



Scoping study: Actors and networks within the EU beekeeping sector

Deliverable D8.1

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B-GOOD

**Giving Beekeeping Guidance by cOmputatiOnal-assisted Decision
making**



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Preface

This report is the first of four deliverables from work package 8 (WP8) 'Multi-Actor Co-development'. This report describes the methodology, implementation and results from Task 8.1 'Scoping study and network analysis'. This task was conducted in collaboration with work package four (WP4) where, as part of task 4.1 (T4.1), a series of in-depth interviews (n=41) were carried out with key actors knowledgeable of the beekeeping sector at an EU level. These interviews had a number of topic areas exploring actor perspectives on 1) beekeeping in the EU, 2) connections and relationships with other actors, 3) what characterises a healthy bee colony and 4) current and future honey beekeeping models in the EU. This report focuses on the identification of key actors and their networks for knowledge exchange, as well as describing and outlining the context within which these actors interact and operate. This is a companion report to deliverable 4.1, which details the methodology and findings of the Strengths, Weaknesses, Opportunities and Treats (SWOT) analysis carried out within T4.1.

Deliverable 8.1 provides an overview of key actors and networks identified as part of Task 8.1, to aid and facilitate multi-level and cross-sector actor interactions and partnerships. Furthermore, it details a number of concrete actions for actor engagement to support other B-GOOD research activities in a number of other B-GOOD work packages.

Summary

B-GOOD is a multi-disciplinary project committed in finding solutions to the diverse problems in the beekeeping sector, particularly designing innovative technologies that help keep bee colonies healthy and ensure sustainable beekeeping practices. A core component of the project is its multi-actor approach (MAA) to integrate the expertise and interests of a wide range of relevant actors to generate innovative and practical solutions.

This report details the work carried out within WP8, particularly task 8.1. We have carried out an initial assessment of the EU beekeeping sector, as a social-ecological system, by undertaking a social-ecological inventory (SEI), using two complementary research methods 1) desk research and 2) in-depth interviews with key actors. These tasks were undertaken in close collaboration with work package 4 (task 4.1), which focused on the a Strength, Weakness, Opportunities and Threats (SWOT) analysis in order to provide a better understanding of the beekeeping business environment in the EU. The output of this collaboration is detailed in report D4.1: SWOT/SOR-analysis of healthy and sustainable beekeeping in the EU. To supplement this analysis, this report provides an overview of the governance structures at a European level, identifying some of the key organizations and their roles related to the beekeeping sector. We have also analysed the knowledge exchange networks of some key actors (as identified in our interviews).

This work has provided valuable insights as to which organizations play an important role and are influential within the EU beekeeping sector, particularly in relation to bee health matters. The European Food Safety Authority (EFSA), BeeLife, and the Pesticide Action Network (PAN Europe) are evidently deeply connected in driving forward policy and legislative changes. However, our analysis also indicates that the landscape of organizations within EU beekeeping sector would appear to be fragmented with numerous disparate organizations (representing different sectoral interests) exchanging technical knowledge related to bee health. Some organizations are well connected where they share interests (e.g. bee health interests), but there are competing interest amongst what is a very heterogeneous sector with organizations representing different beekeeping interests (e.g. hobbyist and professional beekeepers). The scale and diversity of the beekeeping sector within the EU provides numerous challenges for collaborative efforts between different interests within the beekeeping sector but also with linked interests (e.g. beekeepers, farming and environmental

groups), to ensure healthy and sustainable beekeeping. Particularly at national levels, it is apparent (from our study interviews) that there is poor coordination and some competing interests between multiple actors e.g. beekeepers, farmers, environmentalists and responsible authorities as typified about the usage of certain plant protection products e.g. glyphosate.

Recognizing these gaps, B-GOOD will take the opportunity to interact with key actors and promote further knowledge exchange and dialogue between diverse sectoral interests. To facilitate this further actor engagement activities are planned within WP8, again in collaboration with other B-GOOD work packages (e.g. WP1, WP4, WP6 and WP7). Two initiatives are outlined in this report, which are targeted at different groups of actors and at different levels. These engagement mechanisms are:

1. **Multi-actor Forum (MAF)**: platform for engagement with and feedback from key actors presenting different sectoral interests, predominantly at EU level.
2. **Actor workshops**: participatory workshops to engage local / regional actors particularly local beekeepers and beekeeping enterprises, as well as scientists.

The output (data, feedback and insights) from these initiatives will be shared with B-GOOD partners and collaborative actors (e.g. MAF and local actors) to further the development of the project, as well as with other interested parties for wider public dissemination of project outputs.

1. Background

1.1. Task scope and objectives

Task 8.1 sets out to assess and define the social-ecological system (the EU beekeeping sector) within which the B-GOOD project is operating, in collaboration with WP4. This 'scoping study' was the first phase of a series of research activities designed to engage with various key actors, involved in the beekeeping sector, within a framework for conducting a social-ecological inventory (SEI). SEI is an iterative research engagement process used to identify and develop knowledge with key actors, who are actively involved in an issue (Schultz et al. 2007); i.e. for the B-GOOD the development of knowledge (experiences / data), and management tools that enable beekeepers to assess the health status of hives, paving the way for healthy and sustainable beekeeping in Europe.

Task 8.1 involved a combination of desk research and conducting semi-structured / in-depth interviews (in conjunction with WP4). This task set out to (i) identify significant actors influencing the beekeeping sector in the EU; (ii) determine the interconnectedness between these actors (social networks), as well as their links with social entities (e.g. business services, institutions, regulations and cultures), as well as physical entities (e.g. tools / equipment and environments / habitats).

The outputs from these research activities is intended to systematically map key actors and their roles, knowledge exchange networks and the socio-economic landscape they operate in. We provide an overview of the current 'system state' of the EU beekeeping sector in relation to managing the health and sustainability of EU beekeeping and honeybee colonies. Furthermore, this report evaluates the capacity-building needs for enhancing collaboration and learning, by appraising existing linkages and partnerships. We outline a number of B-GOOD project initiatives to further engage with various key actors and to create new partnerships across and linking with existing networks.

1.2. Actors and networks

Actor involvement can make a worthwhile contribution to the development of policy in the EU (Häring et al. 2009). Research has shown that using multi-actor processes in strategic planning and policy development increases credibility as actors by include groups that represent various interests, and increases the likelihood of the execution of the proposed strategy (Häring et al. 2009, Jamieson et al. 2009, Neef et al. 2011). In fact, the vast majority of environmental management decisions are guided by multiple stakeholder interests (Hajkowicz 2008). In agricultural research for development, it is recognized that different actor groups can provide various insights about the biophysical, technological and institutional dimensions of problems, and what innovations are technically feasible, economically viable and social-culturally and politically acceptable (Schut et al. 2016).

Actor engagement approaches involving people representing various interests (as noted above) are widely used and encouraged within environmental and agricultural policy development. Beekeepers operate within a dynamic socio-ecological environment, influenced and having to respond to many, variable factors that influence the health of their bee colonies. Thus, B-GOOD will integrate the expertise and interests of a wide range of relevant actors to shed light on the context and circumstances (apicultural, environmental and socio-economic) under which the beekeeping sector operates in the EU.

More specifically, engagement of various actors in the B-GOOD project will help to determine crucial objectives (research and bee management), as well as generating creative and innovative solutions to achieve these objectives. In this way, key actors will be fully engaged in the co-creation of solutions, strengthened throughout the project's lifespan and, where necessary, new partnerships and networks will be encouraged.

It was of major importance to identify relevant actors and actor networks during the beginning stages of the B-GOOD project, and many work packages are dependent on multiple actor inputs (from local beekeepers to EU policy makers). Initial tasks in both WP4 and WP8 necessitated identifying key actors operating at the European / international level, rather than in a single region or country, to assess the beekeeping sector throughout Europe and to gain pan-European perspectives. The structural composition and actor landscape of the EU beekeeping sector is outlined in Section 3, briefly describing functions and connections between various institutions and organizations.

The identification and engagement with actors at various levels is an on-going and iterative process within the B-GOOD project. Initial focus has been at the European level, although a number of key national actors have also been identified. The further phases of actor engagement are planned within WP8, in collaboration with other work packages. The identification of key actors at a European level has also seeded the establishment of the B-GOOD Multi-actor Forum, described in Section 4.3. In addition, engagement with local beekeepers is also vital for developing 'user-focused' tools and honeybee health indicators. Local beekeepers and other actors will be actively engaged in a series of national participatory workshops, outlined in Section 4.4. Furthermore, an extensive survey of beekeepers will be undertaken, in selected EU countries (WP4). Initial identification of national and regional beekeeping associations has been part of this scoping study and will provide a starting point for developing the sample structure for this survey.

The ongoing identification and engagement with multiple actors will ensure the views, opinions and knowledge of beekeepers, scientists, veterinarians, beekeeping advisors, bee product (e.g. honey packers) and agricultural business representatives etc. will be incorporated into B-GOOD's research activities, generating a learning and innovation system (LIS). This will help B-GOOD deliver outputs that are targeted and benefit beekeepers through the co-development of knowledge, securing the future of beekeeping as key actors envisage it.

Ultimately, the B-GOOD multi-actor approach will also include linkages to policy via direct access to the EFSA MUST-B working group, as well as other related EU projects. B-GOOD generated knowledge and tools and will support and further develop the simulation tools used for honeybee risk assessment and consideration of multiple stressors.

2. Actor identification and networks

Approaches for actor identification can be divided into two major categories. The first approach identifies actors based on importance, whose removal may impede or result in imbalances within the system. The second approach identifies actors based on relational closeness (ties either geographical or socio-economic), or the average relational distance between an actor and all the others, and reflects how central actors operate within a network (Yiwei et al. 2006). We mixed both approaches in our identification of relevant actors.

The task of identifying key actors at the European level was carried out both through desk research and by undertaking interviews, as described in the sections 2.1 and 2.2. The starting point was to identify established actors and networks in the EU beekeeping sector. After initial desk research, we focused on a newly established stakeholder network in the EU beekeeping sector believed to be of emerging importance, the EU Bee Partnership. Then, by asking members of the EU Bee Partnership to name people / organizations they contacted about technical aspects of honeybee health management, we used the short relational distance (technical knowledge exchange) between them to identify other actors within their network. Within actor network theory, actors can lead to the identification of additional key actors. For example, actors can refer implicitly or explicitly to other actors when interviewed (Pouloudi et al. 2004). By asking a targeted group of actors (EU Bee partnership) to name other people or organisations they had been in contact with, mutual connections within the network were identified. The mutual connections that have been identified as part of this scoping study has offered valuable insights into relevant partnerships for long-term collaboration. One output of this work, with input from project partners, has been the creation of an actor database, which lists identified organizations etc. of interest and relevance to B-GOOD (see Section 4.2). Therefore, the actors and networks presented in this deliverable are an important starting point for long-term collaboration, good communication, and greater consensus or compromise between key actors to ensure enduring solutions are achieved during and after the B-GOOD project.

2.1. Desk research

Compiling a list of organizations and individuals representing key actor groups within the EU beekeeping sector was undertaken in collaboration with B-GOOD partners. Initial compilation was focused at an international / EU level, as part of identifying key actors for research interviews, workshops and other engagement activities. Using several linked key words (honeybee, health, Europe and beekeeping) online searches identified numerous public organizations, NGO's, associations, business enterprises and people of potential interest for an interview study about EU Beekeeping and honeybee health. On-line searches were also supplemented by B-GOOD partners, who provided details of many potential actors of interest and relevance to B-GOOD at international and national levels. In agreement with B-GOOD partners, a 'seed' group of actors was identified for interviewing (see section 2.2.), where details about respondent contacts was also asked for. All actors identified, as part of this process, have been collated to create an actor database for B-GOOD. This is an internal 'living document', which is stored electronically and will be continuously updated over the life of the project (see Appendix 1).

