discussed in this context (Hiedanpää, 2013; Vatn and Vedeld, 2012).

Even if the role of pollination in relation to other ecosystem services, or in the maintenance of biodiversity, is recognised by the

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farmers, it does not determine the primary goals set in everyday practices. Instead, the socio-material conditions are what play the key role when decisions are being made. Here, 'socio-material' points to the fact that managing the material world (fields, crop, pollinators, weather conditions, etc.) is affected by the requirements imposed by social demands, where the social demands identified from the interview data encompass such elements as motivation, strength, time constraints, and work load. Socio-material conditions of various sorts determine the day-to-day practices of farmers. Institutional rules or rights set forth by policies and legislation tend to come to mind only when they are in conflict with everyday routines. This mismatch clearly poses a challenge in terms of motivation of the local stakeholders to 'green' their agricultural practices or safeguard the wild pollinators and their nesting and foraging sites at the farm level.

In the interviews, several factors that may weaken motivation to act in the interest of the environment were identified: unwillingness to break up social structures (such as old networks, old habits, and customs), social distance from the administration or other stakeholders, costs, fear of having new work to do, bureaucracy, unreasonably protracted procedures, impractical suggestions, and unrelatedness to personal interests or everyday practices. Creating special difficulty is the fact that different people are motivated by different things. One might be interested in protecting birds, while another may wish to focus on saving other wildlife or maintaining a beautiful landscape. This means that practices and measures need to be tailored at a very local level—general regional or national guidelines are not the smallest scale of policymaking (Aakkula et al., 2006). It also points up that institutions (i.e., clusters of rights, rules, and decision-making procedures) only create the 'backbone' for the activities at the local level. The 'other factors' – belief systems, norms, culture, and sense of community – seem to be of critical significance in determining how the question of pollination is positioned.

6.3. *The potential of the concept of ecosystem services*

In the Brussels WS, one group analysed the pollination question from the perspective of biodiversity loss. However, they identified the connections between biodiversity loss and human benefits. This realisation comes close to the logic of the concept of ecosystem services. Yet it is interesting and important, to appreciate how the participants separated the biodiversity concerns and the human-benefit concerns into two streams of governance questions. The group who started their pondering from the ecosystem-services point of view did not have this option. From the outset, they needed to think about the connections between biodiversity and benefits/beneficiaries. This group's mind map may not be as visibly clear and 'nicely reduced' to clear points, but it does illustrate many difficult and complex issues of governance. It reveals lack of clarity in what the 'service' ultimately is. Is it the abundance of pollinators, as identified in the cascade model in Fig. 1, or is it the final benefit created by the pollinators, as identified by the interviewees in this study? Is the beneficiary nature itself or, instead, farmers and the agricultural industry? The question as to the beneficiary also leads to questions about the liabilities.

According to our interviewees, ideas about the beneficiaries or liabilities related to the service of pollination are not fully formed yet. However, identifying these responsibilities and beneficiaries is important for future policymaking, in planning, and for avoiding stakeholder conflicts. On the other hand, this identification may bring new stakeholders into play. For instance, one interviewee pointed out that the economic base of the agriculture business could be broadened. The private sector has a strong interest in the agricultural business; therefore, their participation and liability should be reconsidered in relation to the environmental issues. It was stated that tax revenues are not the only possible source of income to consider when one is designing policies. Enterprises could provide support to farmers' production and maintenance of ecosystem services. The marketing value of environmentally friendly practices could be developed.

In addition to farmers and enterprises, the role of consumers was discussed. There are many regulations and also voluntary agreements in farming and other industries tied in with the agriculture business, while less attention is paid to consumers. Interviewees posed questions of what steers consumer choices; who holds the power over consumers; and what procedures and relations exist among farmers, subcontractors, retailers, and consumers? These processes and the power relations within them should be opened up for study. This is concordant with the notion of the ecosystem-services approach. The concept helps to identify the services. Through this lens, also the beneficiaries and their liabilities should be identified. The concept of ecosystem services could be a tool guiding discussion of such matters.

At least in our WS, the concept of ecosystem services seemed to be a good tool for revealing the complexity of pollination as a governance issue. Thinking of the concept of ecosystem services in practical terms was fairly new to many of the participants, and this task forced them to move beyond their customary logic and mindset. It was evident also that the concept of ecosystem services has the potential to open up the pollination question, and possibly also other nature-conservation issues, from multilevel and diverse stakeholder perspectives. Questions such as 'whose services?' immediately expose the problematic of governance discussed in this article. The lack of context-dependent knowledge and understanding of stakeholder motivation was realised also. Analysing pollination as a service to someone instead of perceiving it as part of biodiversity for everyone has potential to aid in increasing this kind of knowledge.

The regional and local-level interviews further highlight this point. An important role for the concept of ecosystem services in stakeholder discussions is the way it opens up the economic reasoning behind human–nature relations. Galaz et al. (2012) have identified the Millennium Ecosystem Assessment as one approach to targeting the challenge of interplay. Economic valuation of ecosystem services has received a great deal of criticism, and alternative valuation methods have been presented (e.g., Wilson and Howarth, 2002; Kumar and Kumar, 2008). Our study has shown that economic reasoning is a strong pressure behind the practices affecting pollination. Accepting this reality and turning it into a policy instrument might be worthy of consideration. In this connection, it is also worth remembering that, as one interviewee pointed out, 'one euro does not always equal one euro'. He continued: 'Economic values have different mentalities. A euro with a good spirit may result in good deeds, without a request for full compensation.' Economic reasoning might be one of the motivating elements for such actors as farmers, but other issues too, such as trust, mutual respect, and practicality, are important components of the final level of motivation or the value of the euro in question. Again, we are faced with 'other' than institutional elements of governance.

