MSc Thesis

Perspectives on mitigating wild bee and honey bee decline in the Netherlands:

Identifying conflicts and common ground

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Perspectives on mitigating wild bee and managed honey bee decline in the Netherlands: Identifying conflicts and common ground

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Abstract

Declining wild bee and managed honey bee populations have raised concern about a potential pollination crisis in the Netherlands. Such a crisis would have severe economic and ecological implications. In the light of this issue, a debate is ongoing in the Netherlands regarding how this bee decline should be mitigated. A prominent part of this debate is a stalemate situation regarding the question whether neonicotinoid pesticide use should be banned or not. This thesis seeks to unravel the complex debate surrounding bee decline. In doing so the thesis aims to reveal opportunities for broadly supported initiatives to mitigate bee decline, as well as ways to solve any conflict and stalemate situations that can be found in the debate. Three research questions were answered to that end: (1) Which stakeholders can be identified in the debate? (2) Which areas of conflict and common ground can be identified in the debate? (3) Is integrative negotiation a suitable conflict resolution strategy for the conflicts identified in the debate? Data were collected through desk research and 15 stakeholder interviews. These data were analysed through a stakeholder analysis and an argumentative discourse analysis. The results show that all 15 identified stakeholders can find common ground in their belief that the health of both wild bees and honey bee populations benefit from increasing the availability of biodiverse flower-rich areas in the Netherlands. The main conflicts that were identified concern whether or not the use of neonicotinoid pesticides by Dutch farmers should be banned, and whether or not wild bees and honey bees compete for food sources. The integrative negotiation strategy for conflict resolution is unlikely to be fruiful for either of these conflicts. For the neonicotinoid conflict, third party intervention by an authoritative body that can enforce a decision on this matter seems the only viable solution to this conflict. For the honey bee and wild bee competition conflict, joint initiatives of stakeholders to promote bee habitat increase can solve the conflict.

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List of abbreviations

BVNI – Professional Association for Dutch Beekeepers
CLM – Center for Agriculture and Environment
CTGB – Dutch Board for the Authorisation of Plant Protection Products and Biocides
EC – European Commission
EFSA – European Food Safety Authority
EU – European Union
LTO – Dutch Agriculture and Horticulture Association
Ministry of LNV – Dutch Ministry of Agriculture, Nature and Food Quality
NBV – Dutch Beekeeper Association
N&M – Natuur&Milieu
PPP – Plant Protection Product

1. Introduction

For the last decade, there has been a growing concern for health and stability of managed honey bee colonies and more recently of wild bee populations in the Netherlands. (Potts et al. 2010; Ministerie van LNV 2017; de Groot 2017) In the past two decades, many different studies have investigated possible causal relations between bee mortality and suspected pressures. (e.g. Kremen, Williams, and Thorp 2002; Biesmeijer et al. (2006), Smith et al. (2013), and Scheper et al. (2014)) Despite these efforts to provide clarity on the factors that are causing bee mortality a level ambiguity and controversy remains, which can be explained by the complex nature of particularly wild bees as a study subject. This fuels a heated debate regarding bee mortality and how it should be addressed. Particularly the debate surrounding the use of neonicotinoid pesticides in the Dutch agriculture sector, and whether or not the use of these substances negatively impacts bee populations in the Netherlands has remained heated and unchanged over the past few years. Environmental NGOs (e.g. the Dutch Butterfly Association), as well as certain scientists (e.g. Prof. Jeroen van der Sluijs) have advocated a ban on the use of certain neonicotinoid substances since 2009. (Molenaar 2009) This call for a ban of these neonicotinoid substances can still be found today in, for example, the campaigns of Greenpeace. (Greenpeace Nederland 2017a) Conversely, farming organisations and pesticide producers have been arguing against such a ban. They claim that, based on sound science, the causal relationship between bee mortality and the use of neonicotinoid substances, provided that they are applied conform instructions provided by the manufacturer, has not been sufficiently proven, and that other causes have a far bigger impact. (LTO 2013; Wildenbeest 2013) Though mortality rates of managed honey bee colonies have decreased after 2012, the earlier mentioned campaigns proof that Dutch society does not perceive the bee mortality issue to be over. Attention has increasingly shifted from managed honey bees to wild bee species. Yet, within the debate about the mitigation of wild bee declines, the issue surrounding the desirability of a ban on neonicotinoids continues to be contentious. The unchanged and controversial nature of this neonicotinoid debate indicates a situation of stalemate. This suggests a lack of a broadly supported approach to combat bee mortality. Stakeholders have shown the ability to find common ground by cooperatively creating and signing the national bee strategy in January 2018. However, this broad support became debatable when in their press releases regarding the strategy some signatories mainly framed the strategy as a missed opportunity to ban neonicotinoid use. (Greenpeace 2018) The continuous engagement in this neonicotinoid stalemate takes up time and attention that could otherwise be invested in finding and executing measures on which stakeholders can agree. This is problematic because failure to address the pollinator declines in an effective and efficient manner could, in the worst case, lead to: (1) extinction of wild bee species and (2) inadequate numbers of managed honey bee colonies to provide required pollination services for the Dutch agriculture sector. This would have severe implications for the Dutch economy as well as Dutch ecosystems (Biesmeijer et al. 2006). Therefore, this research project seeks to expose if and how it would

be possible to move past this stalemate situation and to identify courses of action that are politically feasible, and effective in solving the bee mortality problem in the Netherlands.

1.1 Bee mortality

Since ancient times, pollinator species and flowering plants have been linked in their respective evolutionary processes. This process of co-evolution has resulted in an enormous diversity of flowering plants, as well as pollinator species. Through this evolutionary process many plant species became dependent on 'animal assisted pollination' for reproduction. Due to the importance of these pollinators for flowering plant types, pollinators are also important for human survival on the planet since some of these plants are now important crops that function as a source of human nutrition. (James and Pitts-Singer 2008)

1.1.1 Trends in honey bee winter mortality

One of the most specialised pollinator species that is specifically employed for the pollination of agriculture crops is the domesticated European honey bee (*Apis mellifera,* Linnaeus 1758) (referred to as honey bee from here onwards). (Hendrikx et al. 2009) The honey bee is the species that is generally used in the apiculture (beekeeping) sector. Within apiculture practices honey bee colonies are managed in hives. This allows beekeepers to use these colonies for aforementioned pollination services in agricultural areas, as well as for production of honey, wax, royal jelly, propolis and pollen. (Formato, Menegotto, and Jannoni-Sebastianini 2015) The managed honey bee is the species utilised in more than 90% of commercial pollination services (meaning pollination services provided by beekeepers), making it the most important animal pollinator for agriculture on the globe. (Genersch et al. 2010)

In the last decades, honey bee colonies in Europe and the US have been declining. Between 1961 and 2007 honey bee colonies dropped by 26.5% in Europe and by 49.5% in North America. (Vanengelsdorp and Meixner 2010) In the Netherlands, particularly high winter mortality numbers have worried scientists, politicians and bee keepers. Winter mortality of managed honey bee colonies is not considered problematic in itself. A percentage of 10% is considered to be normal as this was the colony loss baseline observed in European countries between 2000 and 2009. (Hendrikx et al. 2009) But, as figure 1 displays from 2006 till 2012 winter mortality percentages in the Netherlands regularly passed 20%, which was a big trigger for concern. (Compendium voor de Leefomgeving 2017) In 2013 a national 'action programme bee health' was published. In this action plan a broad variety of stakeholders and the Dutch government discussed and summarized action points they deemed necessary to create a healthier environment for honey bees. These action points were centred around four pillars, namely (1) crop protection agents; (2) disease and pests among bees ; (3) Availability of food and biodiversity; (4) beekeeping practices. (Ministry of Economic Affairs and Climate 2013) A formal evaluation of the action plan and its results has not taken place. But figure 1 shows decreased winter mortality percentages among honey bee colonies from

2013 onward. (Compendium voor de Leefomgeving 2017) This could indicate the action plan was successful. According to the Dutch Environmental Data Compendium (CLO) and the Dutch Beekeeper Association (NBV) the development can be ascribed to an improved ability of beekeepers to treat their colonies against Varroa mite. (Which correlate with pillar 2 and 4 of the action plan.) (Dommerholt 2017; Compendium voor de Leefomgeving 2017)

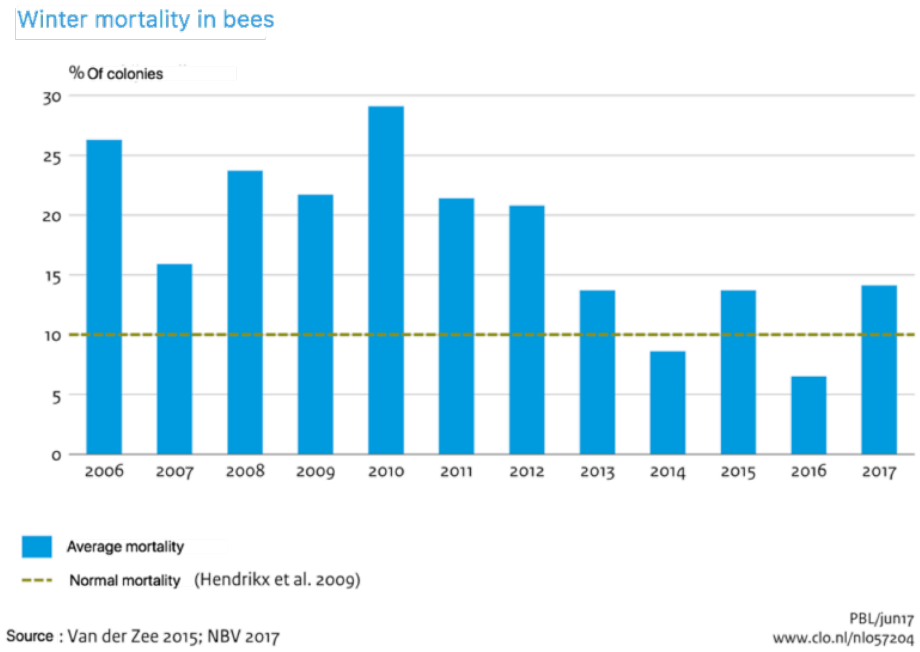


Figure 1. Percentages of winter mortality in managed honey bee colonies in the Netherlands.

1.1.2 Trends in wild bee decline

However, despite the declined winter mortality in honey bees, stakeholders do not consider the issue of bee decline in the Netherlands to be over. In recent years attention and concern has shifted from managed honey bees to the Netherlands' 357 native wild bee species. Out of these 357 wild bee species approximately 50% is on the National Red List, indicating that their existence in the Netherlands is considered to be threatened. (Peeters and Reemer 2003; Ministerie van EZ 2004; Ministerie van LNV 2017) Furthermore, based on historical records, a study by Biesmeijer et al. (2006) indicated a significant decline of bee species diversity in the Netherlands after 1980 compared to before 1980. Another similar study by Carvalheiro et al. (2013) found that the strongest decline in wild bee species richness in the Netherlands took place in the period between 1930 and 1990, when land use changed and intensified rapidly. But these declines stabilised, and for some species populations slightly reversed, in the period after 1990 when investments in conservation increased. Although that reversal of the decline was not nearly enough to compensate for the earlier losses. (Carvalheiro et al. 2013) Information on more recent trends in wild bee populations is not available. Mainly because monitoring the population trends of 357 distinct, but hard to distinguish, bee species proofs to be difficult. This gap leaves room for speculation and disagreement. In 2016, a flyer from the Dutch Crop Protection Association (Nefyto) claimed

'all is well with the bees'. The flyer named different developments to underpin this statement: the lower winter mortality in honey bees due to improved beekeeping practices; the increased awareness and attention for the issue throughout society; the creation of flower strips on farmlands, in municipalities and in people's gardens; and the attention for careful application of crop protection agents. (Nefyto 2016) In a response letter, NBV warned for optimism. They explained that though honey bees had benefited from improved beekeeper practices, wild bee populations do not benefit from such improvements. Instead, NBV argued, wild bees required a more healthy and biodiverse environment to thrive. The measures to realise such a biodiverse environment up to that point had merely been "a well-intended drop on a hot plate" in their perspective. (Dommerholt 2016) This response by NBV paired with the continuation of the debate about how to deal with bee mortality that continues to go on in the media (e.g. the news article by Deelder (2016)) and in the political sphere (e.g. a related plenary debate in September 2017 in the Dutch house of representatives (Tweede Kamer 2017)) shows that the debate and issue is not yet considered solved by Dutch society.

Another reason for the increased attention and concern for wild bee populations can be found in recent findings regarding the contribution of wild bees to crop pollination. For a long time, crop pollination services were mainly attributed to managed honey bees. But recent research reports in the Netherlands found that wild bee species often supplement the pollination service provided by managed honey bees. Thereby making a significant contribution to the quantity and quality of crop yields. Results of these reports showed wild bees were responsible for 18% of the total pollination in blueberries, 46% in strawberries, 60% in apples, and 62% in pears. Moreover, the studies found that increasing the amount of honey bees in the lot did not increase the quality and quantity of the yield. With wild bees, however, a strong link could be found between their abundance and diversity on the one hand, and the yield on the other. (De Groot et al. 2015, 2016) Due to the awareness of this considerable contribution of wild bees to the pollination of certain crops, wild bee species are perceived to have a clear economic value now. This is on top of the on top of their value for Dutch ecosystems. For some actors this new information on the economic value of wild bees increases the urgency and importance of conserving them.

1.1.3 Potential implications of further bee decline

As was pointed out in the previous paragraphs, both declines in managed honey bee colonies and wild bee populations are considered to be problematic by a variety of actors. They include academics (Potts et al. 2010), the Dutch government (Ministerie van LNV 2017), politicians (Blacquière, Van der Steen, and Cornelissen 2009; Leenders 2016), bee keepers, and environmental organisations (Greenpeace Nederland 2017; Natuurmonumenten 2017). The reason for their concern is that loss of animal pollination is associated with a variety of environmental and economic risks. Firstly, animal pollination is a requirement for successful reproduction of flowering plants in ecosystems. In turn, these flowering plants have their

own role in their respective ecosystems, for example as a source of nutrition or nesting sites for other organisms. So, loss of pollinators such as bees, and the pollination service they perform results in a declined reproduction of these plants, which can potentially result in a cascade of biodiversity loss in nature areas. (Pauw 2007) Secondly, as was explained before, pollination as an ecosystem service is of invaluable importance to the production of certain crop types. (Ratamäki et al. 2015) In 2005, the economic value of insect pollination was valued at €153 billion. (Potts et al. 2010; Ratamäki et al. 2015) The global annual market value of production directly linked to pollination services was valued between $235 billion- and $577 billion in 2015. (Potts et al. 2016) (This increase is likely due to the general trend of rising global crop productions and yields (FAO 2015)) Global agriculture output of 2011 was accumulated to be $2.4 trillion. (Alston and Pardey 2014) So, based on a very rough estimation one could argue that, globally, 10-20 percent of the economic value of agriculture would be at stake if pollinating species disappear. (Dirzo et al. 2014) Manual pollination methods (e.g. hand pollination), and mechanical pollination methods (e.g. pollen dusting) are available but have drawbacks. Pollen dusting is less effective compared to insect pollination since it results in lower quality and quantity of the pollinated crops. Hand pollination is effective, but very labour intensive, thus expensive. Resource limitations therefore compromise the economic feasibility of hand pollination as an alternative for insect pollination. (Knapp, Bartlett, and Osborne 2017)

Based on the earlier mentioned estimations of the economic value of insect pollination, and other estimations, researchers seem to agree that, should pollinators continue to decline on a global level, it will have a significant economic impact on the global food production sector. Implications for the production losses of many crop types could result in a loss of livelihoods, as well as a decrease of food security. (Ratamäki et al. 2015) Since fruit and vegetable production, a big sector in the Netherlands, is particularly dependent on pollination services, loss of pollination would have a significant impact on the Netherlands. The Dutch Agriculture and Horticulture Association (LTO) and the Dutch Fruit Growers Association (NFO) have not yet expressed their concern on that matter. However, both have signed the National Bee Strategy, thereby confirming their involvement in ensuring the conservation of pollinators in the Netherlands. Also, both are supporting or initiating projects that promote the development of nesting and/or feeding sites for wild bees on farmlands. (Rijksoverheid 2018; Nieuwe Oogst 2018) These initiatives indicate a level of concern for safeguarding pollination.

Because of risks associated with loss of pollination, there has been an abundance of scientific inquiry into what is causing these declines. These threats, and the controversy surrounding some of them, will be explained in the next paragraphs.

1.2 Scientific findings regarding causes bee decline

In the past decades, researchers from a variety of natural science backgrounds (e.g. ecology, toxicology) have investigated possible causal factors responsible for bee decline. At the moment, the scientific community seems to agree that the decline of bee populations is likely not caused by a single threat, but the result of multiple interacting pressures that negatively impact pollinator health, abundance, and diversity. (Potts et al. 2010; Goulson et al. 2015)

Interacting pressures that were found to have negative effects on bee populations are disease (Ball and Allen 1988; Genersch 2010), the Varroa mite (*Varroa destructor,* Anderson & Trueman 2000) (Goulson et al. 2015), agricultural intensification (Kremen, Williams, and Thorp 2002; Potts et al. 2016), and (neonicotinoid) pesticide use (Brandt et al. 2016; Zee, Gray, and Rijk 2015; Goulson et al. 2015).

The effects of disease have mostly been studied in honey bees. Due to the difficulty of performing research on wild bee species there is a lack of knowledge regarding the relation between disease and decline of wild bee species. In honey bees, however, diseases and viruses are in many cases the result of a weakening of the bees' immune systems as a result of parasites such as the varroa destructor mite, of pesticides, or of hunger. (Morrissey et al. 2015; Ball and Allen 1988) The varroa mite is an invasive alien parasite that infests bee colonies. It weakens bees, their immune system and as a result colony health. (Genersch 2010)

Scientific findings indicate that agricultural intensification has resulted in a loss of habitat for many bee species. Since these agriculture sites often dominantly consist of monocultures, they fail to provide adequate foraging and nesting opportunities for pollinating insects throughout the year. (Goulson et al. 2015) Additionally, some scientists have argued that due to these monocultures and a lack of suitable habitat in the pastures' surroundings, natural enemies of pests are also not abundant, thus amplifying the necessity for pesticide use to eradicate pest organisms such as aphids. (Kremen, Williams, and Thorp 2002)

Among pesticides, mainly those in the category of the neonicotinoids are infamous. This type of systemic pesticide is applied as a seed coting and spreads through the entire plant, thus it also ends up in the nectar and pollen. (Vanbergen and the Insect Pollinators Initiative 2013) So, when bees consume nectar or pollen from such a treated plant, they ingest sub lethal doses of the neonicotinoid substance. Studies have found that this sub lethal exposure can negatively impact the bee's immune system, making them more susceptible for disease (Brandt et al. 2016), and that it can damage the bee's brain function (Palmer et al. 2013) impairing bee's foraging behaviour, learning ability, memory, odour discrimination, (Desneux, Decourtye and Delpuech 2006; Yang et al. 2008; Williamson and Wright 2013) and ability to relocate their hive. (Henry et al. 2012) However, most of these findings were done in laboratory studies. Whether under real field conditions these sub lethal effects occur, and whether these impacts on individual bees significantly impact colony loss remains a point of uncertainty. Designing field studies to test if such a causal relationship exists is challenging

for experimental researchers. (Smith et al. 2013) Precisely this scientific uncertainty seems to fuel conflict and controversy.