2.2. Actor interviews

We initially contacted members belonging to the EU Bee partnership to begin our series of in-depth interviews. These organizations were selected by the European Food Safety Authority (EFSA) in an initiative to bring together representatives in each of the following actor categories: (i) consumer organisations and NGOs; (ii) farmers, primary producers and associations of practitioners; (iii) business, food industry and distributors in relation with food safety, bee health and sustainable pollination; and (iv) academia. We considered these actors as substantially contributing to the EU beekeeping sector at an international scale, and that exclusion of one of these organizations would affect the whole EU beekeeping regulatory environment. First, we interviewed individuals, representing 11 organizations / institutions, as our ‘seed’ set of respondents. As part of the interview, these respondents were asked to provide details of organizations / individuals they interacted with, identifying additional key actors related to beekeeping at the international and European level, as part of a snowball sampling technique. A total of 41 interviews were undertaken (carried out between January and April 2020) and details about the full study can be found in the B-GOOD report D4.1: SWOT/SOR-analysis of healthy and sustainable beekeeping in the EU. As part of these in-depth interviews (semi-structured) a series of questions were included to investigate knowledge the actor networks and knowledge exchanges of respondents. For the initial 11 interviews, respondents were asked about contacts within the EU Bee Partnership, as well as outside this group. The remaining 30 respondents were asked about general contacts related to beekeeping and honeybee health. Respondents were asked to provide a list of contacts before being interviewed (outline details of interview sent prior to interviewing), however responses were mixed (respondents stating time constraints) with many providing further details post interview. All respondents were asked about knowledge exchanges related to ‘technical advice’, rather than information e.g. news (see Appendix 2 for interview guide). Analysis of this network data is given in Section 4.1, further compilation of network data and analysis is planned and will be disseminated by a scientific article as well as a popular article targeted at key actors.

3. The EU beekeeping sector

This scoping study has identified a list of key actors of interest for collaboration with B-GOOD. Furthermore, in conducting this study and from analysis of key actor interviews (section 2.2) we have gained an overview of various structural and governance elements that make up the EU beekeeping sector, the interconnectedness between these elements i.e. actors and their social networks, as well as linkages with social and physical entities. The findings of this work are outlined below, providing an overview of the current ‘system state’ of the EU beekeeping sector in relation to managing the health of honeybee colonies and sustainable beekeeping practices.

3.1. Overview of EU beekeeping

The beekeeping sector is an important part of Europe’s economic and social fabric, proving a variety of services (honey, pollination, employment, relaxation etc.) that are of environmental, economic and cultural significance. The latest EU market overview (spring 2020) states there are approximately 650.000 beekeepers and 18.5 million hives in the EU, producing around 280.000 tons of honey, as well as a variety of other bee products ([data source](#)). Beekeeping in Europe is regarded as a “small sector but important for agriculture and pollination” within the EU. The EU is the second biggest producer of honey after China. However, European honey production is only 60% self-sufficient and the EU still relies heavily on honey imports to meet European consumer and food processor demands. Imports of honey into Europe are dominated by supplies from China (just below 40%), then Ukraine (just above 20%) and South America (about 20%), with Argentina and Mexico major exporters to Europe.

Beekeeping can be both a hobby and a profession, but the distinction whether an individual beekeeper is a 'hobbyist' or 'professional' is not straightforward to define, variable and somewhat contested. The [average number](#) of hives per beekeeper in the EU is 21, but this average varies considerably between countries. German beekeepers have on average 7 hives, whilst Greek beekeepers have 147. The [commonly](#) considered minimum number of hives for professional honey producers is 150, and in 2015 only about 4% of EU beekeepers had over 150 hives. However, different European countries and their beekeeping associations set different thresholds for the number of hives to be a professional or consider professional beekeepers as those relying on their bees / honey as their *main source of income*. Differing profitability for bee product sales, income levels and living standards between European countries makes living off bees highly variable and hence making a distinction between hobbyist and professional beekeepers is problematic. There is tremendous variation in Europe, with some countries considered to have significantly more professional beekeepers, particularly in Southern Europe. Greece, Romania and Spain have been estimated to have between 20-40% of their beekeepers designated as professional, whilst Germany, The Netherlands, Belgium and Scandinavian countries have less than 2% (Chauzat et al. 2013).

The structural complexity and heterogeneity of the EU beekeeping sector raises many issues and challenges regarding the production, distribution and sale of honey (it is a globalized market), the organization and education of beekeepers, the monitoring and the prevention of bee diseases and the protection of bee resources (e.g. from habitat destruction to exposure to pesticides etc.). Further details of our learning gained regarding the strengths, weaknesses, opportunities and threats that might define the EU beekeeping sector in the future is detailed in the B-GOOD report D4.1 SWOT/SOR-analysis of healthy and sustainable beekeeping in the EU.

3.2. International governance elements of the sector: key actors, roles and networks

As noted above, the EU beekeeping sector is highly heterogeneous and very diverse with many actors with different political, economic and cultural interests. There are numerous regional, national and international organizations representing different sector interests from small local hobby beekeeping clubs to Apimondia, the International Federation of Beekeepers' Associations. There are international organizations representing the honey industry (e.g. European Professional Beekeepers Association and International Honey Commission) and authorities focusing on bee and honey health issues (e.g. Directorate-General Health and Food Safety and the European Food Safety Authority). Similar organizations and institutions are also present at national levels.

We have begun to map some of these organizations and knowledge networks at the European level (see section 4.1), particularly actors in connection with honeybee health and sustainable beekeeping practices. It is evident that there are collaborations and some effective networks between a number of key organizations working to develop and improve EU beekeeping sector policies. However, data gathered as part of this study (SWOT and actor network interviews) indicate the sector is very fragmented. Feedback from various actors representing different sectors (beekeeper associations, scientific institutions and industry bodies and authorities etc.) suggest they all see the need for and desire improvements, but our analysis indicates there is poor coordination between many actors that might share common interests e.g. amongst beekeeping associations (professional and hobbyists) and beekeeping with agricultural associations.

The focus of this scoping study has also been to evaluate the institutional structural elements that govern the EU beekeeping sector. Governance in this context entails the "interactions among structures, processes and traditions that determine how power and responsibilities are exercised, how decisions are taken, and how actors have their say" (Graham et al. 2003). The

following briefly outlines some of the key institutional structural elements at the EU level. This study and its identification of key actors has aided the development of the B-GOOD Multi-actor Forum (feedback mechanism for the B-GOOD project) which is described in Section 4.3.

3.2.1. EU Commission and departments

Even though the honeybee sector is considered “small” the European Commission is actively engaged with the sector and its actions cover several policy areas including:

- Beekeeping and agriculture practices;
- Environmental protection and research;
- Pesticide usage;
- Veterinary and medication issues;
- Disease and pest surveillance measures.

There is an inter-services group working on various policy matters related to the honeybee sector with key policy departments (DGs) participating:

- 1 Directorate-General for Health and Food Safety (DG SANTE), G2 Animal Health and Welfare
- 2 Directorate-General for Agriculture and Rural Development (DG-AGRI), G3 Animal Products, B2 Research and Innovation
- 3 Directorate-General for Environment (DG-ENV), D.2B Biodiversity
- 4 Directorate-General RTD Research and Innovation

There are a number of areas of responsibility where these departments endeavour to develop complementary actions and policy initiatives related to bee health and honey production.

- Animal health rules and monitoring: pathogens and pests;
- Veterinary medicines;
- Honey safety: residues and fraud;
- Apiculture programs and honey quality;
- Agri-environmental measures;
- Pesticide usage.

3.2.2. Bee health and pathogen surveillance

To support actions on bee health, the European Commission designated a reference laboratory for bee health, which has been operational since April 2011. [The European Reference](#) laboratory for bee health (ANSES) provides a number of services for the commission and beekeeping sector with key tasks including:

- Coordinating and developing methods employed in EU countries for diagnosing and monitoring of the relevant bee diseases;
- Collecting and diffusing information on endemic, emerging and exotic bee diseases
- Training for experts in laboratory diagnosis, and training workshops for National Reference Laboratories (NRLs);
- Providing technical, scientific support to the Commission and NRLs;
- Provide scientific and technical support to the European Commission for the implementation of an ad hoc pilot European surveillance programme (e.g. [EPILOBEE study](#)).

The use of veterinary medicinal products in the bee sector has to comply with the [European rules on veterinary medicinal products](#). However, it is well recognised that there is limited availability of approved veterinary medicines for bees. There are a number of ‘over the counter’

treatments available to beekeepers throughout Europe. However, not all of these will have gone through a registration process to ensure that they are safe to the user, colony and environment. There are EU-wide authorization procedures, which have been in place since the mid-90s, and the system is supported by the [European Medicines Agency \(EMA\)](#). DG Health and Food Safety (DG-SANTE) are the commission's policy department with oversight of this area (Unit for Animal nutrition, veterinary medicines).

The limited availability of approved medicines is considered an issue for the health management of honeybee colonies (as noted by many interviewed respondents), as well as the limited and ad-hoc teaching of honeybee veterinary medicine in undergraduate veterinary curricula in EU, especially when compared with other fields of veterinary medicine (Iatridou et al. 2019).

3.2.3. Honey production and regulation

As noted above the EU is the second most important honey producer after China, but it is also a net importer of honey from third countries. EU countries with the largest honey production are Romania, Spain, Hungary, Germany, Italy, Greece, France and Poland. Honey is not the only bee product produced, by European beekeepers and other products include pollen, propolis, royal jelly and beeswax. All honey marketed in the EU must fulfil the rules on quality and labelling laid down in the "[honey directive](#)" 2001/110/EC.

The testing and quality assurance of bee products is primarily carried out by privately run testing facilities / laboratories (e.g. [Eurofins](#), or [QSI](#) etc.), on behalf of the major European honey packers and distributors, also represented by their own [association](#). Feedback from interviews, as part of this study, indicate there are very limited resources and capacity within national responsible authorities for testing bee products. The continued detection of fraudulent honey (e.g. dilution / use of sugar syrups) is also challenging both private and public testing facilities as "keeping-up" and detecting new fraudulent techniques is time consuming and costly. The [International Honey Commission](#) is an association that focuses on the development of better and new analysis methods of honey and the other bee products. Furthermore, it is known that many European beekeepers sell their products directly on a subsistence basis. The cost and availability of testing bee products is regarded as prohibitive for small-scale beekeepers. Much of the direct sale honey consumed in Europe is very unlikely to have been tested, although it is presumed to be of 'genuine' quality and of known origin.

3.2.4. Beekeeping and agriculture

Beekeeping is an integral part of the agricultural sector, not only as producing 'animal products' but also as an important service provider (e.g. pollination). Agricultural practices and policies have a direct (e.g. incorrect use of pesticides) or indirect (e.g. provision of floral resources) impact on bees. The Common Agriculture Policy (CAP) places greater emphasis on [sustainable agriculture and](#) specifically takes into account that the agricultural environment and its practices (management of inputs, pesticides and fertilizers) can influence bee health. CAP sets out measures that encourage green farming and enforce environmental rules to strengthen environmental conditions that aim to protect natural resources and enhance biodiversity, which are also reflected in the commission's [European Green Deal](#).

The EU also directly supports the beekeeping sector by providing funding to support bee health, hive management, technical assistance, analysis and research, market monitoring and product quality. To be eligible for this funding EU Member States are required to draw up three-year 'national apiculture programmes', in cooperation with national beekeeping organizations. There are [8 specific measures](#) that are eligible for funding as part of national programmes and funds are allocated according to the number of beehives in each country. Current [national apiculture programmes](#) are for 2020-22 and after each 3 year period the

commission publishes a report (latest [December 2019](#)) on the implementation of the measures concerning the apiculture sector.