7. Conclusions

We have shown how numerous the policy systems affecting pollination are. This is most relevant and obvious in the EU-level data and analysis. Pollination is closely connected to agriculture and many regional and global biodiversity policies but also to land-use planning and international trade. Full recognition of this connection is possible only if the drivers behind pollinator loss are known. The various policy systems create different kinds of pressures on stakeholders, at different levels of society. The second

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research result discussed above shows this clearly. We have illustrated how, at the local level, the question of pollination is tightly coupled with the bio-physical but also social and cultural practices of farming. Accordingly, the local-level concerns are more about the loss of pollination services than about loss of pollinators. At the farm level, the issue is not so much about managing sustainable bio-physical processes as about managing fields for certain types of agriculture. This leads to the problem of fit between local practices and biodiversity-driven EU policies.

However, the biodiversity-conservation concern still is recognised at the local and regional levels. It just does not determine everyday practices, which are tied to economic pressures but also to social and cultural norms. Here we see the concept of ecosystem services as having some potential, since its operationalisation can bring together economic and environmental considerations. Wild pollinators could be advertised as free pollinating service providers. In governance terms, this would be about creating societal opportunities.

Our analysis is supported by theories of governance, framing and institutional fit, scale, and interplay. It shows that looking at governance as a process wherein actors compose a group aiming to solve societal problems together is slightly optimistic. It is more realistic to take the approach that different actors have different ways of understanding and thus framing what actually is the problem. This means that also information needs, motivation, and goals vary.

According to the definition of governance we have referred to Kooiman (2003), institutions' and actors' normative foundation forms a context for governance-related interactions. Young (2008b): 143 states that it is naïve to suppose that restructuring existing institutional arrangements or replacing them with new ones can solve all of our problems. According to our analysis, what is urgently needed is institutions and norms targeted at addressing the mismatch of governance at multiple scales. Instead of pollination, conservation of biodiversity, or agricultural practices, more attention needs to be paid to development of strategies, institutions, and research that redress the mismatch and negative interactions between these factors. Here, social norms, habits, and motivation would be the key to understanding and developing effective and attractive governance measures.

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Appendix A. The participants of the Brussels WS

STEP partners:

Antonio Felicioli, Pisa
Pekka Jokinen, Finnish Environment Institute
David Kleijn, Alterra
Simon Potts, Reading
Outi Ratamäki, Finnish Environment Institute
Olli Schweiger, UFZ
Peter Sorensen, Aarhus University
Pavel Stoev, Pensoft
Other stakeholders:
Pierangelo Bernorio, DG SANCO
Susan Haffmans, PAN Europe
Thomas Koetz, DG Research
Laszlo Kuster, DG SANCO
Philippe Lecompte, Bees Biodiversity Network
Yordanka Mincheva, DG Environment
Aude Neuville, DG ENVI
Paulo Paixão, DG Environment
Thorsten Rahbek Pedersen, Swedish Board of Agriculture
Tiziano Rondinini, Apicoltura Rondinini
Jakub Romanowski, Department of Nature Conservation
Peter Sutton, Syngenta
Pierre Testu, Bees Biodiversity Network

Appendix B. Lists of interview questions (translated into English, originally in Finnish)

A. Benefits provided by pollination
   a. Do you need pollination services? For what? What kinds of benefits do you gain from pollination?
   b. Do you see others as benefiting from pollination services? Who and how? Intermediate and immediate benefits?
   c. How important are these services? What values do you attach to them? Qualitative and quantitative?
B. Analysis of a local map.
   a. Can you localise where these services are created? Fields, yards, the surrounding environment?
   b. What is the significance of these environments for pollination?
   c. Can you identify good or bad characteristics of the environment from the perspective of pollination?
C. Practices/activities affecting pollinators
   a. Which practices/activities (yours or others') do you think affect pollinators, either positively or negatively?
   b. What potential activities/practices could affect pollinators, either positively or negatively?
   c. [Keeping in mind fields, yards, surroundings]
D. Alternatives
   a. Do you see any reason for alternative practices/activities?
   b. Why?
   c. What obstacles can you identify to change? Private or societal?
   d. What would make the changes possible? What kinds of incentives would be needed? Personally or societally?
   e. [Keeping in mind fields, yards, surroundings]
E. Policies and stakeholders related to pollination
   a. On the basis of our discussion, which policies or instruments affect pollination?
   b. Who are the key stakeholders?
   c. What is your relationship to these stakeholders? Are there any 'gaps' between you? What kind, and why?
   d. Can you identify any conflicts between the policies?
F. Knowledge gaps and communication
   a. What kinds of knowledge gaps do you experience? What is your understanding of other stakeholders' level of knowledge?
   b. What kind of information would you need?
   c. Where could you seek this information? Who should provide it?
   d. How would you like your information/knowledge to be utilised in policymaking?
G. Do you see maps as a potential tool in communication with stakeholders? How?

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