1.3 Societal and scientific controversy: link between neonicotinoid use and bee decline

In the past years many different stakeholders were involved in the debate surrounding bee mortality and how it should be addressed. Some of them such as NBV -one of the Dutch beekeeper associations in the Netherlands- and LTO -a Dutch agriculture association- were already mentioned in earlier paragraphs. Other stakeholders who got involved in the debate include environmental NGOs such as Greenpeace and N&M, and stakeholders from the crop protection sector such as Bayer and Nefyto. Apart from these organisations, some scientists also got involved in this debate. They include Prof. Dr. Jeroen van der Sluijs (Utrecht University), Prof. Dr. Jaques Blacquière (Wageningen University), and Prof. Dr. Koos Biesmeijer (Naturalis Biodiversity Centre). Since the topic became more and more alive in society, politicians also got involved in the debate. The topic of bee mortality and how to address it has been discussed in the house of representatives regularly in the past years. (Staten-Generaal 2009, 2011, 2017)

The debate surrounding bee mortality as we know it today started around 2008, when beekeepers in certain regions were confronted with extremely high winter mortality percentages and sounded the alarm bell. Similar trends had also been detected in other European countries and in the US. (Vermeulen 2008) Because much was still unclear about the exact causes of this phenomenon, Gerda Verburg -the Minister of Agriculture at the time- responded by investing in research and monitoring. (Ministerie van ELI 2009) In 2009 controversy emerged due to a petition initiated by nature manager Jaap Molenaar, beekeeper Peter Slootweg and Prof. Dr. Jeroen van der Sluijs. In the petition, that was signed 35.918 times, members of the permanent commission for LNV (agriculture, nature and food quality) in the house of representatives were urged to contribute to, amongst other things, a ban on three neonicotinoid substances. The initiators of the petition argued that the scientific findings that showed the sub lethal effects of these neonicotinoid substances in honey bees (explained in paragraph 1.2) could be linked to the high levels of honeybee mortality in the Netherlands. (Molenaar 2009) LTO immediately opposed those claims, stating that according to a variety of studies conducted in the Netherlands, Germany, France and the US, no causal relation existed between the use of certain pesticide substances and bee mortality. Instead, LTO argued, important sources of bee mortality were the Varroa mite and a lacking availability of nectar and pollen. (LTO 2009)

Dutch academics have been divided when it comes to the matter of the relation between neonicotinoid use and bee mortality since the start of the debate. The disagreements between Prof. Dr. Jeroen van der Sluijs of the Utrecht University and Prof. Dr. Tjeerd Blacquiere of Wageningen University are particularly well know. These scientists and their views were the subject of an episode regarding the link between neonicotinoid use and

honey bee mortality of Dutch TV show 'Zembla' in 2011. (Nietsch 2011) Van der Sluijs is of the opinion that banning the use of neonicotinoid pesticides in the Netherlands is warranted based on the current state of science. In his publications he refers to findings regarding the sub lethal effects of neonicotinoid substances on honey bees; uncertainties about the long-term toxicity of neonicotinoid substances; uncertainties about interactions between these substance and other stressors. In his perspective the combination of these is enough to warrants precaution and thus a ban on the use of neonicotinoid substances. (Sluijs et al. 2015) Prof. Dr. Blacquiere of Wageningen University has disagreed with this notion. According to Blacquiere other factors, such as the Varroa mite, have a much more important impact on honey bee mortality. (Roos 2012) Though he agrees with Van der Sluijs that lethal and sub lethal effects were found in laboratory studies, he argues that in field studies in which honey bees were exposed to field-realistic dosages no effects were found. (Blacquière et al. 2012) Van der Sluijs in turn argued that laboratory studies are the only reliable source of information when it comes to these risk assessments, since field-studies cannot exclude the impact of factors other than the neonicotinoids. (Roos 2012) Because of these different manners in which academics interpret the current body of evidence, scientific research has not been sufficient to solve the controversy regarding a possible link between neonicotinoids and bee mortality within society.

In recent years, despite the shift of attention from honey bees to wild bees, the controversy surrounding neonicotinoid pesticides continued. Recent calls for a neonicotinoid ban on the Dutch national level include a request to the Dutch board for the authorization of plant protection products and biocides (College voor de toelating van gewasbeschermingsmiddelen en biociden. Referred to as Ctgb in future text) by three environmental NGOs (Greenpeace, Natuur&Milieu and the Bird Protection Association) in 2015, and the letter sent by 'Experimental Toxicology Services' (ETS) to the Dutch house of representatives in 2017. (Schouten 2017; Greenpeace Nederland 2015) The rhetoric in these remains similar to the earlier mentioned petition that was filed in 2009. In the meantime, LTO and Bayer also remain to stand firm in their position that a ban on these neonicotinoids is undesirable and will not in fact help bee populations. They still argue that the link between bee mortality and neonicotinoid use has not been sufficiently proven. (Schouten 2017; Bayer Cropscience 2013) Another argument these organisations submit against a ban is the alleged economic impact it would have. A lack of suitable alternatives for this group of pesticides would leave farmers with higher crop losses in the face of a neonicotinoid ban according to spokespeople of Nefyto and LTO, the advocacy organisations of the crop protection producers in the Netherlands, and 50.000 Dutch farmers respectively. (LTO 2011; Wiepkema 2017)

The unchanged and continuously controversial nature of this debate in these past nine years indicates a stalemate situation. The stalemate was not resolved with scientific evidence or the decline in winter bee mortality in managed honey bee colonies. Concern has shifted

from honey bees to wild bees and those who believe neonicotinoids to be harmful see them as a threat to wild bees as much as to honey bees. Initiatives such as the 'action programme bee health' and recently the 'national bee strategy', that were signed by a broad array of stakeholders, proof that stakeholders are able to find some common ground. (Ministry of Economic Affairs and Climate 2013; Rijksoverheid 2018) However, organisations like Greenpeace and the Bee Foundation (Bijenstichting) have issued press releases in which they expressed their dissatisfaction with the limitations of the national bee strategy. Their main point of critique being the lack of attention to pesticide use and neonicotinoids in particular. In their view the national bee strategy fails to address a main cause for bee decline by leaving out the neonicotinoid issue. (Greenpeace 2018; Bijenstichting 2018) Particularly the expressed dissatisfaction of Greenpeace is striking, since they are a partner of the national bee strategy. This begs the question to what extent one can actually speak of 'broad support' for the national bee strategy and shows the relevance of addressing the neonicotinoid deadlock.

1.4 Research objectives

In an attempt to find manners to move past the neonicotinoid stalemate situation, and to find feasible solutions for bee declines in the Netherlands in general, this research project will 'zoom-out' and investigate the different layers of the broader debate surrounding bee mortality in the Netherlands from a social science perspective. To that end this thesis seeks to fulfil the following research objectives.

1. Identify stakeholders involved in the issues relating to bee declines in the Netherlands and get a clear idea of their interests and power positions in relation to the issue of bee mortality in the Netherlands.
2. Identify areas of conflict and common ground in the debate regarding causes of bee mortality and how to solve the bee mortality problem in the Netherlands among the identified stakeholders.
3. Determine whether integrated negotiation is a suitable conflict resolution strategy to for identified conflict(s) and can, in extension, lead to a more sustainable bee management in the Netherlands.

Through achieving these research objectives this thesis aims to promote clarity among involved stakeholders by exhibiting the perspectives on the requirements for healthy honey bee and wild bee populations in the Netherlands.

Though it is common for research questions to follow the introduction and the research goals, in this thesis they have been placed at the end of the theoretical framework that is discussed in chapter 2. This was done because the research questions have been informed by the theories that were employed. In doing so the theoretical framework was more solidly integrated in the thesis.

1.5 Scientific and societal relevance

As was explained in the previous paragraphs, the current debate surrounding bee mortality has many facets and layers. Based on the interacting causes that have been identified so far, it is clear that pollinator decline in the Netherlands has been a result of anthropogenic influences. Therefore, a solution for these issues is sought in changing behaviour of certain actors, either through policy changes, pressuring other parties through influencing public opinion, or other measures. These measures are largely guided and informed by findings from natural science research projects. Therefore, research efforts regarding bee mortality so far, have mainly been within the boundaries of the natural sciences (e.g. ecology, biology, toxicology), answering the questions surrounding causes of winter mortalities in managed honey bee populations and biodiversity decline in bees. But, as became clear in paragraph 1.3, academics interpret the state of science differently when it comes to for example the influence of neonicotinoid use on bee mortality. So, although those research efforts are of irrefutable importance, they do not necessarily help stakeholders to break through existing stalemates. A social science approach can contribute to a solution to such stalemates in the face of scientific uncertainty because it can explain the interests and dynamics that shape the conflict. If those factors become clear to stakeholders involved it becomes possible to find common ground to work with and possibly strategies to move past the conflict.

Finding a way past the stalemate is of societal relevance as well. Failure to address the bee declines in an effective and efficient manner could, in the worst case, lead to extinction of wild bee species and inadequate numbers of managed honey bee colonies to provide required pollination services for the Dutch agriculture sector. As was stated earlier this would have significant ecological and economic impact on the Netherlands. The continuation of the stalemate hinders such an effective and efficient approach since it puts a strain on relationships between stakeholders, hinders a cooperative and broadly supported approach for the mitigation of bee decline, and takes up time and attention that could be focussed on finding and executing solutions.

1.5 Overview of the thesis structure

This thesis will unfold in the following manner. Chapter 2 starts by explaining the theoretical framework and the research questions, which were informed by this framework. Chapter 3 proceeds and describes the methods that were utilised to answer the research questions. Chapter 4 showcases the results of the study. In chapter 5 conclusions are drawn and the discussion of the research project is laid out.

2. Theoretical framework

This chapter will explain the theoretical elements and models that will be employed in order to analyse the debates surrounding the bee mortality problem with the aim to identify and move past conflict areas, and to distil feasible and sustainable courses of action for solving the bee mortality issue. Firstly, the relevance of identifying stakeholders and their interests in solving the issue at hand is considered. Secondly, the chapter will explain the significance of identifying what the problem is in the perspective of the different identified stakeholders, and how a discourse analysis can be employed to identify areas of conflict and common ground on multiple levels of the discussion. In the last step, several theories that can be employed for the resolution of identified conflicts in different levels will be explained. The chapter ends with the research questions this research project seeks to answer.

The objectives for this research project correspond with the steps required in the general process of problem solving and, more specifically, the process of designing broadly supported policy initiatives. (Lenkens 2017; Bryson 2004) A first step in this process (which is identical to the first objective) is to identify stakeholders and get an understanding the interests and priorities of the stakeholders involved. In a second step (which corresponds with the second objective) the true source of division -or conflict- as well as areas of common ground are identified. In a third step, alternative ways to gap the identified sources of conflict and controversy, and to optimally utilise areas of common ground ought to be found. (Bryson 2004; Rubin, Pruitt, and Kim 1994) In this thesis the identification of alternative solutions happens in the section 2.3, utilising theories that were found in literature. The third objective goes one step further and tests whether preconditions for this conflict resolution strategy are present in the context of the respective conflict(s) and the key stakeholders involved in them.

Figure 1 is a visualisation of the analytical steps and research strategies that were performed towards meeting each objective. The theories and concepts underpinning this figure are explained in the following paragraphs.

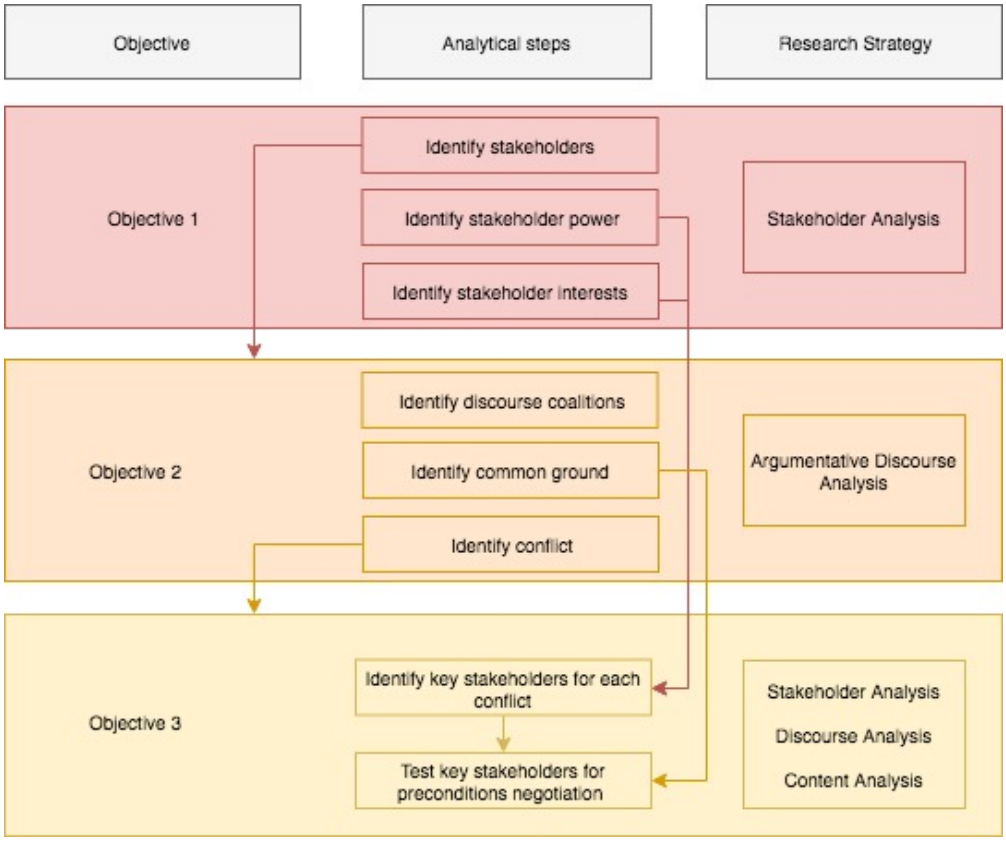


Figure 1: Overview of the analytical steps and research strategies used in the thesis. The arrows show how information derived in one analytical step is used for analytical steps later in the research process

2.1 Identifying stakeholders and their main interests: Stakeholder analysis

A first step in moving past stalemates and designing problem solving policy or management initiatives that are broadly supported, is to get an understanding of the stakeholders that are involved in the issue that is to be targeted by said initiatives.(Bryson 2004) Stakeholders in the context of this thesis are defined as:

Any organisation or individual who can affect or is affected by the population trends of wild bees and/or honey bees in the Netherlands, or by initiatives that aim to impact those population trends.

This definition is an adaptation of Freeman's definition of stakeholders: *"Any group or individual who can affect or is affected by the achievement of the organisations purpose."* (Freeman 2010, 53) The Freeman definition is a broad one and it incorporates not just stakeholders with the power to affect the situation, but also those who are affected. One could argue that only those organisations and people who have power are relevant, since those with little power probably do not have a strong influence on the conflict(s) that can be identified. But giving weight to the interests of those who are less powerful, yet affected, is in line with the democratic and social justice values that are relevant within public

management. (Lewis and Gilman 2005) Furthermore, positions of power are subject of change. So, taking into consideration the views of those who are less powerful creates more robust and sustainable agreements. (Freeman 2010)

A method that is frequently used to identify and get a better understanding of the stakeholders that are involved in policy processes is the stakeholder analysis. Originally developed in the field of business management studies in the 1970s and 1980s, the method was adopted by policy scientists to better understand the influence and role of interest groups within policy decision making processes. (Brugha and Varvasovszky 2000) A stakeholder analysis usually consists of three steps: Identifying stakeholders; differentiating between stakeholders; examining stakeholder relationships. (Reed et al. 2009) Various factors can be used to differentiate between stakeholders. Within the field of policy analysis the concepts of interest and power are frequently used to this end. (Bryson 2004) The following sections will explain these concepts, and how they apply to the case of bee decline debate in the Netherlands, in more detail.

Interests are the underlying reasons why stakeholders want to solve the problem, or want to be involved in the conversation regarding solutions for the problem. (Fisher, Ury, and Patton 2012) These reasons include stakeholder's needs, desires, concerns, and fears. (Ury, Brett, and Goldberg 1988) As was explained in the introduction, further decline of wild bees or honey bees can have both economic and ecological implications. Therefore, it is likely that stakeholders have either an economic interest or an ecological interest in contributing to mitigating bee decline. Additionally, it is likely that certain stakeholders have more of an interest in conserving either managed honey bee colonies or wild bee populations. Since all these different interests can be at odds with one another, they may explain some of the conflict and controversy in the debate. So, in the analysis there will be a focus on determining which type of interest each stakeholder has in contributing to the mitigation of bee decline.

The concept of power is a broadly used and many definitions exist depending on the disciplinary field that is consulted. However, according to Dowding (2011), most definitions have in common that they describe power as an attribute that is ascribed to an agent to describe their ability to bring about some outcome. In the context of this thesis this agent would be a stakeholder. Within the boundaries of this broad definition of power an analytic distinction can be made between two concepts: Outcome power and social power. 'Outcome power' (or 'power to') refers to the ability of a stakeholder to bring about or help bring about a certain outcome. 'Social power' (or 'power over') is the ability of a stakeholder to deliberately change the incentive structures of other actors in order to bring about outcomes. (Dowding 2011) For example, in the case of the bee decline debate farmers poses outcome power because they are able to manage their lands in ways that make it suitable or unsuitable as bee habitat. An organisation like Greenpeace does not necessarily have this

outcome power, since they do not have agency over the manner in which lands are managed, or over whether certain pesticides are used or not. However, Greenpeace still possesses power in the sense that they have strong tools to influence public opinion in favour of more bee friendly land management practices. This new public opinion may create incentives for politicians to change policies that impact the farmers' land management, and/or directly create incentives farmers to manage their lands in manners that are perceived to be more bee friendly. Therefore, Greenpeace is socially powerful. Making this analytical distinction between the two power concepts in the context of this thesis has multiple benefits. Firstly, both types of power are relevant in the discussion. By explicitly looking for both, a more comprehensive understanding of the power resources involved will be gained. Secondly, it provides information on power dynamics and where power is directed. For example, those stakeholders who are socially powerful but lack outcome power, are likely using their power resources to ultimately influence those with high outcome power. Thus, by examining the interests and power of identified stakeholders (the identification process will be explained in paragraph 3.1), a sense of possible conflict sources and stakeholder relations will be gained.