DG-AGRI Civil Dialogue Group

The European Commission, through DG-AGRI have created a forum to help define measures to promote beekeeping in consultation with key actors related to agricultural production. The [Civil Dialogue Group on Animal Products](#) represents a consultative body for all relevant EU issues and policy developments about animal rearing and production. It ensured there is a connection between various relevant actors with the EU Commission. There specific meetings (twice a year) for the sheep, goatmeat and beekeeping sectors that engage actors in seeking to promote and account for beekeeping needs in EU agricultural policy making. Members of this CDG represent a broad spectrum of interests related to animal products sector. The majority of its members (by number of seats) represent agricultural and food trade interests e.g. Committee for Agricultural and Agri-Food Trade (CELCAA), Committee of Professional Agricultural Organisations (COPA) and General Committee for Agricultural Cooperation in the European Union (COGECA). However, a range of other interests are represent by members presenting consumers (e.g. The European Consumer Organization – BEUC), environmental groups (e.g. Birdlife), organic farming (IFOAM - Organics International) and bees (Beelife). The full list of members is publically [available](#).

EFSA & the EU Bee Partnership

EFSA has an important role to play in ensuring [healthy bee stocks](#). Its overall mandate is to improve EU food safety and animal health and to ensure a high level of consumer protection. Central to its work are risk assessments on the environmental safety of Plant Protection Products (i.e. pesticides). Specifically, in relation to bee health it established the EU Bee Partnership, a platform for multi-actor collaboration and dialog that was instigated under its Stakeholder Engagement Approach. The purpose of this platform is to “improve data collection, management, sharing and communications to achieve a holistic approach to the assessment of bee health in Europe and beyond”. The [terms of reference](#) for this platform were published in May 2018. This is a newly emerging EU multi-actor platform and there are 11 designated stakeholders (Table 1) with defined roles and responsibilities. We have preliminary assessed this as a network with our initial findings given in section 4.1.1.

In addition, EFSA is carrying out a [review](#) to revise its 2013 guidance document on the risk assessment of plant protection products and bees ([EFSA, 2013](#)). As part of this review of the Bee Guidance Document, it has set-up [Stakeholder Consultation Group](#), established May 2019.

Table 1: List of stakeholders in the EU Bee Partnership with defined roles.

Organization	Abbreviation	Representing	Short description
European Professional Beekeepers Association	EPBA	Beekeepers	Association of European beekeeping organizations representing interests of commercial and professional beekeepers

Apimondia (International Federation of Beekeepers' Associations)	n/a	Beekeepers	International federation representing beekeeping associations worldwide
Association of Veterinary Consultants	AVC	Bee health interests (scientists/professionals)	Association of independent veterinary consultants, where activities normally concerned with animal and public health issues.
European Federation of Honey Packers and Distributors	FEEDM	Agri-business / industry	Represents the interests of the European honey business
European Crop Protection Association	ECPA	Agri-business / industry	Represents the crop protection industry in Europe, and promotes the safe and sustainable use of pesticides.
International Confederation of European Beet Growers	CIBE	Agri-business / industry	Representing the interests of sugar beet growers.
European Network of Scientists for Social and Environmental responsibility	ENSSER	Independent scientists	Association supporting independent and critical scientific research for the protection of the environment, biological diversity and human health.
BeeLife European Beekeeping Coordination	n/a	Beekeepers	Association formed by professionals of the beekeeping sector across the EU for protection of bees and environment.
Pesticide Action Network (Europe)	PAN	Public / environmental interests	Network (NGOs, institutes + individuals) undertaking advocacy, policy analysis, and campaigning to eliminate dependency on chemical pesticides and support safe pest control methods
International Biocontrol Manufacturers Association	IBMA	Agri-business / industry	Association for biocontrol industries promoting manufacture, proportionate regulation and use of biocontrol solutions.
European Food Standards Authority	EFSA	Public / environmental interests	EU agency responsible for scientific advice and communication on risks

			associated with the food chain (risk assessments).
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3.2.5. International beekeeping

There are two established and highly influential beekeeping associations and networks that are active as part of the international beekeeping sector.

Apimondia

Apimondia (International Federation of Beekeepers' Associations) is a non-profit association headquartered in Rome, Italy. Its mission is to defend beekeepers and their bees across the globe. It has established various structural elements to achieve its aims including 5 regional committees (Africa, Americas, Asia, Europe and Oceania), 7 scientific commissions (Apitherapy, Bee Health, Biology, Economy, Pollination and Bee Flora, Rural Development and Technology and Quality) and several [working groups](#).

COLOSS

COLOSS (prevention of honeybee COlony LOSSes) is an international, non-profit association headquartered in Bern, Switzerland, which is focused on improving the well-being of bees (in particular the honeybee) at a global level. The COLOSS network includes over 1000 members from 95 countries and is composed of scientific professionals (i.e. researchers, academics, veterinarians, agriculture extension specialists and students).

Many people and national associations / organizations are linked with both these international associations and although very influential internationally the scale and diversity of the beekeeping sector within Europe provides numerous challenges for collaborative efforts between different sectoral interests (e.g. beekeepers, farming and environmental), to ensure healthy and sustainable beekeeping. Particularly at national levels, it is apparent (from our study interviews) there is poor coordination and some competing interests between multiple actors e.g. beekeepers, farmers and responsible authorities (health vs agriculture).

4. Scoping study outputs

In addition to providing an overview of EU governance structures, this report evaluates and outlines the capacity-building needs for enhancing collaboration and learning for the B-GOOD project, by appraising existing linkages and partnerships and where necessary signifying the potential to create new partnerships / networks. The following section provides details on work carried out so far and outlines planned B-GOOD engagement and collaborative activities.

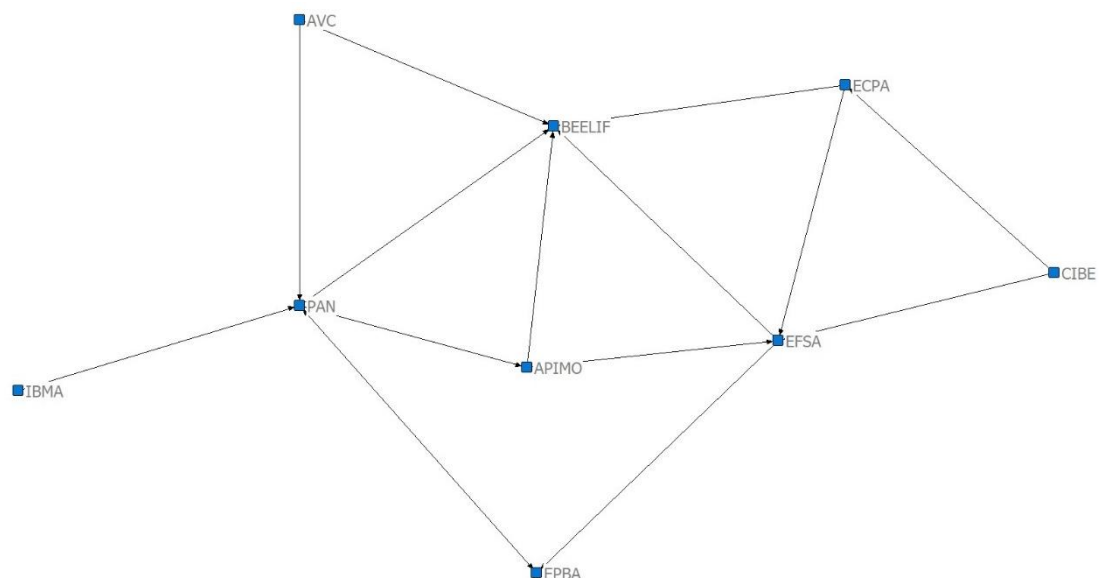
4.1. Identification of EU actors and networks

Here, we report on our analysis of the social network data gained from interviewed respondents as part of the SWOT/SOR study (see section 2.2). The focus of this analysis has been to understand the connections and the nature of interactions between respondents, and the organizations they represent. We started by analysing relationships within the EU Bee Partnership, to assess the connectedness of organizations within this existing network. We also have mapped all the network connections of organisations represented by respondents who were interviewed, to determine the relationships between these organizations. Note that the social network analysis represented here is not a complete network analysis on the EU beekeeping sector, but rather it represents those by which we sampled in the present study.

4.1.1. Connections within the EU Bee Partnership

The EU Bee Partnership is a newly formed network which was formally established in 2018. Our analysis is based on existing relationships for exchanging knowledge related to bee health, rather than interactions as part of EU Bee Partnership activities. Nevertheless, our analysis indicates (see Figure 1) that of the organizations who are members of the EU Bee Partnership, Pesticide Action Network (PAN) and BeeLife (BEELIF) have the most connections, which indicates that they may be exposed to more information and more diverse information concerning bee health. The International Biocontrol Manufacturers Association has the least amount of connections, suggesting that their position within the EU beekeeping sector regarding knowledge exchange about bee health is less central.

The Association of Veterinary Consultants, the European Professional Beekeepers Association and the International Confederation of European Beet Growers all have two connections, suggesting that they have a moderate role in knowledge exchange about bee health. The network mapping of these organizations is only partial but it does suggest that both PAN and BeeLife are active in developing connections and exchanging knowledge with various organizations within the EU beekeeping sector. This is not unsurprising given their aims and positions advocating greater consideration of bee health issues.



Organization name	Abbreviation
Association of Veterinary Consultants	AVC
European Crop Protection Association	ECPA
Pesticide Action Network	PAN
BeeLife	BEELIF
European Professional Beekeepers Association	EPBA
International Confederation of European Beet Growers	CIBE
Apimondia	APIMO
International Biocontrol Manufacturers Association	IBMA
European Food Safety Authority	EFSA

Figure 1: Knowledge exchange connections between organisations belonging to the EU Bee Partnership. The arrows indicate the direction of the connection e.g. 4 organizations stated they had a connection with PAN, whereas PAN stated they had a paired connection with two, EPBA and APIMO.

4.1.2. Connections beyond the EU Bee Partnership

From knowledge exchange details given by the 41 interviews we have been able to map out a more extensive network of actors associated with the beekeeping sector in Europe. The organizations identified by these interviewees and the connections between them can be seen in Figure 2, in which each organisation is abbreviated with an acronym (see Appendix 3). It should be noted that this network map is a result of the sampling structure i.e. relationships primarily directed by how we sampled.

However, there are some interesting points we can highlight if we look at individual organisations and groups of networks. A core set of organizations is highlighted by those having blue nodes (squares), derived from k-core analysis (Seidman 1983). These organizations are all connected with ties to 3 or more linked organizations, creating a subgroup of multi-connected organizations. Five of these organizations are members of the EU Bee Partnership: APIMONDIA (APIMO), Association of Veterinary Consultants (AVC), BeeLife (BEELIF), European Food Safety Authority (EFSA), and Pesticide Action Network (PAN).

Of these organizations, it is apparent the EFSA, BEELIFE and PAN have a high degree of centrality with multiple connections. EFSA and BEELIFE have a number of connections, and would seem to have prominent positions suggesting they are sought out for their knowledge (receiving ties) by other organizations. PAN also has many connections, these are both 'receiving', and 'giving' ties suggesting that they are in an influencing position being both sought for their knowledge as well as disseminating it. However, there are a number of other organizations within this grouping which are linked around the European Union Reference Laboratory for Bee Health (ANSES) and French National Centre for Scientific Research (CNRS).