2.2 Identifying areas of conflict and common ground: Discourse analysis

A second step in moving past stalemates and designing problem solving policy or management initiatives that are broadly supported, is to get an understanding of where stakeholders can find common ground, and what the exact points of conflict are. (Bryson 2004)

The ways in which different stakeholders perceive the problem at hand may differ and is socially constructed. This is not to say that the large amounts of bees that are dying are socially constructed. But the meaning that different stakeholders ascribe to these dead bees are. These meanings have consequences for the policy measures stakeholders deem appropriate to mitigate the issue. (Maarten A. Hajer, Hoppe, and Jennings 1993) One stakeholder may see the dead bees as victims of pollution, and therefore think pesticide use needs to be addressed on a national or European level. Another stakeholder may consider these dead bees victims of insufficient control of the varroa mite and point to bee keepers for solutions. This indicates that multiple meanings, or 'truths', can coexist at the same time (Jorgensen & Phillips, 2002). Conflict emerges when the meanings stakeholders ascribe to an action or event are clashing. The foundation for these meanings can be found in the 'knowledge bank' of each respective stakeholder. This 'knowledge bank' is not limited to academic information, but includes other knowledge sources, experiences, an even an individual's common sense. These knowledge banks, in turn, are culturally informed. (Lederach 1995) Therefore, in order to find conflict solutions that can be broadly supported, an understanding has to be derived of the meaning different stakeholders ascribe to the bee mortality issue, and of the culture and knowledge bases underlying these ascribed meanings among stakeholders. In addition to identifying and understanding areas of conflict, this

research project seeks to identify areas of common ground among identified stakeholders. Understanding what is commonly considered to be 'good' by stakeholders makes it easier to determine which topic areas have the potential to result in policy ideas that satisfy key stakeholders. (Bryson 2004; Merino and Bello 2014) Both common ground and conflict will be identified and analysed through a discourse analysis.

A discourse, in this paper, is interpreted as "a particular way of talking about and understanding the world or an aspect of the world" (Jorgensen & Phillips, 2002; pp. 1), and is seen as a result of institutional and individual actions that reflect certain knowledge types (Ockwell & Rydin, 2006). In the post-modernist notion of the concept, which was described in the work of Foucault (1970), discourses reflect and shape relations between knowledge and power. Power and politics influence the creation of knowledge, and knowledge claims or 'truths' can shape and legitimising policy. But, as was explained in an earlier paragraph a variety of 'truths' can also cause political conflicts and controversies. (Merino and Bello 2014) Decision-making processes within this model of discourse analysis are conceptualised as struggles between 'discourse coalitions'; groups of actors advocating a similar discourse with the aim of gaining acceptance of their framing of a policy or management issue and the way it has to be dealt with (Durning 1995).

Discourse analysis is a term that cannot be exclusively ascribed to a single theoretical model. The term is used for a variety of intertwined philosophical premises, theories, methodologies and techniques for analysis (Jorgensen & Phillips, 2002). In this thesis, the argumentative discourse analysis of Hajer (2006) was employed. In previous studies with objectives similar to this thesis's, such as the one from van Herten and Runhaar (2013) or the one by Kurki, Takala, and Vinnari (2015), the argumentative discourse analysis approach as described by Hajer (2006) was also used, though in a slightly adapted form. Hajer's argumentative discourse analysis approach is suitable because it was adapted to specifically fit problems in understanding environmental policy issues (Ockwell & Rydin, 2006), and the debate concerning the bee mortality issue in the Netherlands and how it should be solved can be understood as such. According to Hajer, conflicts, such as the ones that may be identified when analysing the debate surrounding bee decline, are not necessarily a direct result from complex ideologies and positions of the actors, but from the different meanings that are given to ideas through storylines. (Hajer, 2006) Consequently, the approach will create a thorough and rich understanding of the debate that is analysed, which suits the objective.

The power of storylines has a central position in the argumentative discourse analysis approach. Storylines play an important role in the clustering of knowledge in which discursive complexity is sometimes concealed. Storylines are often characterised by specific matters that dominate the perception of a dilemma or controversy, in this case, for example, regarding the desirability of a European ban on neonicotinoid pesticide use. These storylines

are used to impose a certain view on others. Some storylines can be identified immediately, such as the 'a European ban on neonicotinoids will result in huge economic costs due to crop losses' storyline. By reproducing the story, the actors that oppose the neonicotinoid ban are able to impose this view on others that were not involved in the discussion before (Hajer, 2006). Hajer (2005) argues that a better understanding of controversies is achieved through analysing discourses in terms of these storylines that people shape a discourse with.

When different actors share the same norms, such as the idea that the neonicotinoid ban in the EU is not desirable, and also use similar story lines to shape a discourse, such as the one stating that the neonicotinoid ban has strong economic implications for farmer communities, they become a discourse coalition. According to Hajer (1993): "A discourse coalition is the ensemble of a set of story lines, the actors that utters these story lines, and the practices that conform to these story lines, all organized around a discourse." (Hajer 1993.: 47)."

Discourse coalitions attempt to enhance the influence of a discourse by ratifying their shared story lines (Hajer, 2006). A way to visualise these story lines and discourse coalitions is Toulmin's model of argumentation which will be explained in paragraph 3.2 of the Methodology.

2.3 Developing solutions: Negotiation as a conflict resolution strategy

In a third step towards moving past stalemates and designing problem solving policy or management initiatives that are broadly supported, alternative ways to gap the identified sources of conflict and controversy are sought. (Bryson 2004; Rubin, Pruitt, and Kim 1994) The following paragraphs explain the concept of conflict resolution and provides and overview of some conflict resolution strategies.

2.3.1 Conflict and conflict resolution

When stakeholders become aware that their views are clashing with those of others, there are different manners in which they can perceive this conflict. Often, stakeholders tend to see their views and the views of the other stakeholder as complete opposites. Therefore, they estimate the possible outcomes of the conflict to be a win-lose situation (also known as a zero-sum situation) or a compromise. (Ramsbotham, Miall, and Woodhouse 2011) These perceptions influence the strategies stakeholders will adopt in an attempt to address the conflict. (Overbeck, Mannix, and Neale 2011) The threat of stakeholders perceiving a conflict situation as zero-sum is that parties may inflict such costs on one another in an attempt to 'win' the conflict that both stakeholders end up in a worse situation (lose-lose). A scenario that has been famously illustrated in the zero-sum game theory.

A core model that is used in the field of conflict resolution to predict the strategy a certain stakeholder will adopt to address a conflict is the dual-concern model. The foundation for

the dual concern model was the work of Blake, Mouton and Bidwell, who designed a 'managerial grid' (Blake, Mouton, and Bidwell 1962) and a 'conflict grid' (Blake, Mouton, and Bidwell 1962) wherein they identified five interpersonal conflict management styles that could be employed by a person based on their "concern for people" and "concern for production" in a conflict situation. Pruitt and Rubin (1986) designed the now often used version of the dual-concern model as an extension of the conflict grid by Blake, Mouton, and Bidwell. In Pruitt and Rubin's version of the dual-concern model four conflict strategies can be identified based on two dimensions: "concern about own outcomes" and "concern about other's outcomes". A low concern for both own and other's outcomes would result in a strategy of 'inaction'. Low concern for own outcomes and high concern for other's outcomes predicts a 'yielding' strategy. High concern for both own and other's outcome constitutes a "problem solving" strategy. High concern for own outcome but a low concern for other's outcome will likely result in a "contending" strategy. (Sorenson, Morse, and Savage 1999)

Source: (Pruitt and Rubin 1986)

Figure 2: Dual concern model

Conflict resolution is the conceptualisation of methods and strategies that are designed to help parties who perceive their situation to be zero-sum change their perspective of the situation into a nonzero-sum conflict where both may win or both may lose, and from there ideally guide them to a positive sum direction in which, by cooperating, both parties shape a more desirable situation from which both benefit. (Ramsbotham, Miall, and Woodhouse 2011) To phrase it differently, it is about findings manners to persuade stakeholders to adopt an integrative (problem solving) strategy to handle the conflict, rather than a (purely) distributive approach.

There is a variety of frameworks available to effectively resolve identified conflicts. Including dialogue, participation, collaboration, negotiation, modelling, capacity building, bridging organizations, and adaptive co-management. (Stepanova 2015) To limit the scope of this

thesis, the focus will be one of the more broadly used approaches to resolve conflicts in a peaceful manner: the negotiation strategy. In the following section the concept of negotiation is explained.

2.3.2 Conflict resolution strategy: Negotiation

A broadly used approach to ending conflicts in a peaceful manner within the field of conflict resolution is negotiation. There are many different styles of negotiating which roughly correspond with the strategies identified in the dual-concern model. Because the aim of this research project is to find ways past deadlocked situations and to find mutually satisfactory approaches to the bee decline issue, the focus will be on the integrative style of negotiating. Integrative agreements reduce chance of future recurrence of the same conflict. (De Dreu, Weingart, and Kwon 2000)

In the integrative negotiation process, stakeholders are encouraged to negotiate based on interests rather than positions. The underlying idea is that often there are multiple options to satisfy stakeholders' interests, whereas a position is often just one of those options. If stakeholders keep bargaining over these positions, possibilities for coming for mutually satisfactory solutions are overlooked and the chances that stakeholders start perceiving the situation as a zero-sum conflict increase. (Ramsbotham, Miall, and Woodhouse 2011) This approach to negotiation requires more effort than distributive negotiation strategies, since understanding each party's interests, creating solutions, and reaching agreements is more time consuming than trading concessions. Because extensive trust and communication is required for all stakeholders involved to convey their actual needs and concerns, and to get an understanding of the true needs and concerns of other stakeholders involved. Mutual understanding of these interests is necessary to increase the chances that stakeholders discover creative solutions that meet one stakeholder's interests at little or no expense to the other stakeholder. (Barry and Friedman 1998)

Therefore, integrative negotiations require more preconditions to be successful than a distributive negotiation process that focusses on positions. The preconditions for any successful negotiation process, are: (1) the stakeholders perceive the probability of obtaining their conflict goals through forceful contending, yielding, or avoiding strategies to be unlikely or decreasingly likely; (2) the relative costs of pursuing the conflict goals is increasing relative to the value of the conflict goals; (3) areas of common ground and compatible interests exist between the stakeholders; and (4) sufficient flexibility in the respective stakeholder leaderships to consider negotiation. (Bercovitch and Jackson 2001) The first two of these preconditions have to do with the perceived BATNA, or best alternative to a negotiated agreement, of the key stakeholders in the conflict. In 'Getting to yes' the authors explain:

"the reason you negotiate is to produce something better than the results you can obtain without negotiating." (Fisher, Ury, and Patton 2012, 144)

Thus, the idea behind these two preconditions is that if a stakeholder's BATNA is more likely to get them to their conflict goal than a negotiation, and if the costs of this BATNA do not outweighing the benefits, the stakeholder has no incentive to partake in the negotiation.

An integrative negotiation process requires the following conditions in addition: (1) Stakeholders need to have faith in their ability to solve the problems that are addressed with the negotiation; (2) Stakeholders need to belief in the validity and importance of the positions of other stakeholders; (3) Stakeholders need to be motivated and committed to work together; (4) Stakeholders need to trust the opposing negotiator; (5) Stakeholders need to be able to accurately exchange information despite conflict conditions (this is sometimes difficult in situations of violent conflict); (6) All stakeholders involved need to understand how the integrative negotiation process works. (Lewicki, Saunders, and Minton 2011)

If these preconditions are not present there is a variety of options. In some cases, efforts can be made to create these preconditions in preparation of the negotiation process. For example, stakeholder representatives can meet in a less formal setting to get know each other in order to build mutual understanding and trust on a personal level. If necessary this process can be guided by a third party. Other conditions, such as the necessity for stakeholders to belief in the validity and importance of positions of other stakeholders, can be more difficult or in some cases impossible to create. In such a case negotiation, or integrative negotiation, is probably not going to be fruitful and other conflict resolution strategies, such as third-party intervention can be employed. The third-party intervention strategy will be explained further in paragraph 2.3.2.

By analysing whether these preconditions are present in the conflicts that are identified in the discourse analysis, this thesis seeks to determine whether integrative negotiation is a suitable conflict resolution strategy.

2.4 Research questions

Based on the background of the problem, and the theoretical framework which were discussed in the previous chapters, the following objectives and research questions were developed for the research project.

Towards meeting the objectives that are mentioned in paragraph 1.4, the following research questions will be answered.

Main question 1 (related to objective 1):

- ❖ Which stakeholders can be identified in the debate surrounding mortality in wild bees and managed honey bees in the Netherlands?

Sub questions:

- o What is the link between stakeholders and the issues surrounding honey bee mortality and wild bee decline?
- o What type of interest does each respective stakeholder have in solving the bee mortality issue in the Netherlands?
- o Which power resources does each respective stakeholder have towards solving the honey bee mortality issue and/or the wild bee decline issue in the Netherlands?

Main question 2 (related to objective 2):

- ❖ Which areas of conflict and common ground can be identified in the discourses amongst stakeholders involved in Dutch bee mortality regarding causality of bee mortality and possible solutions?

Sub questions:

- o Which storylines can be identified in the debates?
  - ▪ What is being said and written in the debates?
  - ▪ How are statements formulated in the debates?
- o Which storylines are shared by multiple actors?
- o Which storylines are conflicting?
- o What is causing the identified conflicts?
- o Which actors share the same norms regarding pollinator conservation?

Main question 3 (related to objective 3):

- ❖ Would integrative negotiation be a suitable conflict resolution strategy for the conflicts that can be identified in debate regarding causes and solutions for the bee mortality issue in the Netherlands?

Sub questions:

- o What are the key stakeholders in each respective conflict?
- o Are the preconditions for the integrative negotiation strategy present in the key stakeholders and the context of the respective conflicts?

3. Methodology

The discourse theories underpinning the research questions of this thesis call for a qualitative research approach. The data required for answering the research questions, which were described in the previous chapter, were collected through performing a stakeholder analysis approach based on the approach of Bryson (2004), as well as an argumentative discourse analysis approach as was explained by M. A. Hajer (2006). Both approaches required an iterative process of desktop research, interviewing and analysis. The following sections will explain these data collection methods and how they were applied in this thesis. The paragraphs that follow give an in-depth overview for each objective regarding the research strategy that was used, how key concepts were operationalised and which data sources were consulted.

Desktop research

Desktop research was performed to gain an overall overview of the issues and debates surrounding bees in the Netherlands, and to identify stakeholders that could be interesting for interviews. Questions surrounding honey bee mortality, wild bee decline and possible causes have been a popular subject for scientists and journalists alike. Therefore, to an extent, information regarding the perspectives of certain stakeholders involved in the bee mortality issue, the storylines they use, and their relation to other stakeholders can be derived from online sources such as newspaper articles, press releases, government reports, and academic writings. This desktop research step was a first move towards answering the research questions about what is being written in the debate and how statements are formulated, as well as for the question posed on which actors are involved.

Helicopter interview

A helicopter interview with an expert was performed. Dr. ir. Jeroen Scheper of Wageningen University in the Netherlands, who is an expert on pollinators, was interviewed in that context. The purpose of this helicopter interview was to test whether the most important debates, actors and issues regarding pollinators in the Netherlands had been successfully identified through the desk research. Furthermore, the interview provided additional information on relations between stakeholders.

Semi-structured interviews

Fifteen stakeholder interviews were conducted. Interviews were taken in a semi-structured manner. Meaning that the interviews conducted were of a formal nature in which the interviewer followed a pre-composed list of research questions and conversation topics (the interview guide that was used can be found in Appendix V), but strayed from the guide when she felt it to be important and appropriate. (Cohen and Crabtree 2006) A fully structured interview would have required one interview location and a set of research questions that was completely set in stone. Ensuring standardised interview conditions would have been unrealistic considering the time frame and the busy schedules of interviewees. But more

importantly, a set of standardised questions would have limited the possibility to react to claims by interviewees in order to get sufficient information regarding the 'warrants' and 'backings' stakeholders use for those claims which is important to be able to construct Toulmin's model (which will be further explained in paragraph 3.2 of this chapter). On the other hand, a completely unstructured interview method would have had the risk that answers of different stakeholders could not be compared and would not sufficiently cover the topics related to the research questions. A semi-structured interview provided a good middle ground in which a list of questions is used as a guideline to ensure all relevant topics are covered during the interview, but also the freedom to deviate from the questions to gain additional information regarding a topic that an interviewee introduces during the interview. (Denzin 2008, chap. 4)

With the explicit permission of the respective interviewees, audio recordings were made of the interviews. The interviews were conducted in Dutch rather than English. This was done because the interviewees as well as the researcher are native Dutch speakers. The researcher assumed that by conducting the interviews in the native language, all stakeholders would be able to express their views adequately, and no complications would arise if certain interviewees had more difficulty expressing their view than others due to different levels of English proficiency. This seemed especially important since the way in which stakeholders use language is central to the discourse analysis that was performed. The transcriptions of the interviews were also made in the Dutch language. But in order to process the information collected through the interviews into a thesis in the English language, the researcher translated the relevant quotes that became part of the results chapter from Dutch to English. The researcher has stayed as close to literal translations as possible, but in cases where expressions or figures of speech were used sometimes deviated to ensure the translation captured the intention of the statement. There are some obvious difficulties with this approach, which will be further explained in the discussion chapter. But to ensure that the stakeholders' views and the meaning they sought to communicate through the quote were not lost in translation, the results chapters and appendices were sent to the stakeholders for confirmation that the writings are a good representation of their perspectives on bee mortality in the Netherlands. The interviewees' English skills were of a sufficient level to be able to judge whether their quotes were representative of their views.

Fourteen out of fifteen interviews were conducted face-to-face, one was conducted over the telephone.

Presentation of findings for Prof. Dr. Koos Biesmeijer

In a last step towards strengthening the internal validity of the research findings, endorsement of these findings by pollinator expert Prof. Dr. Koos Biesmeijer was acquired. Biesmeijer is an influential Dutch scientist and scientific director at Naturalis Biodiversity Center. With his research projects on pollinators, he is in the midst of the debate

surrounding bee decline in the Netherlands. Moreover, Biesmeijers commitment to collaboration with scientists, policy-makers, NGOs, and the industry makes him well suited to judge the accuracy of the findings of this thesis. Biesmeijer endorsed the conclusions of the thesis based on a presentation of the main findings by the researcher, and an email in which the main findings were presented in bullet points. Remarks and side notes on this presentation and the email were processed.

3.1 Objective 1: Identifying stakeholders and their interests

The following sections provide information on the stakeholder analysis, how the concepts of power and interests were operationalised and which data sources were used for the analysis. Note that, for reasons that were explained in section 2.1, in this first objective a broad array of stakeholders is identified. For objective 3, key stakeholders are identified, that process will be explained later, in section 3.3.

3.1.1 Research strategy: Stakeholder analysis

As was explained in the theoretical framework a stakeholder analysis consists of three steps, all of which were performed in this thesis: Identifying stakeholders; differentiating between stakeholders; and examining stakeholder relationships. (Reed et al. 2009) Within the thesis the factor of differentiation are stakeholder interests and power. The concept of power is also part of the examination of stakeholder relationships. The following sections will explain how stakeholders were identified, how distinctions were made between stakeholders based on their main interests, and how the power levels of the stakeholders were determined.

3.1.2 Operationalisation: Power and Interests

How the concepts of power and interest, that were both explained in section 2.2 of the theoretical framework, were operationalised is explained in the following sections.

Interests

Within this thesis interests are defined as the underlying reasons why stakeholders want to solve the problem, or want to be involved in the conflict. (Fisher, Ury, and Patton 2012) Based on the fact that implications of further bee decline are of an economic and ecologic nature, which was explained in section 1.1.3, it is likely that stakeholders either have an economic or ecologic interest in contributing to the debate and/or the solution of the issue. In order to identify stakeholders' interests, and whether those interests are primarily economic or ecologic, questions regarding

Economic interest: This thesis considers a stakeholder to have an economic interest in contributing to solving the bee mortality issue if one or more of the following apply:
- Continuation of bee decline (either in wild bees or honey bees) impacts financial revenues of the stakeholder.

- A policy proposal to combat bee decline is discussed that impacts the financial revenues of the stakeholder.

In order to find out whether such an impact exists it is important to identify the main revenue streams of the stakeholder and whether bees, the (ecosystem) services they deliver, or policy proposals are connected to that revenue source.

Environmental interest: This thesis ascribes an environmental interest in contributing to solving the bee mortality issue to stakeholders if one or more of the following apply:
-The mission and/or vision statement of the stakeholder mentions the importance of the environment and/or biodiversity.

Honey bee interest: This thesis considers a stakeholder to have a main interest in honey bee conservation if honey bee decline harms the economic and/or environmental interest of the stakeholder.

Wild bee interest: This thesis considers a stakeholder to have a main interest in wild bee conservation of decline in wild bee populations harms the economic and/or environmental interest of the stakeholder.

Power
Section 2.1 explains the different facets of power and the definitions of 'outcome power' and 'social power'. The following paragraph will explain how these concepts fit the context of this thesis and how they were operationalised.

The outcomes that are most likely pursued in the context of mitigating bee decline can roughly be determined based on the scientific findings regarding the causality of that phenomenon. These were explained in the introduction and include (1) landscape changes which negatively impact bee habitat; (2) use of pesticides; (3) disease and pests. Therefore, whether stakeholders have any outcome power in the context of this issue depends on whether they: (1) possess and/or have agency over the management of land; (2) possess the authority to decide whether and which pesticide will be used; (3) are in a position in which they can control the health of bees. A stakeholder that possesses one or more of these characteristics has outcome power in the context of this thesis. A stakeholder that possesses none of these traits is considered to have 'no outcome power', a stakeholder that possesses one of these traits has 'some outcome power', and a stakeholder that possesses two or more is considered to have 'strong outcome power'.

In order to exert social power a stakeholder may use a variety of resources or strategies. This thesis considers a stakeholder to be socially powerful if said stakeholder has access to one or more of the resources that were described by Sabatier and Weible (2007). These include:

- Legal power (including lobbying campaigns to sway officials and placing allies in positions of legal authority; e.g. agency officials, legislators, judges);
- Public opinion and media;
- Information regarding the problem severity, causes and the costs and benefits of policy alternatives;
- Mobilizable troops (in the context of public demonstrations or statements);
- Financial resources (which can also be utilised to purchase other resources);
- Skilful leadership to mobilise an organisation or coalition.

If two or more of these resources were, based on the utilised sources, plausibly stronger or mores substantial in relativity to other the other stakeholders, the stakeholder's social power is considered to be high.

3.1.3 Data sources: Stakeholder interviews, helicopter interview, various digital sources

Different data sources were used for the different factors that were identified in the stakeholder analysis. (Stakeholders, interests and power respectively) The following paragraphs will describe which sources were used for each respective factor.

Stakeholder identification: News items, government documents, helicopter interview and snowball sampling

Stakeholders were identified based on the literature that was reviewed at the start of the research project, as well as through the helicopter interview and stakeholder interviews. Since bee decline and its possible causes are a popular subject in Dutch news outlets as well as in the national political arena, news articles as well as policy documents provided insights into which organisations were making their voices heard in the public debate. The main stakeholder categories that were identified through this method were: farmers, bee keepers, environmental organisations, crop protection industry, knowledge institutes, and government. Through the helicopter interview that was conducted the researcher ensured no major category was disregarded. The first interviewees that were approached were each part of one of these categories. During the interviews, the researcher asked the interviewees who else they would recommend to speak to in order to get a good overview of the different perspectives on bee health and mortality in the Netherlands. Thereby ensuring that no significant stakeholders were overlooked. This corresponds with the method of snowball sampling. Even though the number of interviews taken has no influence on the statistical reliability of the information gathered in this qualitative method (Saunders, M., Lewis, P., Thornhill, A., 2004), the researcher aimed, and succeeded, to interview at least two representatives per identified stakeholder category. This was done to ensure that nuances and differing views within these stakeholder clusters would not be overlooked.

Determining interests: Stakeholder websites and stakeholder interviews
The information required to determine the interests of stakeholders a combination of desktop research and interviews was utilised. Information regarding the financial resources and mission statements of stakeholders was collected from the official websites of the respective stakeholders. Additionally, in the interviews respondents were asked to how their organisation was connected to the debate surrounding bee decline and why the organisation considered it important to be involved in solving the issue. Answers to these questions provided an insight in the underlying interests.

Determining power resources: Stakeholder interviews and various digital sources
In order to identify the characteristics that constitute outcome power and the resources that accumulate to social power in the identified stakeholders, again, data was pulled from both desktop research and stakeholder interviews. Questions regarding the role stakeholders saw for themselves in the debate generally resulted in information on some power resources. When the information gathered in the interview was insufficient, a variety of sources was used to supplement, including news articles, press releases, petitions and annual financial reports.

3.2 Objective 2: Identify areas of conflict and common ground

As was explained in the first section of the theoretical framework, the objectives and the corresponding analytical steps of this thesis were based on the approach for a broadly supported policy initiative, as was described by Bryson (2004). In this second step, areas of conflict and common ground are identified through a discourse analysis. The focus of this discourse analysis will be on aspects of the debate that correlate with identifying the cause of the problem and finding ways to eliminate those causes. This is because these are the steps of problem solving that were described by Andersen and Fagerhaug (2013). In the context of this thesis the focus will be on: (1) what stakeholders perceive to be the cause(s) of bee decline and the meaning the ascribe to that; (2) what stakeholders perceive to be desirable solutions to bee decline.

3.2.1 Research strategy: Hajer's approach to discourse analysis

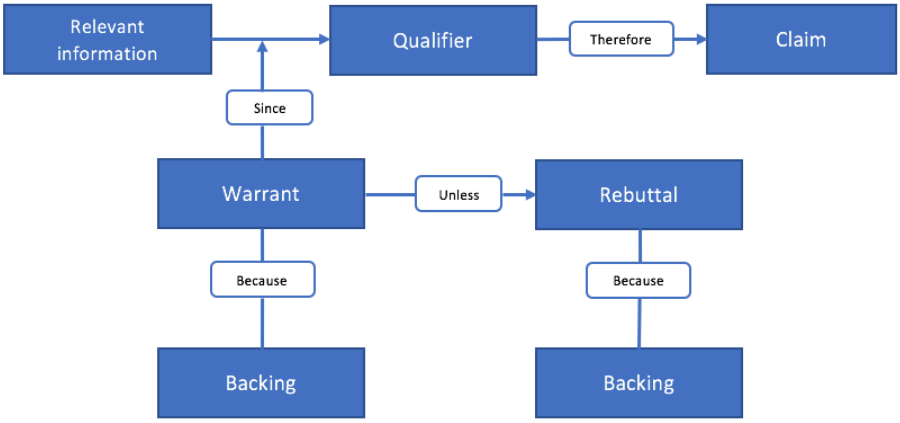
The methodological approach to discourse analysis as described by Hajer (2006) was used. In this approach, Hajer describes ten steps for a successful discourse analysis. These steps, and how they were executed in this thesis are explained further in the following sections. Data collection and data analysis alternate multiple times throughout the research process if these steps are followed, which allows for iteration when necessary.

Ten steps of Hajer

1. Desktop research was performed to gain an overall overview of the pollinator issues and debates in the Netherlands, and to identify stakeholders that could be interesting for interviews. Desktop research was explained in more detail at the start of this chapter.
2. A helicopter interview with an expert was performed. Dr. ir. Jeroen Scheper of Wageningen University in the Netherlands, who is an expert on pollinators, was interviewed in that context. This step was explained at the start of this chapter.
3. Documents, such as press releases and research reports, released by stakeholders, in order to start identifying important storylines were analysed.
4. Stakeholder interviews were conducted. A detailed description of these interviews is provided at the start of this chapter. The interview guide that was used by the researcher when performing these interviews can be found in Appendix V.
5. Sites of argumentation were identified, these are documents or events that contain direct exchange of arguments. The information derived of such an exchange of arguments serves to supplement findings derived through regeneration of arguments. Because the researcher was unable to find such sites of direct exchange, no analysis of such documents was made.
6. Collected data were analysed for positioning effects. This is what happens when actors use language to force other actors in a certain role, or when actors use language to decline a role that is forced upon them. Analysing for positioning gives an impression of the relations between actors, and of argument goals.
7. Key incidents regarding pollinator management and policy in the Netherlands were identified, to understand how these have shaped the context and dynamics of current debates. The information required to identify these key incidents was derived through both the interviews and desktop research. Key incidents that required further explanation for thesis readers were processed into a textbox.
8. This step, which entails analysing whether certain statements of interviewees are coherent with practices, was skipped.
9. The collected data was interpreted and structured. This was done through a process of coding interview transcripts and using the patterns that were found in creating a Toulmin's model of argumentation. Toulmin's model is explained in more detail on the next page.
10. For the tenth step, Hajer (2006) prescribes a second interview with the interviewed stakeholders as a means to check whether the researcher has correctly interpreted what was said during the first interview. A second interview with each of these stakeholders was not be feasible. However, the researcher sent a draft version of this thesis to the interviewees and requested them to check whether their statements were interpreted and translated accurately. Out of the fifteen interviewees, seven responded to the request. Some of them immediately approved of the depiction of their views, but a couple of stakeholders had some remarks. They approved of the representation of their views in the thesis after these remarks were processed.

Toulmin's model of argumentation

Inspired by the article by van Herten and Runhaar (2013), this research paper will use Dunn's (2015) adaptation of Toulmin's (Toulmin 1958) model of argumentation to visualise the structure of the discourses and storylines within the respective discourse coalitions. Arguments are the main medium to drive debates regarding public and private policies. (Dunn 2015) Therefore, structuring them gives an improved view on the meanings of the main discourses and their potential impacts. This structuring can reveal discourse coalitions, as well as disagreements among discourse coalitions. As was explained in section 2.2 of the theoretical framework, awareness of disagreements can be fundamental for understanding controversies and deadlock situations. (van Herten and Runhaar 2013) The model that will be used for this research project will slightly diverse from the model that was used by van Herten and Runhaar (2013), since the focus here is not only on conflict and controversies that relate to public policies, but also on controversies regarding issues outside of the public sphere if they impact pollinator management in the Netherlands.



Source: Dunn (2015)

Figure 3: Elements of an argument

The model (see Figure 2) displays how any claim, or argument conclusion, is supported through a structure of at least four and sometimes six elements. First, relevant information provides 'input' to start the argument. Second, the warrant provides reason to support the claim based on the relevant information. Third, a backing provides additional evidence to support the warrant. Lastly, a qualifier, often informed by the relevant information and warrant, adds plausibility to the claim. Some arguments contain a rebuttal, which communicates conditions, exceptions or qualifications that reduce the strength of the qualifier. This rebuttal can be supported through a backing. (Dunn 2015)

3.2.2 Operationalisation: Discourse coalition, conflict, common ground

Discourse coalitions

Stakeholders were considered to be in a stakeholder coalition if they used a similar set of storylines to underpin the same claim regarding the causality of and the solution(s) for bee decline.

Conflict
A discussion topic was identified as a conflict if contradictory storylines were used by different stakeholders.

Common ground
Common ground was identified by the usage of one or more similar storylines by multiple stakeholders. The more stakeholders use the storyline, the more robust the common ground.

3.2.3 Data sources: Interviews, stakeholder press releases

The transcripts of the stakeholder interviews embodied the vast majority of data used for the discourse analysis. In the analyses of the storylines used in the conflicts that were identified, press releases of the stakeholders' websites were used to supplement interview data. The researcher took care to only use sources that were controlled by the respective stakeholder to this end, in order to ensure quotes reflected the actual perspective of that stakeholder and were not influenced by third party bias.

3.3 Objective 3: Test whether integrative negotiation is a viable option to resolve identified conflicts.

The following sections explain the different research strategies used to test the preconditions for integrative negotiation, the operationalisation of key stakeholder identification and the tested preconditions, as well as the data sources that were used.

3.3.1 Research strategy: Stakeholder analysis, discourse analysis, content analysis

The researcher used findings from the discourse analysis and the stakeholder analysis to determine whether the required conditions for a negotiation and/or integrative negotiation strategy were present in the key stakeholders of each identified conflict. By doing so, an estimation could be made whether the integrative conflict resolution strategy has the potential to resolve the identified conflicts in the bee mortality debate.

In this step of the analysis just key stakeholders were considered since based on the work of Bryson (2006) failure to consider the interests and perspectives of key stakeholders will likely result in failure to resolve the identified conflict. A stakeholder is considered 'key' if it has a high interest in the conflict issue and high power in influencing the conflict issue. (Bryson 2006)

3.3.2 Operationalisation: Key stakeholders, preconditions for (integrative) negotiation

Key stakeholders
To determine which stakeholders are 'key' in each of the identified conflict the stakeholder analysis that was performed in an earlier analytical step was utilised. Based on the results of

an approach based on the power-interest grid was performed in which the following questions were answered:
-Which stakeholders have the strongest interest in this particular conflict issue?
-Which stakeholders are most powerful in this conflict?

Stakeholders that had both a high interest and a high level of power were considered key stakeholders.

Preconditions for successful (integrative) negotiation

To determine the potential success of the negotiation strategy in resolving the conflicts that were identified in the discourse analysis, the preconditions for successful negotiation of Bercovitch and Jackson (2001) and the preconditions for successful integrative negotiation of Lewicki, Saunders, and Minton (2011) were tested. The following text explains how each of these preconditions were tested in this thesis. This is with the exception of stakeholders need to have faith in their ability to solve the problems; stakeholders need to trust the opposing negotiator; stakeholders need to understand how the integrative negotiation process works; and stakeholders need to be able to accurately exchange information despite conflict conditions. These preconditions could not be tested due to the hypothetic nature of a possible negotiation, or because necessary data was lacking.

Preconditions for negotiation:

1. the stakeholders perceive the probability of obtaining their conflict goals through forceful contending, yielding, or avoiding strategies to be unlikely or decreasingly likely.

The precondition was measured by answering the following questions for each key stakeholder in the conflict:

- What is the stakeholder's conflict goal?
- What is the stakeholder's current conflict strategy?
- How successful is the stakeholder's current conflict strategy in obtaining the stakeholder's conflict goal?

2. the relative costs of pursuing the conflict goals is increasing relative to the value of the conflict goals

The precondition was measured by answering the following questions for each key stakeholder in the conflict:

- What would it cost the stakeholder if conflict goal is not obtained?
- What are the costs of the current pursuit of the conflict goals?

3. areas of common ground and compatible interests exist between the stakeholders

This precondition was tested by consulting the findings of the stakeholder analysis (compatible interests) and the discourse analysis (areas of common ground).

4. sufficient flexibility in the respective stakeholder leaderships to consider negotiation

This precondition was measured by answering the questions:

- Have the key stakeholders been open to attempts to collaborate and/or negotiate in the past or on other issues?

Preconditions for integrative negotiation:

1. Stakeholders need to belief in the validity and importance of the positions of other stakeholders

This precondition was measured by analysing the statements made in the stakeholder interviews regarding the validity of other stakeholder positions.

2. Stakeholders need to be motivated and committed to work together

This precondition was measured by analysing statements made in the stakeholder interviews of key stakeholder regarding the possibility of working together with the other key stakeholders.

3.3.3 Data Sources: Stakeholder interviews, various digital sources.

Information gathered in the stakeholder analysis (explained in section 3.1 of this chapter) was re-used for the identification of key stakeholders in each identified conflict.
Much of the information necessary to test the preconditions could be derived through the stakeholder interviews. For the preconditions that required information other than stakeholder perceptions, a desktop research was performed. Sources that were used included letters of Ministers to the Dutch house of representatives, annual financial reports, and stakeholder press releases.

3.4 Ethical considerations

The concept of 'informed consent' was carefully considered in the conduct of this study. Informed consent is an ethical and legal requirement for research in which human participants take part. In the context of this thesis it entailed informing the participants about the context and aims of the research, and receiving voluntary agreement from these stakeholders to participate in an interview, both before the respective interviews were conducted. (Nijhawan et al. 2013) In most cases the interview requests were done via email, so context and information were provided within this participation request. Additional verbal explanations regarding the context of the research was provided at the start of the interviews by the researcher. Voluntary agreement to participate was then send back through email by the interviewees. Some interviewees only were willing to participate in the research project under the condition that they would be allowed to read the thesis before it would become publicly available, in order to confirm whether they agreed with the way their perspectives are represented in the results chapter. These conditions were accepted by the researcher. Additionally, the researcher acquired the verbal consent of the interviewees to make an audio recording of each respective interview before starting the interview.

4. Results

The following sections will display the data that were derived during the course of the research project. The results are structured according to the three research objectives and the respective theories and methodologies that were employed to meet them. Paragraph 4.1 will cover the results of the stakeholder analysis, paragraph 4.2 displays the results of the discourse analysis and in paragraph 4.3 the conflicts that were identified in paragraph 4.2 will be analysed to find out if preconditions for integrative negotiation are present.

4.1 Objective 1: Stakeholders and interests

The first objective was to: 'Identify key actors involved in the issues relating to pollinator declines in the Netherlands and get a clear idea of their respective connections and roles in Dutch pollinator management.' In the stakeholder analysis the stakeholders' interests in solving the bee mortality issue, and their types of power were identified. As was clarified in chapter 2, interests are the underlying reasons why stakeholders want to solve the problem, or want to be involved in the conflict. (Fisher, Ury, and Patton 2012)

Snowball sampling proved to be effective and resulted in, among others, the interviews with Agrifirm, Houten municipality, Naturalis, Bayer, Nefyto and CLM. Stakeholders that seemed interesting but remained unavailable for interviews, despite multiple attempts to get in touch, were parties in the retail sector. The difficulty to get in touch with people in this sector was confirmed (off the record) by some of the interviewees. This is remarkable since some of the retail organisations that were approached have been visible in the media when it comes to the bee mortality issue. Examples being Dutch warehouse chain 'de Bijenkorf' and Dutch beer producer Heineken. Bijenkorf launched a national 'let's bee kind' campaign in the summer of 2017, raising awareness for the bee mortality issue. Heineken has created habitat for bees on the terrain surrounding their brewery as part of the 'Green Circles' initiative. (Snep 2014; Seventer 2017) The unavailability of parties in the retail sector for interviews is unfortunate, but there are several possible explanations. Firstly, the bee mortality issue does not directly relate to their core business. Combined with the full calendars of the employees of both companies this could explain the unavailability. Secondly, it could signal that parties in the retail sector do have a PR-interest in involving themselves in mitigating bee mortality and are, thus, willing to play a part in spreading awareness or changing the management of their factory terrains. But they do not have an interest in or desire to actively participate in the conversation surrounding bee mortality and how to mitigate it.

Table 1 provides an overview of the different stakeholders that were identified through desk research and snowball sampling (see chapter 3). The table introduces the stakeholders that were interviewed and provides an overview of their interests in solving the bee mortality issue and/or being part of the debate surrounding bee mortality, as well as on their sources

and level of power. More detailed information underpinning the data in table 1 can be found in paragraph 3.1 (methodology) and in Appendix II (data and analysis).