It would seem that a number of our interviewees are connected by knowledge exchanges related to the active monitoring and prevention of bee diseases, with a cluster of veterinarian and monitoring organizations particularly in France (GTVAP, OMAA and SNGTV). In addition, the Food and Agriculture Organization (FAO) and APIMONIDA (APIMO) are also connected within this core subgroup. Outside of this core grouping of organizations, there are number of other organizations with circular links, but with fewer ties and these are highlighted in by organizations with black nodes (squares). Organizations with red nodes have simple linear ties.

The overall landscape of organizations exchanging technical knowledge related to bee health would appear to be somewhat fragmented with numerous disparate organizations, connecting where there are shared interests. The core subgroup identified in this initial network analysis has highlighted some of the key organizations who can provide B-GOOD with expert knowledge, but who are also likely to be key for disseminating project outputs and influencing policy developments at the European level.

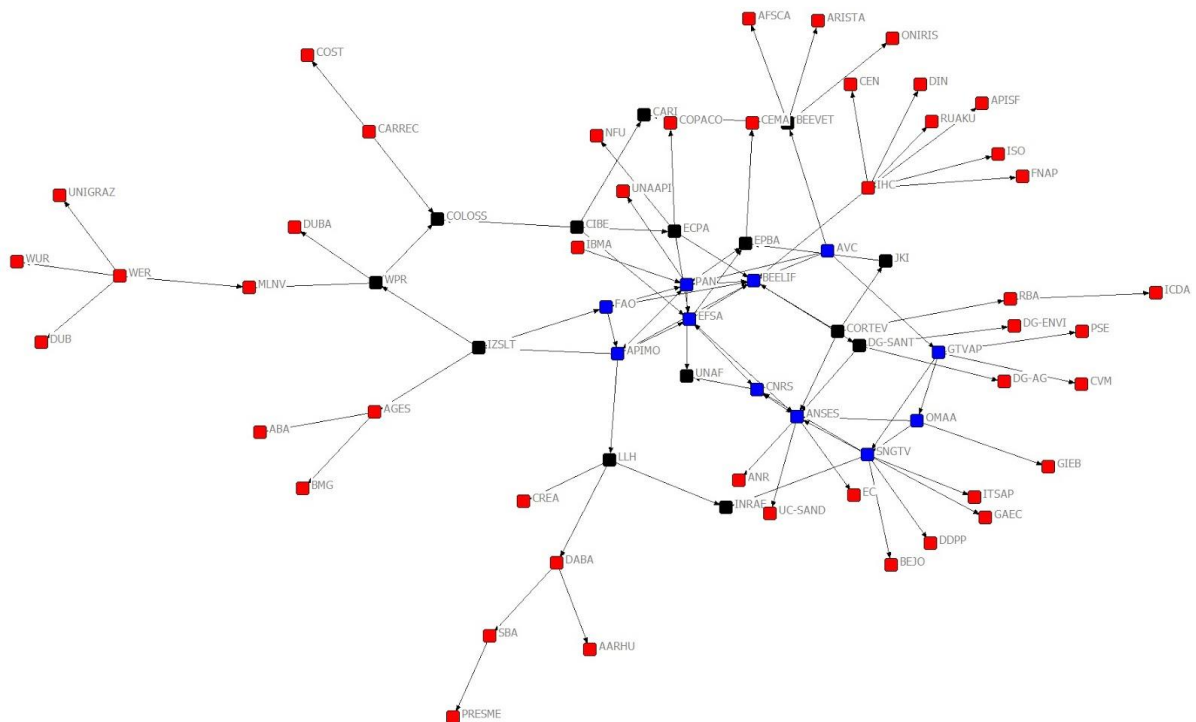


Figure 2. Connections beyond the EU Bee Partnership, the colours for each organizations node (square) indicate the degree of their centrality. For a full list of organization names and abbreviations see Appendix 3.

4.2. Actor database

We have created a simple database of potential actors of interest to B-GOOD for engaging with in variety of ways e.g. research activities, tool development and feedback or dissemination of project results. This database is primarily for internal use and distribution to project partners by means of internal project repositories, website and MS Teams. This database will be periodically updated during the course of the project adding newly identified actor groups and projects, as well as interactions with B-GOOD (see appendix 1). It lists identified actor organizations, as well as engagement activities that they have participated in with B-GOOD work packages, particular in relation to communication and exploitation of project outputs e.g. WP7.

4.3. Multi-actor Forum

A keystone of B-GOOD's multi-actor approach will be the establishment of a Multi-actor Forum (MAF), to enable B-GOOD partners to interact with a variety of key actors, representing different sectoral interests. Its formation is an output of this study and work package milestone (MS53).

This Multi-actor Forum (MAF) will act as a platform for B-GOOD partners to interact directly with a selected group of key actors, representing varied interests within the EU beekeeping sector. The aim of this forum is to provide a channel for B-GOOD to disseminate project progress and results to a targeted audience of key actors, recognized and selected because of their expertise and knowledge in various areas related to the bee health and beekeeping. However, the MAF is not purely a channel for targeted dissemination of project outputs. The MAF will enable actors to give their feedback and guide project developments, to ensure high quality research outputs, as well as user focused developments.

The MAF will be composed of invited members representing different interests at both EU and national levels. The MAF, as a platform for dialog, will be convened both virtually and physically. Members will be invited to participate in a variety of project meetings, events and channels for communication. The MAF will be formally established in July 2020, and as part of this scoping study a list of potential candidates has identified, as well as its operational mechanisms. The first MAF is due to be convened during the planned B-GOOD Consortium Meeting to be held in early July. Due to current movement restrictions throughout Europe this will be a virtual meeting (series of teleconferences). Nevertheless, we regard it as an ideal event to launch the MAF, to engage with key actors, detail project progress, results and gain their feedback. The following sections outline the proposed composition and operation of the MAF.

4.3.1. Composition

The B-GOOD MAF is intended to be a diverse group of individuals, representing various sectorial interests associated with beekeeping in Europe. The MAF should have broad sector interests (beekeepers to policy makers) and geographical (north, south, east and west) representation. It is proposed that candidates represent each of the following sector interests.

- (i) **Beekeepers** e.g. individual beekeepers or representatives of beekeeping associations (professional and hobbyist).
- (ii) **Public / environmental interests** e.g. representatives of environmental NGOs or public authorities
- (iii) **Bee health interests** e.g. scientists / veterinary or professional advisors
- (iv) **Agricultural / rural interests** e.g. individual farmers, primary producers or representatives of farming associations
- (v) **Honey business / food industry** e.g. representatives of enterprises involved in processing bee products (packing, distribution or quality assurance)

At least 4-5 candidates will be invited to join the MAF from each of these categories. This will provide a core group of key actors, willing to actively engage with B-GOOD at various events and stages of the project. It is anticipated, that not all members of the MAF will participate / attend all events. Different members can be invited to offer their expertise at selected events, depending on their area of interest and knowledge. It is suggested that 2 selected representatives from each category are invited to participate in events, so as to enable meaningful dialog and exchanges of knowledge.

4.3.2. Selection criteria

It is proposed that candidates for the MAF are selected and invited to join because they have personal and professional characteristics that engender them to interact, provide valued input, and consider it worth their while (i.e. they share in an interest in B-GOOD aims and see it as beneficial to contribute). The following candidate characteristics should be considered.

1. Possess 'expert' or 'sector' knowledge of relevance to B-GOOD, whether this is scientific, technical or local etc.
2. Willing to engage with B-GOOD and give feedback, over the remaining life span of the project.
3. Prepared to actively participate in a number of B-GOOD events and disseminate project results / outputs to their respective actor communities
4. Willing to participate, with English as the project's working language
5. Trusted by the B-GOOD Coordination Team (impartial and no 'competitive' interests)

4.3.3. Potential candidates

A list of key actors involved in the EU beekeeping sector has been compiled. It is proposed that potential candidates for the MAF are initially recruited from this group of people, who have already actively engaged with B-GOOD. An initial list of possible candidates has been prepared and the list will be made publically available at its launch at the Consortium Meeting (July 2020).

MAF members will be expected to have on-going interactions and offer input to the project, requiring a degree of commitment. B-GOOD will support their participation through regular communications and supporting their participation at selected events, as deemed appropriate. However, it should be recognised that other commitments / time clashes might mean some members opt to decline further engagement and a roster of potential candidates will be maintained.

Although an initial list of MAF candidates has been prepared, additional / alternative candidates can also be suggested and included as project needs require.

4.3.4. Convening of the MAF

Engagement of the MAF is intended to be an iterative process whereby MAF members are invited to participate in specific technical meetings and events. Two facilitated workshops are planned, mid-way through and towards the end of the project. However, the first engagement of the MAF will be its participation in the 2nd Consortium Meeting, to be held between 6 and 8 July 2020. This virtual meeting provides an excellent opportunity to convene the MAF to initiate a dialog, as well as launching a MAF communication platform to maintain this dialog with key actors. (see 4.3.5). Although not a physical meeting (due to current movement restrictions), active engagement of selected MAF members in the 2nd Consortium meeting is proposed in two ways:

- i) Inviting members to participate in selected teleconferences where work packages , of interest to them, present results and future research activities.
- ii) Hold a specific MAF teleconference (90 minutes max) to enable MAF members to interact directly with the B-GOOD Coordination Team as well as work package leaders.

The second MAF activity will be structured and facilitated in a way to:

- i) Understand their expectations of the B-GOOD project
- ii) Review and gain their feedback about current and anticipated project outputs
- iii) Match project outputs with their expectations, and where necessary adjust project activities to meet expectations and desired outputs

The involvement of the MAF in the 2nd Consortium Meeting will be integrated with its arrangements and agenda as so as to enable meaningful participation.

4.3.5. MAF communication platform

In addition to MAF members being invited to selected events (e.g. meetings either physical or teleconference) MAF members will also invited to join a separate MAF MS Team channel as guest users. This communication platform will enable B-GOOD to maintain open dialog with MAF members, by providing

- i) Secure system to 'chat' with MAF members

- ii) Means to inform members of B-GOOD events e.g. meetings, news items and publications
- iii) Access to selected folders, internal repositories and documents (e.g. milestone and deliverable reports).
- iv) Means for MAF members to upload items / documents of interest for B-GOOD

The establishment of this MAF communication platform requires further development work, discussion and agreement with the project's Coordination Team. However, a number of initial considerations are suggested below:

- i) Platform needs to be moderated and MAF interactions facilitated
 - a. Coordinated by single point of contact but supported by key consortium members e.g. WP leaders
- ii) Ability within MS Teams to create a 'Chinese wall' (a virtual access / information barrier), to restrict access to other B-GOOD teams, where sensitive data might be held.
- iii) Willingness / ability of MAF members to join and actively use the MS Teams platform
- iv) Maintaining the confidentiality of documents / materials / research results published on the MAF channel e.g. MAF members given preview / access to results prior to public release of data.
- v) Terms of reference will be sent to all MAF members, clearly stating their expected roles, potential time commitments and how both B-GOOD and members can benefit from collaborating.

4.4. Actor workshops involving local beekeepers

In addition to the MAF a series of workshops are planned as part of B-GOOD's multi-actor approach (MAA). These workshops are designed to be multi-functional (dissemination and feedback) and targeted at actors at a regional / local levels. Five national workshops are planned to be held in the following countries: Finland, Germany, Italy, The Netherlands and Switzerland and a standard workshop format has been developed working in collaboration with other work packages (WP1, 4, 6 and 7). The purpose of these workshops will be to:

- 1) Foster interactions between B-GOOD partners (scientists / advisors) and regional / local actors (predominately beekeepers and beekeeping enterprises)
- 2) Introduce the B-GOOD project (goals and activities) to workshop participants
- 3) Investigate participant perceptions of the current state of beekeeping, how they envisage the future of beekeeping (ideal future), and how this might be realized.
- 4) Initiate recruiting of local beekeepers for B-GOOD Tier 2 field studies (A). This involves 8 beekeepers selected in the five countries who will receive the BEEP base and app as part of WP1)
- 5) Provide a channel for feedback for participants as local / regional actors about project activities and developments.