Table 1 shows strong fragmentation when it comes to the interests behind involvement in the debate surrounding bee mortality, which reflects the complexity of the debate. There are stakeholders who have a main interest in conserving honey bees, in conserving wild bees and there are stakeholders who have an interest in conserving both. Another point of division is the nature of the stakeholders' interest when it comes to solving the issue of bee mortality or being involved in the debate on how to solve it. For some the interest is mainly economic because they are for their main source of income dependent on the existence of bees and the services they provide. Others are not economically dependent on bees, but still want to address bee mortality as a result of environmental or ecologic concerns. An interesting outlier is the NBV who's main interest is a cultural one. Their members are partaking in beekeeping as a hobby and are therefore in general not economically dependent on their bees. But the organisation does have an interest in conserving beekeeping as an activity with historic value, for which they would require the continued existence and welfare of honey bee populations. (Interview NBV)

Striking is that in general stakeholders that have a main interest in conserving wild bees also mainly have environmental interests in solving the bee mortality issue. Managed honey bees tend to be of interest for those stakeholders who have an economic interest in solving the bee mortality issue, though not always exclusively. Particularly for those stakeholders that have an economic interest in maintaining pollination services the type of bee is of main importance for them is not straightforward.

Whether the differences in interests between the stakeholders are the cause of conflict depends on whether or not initiatives or ideas of certain stakeholders are harmful (or at least perceived to be harmful) to the interests of other stakeholders. In the introduction it was already established that some conflict exists regarding the desirability of a ban on the use of neonicotinoid pesticides. This is a case in which stakeholders with environmental interests perceive these substances as a threat to the environment and the health of wild bees and honey bees. This will become clearer in paragraph 4.2 which explains the perspectives of different stakeholders.

Stakeholders also have very different power types and levels. However, every stakeholder does poses some type of power, be it outcome power or social power. It is likely that those with strong social power seek to influence the behaviour of those stakeholders with high outcome power, either by attempting to influence policies and legislations or by influencing stakeholders directly. Whether the differences might become relevant later in the thesis, when looking whether preconditions for integrative negotiation are present.

Table 1: Overview of the results from the stakeholder analysis of the interviewed beekeeper associations. Power levels are indicated as 'no power' (-), 'some power (+), or a 'high level of power' (++).

Stakeholder name	Description stakeholder	Interests					Power	
		Managed bee	Wild bee	Economic	Environmental	Cultural	Outcome	Social
NBV	Bee keeper association	X				x	+	-
BVNI	Professional bee keeper association	X		x			+	+
LTO	Representation Dutch agriculture and horticulture sector	X	x	x			++	++
Agrifirm	Cooperation of Dutch farmers	x	x	x			++	+
Greenpeace NL	Environmental NGO		x		x		-	++
N&M	Environmental NGO		x		x		-	+
Natuurmonumenten	Nature NGO		x		x		++	+
The Pollinators	Project of two organisations with a focus on conserving pollinating species	X	x		x		+	+
Bayer	Crop protection substance producer	x	x	x	x		+	++
Nefyto	Advocacy association of the crop protection substance producers			x	x		-	++
NBC	Research center dedicated to topics regarding biodiversity	X	x		x		-	+
CLM	Consultancy firm		x				-	+
Min. LNV	National government	X	x	x	x		+	++
Prov. Overijssel	Regional government		x		x		++	+
Mun. Houten	Local government		x		x		++	+

4.2 Objective 2: Areas of conflict and common ground

The previous paragraph presented the results of the stakeholder analysis. The results show that there is a clear division when it comes to the interests that underpin the involvement of stakeholders in the debate surrounding bee decline. Incompatibility of those different interests may explain some of the conflicts in the debate. In order to meet objective 2 these areas of conflict were identified through a discourse analysis. The results can be found in the following paragraphs. Paragraph 4.2.1 shows the results of the discourse analysis of the different layers of the bee decline debate. Based on those results it provides and overview of the discourse coalitions. Paragraph 4.2.2 explains which storylines in this debate were used by most stakeholders, as to identify common ground. Paragraph 4.2.3 analyses and explains the conflicts that were identified in paragraph 4.2.1.

4.2.1 Identifying Discourse Coalitions

As was explained in the theoretical framework when multiple stakeholders share the same storylines towards the same goal, they are considered a discourse coalition in this thesis. So, only stakeholders that share the same storylines throughout the debate are considered a discourse coalition. This discourse analysis has a focus on two aspects of the debate: (1) stakeholder perspective of causality; (2) stakeholder perspective on solutions. Since stakeholders who have different perspectives on causality can already no longer be in a discourse coalition together, in a first analytical step the interviewed stakeholders were divided into groups based on their perspective on causality. If the stakeholders in a group continue to use the same storylines in the other layer of the debate (regarding solutions for the problem) they are considered a discourse coalition. Each of the following paragraphs describes one of these groups, explains the storylines used by the stakeholders throughout the debate and concludes with the discourse coalitions that can be identified.
It is relevant to note that based on the theory the researcher expected to identify two distinct and opposing discourse coalitions that could explain all conflict. However, discourse coalitions in the first layer of the debate fell apart in the second. Storylines that reflect stakeholder perspectives on concrete methods to achieve envisioned solutions for bee decline are highly fragmented. This lack of coherence and broadly supported storylines in this last layer of the debate made it very difficult to distinguish discourse coalitions.

Group 1: Focus on impact of Dutch agriculture system

The stakeholders that make up the first group that supports the same storyline regarding the causality of bee mortality in the Netherlands are:

Environmental and Nature Conservation NGO's	Knowledge Institutes
Greenpeace	CLM
Natuurmonumenten	
Natuur&Milieu	Government
The Pollinators	Province of Overijssel

Strikingly, all the environmental and nature NGO's that were interviewed for this thesis fall into this same group. This group of stakeholders shares the same storylines regarding causality and the abstract solution to bee mortality, but fall apart into different, mostly small, discourse coalitions and loose storylines when it comes to concrete measures they deem desirable to obtain that solution. This development is visualised in figure 5.

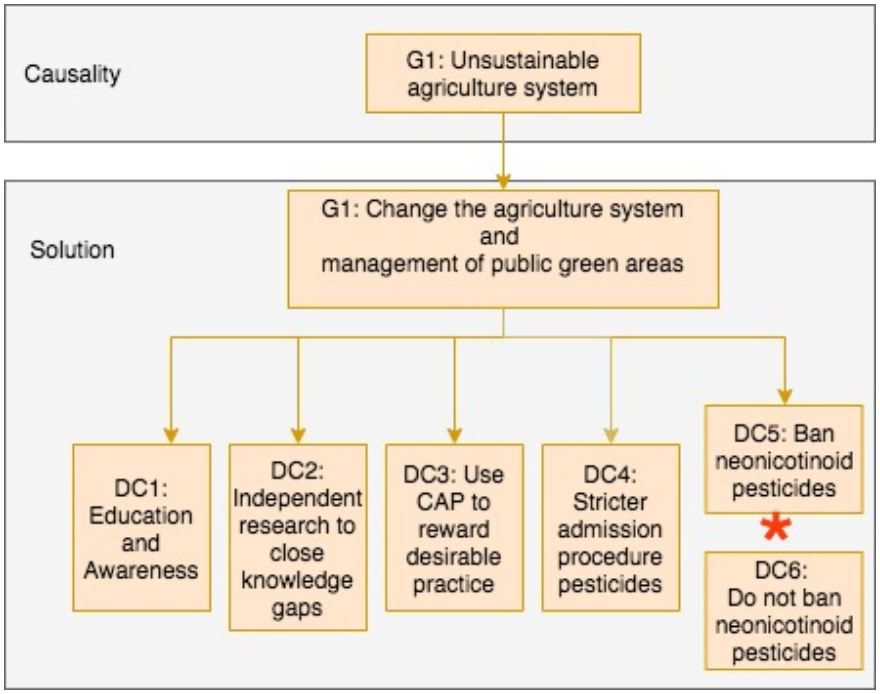


*Figure 5: Visualisation of the progression of the storylines used by Group 1 (G1) through the layers of the debate (Causality, Solution). At the end of the model, group 1 falls apart into five different discourse coalitions (DC). The * symbol shows a direct conflict between discourse coalitions.*

In the following sections the storylines that are utilised in each of the layers of the debate will be shortly explained. The more detailed analysis can be found in appendix III.

Causality according to group 1: Unsustainable agriculture and land management

Regarding the causality of bee mortality in the Netherlands this first group of stakeholders claims that: Main causes for both honey bee and wild bee mortality are landscape change and pesticide use, which are both encompassed in the current Dutch agriculture practices. For honey bees specifically, disease and pests encompass another main cause.

Warrants and backings that are used by the stakeholders to underpin this claim are displayed in figure 6. Both figure 6, and an analysis of the storylines used as warrants and backings can be found in the 'group 1' section of Appendix III. The following text provides a short summary of the findings.

The stakeholders in group 1 view bees victims of the Dutch industrialised agriculture system. The storylines stakeholders use as warrant underpinning the shared claim explain how the

current industrialised agriculture system promotes monocultures, resulting in diminishing biodiversity, thus food sources for bees. Moreover, industrialised agriculture depends strongly on pesticide use, which these stakeholders also consider a main cause for bee decline. (Interview Greenpeace; Natuur&Milieu; Natuurmonumenten; The Pollinators; CLM) Greenpeace stated in this regard: "*The way in which we perform agriculture is bad for nature, and nature provides services for farmers. There are no flowers on farmlands anymore and there is a lot of chemical pesticide use, that is bad for nature and, among others, bad for honey bees."* (Interview Greenpeace) Cost effective, but biodiversity depriving management of public green areas by municipalities is also considered an important cause of bee decline by the stakeholders in group 1. (Interview CLM)

Solutions according to group 1: Change the current agriculture system and the manner in which (public) green spaces are managed.

The previous section established that according to the stakeholders that support this narrative bee mortality is caused by agriculture practices that are harmful for the natural environment (thus bee habitat). As a consequence of that belief these stakeholders see changing those practices as a solution for the bee mortality problem in the Netherlands. They thus claim that the current agriculture system should be changed into one that promotes nature inclusive agriculture practices. Management of public green spaces should have a stronger focus on biodiversity. Further storylines that were used to underpin this claim are displayed in figure 7. Both the figure 7, and an analysis of the storylines used as warrants and backings can be found in the 'group 1' section of Appendix III. The following text provides a short summary of the most important storylines.

The main reason stakeholders in this group opt for a 'system change' rather than just a change in agriculture practices, is that they believe that policies in both the private and public sphere put farmers in a position that forces them into practices that are increasingly unsustainable. In the words of the Greenpeace spokesperson: "*Everything needs to be as cheap as possible. With that, they* [supermarkets red.] *keep farmers hostage in a social-economic position that drives them to keep intensifying their practices.* […] *The result is intensification of grassland management, less birds, more cows, and less flowers."* (Interview Greenpeace) The Pollinators stated: "*As long as the whole system is not adjusted, you will […] continue to have a lack of healthy living environment for bees and ultimately for people."* (Interview The Pollinators)

Discourse coalitions identified in group 1

Since all stakeholders in this group have shared the same storylines regarding causality and the solution to bee decline, any storyline regarding desirable measures to achieve the previously mentioned solution that is used by two or more stakeholders can be identified as a discourse coalition. As was indicated in figure 5, storylines used in this layer of the debate are highly fragmented. Table 2 displays all measures that are described as desirable by these

stakeholders and shows the six discourse coalitions that were identified. More detailed information on these storylines can be found in Appendix III.

Despite this fragmentation of storylines, the different solution measures that were proposed by stakeholders and stakeholder coalitions can work complementary to one another or, at least, are not conflicting. However, strikingly, despite these stakeholders sharing the same storylines through most of the debate, within this group a direct conflict occurs regarding in the matter of neonicotinoids and how to deal with them. This neonicotinoid conflict will be further explained in paragraph 4.2.3.

Based on the storylines displayed in table 2, it seems that most of the stakeholder in group 1 can support 'soft measures' that stimulate farmers and other landowners to manage their lands in a more bee friendly way through raising awareness or capacity building. However, it appears as if Greenpeace and Natuurmonumenten are the only ones that would like to see hard government interference, particularly in the area of pesticides, through changes in authorisation procedures and a legal ban on neonicotinoid pesticides.

Table 2: Overview of the storylines employed by stakeholders in group 1 and the stakeholders that support them. A black 'x' signals that the stakeholder uses the storyline, a red 'O' shows stakeholders that opposes the storyline. Discourse coalitions are indicated in the last colon with the abbreviation 'DC'.

	Greenpeace	Natuur-monumenten	Natuur& Milieu	The Pollinators	CLM	
Educate and promote awareness among farmers, municipalities and the general public	x	x			x	DC1
Independent research to close knowledge gaps	x	x				DC2
Stimulate desirable practices with governmental reward system (e.g. utilise the CAP)	x		x			DC3
Stimulate the retail sector to take responsibility	x					
Governmental responsibility: The preach, the carrot and the stick	x					
Stricter authorisation procedure pesticides (with independent review committee)	x	x				DC4
Enforce a legal ban on using neonicotinoid pesticides	x	x	x	x	O	DC5 DC6
Develop sustainable alternatives to chemical pesticides	x				x	

To summarise the findings on group 1, in a broad sense these stakeholders use similar storylines regarding the solution to bee decline. Namely, a change in the Dutch agriculture system towards a system that encourages farmers to promote biodiversity on their barnyards and reduce pesticide use. However, the storylines used by these stakeholders start to diverge when it comes to the question how that solution should be achieved, resulting in six discourse coalitions. Showing that even though these stakeholders very much agree on the end that they strive for, they have different perspectives on the best means to get there.

Group 2: Do not overstate the impact of pesticide use on bee populations

The stakeholders that make up this second group that shares the same storylines regarding the causality of bee mortality in the Netherlands are:

Beekeeping organisations	Agriculture organisations
BVNI	LTO
NBV	Agrifirm
Governmental organisations	Knowledge institutes
Ministry of LNV	Naturalis
Crop protection industry	
Bayer	
Nefyto	

Figure 8 provides a visualisation of the storylines that were used by these stakeholders in the different layers of the debate. Something that stands out when looking at figure 8 is that when it comes to the question how the issue of bee decline should be solved the group falls apart into three storylines. Though all stakeholders in this group used the storyline that claims a solution to bee decline to be an increase in flower-rich and biodiverse areas, the other two storylines were supported by only a few of the stakeholders in this group. The stakeholders supporting these three respective solutions fall further apart into a total of seven discourse coalitions when it comes to the question which measures they would ideally employ to get to those solutions. Three of the 'solution measure' storylines apply to both increasing flower-rich biodiversity and shifting towards a more sustainable crop protection approach.

In the sections following figure 8 the storylines that are utilised in each of the layers of the debate will be shortly explained. The more detailed analysis can be found in appendix III (section group 2).

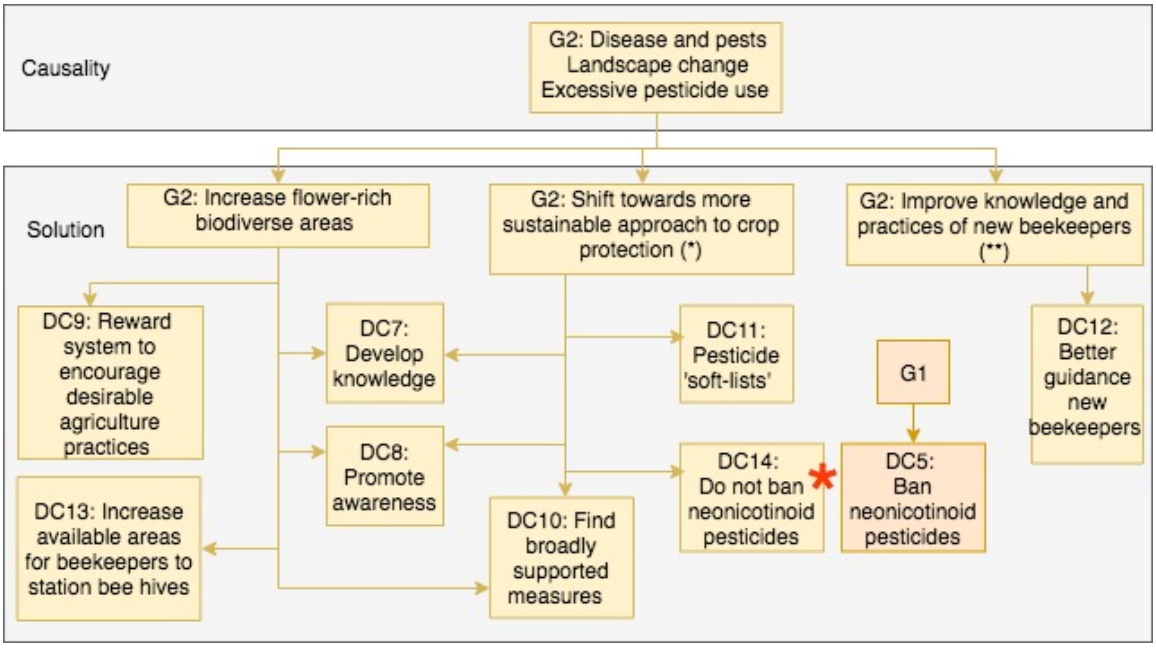


*Figure 8: Visualisation of the progression of the storylines used by group 2 (G2) through the layers of the debate (Causality, Solution). The * symbol shows a direct conflict between discourse coalitions.*
Note: (*) Storyline only used by Ministry of LNV, LTO and Agrifirm; (**) Storyline only used by Ministry of LNV, NBV and BVNI

Causality according to group 2: Disease and pests, landscape change and excessive pesticide use

Stakeholders in this second group claim that the main causes of bee mortality are current landscape management, disease and pests, and beekeeping practices. The causal impact of pesticide use should not be overstated. The main difference between this perspective on causality of bee decline and that of the first group is the weight that is ascribed to the role of pesticides in relation to bee mortality. The first group placed pesticide use on the same level as landscape change and disease and pests as a threat to bee populations. This second group perceives pesticide use to be less impactful than a few other causes. An overview of the warrants and backings that were used to underpin this claim regarding causality of bee decline can be found in figure 9. Figure 9, and a detailed explanation can be found in the Group 2 section of appendix III. The following text provides a summary of the most important storylines.

Storylines used by stakeholders in group 2 disregard or diminish the causal impact of pesticide use on bee decline. The spokesperson of the Ministry stated: *"If you manage your landscape in a way that deprives those animals of the opportunity to find enough food; or in the period when they need it; or of the right nesting opportunities, it will not go well. Those are much more determining factors, I was assured as much by scientists, than crop protection agents."* (Interview Ministry of LNV) Another storyline that is employed by a few stakeholders is that due to a new influx of hobby beekeepers, a big group of beekeepers does not have the knowledge on how to keep their honey bee colonies alive when confronted with disease and pests. (Interview BVNI; NBV; LTO; Nefyto; Bayer)

Solutions according to group 2: Ensure biodiversity increase, promote more sustainable approach to pesticide use, and improve beekeeper education

The solution envisioned by this second group cannot actually be summarised in one clear overarching idea like that of group 1. However, three general solution claims can be identified: (1) ensure an increase in the availability of biodiverse and flower-rich areas for bees; (2) Improve knowledge and skills of new hobby beekeepers; (3) Promote a sustainable approach to crop protection. A separate Toulmin's model was made for each of the above-mentioned claims, since they are not all supported by all the stakeholders in this group. These models (figure 9, 10 and 11) can be found in Appendix III section 'group 2'.

It is interesting to note that the three claims, particularly the first two, do correspond with elements of the solution proposed by the first group. What makes the solution(s) proposed by this group distinct however, is that this group does not emphasise the importance of addressing the system in which growers and farmers operate. That is, with the exception of NBV, with their spokesperson stating *"The biggest problem is the commitment, yes, it is actually the earning structure* [in agriculture red.]" (Interview NBV) Another distinction is that some stakeholders in this group focus on the improvement of beekeeper practices, a topic that was not addressed in the solution proposed by stakeholders in the first group. The following sections will summarise the storylines used by stakeholders in this group to underpin the three solutions they envision.

(1) All stakeholders in group 2 agree on the importance of increasing suitable bee habitat. (Interview BVNI; NBV; Agrifirm; LTO; Nefyto; Bayer; Ministry of LNV; Naturalis) BVNI stated: *"Which is why I focus much more on biodiversity. Because I am convinced that this contributes so enormously to the improvement of bee-like insects, that is unprecedented. If that butterfly can eat well, that bumblebee can eat well, you know, varied, then everyone profits. So, for me it starts there." (Interview BVNI)*

(2) Both beekeeper organisations agreed that more contact and exchange between new and more experienced beekeepers would be a solution to new beekeepers having difficulty maintaining a healthy colony. However, they do explain that because all transfer of knowledge when it comes to beekeeping is done on a voluntary basis, they have limited power in that regard. (Interview BVNI; NBV)

(3) A group of stakeholders explained how promoting a sustainable approach to crop protection does help control the environmental impact of agriculture practices and how this would be favourable for bees. (Interview Ministry of LNV; LTO; Nefyto; Bayer; Agrifirm) The Ministry of LNV spokesperson stated: "*But the question is of course whether you can, through a different system approach, change the manner in which farmers treat their crops in a manner that less crop protection agents need to be used. So, an integrative crop protection."* (Interview Ministry of LNV)

Discourse Coalitions identified in group 2

Table 3 displays all measures that are described as desirable by these stakeholders of group 2 and shows the nine discourse coalitions that were identified. More detailed information on these storylines can be found in Appendix III.

Table 3: Overview of the storylines employed by stakeholders in group 2 and the stakeholders that support them. A black 'x' signals that the stakeholder uses the storyline, a red 'O' shows stakeholders that opposes the storyline. Discourse coalitions are indicated in the last colon with the abbreviation 'DC'.

	NBV	BVNI	Ministry of LNV	LTO	Naturalis	Agrifirm	Bayer	Nefyto	
Develop knowledge	x		x	x	x	x	x	x	DC7
Increase knowledge that is ready to be applied in practice	x			x		x	x	x	DC7.1
Increase awareness among farmers, municipalities and other landowners		x	x		x		x	x	DC8
Stimulate rather than obstruct desirable practices with governmental reward system (e.g. utilise the CAP)			x	x	x		x		DC9
Work through initial logistic hiccups and toward structural, broadly supported solutions		x		x					DC10
Create policies, guidelines, stimulating funds etc. to promote an increase of bee friendly habitat and to professionalise beekeepers.		x							
Work with 'soft-lists' of pesticides that should be used with great care and only as a last resort				x		x			DC11
The issue with pesticides will to a large extend solve itself		x							
Increase guidance of new beekeepers by experienced beekeepers	x	x					x	x	DC12
Update material beekeeper courses		x							
Make more areas available for beekeepers to station their beehives	x	x							DC13
Do not ban neonicotinoid substances		x	x	x	x	x	x	x	DC14

Any storyline regarding desirable measures to achieve the previously mentioned solution that is used by two or more stakeholders was identified as a discourse coalition. As was indicated in figure 8, and as was the case with group 1 as well, storylines used in this layer of the debate are highly fragmented, but not necessarily conflicting.

To summarise the findings on group 2, stakeholders named disease and pest (and inability of new beekeepers to perform adequate pest control), biodiversity loss and, to a lesser extent, excessive or uncareful pesticide use as the causes for bee decline. In the solution layer of the debate all stakeholders shared the storyline that increasing flower-rich areas would benefit both wild bees and honey bees. A few stakeholders of the group also see solutions in stronger exchange between experienced beekeepers and new beekeepers and promoting a sustainable approach to crop protection. In the last layer of the debate, regarding desirable measures to come to the envisioned solutions, stakeholders used a big variety of storylines, resulting in nine discourse coalitions. Some of these were strongly supported as they were used by almost all of the stakeholders in group 2. Particularly developing knowledge and building awareness are measures that are broadly supported in group 2. Also, all stakeholders of the group, with the exception of NBV, explicitly oppose the neonicotinoid ban proposal.

4.2.2 Areas of common ground

The previous paragraph (4.2.1) provided an overview of the storylines that were used by stakeholders in the different layers of the debate and identified discourse coalitions. The results showed a big variety of small discourse coalitions, but also a few broadly supported ones. As part of objective 2 of this thesis (identifying conflict and common ground), this paragraph provides an overview of the commonalities in the storylines that were identified through the discourse analysis.

Based on the findings in the previous paragraph, there are two causes for bee mortality that most stakeholders agree on need addressing. The first one is the threat that is referred to as either ‘biodiversity loss’, ‘habitat loss’ or ‘land use change’. The second one is referred to as ‘Varroa mite’, ‘disease and pests’ and ‘bee keeper knowledge. The following paragraphs each explain an area of common ground regarding desirable solutions aimed at diminishing these threats, and regarding desirable measures to come to those solutions.

4.2.2.1 Address the lack of suitable bee habitat

All stakeholders used a similar storyline regarding the role of Dutch land management in bee decline in the Netherlands, stating that it is one of the main causes. The main explanation that stakeholders give for this notion is that current land management does not sufficiently promote floral biodiversity, thereby diminishing potential bee habitat. Therefore, they also agree on the idea that both wild bee species and managed honey bee colonies would benefit from increased development and maintenance of suitable habitat. (See paragraph 4.2.1)

Conditions for suitable bee habitat includes year-round availability of a diversity of flowering plants, which serve as food source for both wild bees and honey bees.

Practices that stakeholders have stated to be desirable for bees in terms of management of green spaces are:
-Sowing flower mixtures that are attractive to the bee species native in the area (which flowers differs per area in the Netherlands).
-Maintaining existing and newly sown flower-rich areas.
-Change mowing practices. Rather than tightly and evenly mowing every field edge, ditch, roadside and garden, stakeholders agree that mowing strategies that, at all times, leave some parts of these green areas unmown are preferable. Since that strategy leaves nesting and foraging sites for bees throughout the seasons. (i.e. Interview Bayer; Houten Municipality; Greenpeace; Naturalis; NBV)

Stakeholders also generally agreed that: society in its entirety is responsible for addressing lack of suitable habitat in the Netherlands; a transition to a more sustainable agriculture approach would be beneficial; bee friendly land management practice should be incentivised and rewarded; and (applicable) knowledge and awareness should be created regarding desirable land management. These areas of agreement are further explained in the following sections.

Society-wide responsibility to address lack of suitable bee habitat
Most stakeholders used storylines in which the responsibility of addressing the current lack of suitable bee habitat was placed on the entirety of Dutch society. The following quote by the Natuurmonumenten ecologist summarises this sentiment: "*I do think the government has a responsibility. But I don't think they are alone in that. […] Local governments, farmers, and actually everyone who has access to a garden [also has a responsibility red.]. Lots of people have their garden paved. That is not necessarily a good thing for bees. And we have quite some urban areas in the Netherlands. So, in that sense I think everyone is responsible.*" (Interview Naturalis)

Some stakeholders did stress the importance of specific land managers being active in creating more bee friendly habitat. A storyline that returned multiple times was that 'most can be gained from addressing land management on farms'. An example is the Naturalis spokesperson who stated: "*And I mention farmers first, because that is simply the largest land area and I think the most can be gained there and on the roadsides.*" (Interview Naturalis) Greenpeace also stressed the importance of addressing farming practices and stated: *"But you have to do something about biodiversity on the fields, around the fields. So, those flowers. And ensuring there is always food available for useful biodiversity."* (Interview Greenpeace) Conversely, Bayer argued it is hypocritical to look at farmers for biodiversity improvement if society is not willing to pay for more bee friendly management of public

spaces. (Interview Bayer) These different ideas about on which land manager the focus should be, gives the impression of disagreement. However, these statements do not seek to gainsay the role of other land managers, but rather to ensure that all land managers pull equal weight in addressing the issue. So, when push comes to shove, stakeholders acknowledge that all land managers in the Netherlands can contribute to promoting bee habitat.

Incentivise and reward desirable practice

As explained in the previous sections, all stakeholders see a role for farmers in developing more habitat for bees. Other notions that stakeholders agreed on were that 'farmers do not have it easy' and for some stakeholders that 'farmers are stuck in a system'. The Province of Overijssel spokesperson, for example, stated: "*Yeah, farmers simply don't have it easy. There are many rules that they need to comply with. That is difficult, because you are educated to be a farmer not a rule manager, at least that is what I always think. I also think there is so much going on and so much asked of them that it quickly feels like an extra burden really quick."* (Interview Province of Overijssel) The spokesperson for Natuur&Milieu stated that for farmers it is *"not advantageous to farm in a nature inclusive manner."* (Interview Natuur&Milieu)

Therefore, stakeholders agree that farmers should receive external support, and that bee friendly behaviour should be rewarded and incentivised. (Interview Natuur&Milieu; Province of Overijssel; Greenpeace; Ministry of LNV; Naturalis; Bayer; LTO) What that reward and incentive should look like, and which body should provide them is not always clearly specified. One storyline used by multiple stakeholders does provide ideas on where financial support should come from: the EU budget for the Common Agriculture Policy (CAP). (Interview Natuur&Milieu; Greenpeace; Ministry of LNV; Naturalis; Bayer) The CAP provides subsidies to European farmers, and in order to receive subsidies from this fund farmers are required to execute so called greening measures. (Interview Naturalis; LTO) Some stakeholders have expressed dissatisfaction with the current Dutch implementation of these greening measure requirements. LTO, for example, mentioned that the requirements are too rigid and one-size-fits-all, which leaves no room for farmers to be creative in finding the most effective way to support biodiversity on their lands. (Interview LTO) But in general stakeholders appear to see the potential, particularly for incentivise the creation of flower rich field margins on farms.

4.2.2.2 Improve beekeeper practices

The threat of Varroa and other pests and disease for honey bee health was named, but not further discussed by a lot of the stakeholders in the debate. This is most likely a result of a large proportion of the stakeholders having a main interest in conserving the environment and wild bees, and not in honey bees (which became evident in paragraph 4.1, the stakeholder analysis). Greenpeace for example mentioned: *"Varroa, that is something that*

needs to be dealt with, I get that, but that is not something I can do much about. We are a nature and environmental organisation, so we are mainly concerning ourselves with agriculture." (Interview Greenpeace)

Those stakeholders that did use storylines regarding honey bee health, and the causal factors that threaten it, agreed that to ensure winter mortality of honey bee colonies stays low, beekeeping practices should be improved. The BVNI spokesperson stated: *"So, knowledge. Knowledge of the beekeeper. That is something the [beekeeping red.] associations should pay much more attention to. And that does happen. Lectures are organised and courses are organised. Yes, and you see in Germany again, that beekeeper training takes three years, here in the Netherlands it is one season. Of course, in the end that results, in my perspective, in higher bee mortality."* (Interview BVNI) The stakeholders also agree that for this beekeeper knowledge to improve, more exchange between experienced beekeepers and new beekeepers would be beneficial: "*This is something that is detected, and there is explicit deliberation about how we can ensure that there is more exchange of experiences. What kind of methods we can employ to that end. But everything is on a voluntary basis. That makes a big difference."* (Interview NBV) The last sentence indicates that capacity, and possibly motivation, of individual experienced beekeepers to guide new beekeepers is insufficient. This suggests that despite discursive consensus that this lack of exchange between experienced and new beekeepers is negatively impacting be health, the successful solution of this identified problem depends on individuals, and their capacity and motivation for behaviour change.

4.2.2.3 Promote knowledge and awareness

When looking at the stakeholder coalitions and the measures they propose to come to the solutions they envision for the issue of bee decline, it becomes clear that in both group 1 and group 2 there are discourse coalitions that deem knowledge development important. Views on which type of knowledge requires development vary for each stakeholder. Some of the stakeholders stress the importance of educating those who are actually responsible for executing land management, such as farmers and mowing contractors. For example, CLM explained the importance of educating farmers about threshold values for pests, stating: "less use [of pesticides red.] is *possible if all growers use the newest techniques and use these types of techniques for monitoring threshold values. Then the use of those substances and the risk of the use of those substances can vastly reduce."* (Interview CLM) The LTO spokesperson explained how knowledge development is seldom tailored to be applied by farmers: "*But you see a bump when it comes to translating fundamental knowledge into practice. Particularly in the current manner in which knowledge is structured. At a certain moment in the knowledge development process they say: "This question has to do with application of knowledge, that is no knowledge development anymore." Whilst I think: "The knowledge is still not available in a way in which farmers or growers can do something with it and apply it in their practices."* (Interview LTO) Although the storylines vary greatly in

terms of the content of the knowledge that needs to be developed, the common factor is that stakeholders are in need of practically applicable knowledge.

Storylines used by different stakeholders regarding awareness also vary greatly. Particularly in terms of the envisioned target audience, and what the target audience should be made aware of. For example, the spokesperson of the Province of Overijssel explained the importance of making people aware of which actions are and which are not beneficial to bees*: "Of course, as a province we have responsibility for nature policy, and I think that also entails inspiring people. Raising awareness so that people feel more connected [with nature red.] so that they are more inclined to take action, or to stop doing certain things."* (Interview Province of Overijssel) The Ministry of LNV explained how awareness could help certain land managers look past their core task: *"For example, 'Rijkswaterstaat' they just say: 'the dikes need to be safe and we have programme x for that. We've done it that way for decades, if not centuries.' And of course, then for us it becomes a challenge to provide the idea that: 'if you do it like this, or if you strengthen this one measure, it does not have to cost more or be more complicated. If that is anchored you have something that is contributing [to combatting bee mortality red.] without much costs or difficulties for your organisation.'* (Interview Ministry of LNV) Despite these differences in target audience, stakeholders

4.2.3 Areas of conflict

Paragraph 4.2.1 provided an overview of the storylines that were used by stakeholders in the different layers of the debate, and the discourse coalitions that were identified. The previous paragraph (4.2.2) displayed the common ground stakeholders share in the debate. Showing that stakeholders agree on the importance of increasing biodiversity, improving beekeeper practices, closing knowledge gaps, and promoting awareness among land managers regarding bee-friendly practices. However, areas of disagreement were also found in the different layers of the debate surrounding bee decline and how to solve it. This paragraph will explain those areas of conflict and the conflicting storylines that are used by the discourse coalitions in each respective conflict. This is done in the last analytical step towards meeting objective 2 of this thesis: Identifying conflict and common ground.

The main conflicts that were identified based on the discourse analysis are the conflict regarding neonicotinoid use, and the conflict regarding the competition between honey bees and wild bees for food sources. The following paragraphs each explain one of these two conflicts.

4.2.3.1 Neonicotinoids: to ban or not to ban?

The most prominent conflict that was found, and which involved nearly all stakeholders in the debate regarding bee decline, is the one concerning neonicotinoid pesticides. The following sections display the two discourse coalitions that were identified, the conflicting storylines these coalitions used, and the causes and drivers of the conflict.

A detailed overview and analysis of the storylines used by both the proposing and opposing discourse coalitions in this conflict

To fully understand some of the storyline arguments that are utilised by the stakeholders in the debate, some context regarding the authorisation procedures for crop protection substances is relevant. Textbox 1 provides some information on the authorisation procedures in place at the EU level as well as the Dutch national level.

Textbox 1

Authorisation procedures plant protection products

For a plant protection product (PPP) to be allowed on the market in the Netherlands, it needs to comply with a set of European as well as a set of national rules. Firstly, the active substance in the product needs to be approved at the European level by the European Commission (EC hereafter). The EC bases their decision making in this regard on risk assessments by the European Food Safety Authority (referred to as EFSA hereafter). (European Union 2009)

Apart from this approval of its active substance at the European level, the PPP also needs to receive an authorisation from the relevant EU-member state. Once this authorisation comes through in one member state, the PPP can be distributed in other EU-member states with a comparable agriculture, plant health and environmental conditions due to the principle of mutual recognition. (European Union 2009) The institution that is responsible for assessing whether PPPs meet both the European and Dutch requirements, and for granting authorisations in the Netherlands, is the College for Authorisation of Crop Protection (CTGB hereafter). The manner in which CTGB should assess whether a PPP meets the requirements is stipulated in a set of European and Dutch rules. CTGB mainly assesses whether use of the PPP is safe for people, animals and the environment. To test this, the possible exposure of people, animals and the environment to the active substance in the PPP is compared to the safe levels of the active substance(s). (Ministerie van LNV 2017)

Recent history neonicotinoid authorisations in the EU

In 2013 EFSA published the 'guidance document on the risk assessment of plant protection products on bees'. This document is often referred to as the 'bee guidance'. This document was commissioned by the EC and served to provide guidance for risk assessments regarding the impact of PPPs on bees. (European Food Safety Authority 2013)

Using the methods outlined in the bee guidance document, EFSA performed a risk analysis of three neonicotinoid substances (clothiadin, imidacloprid and thiamethoxan respectively). The results, which were published in January 2013, led to European restrictions on the use of these neonicotinoids as they were determined to be harmful for honey bees. (European Commission 2013)

Discourse coalitions: Pro-ban and No ban

Based on the discourse analysis that was performed in paragraph 4.2.1, two stakeholder coalitions could be identified when it comes to the question whether a ban on neonicotinoid use would be desirable.

The stakeholders that are part of the 'pro-ban' coalition are:

Environmental- and Nature Conservation NGO's
Greenpeace
Natuurmonumenten
The Pollinators
Natuur&Milieu

The stakeholders that make up the 'no ban' coalition are:

Beekeeping organisations	Knowledge Institutes
BVNI	CLM
NBV	Naturalis
Governmental organisations	**Agriculture organisations**
Ministry of LNV	LTO
	Agrifirm

Conflicting storylines

When comparing the storylines used by the 'pro-ban' and 'no ban' coalitions (a detailed overview of these storylines can be found in Appendix IV), a couple of conflicting storylines stand out.