The outcome for these workshops will be a summary report on the multi-actor workshops held, entitled "Report multi-actor workshops (Pathways for change)".

The format of these workshops was based on a well-established approach originally conceived by Robert Jungk (Jungk et al. 1987), called 'Future Workshops'. Each B-GOOD Future Workshop is intended to take about three hours and involve between 10-20 participants, representing several key actor groups:

1. **Beekeepers:** potentially those targeted / likely to participate in B-GOOD Tier 2 - Field A Studies.
2. **Scientists / beekeeping advisors:** B-GOOD scientists (from partner higher education institutions) and/or beekeeping advisors from regional / national organizations
3. **Beekeeping enterprises:** representatives from local / regional enterprises providing services to beekeepers (private)

These workshops will follow a format with four general phases, outlined below.

1. Preparation phase (B-GOOD project and workshop introduction)
2. Critique phase (participants criticize / critique the current situation and define major issues / problems for them in current beekeeping sector, local to national level).
3. Fantasy phase (participants imagine an ideal future situation.)
4. Implementation / action phase (finally, participants find ways to move from the actual situation to an ideal one.)

Full details of the workshop's structure are detailed an operational table (appendix 4), which is available on the B-GOOD MS Teams platform. In addition to the operational table, standard reporting and practical guidance documents have been made available to partners conducting these workshops (available on MS Teams).

Working in close collaboration with partners (BSOUR, MLU, SML, UBERN, WR) conducting the workshops, three workshops were originally planned to take place in spring 2020: two in March (Finland and Switzerland) and one in April (The Netherlands). Unfortunately, due to the outbreak of Covid-19 and sever movement restrictions in these countries these had to be cancelled. Planning of the B-GOOD Future Workshops is thus ongoing, with alternative dates or methodologies currently being considered, with involved partners being consulted. Recruitment of beekeepers for Tier 2 Field A Studies is planned to take place in early autumn 2020 and workshops will be coordinated with this recruitment.

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6. Appendices

Appendix 1: B-GOOD actor database

No.	Organization name	Abbreviation	Type	Representing	EU Bee Partnership	Level	Country	Short description	Website
1	European Professional Beekeepers Association	EPBA	NGO	Beekeepers	Stakeholder	EU	n/a	Association of European beekeeping organizations representing interests of commercial and professional beekeepers	http://www.professional-beekeepers.eu
2	European Federation of Honey Packers and Distributors	FEEDM	NGO	Agri-business / industry	Stakeholder	EU	n/a	Represents the interests of the European honey business	https://www.feedm.com/
3	European Crop Protection Association	ECPA	NGO	Agri-business / industry	Stakeholder	EU	n/a	Represents the crop protection industry in Europe, and promotes the safe and sustainable use of pesticides.	https://www.ecpa.eu/
4	International Confederation of European Beet Growers	CIBE	NGO	Agri-business / industry	Stakeholder	EU	n/a	Representing the interests of sugar beet growers.	https://www.cibe-europe.eu/
5	Apimondia (International Federation of Beekeepers' Associations)	n/a	NGO	Beekeepers	Stakeholder	International	n/a	International federation representing beekeeping associations worldwide	https://www.apimondia.com/en/
6	BeeLife European Beekeeping Coordination	n/a	NGO	Beekeepers	Stakeholder	EU	Belgium	Association formed by professionals of the beekeeping sector across the EU for protection of bees and environment.	https://www.bee-life.eu/
7	Association of Veterinary Consultants	AVC	NGO	Bee health interests (scientists/professionals)	Stakeholder	EU	France	Association of independent veterinary consultants, where activities normally concerned with animal and public health issues.	https://www.avc-eu.de/association/
8	European Network of Scientists for Social and Environmental responsibility	ENSSER	NGO	Independent scientists	Stakeholder	EU	Germany	Association supporting independent and critical scientific research for the protection of the environment, biological diversity and human health.	https://ensser.org/
9	Pesticide Action Network	PAN	NGO	Public / environmental interests	Stakeholder	EU	Belgium	Network (NGOs, institutes + individuals) undertaking advocacy, policy analysis, and campaigning to eliminate dependency on chemical pesticides and support safe pest control methods	https://www.pan-europe.info/
10	International Biocontrol Manufacturers Association	IBMA	NGO	Agri-business / industry	Stakeholder	International	Belgium	Association for biocontrol industries promoting manufacture, proportionate regulation and use of biocontrol solutions.	https://www.ibma-global.org/en/about-ibma
11	European Food Safety Authority	EFSA	PB	Public / environmental interests	Stakeholder	EU	Belgium	EU agency responsible for scientific advice and communication on risks associated with the food chain (risk assessments).	http://www.efsa.europa.eu/
12	Prevention of honey bee colony losses (Honey bee research association)	COLOSS	NGO	Bee health interests (scientists/professionals)	Observer	International	Switzerland	Association of scientific professionals focussed on improving the well-being of honey bees at a global level	https://coloss.org/
13	EU Reference Laboratory for honey bee health (ANSES)	EURL	PB	Bee health interests (scientists/professionals)	Observer	EU	France	EURL is research Institution and laboratory (at ANSES) working on an extensive number of scientific subjects related to honeybee health.	https://sitesv2.anses.fr/en/minisite/abeilles/eurl-bee-health-home
14	Directorate-General for Agriculture and Rural Development	DG AGRI	PB	Agricultural / rural interests	Observer	EU	Belgium	Commission department responsible for EU policy on agriculture and rural development and the common agricultural policy (CAP).	https://ec.europa.eu/info/departments/agriculture-and-rural-development_en
15	The Directorate-General for Health and Food Safety	DG SANTE	PB	Public / environmental interests	Observer	EU	Belgium	Commission department responsible for EU policy on food safety and health and for monitoring the implementation of related laws.	https://ec.europa.eu/info/departments/health-and-food-safety_en
16	European Parliament	EP	PB	Public / environmental interests	Observer	EU	Belgium	Intergroup on "Climate Change, Biodiversity and Sustainable Development", composed MEPs from all political groups and Parliamentary Committees.	http://ebcd.org/intergroup/
17	Joint Research Centre	JRC	PB	Public / environmental interests	Observer	EU	n/a	EU Commission's science and knowledge service, providing independent scientific advice.	https://ec.europa.eu/info/departments/joint-research-centre_en
18	International Union for Conservation of Nature	IUCN	PB	Public / environmental interests	No	EU	Switzerland	Organization working in the field of nature conservation and sustainable use of natural resources (IUCN RedList)	https://www.iucn.org/
19	International Centre for Young Beekeepers	ICYB	NGO	Beekeepers	No	International	Czech Republic	Organization promoting the development of young beekeepers, supporting and arranging international meetings.	http://icyb.cz/
20	Food and Agriculture Organization of UN	FAO	PB	Agricultural / rural interests	No	International	Italy	UN agency that leads international efforts to achieve food security and sustainable farming.	http://www.fao.org/home/en/
21	Mediterranean Beekeepers Association	FED APIMED	NGO	Beekeepers	No	EU	Italy	Regional trade association which offers assistance, consultancy, technical and professional to beekeepers and enterprises / cooperatives.	http://www.fedapimed.com/home_en.html
22	Animal and Plant Health Agency	n/a	PB	Bee health interests (scientists/professionals)	No	National	UK	Executive agency, under UK Department of Environment, Food and Rural Affairs (DEFRA), responsible for safeguarding animal and plant health.	https://www.gov.uk/government/organisations/animal-and-plant-health-agency
23	European Seed Association	n/a	NGO	Agri-business / industry	No	EU	Belgium	Association representing interests of those active in research, breeding, production and marketing of seeds of agricultural, horticultural and ornamental plant species	https://www.euroseeds.eu/
24	European Young farmers association	CEJA	NGO	Agricultural / rural interests	No	EU	Belgium	Forum for communication and dialogue between young farmers and European decision makers	http://www.ceja.eu/
25	COPA-COGECA	n/a	NGO	Agri-business / industry	No	EU	Belgium	Umbrella organization representing farmers and their cooperatives in the EU.	https://copa-cogeca.eu/Menu.aspx
26	European Association for Agro-ecology	n/a	NGO	Agricultural / rural interests	No	International	France	Association of institutions, groups and individuals interested in promoting agroecology (sustainable development of farming and food systems)	http://www.agroecology-europe.org/
27	European Landowners Organization	n/a	NGO	Agricultural / rural interests	No	EU	Belgium	Represents interests of the owners and managers of rural land, and rural businesses, within the EU	https://www.europeanlandowners.org/
28	Federation of Veterinarians of Europe	FVE	NGO	Bee health interests (scientists/professionals)	No	EU	Belgium	Umbrella body for EU veterinary associations represent veterinarians working in different fields.	https://www.fve.org/
29	Bee Sources	n/a	SME	Bee health interests (scientists/professionals)	No	EU	Italy	Consultancy providing expertise in research to field technical assistance related to beekeeping.	https://www.beesources.com/en/