Firstly, opposing claims are made when it comes to the scientific proof for the causal relation between neonicotinoid use and bee decline. This is in line with the societal and perceived academic controversy surrounding this possible link that was described in the introduction of this thesis. The storylines used by stakeholders seek to legitimise the findings that confirm their own stance, or to delegitimise findings that the 'other side' uses as a warrant. For example, stakeholders that support the 'pro-ban' narrative legitimise their claim by stating that independent researchers have found proof for a causal relation between neonicotinoid use and bee decline. (Interview Greenpeace) In their storylines they delegitimise the results from the CTGB risk assessments by stating these assessments are too limited. (Interview Greenpeace) The same happens the other way around. For example, Nefyto stated that the studies that are used by the 'pro-ban' stakeholders to prove a relation between neonicotinoid pesticides and bee mortality are not in accordance with the Good Laboratory Practice standards. (Interview Nefyto)

Secondly, dissatisfaction exist regarding the guidance and models that are used in the risk assessment procedures. Whilst both 'sides' are not satisfied with the current risk assessment, that is for different reasons. Greenpeace argued that current risk assessments concerning neonicotinoids are too limited since they only focus on the impact on bees and does not test the impact of pesticides on other non-target organisms. (Interview Greenpeace) Bayer and Nefyto have argued that the bee guidance that the EC commissioned EFSA to use in their neonicotinoid risk assessment is, in its current form, not practically feasible. Both stakeholders explained how unreasonable data requests made by EFSA for the model resulted in data gaps. In turn, these data gaps in the model led to the conclusion that use of three neonicotinoids came with 'unacceptable risk' to honey bee health. Bayer and Nefyto have, thus, called for a revision of the current bee guidance which would use data that is more feasible to obtain for pesticide producers. (Interview Bayer; Nefyto)

The two previous sections show that disagreement exists among stakeholders regarding which research projects into causes for bee decline are legitimate; what constitutes a good authorisation procedure; and how risk assessment models that test the relation between certain pesticides and bee health should be designed. The conflicting storylines on these matters are a clear example of the discursive struggle of different stakeholders for the dominance of their truth perceptions at the decision-making level. For example, decisions at the EC level regarding which guidance models should be used to assess the risk of neonicotinoid pesticides on bee decline, illustrate that power and politics influence the creation of knowledge. The findings resulting from the research based on that bee guidance model leading to restrictions on the use of three neonicotinoid pesticides (European Commission 2013) presents a clear example of knowledge claims being used to legitimise policy decisions. This is in line with the Foucauldian understanding of the relation between power and knowledge that was explained in the theoretical framework of this thesis. (Foucault 1970) Thus, the 'decision to ban neonicotinoids would be a political one, based on emotions rather than science' storyline, which was used by a few stakeholders in the 'no-ban' coalition has some merit. (Interview Agrifirm; Broeders, personal communication 4 June) However, the implication in the storyline that these decisions can be completely depoliticised and solely based on objective science, disregards the inherent political nature of such knowledge creation decisions.

A third set of conflicting storylines that can be identified concerns the availability of alternatives to neonicotinoid pesticide use. Stakeholders from the no-ban coalition have stated that due to the lack of more sustainable alternatives to neonicotinoid pesticides, there is a risk of shifting, and possibly exacerbating the problem if neonicotinoid substances are banned. They explain in this storyline that farmers will remain dependent on methods to keep pests under control if they wish to continue to produce food crops. Therefore, farmers will likely start using other substances that have received an authorisation if neonicotinoids should be banned. The risk is that these alternatives might end up doing more harm than the

neonicotinoids would have, because higher volumes need to be applied for a similar effect for instance, and that the total environmental impact will increase if these other substances are used as an alternative for neonicotinoids. Which would be more harmful for Dutch pollinator populations than the neonicotinoids are now. (Interview CLM; Naturalis; LTO) Moreover, Nefyto state that because of a lack of suitable alternatives, a ban on neonicotinoids would have a severe economic impact on the Dutch agriculture and horticulture sector, as well as pesticide producers. (Interview Nefyto) These storylines were opposed by Greenpeace, one of the stakeholders in the pro-ban coalition, who used the storyline that alternatives to neonicotinoids are actually available. (Interview Greenpeace) Much like the conflicting storylines in the previous paragraphs, these competing storylines are a manifestation of competing knowledge claims.

Causes and drivers of the conflict

Based on the findings of the stakeholder analysis and the discourse analysis the following causes and drivers of the neonicotinoid conflict were identified. These factors can explain why stakeholders have difficulty moving past this conflict.

Firstly, based on the results of the stakeholder analysis (section 4.1 and appendix I) combined with the conflicting storylines that were described in the previous paragraphs, the following conflict of interest can be established. A neonicotinoid ban would have a harmful impact on the economic interests of powerful stakeholders such as Nefyto, LTO and Bayer (which were identified in the stakeholder analysis). Conversely, powerful stakeholders in the pro-ban coalition, such as Greenpeace, Natuurmonumenten and Natuur&Milieu, would perceive continuous authorisation of neonicotinoid pesticides to be harmful to their environmental interests. The strong social power of both proponents and opponents has resulted in an ongoing struggle for discursive dominance. This explains the enduring stalemate.

Secondly, when looking at the bee decline debate in section 4.2.1 of this chapter, it becomes clear that certain storylines are embedded in debates of a larger scale than just wild bee decline or honey bee mortality. Those will be explained in the following paragraphs.

The debate surrounding bee decline has become strongly interlinked with more general debates surrounding the Dutch agriculture system. Although most stakeholders used storylines that stressed the importance of a sustainable approach to agriculture, the meaning of what constitutes sustainable agricultural seems to vary for different stakeholders. The main point of disagreement seems to be the role of pesticides in sustainable agriculture, or rather, if pesticide use can coincide with sustainable agriculture at all. Pesticide producers believe that pesticides, when used according to the label can be seen as a tool to ensure sustainable yield: *"Look, sustainability and effects of [pesticide red.] substances have something to do with each other, but they are also very different. To us,*

crop protection substances, whether they are chemical or organic, are a tool for a farmer. […] Pesticides are a means to realise a sustainable cultivation. And you can use a means or appliance, just like a tractor or every other input that you use on a farm, in a good or in a bad way." (Interview Bayer) Environmental organisations like Greenpeace sees sustainable agriculture as a biodiverse and organic system in which no chemical pesticides are used and using agro-biodiversity as pest control. (Interview Greenpeace) Stakeholders such as CLM, LTO and the Ministry of LNV used storylines about the integrated approach to pesticide use. Their storylines imply that in a sustainable agriculture approach, pesticides can be used but should be seen as a last resort. (Interview CLM; LTO; Ministry of LNV) These different perspectives point at fundamental value differences regarding pesticides in general.

Another bigger issue underpinning the neonicotoid debate concerns the role of the government in controlling the pesticide sector. Greenpeace used storylines urging for strong government interference when it comes to pesticide use. (Greenpeace) Other stakeholders believe that the pesticide industry is very responsible in its practices, and also has incentives to become more sustainable due to the shift in consumer demand for more sustainable food production. They believe politics and government should not be more involved in pesticide regulation. (Interview Nefyto; BVNI)

4.2.3.2 Honey bees and wild bees: competition for food sources, or not?

The previous section displays the prominent conflict surrounding bee decline. This section explains the second identified conflict. This second conflict was a bit more hidden in the debate and could not be identified based on the discourse coalitions identified in paragraph 4.2.1. Instead it was identified based on conflicting storylines that were found in the discourse analysis process. This conflict concerns the Natuurmonumenten policy to limit the amount of managed honey bee colonies that are stationed in their nature areas. (Interview Natuurmonumenten) Beekeepers, who want their honey bees to have access to the scarce flower-rich and biodiverse areas of the Netherlands, are unhappy about this policy. (Interview BVNI; NBV) The only stakeholder apart from the beekeepers and Natuurmonumenten who mentioned this conflict in their interview was the Province of Overijssel. Their spokesperson stated: "*Those are very different perspectives. And both have merit, that is my view. Of course, you should not place beehives in places where wild bees and insects in general are doing very poorly. But, place them in more suitable areas."* (Interview Province of Overijssel) The conflict is shortly explained in this section. Detailed information about the quotes and storylines used by the stakeholders can be found in the 'honey bees and wild bees' section of Appendix IV.

Conflicting storylines

The main storylines used by Natuurmonumenten to justify their policy decision, are (1) that gestation plants are scarce; (2) that insect populations and wild bee populations are doing poorly, and many wild bee species are threatened; (3) that honey bees are not threatened;

(4) that it is Natuurmonumenten's task to protect and conserve wild bees, but not to protect beekeeping practices; (5) that research papers have determined that there is a high risk that honey bees compete with wild bees for the same food sources, and in high densities supress wild bee populations. (Interview Natuurmonumenten) Natuurmonumenten follows the advice of these research papers in being careful with the amount of honey bees they allow in their areas. (Mallinger, Gaines-Day, and Gratton 2017; Wojcik et al. 2018)

The main storylines used by the beekeeper associations are (1) that beekeepers have difficulty getting access to sufficient food sources for their honey bee colonies; (2) that they do not believe that competition takes place between honey bees and wild bees, due to differences in life cycles and flower preference. (Interview BNVI; Interview NBV)

Stakeholders use different knowledge banks to underpin their storylines, and the knowledge claims they make regarding the competition between wild bees and honey bees are conflicting.

Causes and drivers of the conflict

The main interests of stakeholders involved in this issue clash within the context of this conflict. The stakeholder analysis results (paragraph 4.1 of this thesis), confirm that the beekeeper associations have a main interest in maintaining the health of their honey bee colonies, whereas Natuurmonumenten has a main interest in conserving wild bees. In the perspective of Natuurmonumenten, permitting access to their nature areas to every beekeeper that requests it, would harm their main interest. This also becomes evident in the following quote of the Natuurmonumenten ecologist*: "I would be really happy if there would be hard evidence that honey bees and wild bees, in any ratio, have zero influence on one another, that would make things much easier for us. In that case we would say: place your colonies here. However, research that we see makes us think: "There is a really high risk that there is competition going on, and that there are negative effects [on wild bees red.], so we have to be careful."* (Interview Natuurmonumenten)

Although these conflicting storylines and interests explain the conflict to some extent, the conflict is in essence a symptom of a problem that both Natuurmonumenten and the beekeepers share: The scarcity of qualitative food sources for bees, both managed and wild ones.

4.3 Objective 3: Conflict resolution

Previous sections 4.2.2 and 4.2.3 established that both areas of common ground and conflict exist within the debate surrounding bee decline in the Netherlands. This section provides the results of the analysis that was performed towards meeting objective 3 of this thesis: Determine whether integrated negotiation is a suitable conflict resolution strategy to for identified conflicts. The main conflicts that were identified in section 4.2.3 concern a

possible ban on neonicotinoid use, and a disagreement regarding whether honey bees compete with wild bees for food sources. The following sections explain whether the preconditions for integrative negotiation are met within the context of these conflicts.

4.3.1 Neonicotinoid conflict

As was explained in the introduction and in paragraph 4.2.3, the neonicotinoid conflict is a long-standing one of almost ten years. Resolution of this conflict would be beneficial, since the conflict seems to take up time and attention from all stakeholders, which could be invested in implementing measures that stakeholders do agree on. In paragraph 4.2.1 it became clear that within this particular conflict, stakeholders are at a very fundamental disagreement. This section shows the key stakeholders, and whether or not the key stakeholders meet the preconditions for integrative negotiation.

Key stakeholders

Based on the information collected in the stakeholder analysis, key stakeholders in this conflict are:

LTO: Has, out of all stakeholders, the highest outcome power when it comes to pesticide use. Also has a strong interest in maintaining the neonicotinoid authorisation.

Bayer and Nefyto: Have a strong interest in maintaining the neonicotinoid authorisations dependence on authorisations of neonicotinoids and are socially powerful.

Greenpeace: Has a strong interest in the issue and is the most socially powerful proponent of a neonicotinoid ban.

Preconditions for integrative negotiation

Table 4 Overview of the presence of preconditions for successful negotiation and successful integrative negotiation in involved stakeholders. The O signifies the presence of the precondition in a stakeholder, the X signifies a lack of this precondition in a stakeholder, O/X signifies that the precondition is partially present (for example only with respect to a certain stakeholder)

		LTO	Bayer	Nefyto	Greenpeace
Negotiation	Perceived probability of obtaining conflict goals through other strategies (increasingly) unlikely	O	O	O	X
	Relative costs of conflict goals pursuit increase relative to conflict goal value	X	X	X	X
	Areas of common ground and compatible interests exist between stakeholders	O	X	X	O/X
	Leadership flexible enough to consider negotiation	O	O	O	O/X
Integrative	Belief in validity and importance of positions other stakeholders	O	X/O	X/O	X

	Motivation and commitment to work together	O			O/X

The results of the precondition test in table 4 clearly shows that not all preconditions can be met. Therefore, a negotiation or integrative negotiation between the abovementioned stakeholders will most likely not result in a successful problem resolution. The following text will provide a short explanation of the content of table 4. A detailed explanation underpinning of the table can be found in Appendix V in the 'neonicotinoid conflict' section.

Greenpeace lacks incentive and motivation to consider negotiating with the pesticide industry. The spokesperson stated: *"it is not likely you will see us around the table with Bayer or Monsanto themselves, because we don't believe we will be able to cover much ground with that approach. Because their business model is selling substances that are bad for, for example, bees. That is their core business."* (Interview Greenpeace) Moreover, Greenpeace's current contending strategy is working for them since the dominant discourse is shifting towards their 'pro-ban' discourse. This is evident from the shift in storylines used by the relevant Ministers over the past eight years. In 2010, Minister at the time Gerda Verburg stated there was: *"no reason for a moratorium"* (Verburg 2010, 5) Martijn van Dam, who was Minister in 2017, supported the draft proposal by the EC to ban neonicotinoid use: *"Based on the findings of EFSA I am of the opinion that action within Europe is required regarding risky applications of the three neonicotinoids imidacloprid, clothianidin and thiamethoxam and therefore support the proposals of the EC. Despite EFSA having used a non-approved assessment framework, I think the findings justify European action."* (Van Dam 2017, 4)

LTO meets most of the preconditions for negotiation, in part because they do share some common ground with Greenpeace and they do believe in the validity of Greenpeace's positions: *"Look, an NGO such as Greenpeace wants to get rid of crop protection, because they want to move towards organic agriculture. And there are many reasons behind that, and part of those are legitimate. It is their right to advocate that."* (Interview LTO)

However, none of the key stakeholders meets all preconditions. So, it is unlikely that these stakeholders could collaborately resolve the neonicotinoid conflict through a negotiation.

4.3.2 Competition between wild bees and honey bees conflict

This second conflict is isolated to a few stakeholders and concerns the Natuurmonumenten policy in which they limit the number of beehives that are allowed in their nature areas. Beekeepers are unhappy about that policy. This section shows the key stakeholders and whether or not those key stakeholders meet the preconditions of integrative negotiation.

Key stakeholders

The societal controversy surrounding the question whether competition for food sources between wild bees and honey bees is isolated to a small group of stakeholders: Natuurmonumenten, BVNI, NBV, and the Province of Overijssel. The first three are considered key stakeholders in this issue, since they are the only ones that have an interest in this conflict.

Preconditions for integrative negotiation

Table 5 provides an overview of the stakeholders, and whether they meet the pre-conditions for negotiation and integrative negotiation. The findings are shortly explained in the following section, and a detailed overview of the data that was used to make the model can be found in the 'competition wild bees and honey bees conflict' section of Appendix V.

Table 5 Overview of the presence of preconditions for successful negotiation and successful integrative negotiation in key stakeholders in the 'competition between wild bees and honey bees' conflict. The O signifies the presence of the precondition in a stakeholder, the X signifies a lack of this precondition in a stakeholder, O/X signifies that the precondition is partially present (for example only with respect to a certain stakeholder)

		Natuurmonumenten	BVNI	NBV
Negotiation	Perceive probability of obtaining conflict goals through other strategies (increasingly) unlikely	X	O	O
	Relative costs of conflict goals pursuit increase relative to conflict goal value	x	x	x
	Areas of common ground and compatible interests exist between stakeholders	O	O	O
	Leadership flexible enough to consider negotiation	x	O	O
Integrative Negotiation	Belief in validity and importance of positions other stakeholders	x	x	x
	Motivation and commitment to work together	O	O	O

The results of the precondition test in table 5 clearly show that not all preconditions can be met. Therefore, a negotiation or integrative negotiation between the abovementioned stakeholders will most likely not result in a successful problem resolution.

It is relevant to note that in this particular situation, there is an asymmetrical power dynamic, since Natuurmonumenten is the owner of their nature areas. Therefore, Natuurmonumenten has the power and right to decide whether they are willing to allow bee

keepers to place their bee colonies in their nature areas. Natuurmonumenten is not necessarily dependent on beekeepers, which makes the power dynamic in the context of this particular conflict lobsided. It also means that Natuurmonumenten already reached its conflict goal. Thus, they would have no incentive to start negotiating. The conflict strategy of Natuurmonumenten can be considered to be contending, since they display a high concern for self and a low concern for the other by stating: *"It is not Natuurmonumentens task to support beekeepers."* (Interview Natuurmonumenten) That said, the current policy does not entail a complete ban of honey bee hives within the nature areas, it allows one honey bee colony on every hundred hectares. This can be considered a compromise or even a problem solution strategy in which Natuurmonumenten took into consideration the interest of beekeepers to the extent that they considered unharmful for their own interest.

Interestingly, two of the preconditions were met, including commitment to work together and the existence of common ground. Both Natuurmonumenten and the beekeeper associations are aware of their shared interests when it comes to promoting the development of more biodiverse and flower-rich areas in the Netherlands. (Van Steenis, personal communication, 8 June 2018; Interview BVNI) This conflict can be considered a symptom of a resource scarcity, in this case gestation plants. Thus, the key stakeholders in this conflict have a shared interest in ensuring the increase of that resource.

However, it is highly unlikely that Natuurmonumenten would enter negotiation with the beekeepers regarding their honey bee limitation policy. The reason for this is that the association council, which represents the 700.000 members of Natuurmonumenten, has fully endorsed the policy. (Interview Natuurmonumenten) If Natuurmonumenten would consider negotiating with beekeepers to change this policy, they would have to justify this toward the association council. However, even that consideration would be unlikely due to the scientific basis for the policy.

4.3.3 The National Bee Strategy: Product of successful negotiation?

In January 2018, 43 Dutch stakeholders signed the "National Bee Strategy: Bed & Breakfast for Bees". Among the signatories were ten of the stakeholders that were analysed in this thesis: Bayer, BVNI, CLM, LTO, the Ministry of LNV, Naturalis, Natuurmonumenten, Nefyto, the Province of Overijssel and Natuur&Milieu. The strategy is the result of multiple meetings between stakeholders, initiated by the Ministry of LNV, in which they developed this shared strategy to mitigate, mainly, wild bee decline in a collaborate manner. (Rijksoverheid 2018) In this section the strategy document is shortly analysed and the content compared to the findings in this thesis.

The three goals of the strategy concern three themes: biodiversity; the interplay between agriculture and nature; and honey bees. These themes largely match the areas of common ground that were identified in paragraph 4.2.2 of this chapter. More similarities between the

thesis findings and the national bee strategy are found in the list of underlying goals of the strategy. The list includes awareness, education, and action perspective goals under each of the themes. All of those underlying goals were also identified as areas of common ground in the results of this thesis.

Pesticides, which are named by some of the stakeholders in the debate as one of the main causes of bee decline (i.e. interview Greenpeace; The Pollinators) are just named shortly in the strategy. Mainly as a reference to existing Dutch policy. Some stakeholders, at the time of publication, criticised the strategy for not incorporating this cause for bee decline more into the strategy. (Bijenstichting 2018) However, based on the findings in this thesis, such fundamental differences drive the disagreement on this topic, that it is highly unlikely stakeholders would have come to an agreement on it in the process through which the strategy was development. Moreover, too much of a focus on this specific area of disagreement could have interfered with the stakeholder ability to identify common ground. Although it is absolutely important that stakeholders exchange their view on the pesticide topic, leaving this controversial topic somewhat out of the strategy left room for stakeholders to look past their differences and discover common ground.