30	Bee Safe	n/a	SME	Bee health interests (scientists/professionals)	No	EU	Germany	Consultancy providing expertise in research to field technical assistance related to beekeeping.	https://www.bee-safe.eu/
31	Beeodiversity	n/a	SME	Bee health interests (scientists/professionals)	No	EU	Belgium	Consultancy providing expertise in research to field technical assistance related to beekeeping.	https://beeodiversity.com/en/
32	BEEP	n/a	SME	Bee health interests (scientists/professionals)	No	EU	Netherlands	Enterprise developing online systems (apps and data platforms) for beekeepers to monitor bee hive health.	https://beep.nl/
33	The Red Beehive Company	n/a	SME	Bee health interests (scientists/professionals)	No	EU	UK	Enterprise offering natural pollination services to agriculture and horticulture, and consultancy services across the UK and Europe.	http://www.redbeehive.com/
34	Arnia	n/a	SME	Bee health interests (scientists/professionals)	No	EU	UK	Enterprise developing remote hive monitoring system with beekeepers.	https://www.arnia.co.uk/
35	ApisProtect	n/a	SME	Bee health interests (scientists/professionals)	No	EU	Ireland	Enterprise developing remote hive monitoring system with beekeepers.	https://www.apisprotect.com/home
36	Beekeeping Centre of Research and Information	CARI	NGO	Bee health interests (scientists/professionals)	No	EU	Belgium	Belgian research based association created by Ecology Laboratory University of Louvain (UCL) with focus on: information, education and valorisation of the quality of bee products / services	http://www.cari.be/
37	Bee Friendly	n/a	NGO	Bee health interests (scientists/professionals)	No	EU	France	Association promoting European labelling that aims to identify and promote pollinator-friendly products and production systems	http://www.certifiedbeefriendly.org/en/about-us/
38	BeeOdiversity	n/a	SME	Public / environmental interests	No	International	Belgium	Social enterprise developing business models for environmental sustainability, with focus on bee pollinators.	https://beeodiversity.com/en/
39	Proagrica	n/a	MNC	Agri-business / industry	No	International		Provider of independent connectivity and data-driven support solutions for the agriculture and animal health industries.	https://proagrica.com/
40	Greenpeace	n/a	NGO	Public / environmental interests	No	International	Belgium	International environmental pressure group	https://www.greenpeace.org/eu-unit/
41	Birdlife	n/a	NGO	Public / environmental interests	No	International	UK	International environmental pressure group focusing on birds	https://www.birdlife.org/
42	Sygenta	n/a	MNC	Agri-business / industry	No	International	n/a	Multi-national corporation providing agricultural chemicals (pesticides), seeds and biotechnology solutions to the EU agricultural sector.	https://www.syngenta.com/
43	Dow AgroSciences (CORTEVA)	n/a	MNC	Agri-business / industry	No	International	n/a	Multi-national corporation providing agricultural chemicals (pesticides), seeds and biotechnology solutions to the EU agricultural sector.	
44	International Honey Commission	IHC	NGO	Beekeepers	No	International	n/a	Bee sector / industry association to create world honey standards and quality criteria for bee products (incl. methods for analysis and testing etc.)	http://ihc-platform.net/
45	Bayer AG	n/a	MNC	Agri-business / industry	No	International	n/a	Multi-national corporation providing agricultural chemicals (pesticides), seeds and biotechnology solutions to the EU agricultural sector.	https://www.bayer.com/
46	QSI		SME	Beekeepers	No	International	Germany	International network of private laboratories for analysis of honey products.	https://www.qsi-q3.com/
47	Eurofins		SME	Beekeepers	No	International	Germany	International network of private laboratories for analysis of honey products.	https://www.eurofins.com/
48	EvaCrane Trust	n/a	NGO	Beekeepers	No	International	UK	Trust funding and supporting bee and beekeeping research and collection, collation and dissemination of bee related science and research worldwide.	https://www.evacranetrust.org/
49	APISERVICES	n/a	SME	Beekeepers	No	International	?	Online platform offering beekeeping consultancy and network of bee sector services	https://www.apiservices.biz/en/
50	GTV Apiculture	SNGTV	NGO	Bee health interests (scientists/professionals)	No	National	France	Association of independent French veterinary consultants, concerned with animal and public health issues.	https://www.sngtv.org/
51	German Professional Beekeepers Association	DBIB	NGO	Beekeepers	No	National	Germany	National beekeepers (professional) association (Deutsche Berufs- und Erwerbsimkerbund)	https://berufsimker.de/
52	National Union of French Beekeepers	UNAF	NGO	Beekeepers	No	National	France	National beekeepers association (Union Nationale de l'Apiculture Française)	www.unaf-apiculture.info
53	Finnish Beekeepers Association	n/a	NGO	Beekeepers	No	National	Finland	National beekeepers association (Suomen Mehiläishoitajain Liitto r.y.)	https://www.mehilaishoitajat.fi/liitto/in-english/
54	Danish Beekeepers Association	n/a	NGO	Beekeepers	No	National	Denmark	National beekeepers association (Danmarks Biavlerforening)	https://www.biavl.dk/
55	Swedish Professional Beekeepers Association	n/a	NGO	Beekeepers	No	National	Sweden	National beekeepers association (Bodlingsföretagarna)	http://www.bodlingsforetagarna.se/
56	National Union of Italian Beekeepers	n/a	NGO	Beekeepers	No	National	Italy	National beekeepers association (Unione Nazionale Associazione Apicoltori Italiani)	http://www.mieliditalia.it/
57	Central Association of Bee-Keepers	CABK	NGO	Beekeepers	No	National	UK	Educational charity to promote and further the craft of beekeeping (scientists and beekeepers)	https://www.cabk.org.uk/
58	British Beekeepers Association	BBKA	NGO	Beekeepers	No	National	UK	National beekeepers association	https://www.bbka.org.uk/
59	Bee Farmers' Association		NGO	Beekeepers	No	National	UK	National professional beekeepers association	https://beefarmers.co.uk/
60	Swiss Beekeepers Associations	APISUISSE	NGO	Beekeepers	No	National	Switzerland	National beekeepers association	https://www.bienen.ch/organisationen/apisuisse.html
61	Slovenian Beekeepers Association	n/a	NGO	Beekeepers	No	National	Slovenia	National beekeepers association	http://www.czs.si/
62	German Beekeeping Association	DIB	NGO	Beekeepers	No	National	Germany	National beekeepers association	https://deutscherimkerbund.de/
63	Confederation of the Bulgarian Beekeepers	n/a	NGO	Beekeepers	No	National	Bulgaria	National beekeepers association	https://cbb.bg/
64	National Federation of Portuguese Beekeepers	FNAP	NGO	Beekeepers	No	National	Portugal	National beekeepers association	http://fnap.pt/
65	Belgian beekeeping federation		NGO	Beekeepers	No	National	Belgium	National beekeepers association	http://www.fab-bbf.be/
66	Federation of Beekeepers of Ireland Associations	FIBKA	NGO	Beekeepers	No	National	Ireland	National beekeepers association	https://irishbeekeeping.ie/
67	National Farmers Union (UK)	NFU	NGO	Agri-business / industry	No	National	UK	National farmers union	https://www.nfuonline.com/
68	Dutch Beekeepers' Association	NBV	NGO	Beekeepers	No	National	Netherlands	National beekeepers association	https://www.bijenhouders.nl/

69	Professional association Dutch beekeepers		NGO	Beekeepers	No	National	Netherlands	National professional beekeepers association	https://www.beroepsimkers.nl/en/11-english/general/2-professional-association-dutch-beekeepers.html
70	Utrecht Beekeepers' Association	n/a	NGO	Beekeepers	No	National	Netherlands	Regional beekeepers association	
71	Wageningen Environmental Research	WUR	RI	Public / environmental interests	No	National	Netherlands	Research institute, conducting research into various aspects affecting bee health	https://www.wur.nl/expertises-dienstverlening/onderzoeksinstituten/Environmental-Research-1.htm
72	Clinique Vétérinaire des Mazets	n/a	SME	Bee health interests (scientists/professionals)	No	National	France	Veterinary services for beekeepers	https://www.votreveto.net/cliniquedesmazets/contact/default.aspx?code=4383&type=veto
73	Réseau biodiversité pour les abeilles (The Biodiversity Network for Bees)	RBA	NGO	Bee health interests (scientists/professionals)	No	National	France	Network to promote importance of the food resource for bee health, and to improve the floral offer in French territories	https://www.reseau-biodiversite-abeilles.fr/
74	Benaki Phytopathological Institute	BKI	RI	Bee health interests (scientists/professionals)	No	National	Greece	Research institute for scientific studies in plant health and plant protection, particularly risk assessments for plant protection products and in honeybee product residues and consumer safety.	https://en.bpi.gr/
75	French National Centre for Scientific Research	CNRA	RI	Bee health interests (scientists/professionals)	No	National	France	Leading research institution, with research on neurobiology and bee health aspects (varroa, pesticides).	http://www.cnrs.fr/en/cnrs
76	Groupe­ment de Défense Sanitaire Apicole de la Sarthe (Sarthe Apiary Health Defence Group)	GDSA	NGO	Bee health interests (scientists/professionals)	No	National	France	Association and network for local bee sector interests to ensure health bee colonies	https://www.abeilles72.org/
77	French Agency for Food, Environmental and Occupational Health & Safety	ANSES	PB	Bee health interests (scientists/professionals)	No	National	France	Network of reference and research laboratories located throughout France, conducting activities in three major areas: animal health / well-being, food safety and plant health.	https://www.anses.fr/en
78	Landesbetrieb Landwirtschaft Hessen	LLH	PB	Agri-business / industry	No	National	Germany	State agriculture educational and advisory institution of the State of Hesse.	https://llh.hessen.de/
79	Julius Kühn-Institut Germany	JKI	RI	Public / environmental interests	No	National	Germany	Federal Research Centre for Cultivated Plants in Germany, with Institute for Bee Protection.	https://www.julius-kuehn.de/en/bs/
80	Carreck Consultancy		SME	Beekeepers	No	International	UK	Bee advisory service	https://www.facebook.com/CarreckBees/
81	Austrian Agency for Health and Food Safety	AGES	PB	Public / environmental interests	No	National	Austria	AGES supports Austrian federal ministries in questions relating to public health, animal health, food safety, medical and drug safety, food security and consumer protection.	https://www.ages.at/en/ages/basics/
82	PianaRicerca	n/a	SME	Beekeepers	No	National	Italy	Consultancy specialized in the field of beekeeping	http://www.pianaricerca.it/
83	Veto Pharma	n/a	SME	Beekeepers	No	International	France	French pharmaceutical company that develops, produces, and distributes innovative products to support honey bee health.	https://www.veto-pharma.eu/
84	Lega	n/a	SME	Beekeepers	No	International	Italy	Enterprise producing and supplying beekeeping equipment	https://www.legaitaly.com/en
85	Lyson	n/a	SME	Beekeepers	No	International	Poland	Enterprise producing and supplying beekeeping equipment	http://lyson.eu/
86	Intertek	n/a	SME	Beekeepers	No	International	?	International network of private laboratories for analysis of honey products.	https://www.intertek.com/food/testing/honey-analysis/
87	Consorzio Nazionale Apicoltori (Italian National Consortium of Beekeepers)	CONAPI	NGO	Beekeepers	No	National	Italy	Largest national beekeepers cooperative in Italy, following full supply chain.	https://conapi.it/en/
88	National Bee Breeding Association (Bulgaria)		NGO	Beekeepers	No	National	Bulgaria		https://www.nrap-bg.org/main.php
89	Bulgarian Organic Foods Ltd.	n/a	SME	Beekeepers	No	National	Bulgaria	Producers of organic honey and bee products	https://natural-honey.eu/about-us
90	Pollenity	n/a	SME	Beekeepers	No	International	Bulgaria	Enterprise developing and producing smart technologies and equipment for beekeeping	https://pollenity.com/about/
91	Confederation of Portuguese Farmers	CAP	NGO	Agri-business / industry	No	National	Portugal	Represents around 250 agricultural organizations throughout Portugal.	https://www.cap.pt/en
92	Dutch Crop Protection Association (Nefyto)	Nefyto	NGO	Agri-business / industry	No	National	Netherlands	Organization for producers of chemical & biological crop protection products for the Dutch market	https://www.nefyto.nl/nefyto-english
93	Direcção-Geral de Alimentação e Veterinária (Portuguese National Authority for Animal Health)	DGAV	PB	Public / environmental interests	No	National	Portugal		
94	Hiveeyes		NGO	Beekeepers	No	International		Developers of beehive monitoring infrastructure platform and toolkit based on affordable hardware, wireless telemetry and modern software.	https://hiveeyes.org/
95	BEEXML	n/a	NGO	Bee health interests (scientists/professionals)	No	EU	n/a	Collaboration platform for the standardization of the exchange of data about bees and beekeepers	http://beexml.org/beexml/
96	Ecosystem Services Partnership	ESP	NGO	Bee health interests (scientists/professionals)	No	International	n/a	Worldwide network to enhance the science, policy and practice of ecosystem services for conservation and sustainable development	https://www.es-partnership.org/
97	Observatory of Mortalities and Impairments of the Honey Bee	OMAA	PB	Bee health interests (scientists/professionals)	No	National	France		
98	Experimental Zooprophy­lactic Institute	IZSLT	PB	Bee health interests (scientists/professionals)	No	National	Italy	Public health control institution for the Latium and Tuscany Regions (Central Italy), focus on animal health and breeding incl. bees.	http://www.izslt.it/eng/
99	Mountain Research Center (Centro de Investiga­ção de Montanha)	CIMO	RI	Bee health interests (scientists/professionals)	No	National	Portugal	Multidisciplinary research unit focused on Mediterranean mountain issues based at the Polytechnic Institute of Bragança, Portugal	http://www.cimo.ipb.pt/web/index.php?r=site/about
100	British Bee Veterinary Association	BBVA	NGO	Bee health interests (scientists/professionals)	No	National	UK	Vet association to promote awareness and education in bee health, disease, management and research across the veterinary profession	https://britishbeevets.com/

Appendix 2: Interview topic guide

IN DEPTH INTERVIEWS WITH 40 STAKEHOLDERS

Introduction
<i>Introducing the researchers and explaining the purpose of the interview</i>
<i>Informed consent procedure</i>
<p>- Introduction:</p> <p>Explain the purpose of the interview: investigate the views and opinions of stakeholders about 1) beekeeping in the EU, 2) connections and relationships with other stakeholders, 3) what characterises a healthy bee colony and 4) current and future honey beekeeping models in the EU.</p> <p>Confidentiality is guaranteed: no names of persons, organisations or companies in the report. The conversation is audio-recorded and will be transcribed to facilitate reporting.</p> <p>Reporting: the executive summary of a report based the interviews will be distributed among the participants.</p>

Interviewer notes: Prior to conducting this interview the participant should be sent an email with the study information and consent form and read the following.

Introduction script:

This interview will take approximately 2 hours to complete. In order to insure that all information will remain confidential, I will not record your name. I will only use a code for this interview when noting your answers.

Your name or any details that might identify you will not be published and transcripts of this call will be securely stored electronically. All personal information you provide will be kept confidential, anonymous and treated according to the EU regulations on personal data ownership.

Just to remind you, your participation is voluntary and you may refuse to participate at any time and do not need to give me a reason. You will not be paid for participating in this study and there will be no cost or risk for you to participate. If you would like a copy of the summary report for this study please let me know at the end of the interview and I will add your name to a list that I will maintain separately. If you have questions later about this study, please contact me at <insert interviewer phone number>.

Please can you confirm you have received and read the study information sheet and consent form. Consent form sent and received.

☐ Yes

I would like to record this interview. Do you agree to continue and participate in this study and that this interview is recorded?

☐ Yes ☐ No (if no terminate interview)

Do you have any questions about the project, or this conversation before we begin?

Participant consent needs to be obtained before conducting the interview. Two informed consent forms must be completed. The original is kept by the investigator for a period of 25 years, the copy is given to the participant.

Interviewee: (name and institution)

Date:

Participant code:

Interviewer note: Respondent names should not be recorded here. Please use the spreadsheet provided to record respondent names against the codes provided e.g. T4.1_1a_x (predetermined numeric code)

Topic 2: Transfer of knowledge and information about honey bee health

Gaining insight into the knowledge networks that exist between stakeholders, especially concerning honey bee health. Gaining insights into connections within and outside of the EU Bee Partnership.

Suggested script: I would now like to talk to you about your connections within and outside of the EU Bee Partnership.

1 In the past year, did you turn to other members of the EU Bee Partnership (see the list) for **technical advice** about specific problems relating to honey bee health (such as varroa, pesticides, inadequate nutrition, pathogens, etc.)?

Interviewer note: technical advice/knowledge here is defined as technical support to solve problems.

1a If so, can you provide names for all those you have contacted, and the organization they work for? Probe to list all contacts they can think of. (Should be no more than 12)

1b For all of the people you just mentioned, can you indicate the three people you have had the most contact with?

Interviewer note: Record the order and the names of the three most contacted people and ask following questions for each of these named people. If they can only name one or two, record this.

Name 1:

Name 2:

Name 3:

1c How often have you been in contact with (*name*) in the last year? 1= very occasionally (once in last year); 2 = occasionally (every 6 months); 3 = frequent (every month); 4 = very frequent (weekly)

1d How did you contact them? 1 = meetings in person; 2 = conference in person; 3 = by email; 4 = by telephone; 5 = other (please note)

1e What technical knowledge did you discuss / exchange?

1f Concerning technical knowledge about honey bee health, did you give information, receive information, or both?

2 In the past year, did you turn to anyone outside the EU Bee Partnership for **technical advice** about specific problems relating to honey bee health (such as varroa, pesticides, inadequate nutrition, pathogens, etc.)?

Interviewer note: technical advice/knowledge here is defined as technical support to solve problems.

2a If so, can you provide names for **all** those you have contacted, and the organization they work for? Probe to list all contacts they can think of

Interviewer note: Record the order and all names given.

Repeat three times for names 1 2 and 3

2b For all of the people you just mentioned, can you indicate the four people you have had the most contact with?

We intend to contact these people for an interview. Could you provide their contact details?

Interviewer note: Record the order, names, and contact details of the three most contacted people and ask following questions for each of these named people. If they can only name one or two, record this.

Name 1: Email:

Name 2: Email:

Name 3: Email:

Name 4: Email:

2c How often have you been in contact with (*name*) in the last year? 1= very occasionally (once in last year); 2 = occasionally (every 6 months); 3 = frequent (every month); 4 = very frequent (weekly)

2d How did you contact them? 1 = meetings in person; 2 = conference in person; 3 = by email; 4 = by telephone; 5 = other (please note)

2e What technical knowledge did you discuss / exchange?

2f Concerning technical knowledge about honey bee health, did you give information, receive information, or both?

2g For each of these 4 names how influential would you rate them?
1 = not influential; 2 = somewhat influential; 3 = very influential

2h How much do you trust the technical advice you give or receive? 1 = do not trust at all; 2 = somewhat trust; 3 = fully trust

Repeat three times for names 1, 2, 3 and 4

Appendix 3: List of organizations and abbreviations

These are the organizations identified as part of actor interviews and included in the actor network analysis

Organisation name	Acronym
ANSES France	ANSES
Aarhus University	AARHU
Agence Nationale de la Recherche (ANR)	ANR
Agence fédérale pour la sécurité de la chaîne alimentaire	AFSCA
Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail	ANSES
Istituto Zooprofilattico Sperimentale del Lazio e della Toscana M. Aleandri	IZSLT
Apimondia	APIMO
Apis Flora Industrial e Comercial Ltda	APISF
Arista Bee Research	ARISTA
Association of Veterinary Consultants	AVC
Austrian Agency for Health and Food Safety	AGES
Austrian Beekeepers Association	ABA
B-GOOD	B-GOOD
BEEVET	BEEVET
Bayer Agriscience	BAYER
Bee Health 2020 LATAM	BHLAT
BeeLife	BEELIF
BeeOdiversity	BEEODI
Bejo Seed Company	BEJO
Benaki Phytopathological Institute	BENAKI
Bundesministerium für Gesundheit	BMG
Carreck Consultancy Ltd	CARREC
Centre apicole de recherche et d'information (CARI)	CARI
Clinique Vétérinaire des Mazets	CVM
Coloss	COLOSS
Copa Cogeca	COPACO
Corteva Agriscience	CORTEV
Council for Agricultural Research and Agricultural Economy Analysis (CREA)	CREA
Danish Beekeepers Association	DABA
Direction départementale de la protection des populations (DDPP)	DDPP
Directorate-General for Agriculture and Rural Development	DG-AG
Directorate-General for Environment	DG-ENVI
The Directorate-General for Health and Food Safety	DG-SANT
Dutch Beekeepers Association	DUBA
Dutch Ministry of Agriculture	MLNV
EU Reference Laboratory	EUREF
Eurofins Scientific	EUROFI
European Agricultural Machinery Industry Association	CEMA
European Professional Beekeepers Association	EPBA

European Commission	EC
European Committee for Standardization (CEN)	CEN
European Cooperation in Science and Technology	COST
European Crop Protection Association	ECPA
European Food Safety Authority	EFSA
FAO	FAO
The French National Center for Scientific Research (CNRS)	CNRS
GAEC Freslon Beekeepers	GAEC
GIE Bretagne	GIEB
GTV Apiculture	GTVAP
German Institute for Standardization (DIN)	DIN
Institut Technique et Scientifique de l'Apiculture et de la Pollinisation (ITSAP)	ITSAP
Institute of Biology, Karl-Franzens-Universität Graz	UNIGRAZ
Institutul de Cercetare Dezvoltare pentru Apicultura	ICDA
International Biocontrol Manufacturers Association	IBMA
International Confederation of European Beet Growers	CIBE
International Honey Commission	IHC
International Organization for Standardization (ISO)	ISO
Julius Kühn-Institut Germany	JKI
Landesbetrieb Landwirtschaft Hessen Germany	LLH
Observatoire des Mortalités et des Affaiblissements de l'Abeille mellifère (OMAA)	OMAA
Oniris Veterinary School	ONIRIS
Pesticide Action Network	PAN
Portugal National Beekeeping Federation (FNAP)	FNAP
PoshBee	POSHBEE
Precision Med Expo & Summit	PRESME
Ruakura Research Centre New Zealand	RUAKU
Réseau biodiversité pour les abeilles	RBA
Slovenian Beekeepers' Association	SBA
Société Nationale des Groupements Techniques Vétérinaires (SNGTV)	SNGTV
Swedish Board of Agriculture	SBA
UK National Farmers Union	NFU
Union nationale de l'apiculture française	UNAF
Unione Nazionale Associazione Apicoltori Italiani	UNAAPI
University of California San Diego	UC-SAND
Programme sanitaire d'élevage (PSE)	PSE
Wageningen Environmental Research	WER
Wageningen Plant Research	WPR
Wageningen University and Research	WUR
l'Institut national de recherche pour l'agriculture, l'alimentation et l'environnement	INRAE

Appendix 4: Future Workshop operational table

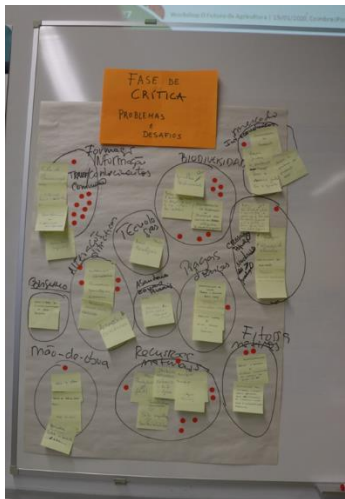
B-GOOD Future Workshop – Operational Schedule Suggested format for workshop (March 2020)


Materials to be prepared in advance and used in the workshop:

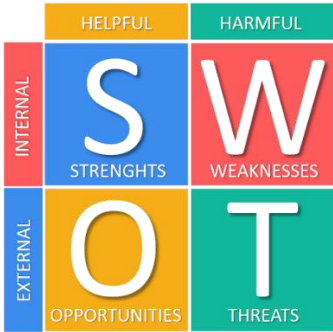
Item no.	Description	Check
1	Introductory presentation	<input type="checkbox"/>
2	Projector	<input type="checkbox"/>
3	Flipchart stands and paper pads, white-boards or pin-boards (at least 2 boards)	<input type="checkbox"/>
4	Printed A4 sheets for the ice-breaker “human bingo” (enough for all participants)	<input type="checkbox"/>
5	Post-it notes (several packs in different colours with and different sizes e.g. 5cm square and large rectangular)	<input type="checkbox"/>
6	Prepared flipchart sheets for different phases of the workshop e.g. Critique phase, Fantasy Phase 1, SWOT matrix sheets (Fantasy Phase 2)	<input type="checkbox"/>
7	Prepared colour cardboard flower petals and hearts (Fantasy Phase 1)	<input type="checkbox"/>
8	Camera (for taking images of workshop outputs)	<input type="checkbox"/>
9	Consent forms for image use and participation in future research (enough for all participants)	<input type="checkbox"/>
11	Pens (enough for all participants), flipchart or white-board marker pens, spare paper (pads)	<input type="checkbox"/>
14	Reimbursements for participants travel expenses (where appropriate)	<input type="checkbox"/>
15	Sticky tape, pins, sticky tack (for putting up images / notes etc.)	<input type="checkbox"/>
16	Voting stickers (sheets of round dots / stars of different colours)	<input type="checkbox"/>


Timing	Sequence/objectives	Content	Methods	Who is responsible / facilitator(s)
Arrival time (e.g. 09.00)	Preparation Create relaxing, creative and informal atmosphere at venue	<ul style="list-style-type: none"> Prepare workshop room 	Arrange chairs and tables, set-up refreshments for breaks Organise materials: flipchart stand, paper, pens, white-boards, pin-boards, Post-It notes, flower and petals etc.	<i>Insert initials e.g. JHW</i>
		Introduction Phase		
Start time (e.g. 09.30) Allow 30 mins.	Introduction to workshop Objectives: Explain what the B-GOOD project is about and why participants are here today. Frame discussions by explaining B-GOOD research objectives. Explain the participatory approach. Provide an opportunity for participant to express interests and aims. Explain the different activities during the workshop. Outline follow up activities and reasons to participate in further research. Outputs: Build trust between facilitators and	<ul style="list-style-type: none"> Use standard presentation to introduce B-GOOD project <ol style="list-style-type: none"> Outline aims of project to enhance and automate HSI. Overview of automated monitoring and brief introduction BEEP Base and BEEP App. How bee keepers will be involved in B-GOOD, e.g. Tier 2 field studies Introduce facilitators / research collaborators / observers in the room. Overview of workshop method, activities and its aims, and when breaks will be taken etc. Rules of conduct (ground rules): three golden rules Outline how will the workshop be followed-up with planned dissemination and research activities e.g. workshop report and Tier 2 field studies If unable to answer questions during workshop explain how these will be followed up. 	<ol style="list-style-type: none"> Give PowerPoint presentation (ppt) - <i>used throughout the workshop to remind participants of timings and activities for each phase.</i> Show agenda on flipchart sheet Show rules of conduct on flipchart sheet <ol style="list-style-type: none"> We do not interrupt each other We do not attack the person (go after the ball – no personal attacks) We keep it brief (give other people a chance to speak) Take notes of participant initial questions around B-GOOD themes. If unable to answer immediately, questions should be noted and answered during follow-up activities e.g. workshop report, newsletters, future workshops, presentations etc. (<i>make notes throughout the workshop</i>). 	XX / XX


	participants. Reassure participants that any questions, issues or opportunities will be followed up.			
10 mins.	<i>Warm-up exercise (if necessary)</i> Create an informal and welcoming environment. Build trust among facilitators and participants.	<ul style="list-style-type: none"> Get participants to move and introduce themselves to each other. Gather information on common facts that are relevant to B-GOOD e.g. 'who uses smart phone apps or who has a beehive?' 	<ol style="list-style-type: none"> Hand out sheets to all participants for warm-up activity - 'Human Bingo' Ask questions about things participants have in common and note number of participants 	XX / XX
		Critique Phase		
30 mins.	<p>Critique phase</p> <p>Objective: Allow participants to express concerns and frustrations of bee keeping today - "blow off steam" phase</p> <p>Output: identify main themes of concern related to two key topics</p> <ol style="list-style-type: none"> Bee colony health Sustainable bee keeping (socially / economically) e.g. upholding cultural and economic value 	<ul style="list-style-type: none"> Start critique phase by asking participants question below then gather comments and create themes Participants to focus on current situation in relation to beekeeping in Europe Focus on two topics (use images or cards with words) <ol style="list-style-type: none"> Maintaining healthy bee colonies Ensuring honey production / bee services are sustainable and valued (economical and culturally) Discuss comments to understand meaning and associations Identify key themes by getting participants to vote <p>"Based on your daily work experience what are your main concerns, problems or challenges that you experience in the honey bee keeping sector today?"</p>	<ol style="list-style-type: none"> Show question written on a flipchart sheet Hand-out post-its to participants Give 5 minutes for participants to write individually, their problems, challenges, issues, concerns and frustrations on post-its. Ask them to come up or collect post-its to add them to flipchart sheet. Allow 15 minutes for facilitator to group / structure 'critique points' in to themes. Use post-it notes for theme headings Discuss post-its with participants to organize themes / comments. Hand out stickers for voting Allow 5 minutes for participants vote (3 votes per person) to prioritize key themes of concern. 	XX / XX

		 <p><i>Critique themes and voting: example from Portugal</i></p>		
10 mins.	<i>Break</i>		<ol style="list-style-type: none"> 1. Refreshments set during preparation phase 2. Prepare for Fantasy phase 1, set-up flipchart, petals and flower heads etc. 	
		Fantasy Phase 1		
30 mins.	Fantasy phase 1: Envisage Objectives: Participants to explore what their 'ideal / fantasy' future for bee keeping would look like, if there were no constraints. Outputs: Fantasy ideas clustered into themes. Identification of key themes for the future, selecting 2-4	<ul style="list-style-type: none"> • Ask participants the questions below about how they see the future, 10 years from now • Use the flower petals to gather participant ideas about the future of farming. • Discuss ideas / comments to understand meaning and associations so that flower petals can be organized (by facilitators) into themes presented by flower heads • Participants to vote on themes to identify key plausible themes for the future of farming 	<ol style="list-style-type: none"> 1. Show questions written on a flipchart sheet 2. Hand out flower petals and ask participants to write out ideas about the future of farming on petals 3. Set the time frame, 10 years from now 4. <i>Allow 10 minutes</i> for participants to write future ideas (no limitations - however farfetched!). 	XX / XX

	<p>themes to discuss in next phase.</p>	<p><i>“What would the ideal future of honey bee keeping sector look like to you?”</i></p> <p><i>“What would you like to see, if there were no constraints, plenty of resources, people willing to pay and no restrictive laws...?”</i></p> <p>Since themes will be used in the <i>Fantasy phase 2</i> and in the <i>implementation phase</i>, suggest selecting 2-3 themes that are interconnected and related to healthy bee colonies and maintaining bee services (i.e. exclude themes completely alien to these and any stand-alone themes).</p>  <p><i>Fantasy futures, example from Portugal</i></p>	<ol style="list-style-type: none"> 5. Allow 15 minutes to gather and discuss ideas. Facilitators to prompt and group ideas (<i>petals</i>) in to themes (<i>flower heads</i>). Briefly discuss ideas and themes with participants. 6. Allow 5 minutes for participants to vote on key themes (3 votes per person) <ol style="list-style-type: none"> a. All participants, including facilitators, should agree on 2-4 key future themes. Any ideas beyond plausibility removed from the discussion. 	
		Fantasy Phase 2		
10 mins	<p><i>Fantasy phase 2: Feasibility/realisation Part 1</i></p> <p>Objectives: Reflect on themes and identify factors that are potential forces for</p>	<ul style="list-style-type: none"> • Introduce PESTEL to identify forces of change, working in small groups. • Start by asking question below. <p>PESTEL stands for:</p>	<ol style="list-style-type: none"> 1. Introduce PESTEL 2. Show question and PESTEL written on a flipchart sheet 3. Hand-out post-its to participants 	

	<p>change. Provide inputs and feedback for other WPs.</p> <p>Outcome: Identification of driving forces (factors) of change for the future, using PESTEL. Inputs for SWOT.</p>	<p>P – Political E – Economic S – Social T – Technological E – Environmental L – Legal</p> <ul style="list-style-type: none"> Participants to discuss one theme, from phase 1, in each group writing out writing comments on coloured post-its. <p><i>“Thinking about the future of bee keeping, what factors do you think might drive positive or negative changes?”</i></p>	<ol style="list-style-type: none"> Divide participants into groups (4-5 in each group), each group to discuss one of the themes identified in fantasy phase 1 Allow 10 minutes for participants to discuss themes and write comments on post-its 	
20 mins	<p><i>Fantasy phase 2: Feasibility/realisation Part 2</i></p> <p>Objectives: Reflect on PESTEL factors and carry out SWOT analysis.</p> <p>Outcome: Identification of PESTEL factors within SWOT, matrix highlighting opportunities that promote or barriers that hinder healthy and sustainable bee colonies in the future.</p>	<ul style="list-style-type: none"> Introduce SWOT analysis and get participants to work in same groups Assign PESTEL factors and within SWOT matrix Participants to explain their analysis and add comments to SWOT flipchart sheet, for all to see 	<ol style="list-style-type: none"> Hand out SWOT matrix (printouts) to each group. Allow 10 minutes for participants to discuss in groups PESTEL factors and add post-its to SWOT matrix. Ask one representative from each group to come up and explain their SWOT analysis. Allow 10 minutes for brief group explanations (key points), and allow questions / open commenting by other participants from other groups. 	

		 <p>SWOT matrix: example from Italy</p>		
10 mins.	Break		1. Prepare for Implementation phase, set-up flipchart / board.	
		Implementation phase		
20 mins	<p>Implementation / action plan phase</p> <p>Objectives: Reflect on PESTEL & SWOT and determine means to achieve desired futures.</p> <p>Outcome: Formulation of an action plan to achieve desired a futures, one that is plausible to ensure healthy and sustainable bee colonies.</p>	<ul style="list-style-type: none"> Participants begin to define and structure an action plan on how they see their desired future for bee keeping. Participant groups to discuss and write on post-its: who does what, when and what resources are needed to achieve their desired futures. Suggest asking: <i>Starting with yourself – what can you do, when can you do it, what do you need, who can support them?</i> Facilitators and participants (open discussion) to formulate action by adding comments to flipchart sheet, breaking down the action plan into stages (beginning with themselves and expanding out from individuals to organizations, authorities and society). 	<ol style="list-style-type: none"> Participants still working in groups Get participants to write ideas on coloured post-its how they see their desired futures being achieved. Start them off by identifying what they can do, and what resources they would need etc. Set-up flipchart with 4-5 action plan stages and key questions to help formulate action plan <ol style="list-style-type: none"> Who? What? When? Resources needed? 	

		 <p><i>Action plan phases: example from France</i></p>		
		Wrap-up and Evaluation Phase		
15 mins	<p>Reflection / wrap-up</p> <p>Objectives: Reflect on action plan; gain feedback from participants on what they anticipate from project.</p> <p>Outcome: feedbacks, questions for project partners (researchers / WPs). What information, activities, or developments would they like to see coming from B-GOOD project.</p>	<ul style="list-style-type: none"> Facilitators / participants to reflect action plans. Participants asked about outputs of the day and any issues raised: <ul style="list-style-type: none"> How the day went? Positive / negative aspects? Suggestions to improve etc. Do they believe B-GOOD topics are of concern for them? What feedback / information would participants want from researchers? Are there uncertainties they would like address / information they would really like to have made available to them etc.? 	<ol style="list-style-type: none"> Using prepared cards (0 – 5 – 10 balance scale) ask participants to vote (using coloured stickers) on the following questions <ol style="list-style-type: none"> Running of the workshop? Balance of contributions between participants and B-GOOD researchers (facilitators) Concern with B-GOOD topics? Ask open questions, if time <ol style="list-style-type: none"> Suggestions for improvement? What feedback / additional information you would like to have from us as scientists in the B-GOOD project? Take notes of farmers questions and expectations for future relationships. 	

5 mins	<p>Follow-up</p> <p>Objectives: To inform participants about what happens after the workshop</p> <p>Outcome: Start a dialog with participants and develop mechanisms to follow-up.</p>	<ul style="list-style-type: none"> • Explain to participants what is next and how will the workshop be followed up 	<ol style="list-style-type: none"> 1. Tell participants follow-up activities <ol style="list-style-type: none"> a. Invitation to participate in Tier 2 field trials or further research / workshops b. Distribution of workshop summary report (ensure transparency of process) c. Follow-up / respond to specific questions raised by participants d. Newsletter Multi-Actor Groups B-GOOD with information and results from other workshops in other countries e. 	
End	<i>Lunch / drinks?</i>			