Whether stakeholders will manage to put the strategies' words into action, only time will tell. However, stakeholders seem committed. The booklet accompanying the strategy includes descriptions of seventy different stakeholder initiatives and projects to address the bee decline issue. (Rijksoverheid 2018)

To summarise, National Bee Strategy, although it does not address the more controversial topics in the bee decline debate, has succeeded in extracting from the broad and complex debate surrounding bee decline the main areas of common ground between a broad array of stakeholders and processed that into concrete goals. This is an achievement in a debate that is so prone to polarisation.

5. Conclusion and Discussion

This thesis analysed the societal debate that originally emerged as a result of high winter mortality in honey bees, and that continued due to declines in wild bee population in the Netherlands. This was done in order to get a more comprehensive understanding of the stalemates within the debate, and of whether negotiation could be a suitable strategy to resolve them.

This final chapter provides the answers to the main research questions of this thesis, the relevance of the findings in relation to the broader academic body of work, a critical discussion of the used theories and methods, and recommendations for policy makers and further research.

5.1 Conclusion

Three main research questions were answered in this thesis. The following sections display the answer to each respective question.

Main Question 1: Which stakeholders in the debate surrounding mortality in wild bees and managed honey bees in the Netherlands can be identified?

In the stakeholder analysis fifteen stakeholders were identified: NBV, BVNI, LTO, Agrifirm, Greenpeace, N&M, Natuurmonumenten, The Pollinators, Bayer, Nefyto, Ministry of LNV, Province of Overijssel, and the municipality of Houten. There are more than fifteen stakeholders in the Netherlands that are involved in this debate, however, these fifteen comprise a rather accurate representation of the perspectives on the bee decline issue could be ensured. At least two stakeholders were interviewed from each of the six main stakeholder categories in the debate: (1) Bee keepers; (2) Farmers; (3) NGOs (with a focus on nature or the environment); (4) Crop protection substances industry; (5) Knowledge institutes; (6) Government.

Results from the stakeholder analysis show that stakeholders have different links to the bee decline issue and very different interests and levels of social- and outcome power. For about half the stakeholders in this research project, their interests in the debate are mainly rooted in environmental ideals and focus on wild bees. The other half mainly has an economic interest in maintaining sufficient pollination services, these stakeholders typically have an interest in both the prosperity of honey bee and wild bee populations. These interests conflicted in the context of the neonicotinoid ban proposal and the desire of beekeepers to station their honey bees in nature areas.

Main Question 2: Which areas of conflict and common ground can be identified in the discourses amongst stakeholders involved in Dutch bee mortality regarding causality of bee mortality and possible solutions?

In the debate surrounding wild bee decline and honey bee mortality stakeholders can find common ground in their beliefs that: (1) Lack of suitable habitat for bees should be addressed; (2) Addressing this lack of suitable habitat is a responsibility for the whole of Dutch society; (3) Desirable practice should be rewarded and incentivised; (4) Practices of new beekeepers should be improved through better transfer of knowledge; (5) There should be attention for building stakeholder knowledge and awareness.

Stakeholder storylines and views regarding the mitigation of (wild) bee decline conflicted on: (1) Whether neonicotinoid pesticide use should be banned; (2) Whether honey bees and wild bees compete for food sources. The former constitutes the main conflict in the debate, since most interviewed stakeholders are in some way involved in this conflict. The latter is a more isolated conflict between the beekeeper organisations (NBV and BVNI) and one of the nature NGOs (Natuurmonumenten).

The results showed that the causes and drivers behind ongoing neonicotinoid conflict are the harmful impact of a ban on the interests of powerful stakeholders, the strong social power of both proponents and opponents, the fundamental value differences behind stakeholder perspectives regarding pesticides in general, perceived scientific ambiguity, and disagreement regarding the current risk assessment model. The main causes of the honey bee vs. wild bee conflict are perceived scientific ambiguity as well as conflicting interests. Beekeeping organisations have a main interest in ensuring the health of their honey bee colonies, whereas Natuurmonumenten has a main interest in the protection of wild bee populations.

Main Question 3: Would integrative negotiation be a suitable conflict resolution strategy for the conflicts that can be identified in the debate regarding causes and solutions for the bee mortality issue in the Netherlands?

In the first main conflict that was identified, regarding a neonicotinoid ban, the key stakeholders that were identified are LTO, Bayer, Nefyto and Greenpeace. These are the stakeholders that have the strongest interests in this particular conflict and also possess strong outcome and/or social power. The key stakeholders in the second main conflict, regarding the possible competition for food sources between honey bees and wild bees are NBV, BVNI and Natuurmonumenten, since these are the only stakeholders that have an interest and/or power in this matter.

Key stakeholders, in both the neonicotinoid conflict and the wild bee vs. honey bee conflict, lack incentive and motivation to partake in a negotiation process with other key stakeholders. This is evident from their inability to meet the preconditions for (integrative)

negotiation. It can, thus, be concluded that at this time negotiation is not a suitable conflict resolution strategy for either of these conflicts.

5.2 Discussion

This section offers a critical discussion of the thesis findings, as well as of the theoretical framework and methods that were used. This discussion is comprised of four steps. First, the results of this thesis are placed in the context of existing literature (section 5.2.1). Secondly, the policy relevance is discussed (section 5.2.2). In the third step the theoretical framework and methods are reflected upon, and limitations of the study are explained (section 5.2.3). Lastly, recommendations are offered (section 5.2.4).

5.2.1 Scientific relevance

This thesis contributes a social science perspective to the current scientific body of work concerning honey bee mortality and wild bee decline in the Netherlands. So far, a substantial amount of natural science research has focussed on closing data gaps regarding the questions surrounding causes of winter mortalities in managed honey bee populations and declines of wild bee populations. (e.g. Kremen, Williams, and Thorp (2002); Biesmeijer et al. (2006); Smith et al. (2013); and Scheper et al. (2014)) However, societal and stakeholder perspectives on what constitutes a desirable approach to mitigating these bee related issues are not solely influenced by these academic findings. They are also influenced by societal factors, value-based priorities and interests of groups and individuals. The results that stem from the social science lens that this thesis employed, include information on those factors and, thus, can provide explanations for ongoing conflicts. Also, they provide insight in areas of common ground among stakeholders, which can be utilised to design initiatives and policies that are broadly supported.

The thesis results confirmed that the most prominent conflict in the Dutch debate surrounding wild bee decline and honey bee mortality is the one concerning neonicotinoid use. This conflict is not exclusive to the Netherlands, and the same debate has been studied at the EU level. (McGrath 2014) The study by McGrath (2014) regarding the neonicotinoid debate at the EU level resulted in findings similar to this study. McGrath came to the same conclusion that the debate regarding the relation between neonicotinoid pesticides and bee decline is part of a bigger debate about integrated pest management and long-term sustainability of agriculture. A debate that, McGrath argues, is itself a part of an even broader debate regarding the price that we as a society are willing to pay for the insurance of food security in the context of increasing human populations and increasing biodiversity loss. (McGrath 2014)

5.2.2 Policy relevance

During the timeframe in which this thesis was written, the National Bee Strategy was also developed, and eventually signed by 43 stakeholders. As was explained in section 4.3.3 the

goals that are articulated in the National Bee Strategy are similar to the main areas of common ground that were identified through the argumentative discourse analysis. This is hopeful, because it indicates that in the process of developing the National Bee Strategy stakeholders were able to recognise and operationalise the main areas of common ground. Which means that the neonicotinoid conflict did not strain stakeholder relations to such an extent that they were unable to share interests. The findings in the common ground of this thesis can be seen as an affirmation for the goals of the National Bee Strategy. Additionally, the results of the discourse analysis have the potential to enhance mutual understanding between stakeholders, which may strengthen incentive for collaboration and reduces the chance that new conflicts occur in the future. Lastly, it can serve for stakeholders to find likeminded organisations to collaborate with.

5.2.3 Reflection on theories and methods

The three-step analysis in which stakeholder analysis and argumentative discourse analysis were combined proved effective in meeting the research objectives. However, in the execution of the methods multiple challenges arose. Firstly, the semi-structured interview approach that was conducted, although effective in getting stakeholders to open up and talk freely, resulted in a lack of structure in the interview transcriptions and, in some cases, hard-to-compare answers. Questions regarding desirable solutions were, in part, formulated in a way that measured solutions for obstacles that the interviewed stakeholder was confronted with in their own efforts to establish a more bee friendly environment in the Netherlands. This may, in hindsight, explain the fragmentation of the measures that were suggested by stakeholders in the last layer of the debate.

Secondly, as was explained in the methodology, interviews were conducted in Dutch, as this is the native language of both the researcher and the interviewees. For the processing of this data into a thesis in the English language, big parts of the interview quotes needed to be translated. Translation of important interview quotes from Dutch to English was done as carefully as possible, however, conserving the sensibilities and nuances of a quote in the translation was in some cases difficult. Further, in some cases a translation requires interpretation by the researcher, which comes with the risk of researcher bias. Providing stakeholders with opportunity to check the draft of the thesis in terms of accuracy of the rendering of their views, perspectives and storylines, was effective in contributing to the credibility of the thesis as it limited researcher bias and ensured that stakeholders agreed with the manner in which their perspectives on bee decline is depicted in the thesis.

Lastly, it is important to take into account the limitations of the study. Firstly, the study and its results solely apply to the perspectives and storylines of stakeholders in the Netherlands in a specific timeframe. The stakeholder interviews, which are the main data source for the discourse analysis, took place between July and November 2017. Between the interviews and the publication of this thesis some major developments took place. These developments

include the publication of the National Bee Strategy in February 2018 (Rijksoverheid 2018), the publication of the results of the updated risk assessment of three neonicotinoid pesticides in the end of February 2018 (EFSA 2018), and the decision of the EC to nearly completely ban the use of those respective neonicotinoids in April 2018. (Carrington 2018) Since these developments have altered the context of the debate it is possible that stakeholders would use different storylines and answer the interview questions differently if they would take place at this time. Therefore, the findings of the discourse analysis solely represent the perspectives and storylines used by stakeholders in the period of July to November 2017. Secondly, a few interviewees stated that due to the structure of the organisation they work for, an hour-long interview with them does not necessarily represent the official stance of the complete organisation. This is particularly the case for the associations with a large member base. However, these perspectives are still relevant since the views of an individual working within a stakeholder organisation generally align with most of the official views of the respective stakeholder.

5.2.4 Recommendations

Neonicotinoid conflict: Third party intervention
Due to the recent European ban on three neonicotinoid pesticides (Carrington 2018), it is not much of a recommendation anymore. However, based on the mutually exclusive interests and fundamental differences between stakeholders in the neonicotinoid debate, it seems unlikely that stakeholders would have been able to solve the conflict themselves without government intervention. Third party intervention that imposes solution seems to be the best option to break through this stalemate.

Wild bees vs. honey bees conflict: Joint efforts in developing new bee habitat
Theoretically, solving this conflict through joint fact finding seems like an obvious solution, since the disagreement between the stakeholders is based on differing knowledge claims. However, it does not seem likely to be a feasible option. Firstly, because both organisations have limited resources. The resources required to perform a study that answers the question whether significant competition for food sources takes place between wild bee species and honey bees most likely surpass the resources available to these parties. Secondly, even if Natuurmonumenten would have these resources, their interest in utilising those resources for this particular goal is questionable.

The results of the preconditions test revealed that Natuurmonumenten and the beekeeper associations share common ground in their desire to increase flower-rich biodiverse areas in the Netherlands. It also revealed that these stakeholders are motivated to work together on this. Essentially, this conflict is a symptom of research scarcity. So, if stakeholders can work together in increasing resource and reduce scarcity that could eventually solve the conflict.

Behaviour change research

The bee decline issues in Netherlands can be understood as a result of anthropogenic influences. Therefore, a solution for these issues is sought in changing behaviour of certain actors, either through policy changes, pressuring other parties through influencing public opinion, or other measures. However, the effectiveness of such measures hinges on the stakeholders that have to implement them in practice as well as on their capacity to do so. (Bryson, 2004) When it comes to the unanimously agreed upon desirability to increase biodiverse bee habitat, target actors with outcome power are land managers and the people that are responsible for the implementation of land management plans in the field. Lack of desired behaviour change in these actors and individuals indicates lacking motivation, ability (capacity), or trigger. Therefore, in order to design effective policy or projects aimed at changing behaviour, it is relevant to identify which of these three factors of behaviour change is missing in the target group through behaviour change research. That way, the design of the policy can be sufficiently focussed on the specific factor that requires attention in each target actor. (Fogg 2009a)

Practically applicable knowledge development and distribution

One of the areas of common ground that was identified in this thesis is the need for knowledge that is ready to be applied in practice. Ensuring that actors with direct influence on land management have access to low-threshold and easy-to-apply information regarding the most favourable land management techniques is important for effective progress towards more and healthier bee habitat. To illustrate, the recent EC decision to ban neonicotinoid pesticides will result in Dutch growers needing to shift to alternative means of crop protection. It is important that organisations reach out to these growers and provide understandable information that is directly applicable regarding the least environmentally impactful alternatives. This to prevent the neonicotinoid ban from resulting in an increase in environmental pressure.

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Appendix I: Stakeholder analysis

Table 1: Overview of the results from the stakeholder analysis of the interviewed beekeeper associations. Power levels are indicated as 'no power' (-), 'some power (+), or a 'high level of power' (++).

Stakeholder name	Description stakeholder	Interests					Power	
		Managed bee	Wild bee	Economic	Environmental	Cultural	Outcome	Social
NBV	Bee keeper association	X				x	+	-
BVNI	Professional bee keeper association	X		x			+	+
LTO	Representation Dutch agriculture and horticulture sector	X	x	x			++	++
Agrifirm	Cooperation of Dutch farmers	x	x	x			++	+
Greenpeace NL	Environmental NGO		x		x		-	++
N&M	Environmental NGO		x		x		-	+
Natuurmonumenten	Nature NGO		x		x		++	+
The Pollinators	Project of two organisations with a focus on conserving pollinating species	X	x		x		+	+
Bayer	Crop protection substance producer	x	x	x	x		+	++
Nefyto	Advocacy association of the crop protection substance producers			x	x		-	++
NBC	Research center dedicated to topics regarding biodiversity	X	x		x		-	+
CLM	Consultancy firm		x				-	+
Min. LNV	National government	X	x	x	x		+	++
Prov. Overijssel	Regional government		x		x		++	+
Mun. Houten	Local government		x		x		++	+

whether stakeholders have any outcome power in the context of this issue depends on whether they: (1) posses and/or have agency over the management of land; (2) possess the authority to decide whether and which pesticide will be used in a certain area; (3) are in a position in which they can control the health of honey bees. A stakeholder that possesses one or more of these characteristics has outcome power in the context of this thesis.

In order to exert social power a stakeholder may use a variety of resources or strategies. This thesis considers a stakeholder to be socially powerful if said stakeholder has access to one or more of the resources that were described by Sabatier and Weible (2007). These include:

- Public opinion and media;
- Information regarding the problem severity, causes and the costs and benefits of policy alternatives;
- Mobilisable troops (in the context of public demonstrations or statements);
- Financial resources (which can also be utilised to purchase other resources);
- Legal power (including lobbying campaigns to sway officials and placing allies in positions of legal authority; e.g. agency officials, legislators, judges);

Bee Keepers

Bee keepers have an obvious interest in ensuring their honey bee colonies are healthy. For some hobby bee keepers, this is purely out of interest and love for bees and their environment. (Interview NBV) For professional beekeepers, there is an additional financial interest in maintaining the health of their honey bee colonies. (Interview BVNI)

Dutch Beekeeper Association
(Nederlandse Bijenhoudersvereniging (NBV))

Logo. Digital image. Bijenhouders. Accessed January 22nd 2018. https://www.bijenhouders.nl.

The interviewee of the NBV is member of their board.

Dutch Beekeeper Association (NBV)

The NBV is one of the beekeeper associations in the Netherlands. The organisation represents and connects both professional beekeepers and hobby beekeepers, and also welcomes those who are interested in honey bees and other pollinating insects. One of the

goals of the association is to support beekeepers and influence their surroundings to ensure optimal living conditions for bees. (Nederlandse Bijenhoudersvereniging 2018)

Interests

The association has the following mission: *"The NBV connects, strengthens, educates, inspires and facilitates beekeepers with the goal to conserve and promote a healthy bee population."* (Nederlandse Bijenhoudersvereniging 2018, sec. Missie) This mission was underpinned during the interview when the spokesperson was asked about the underlying incentive of the organisation to be involved with bees in the Netherlands. She said on the matter: *"Why does NBV find it important to be involved with bees in the Netherlands? What is the underlying incentive?"* (Interview NBV) She answered: *"I would say history. Bee keeping used to be an important pillar of agriculture. We even had a testing station. Look, beekeeping exists in the Netherlands, and people are interested in keeping bees. That is our reason for existence. It is kind of like bird watching I think, the bird protection organisation, actually comparable. They are watching birds, but they also see them disappear, so they start getting involved."* (Interview NBV) The main interest is to conserve honey bee colonies since most beekeepers manage honey bee colonies. But interestingly the vast majority of beekeepers in the Netherlands, and the majority of beekeepers that are members of NBV, are hobby beekeepers. Therefore, there is not an economic incentive to maintain honey bee colonies. However, there is also not necessarily a strong ecologic interest at play. NBV does have an interest in maintaining or promoting flower-rich biodiverse areas, but that is in service of maintaining healthy honey bee populations, not the other way around. The NBV is therefore the only stakeholder that does not fit into either the economic or ecologic interest category. Its interest in conserving honey bees is more based in the notion that the practice is important cultural heritage and should therefore be protected. Therefore, their interest in conserving honey bees is considered a cultural one.

Even though NBV thinks there is not much of a problem with honey bee mortality at the moment, the organisation has a big interest in remaining part of the discussions surrounding bee mortality. This is because they seek to gain recognition as a direct contributor to the Dutch agriculture sector, and thus to the Dutch economy. When asked about what she would consider an ideal national bee policy the NBV spokesperson said: *"The starting point is that we discuss that the survival of bee keeping is of relevance for the government because it has a function in nature management and agricultural production."* Interviewer: "*So the starting point is that the government recognizes that it is important?"* NBV: *"Yes, because if this is not the case […] the government would say: 'make those people organise it themselves. It is a hobby. It is something like making puzzles, model trains, playing games etcetera.' Those are also not things the government gets involved in […] But if you say: 'Bee keepers are of importance for part of the agricultural production, if it disappears we cannot grow tomatoes and blackberries.' If that is recognised by the government, I think a structure, comparable to the testing stations should be thought up. I don't want to return to that time,*

because it fitted in that context, but an organisation that is financed by the government." (interview NBV) This indicates that reason that NBV has an interest in gaining governmental recognition for the relevance of bee keepers and honey bees for society, also because this would potentially yield financial and/or academic support and resources for bee keeper activities.

Power

NBV has outcome power in improving honey bee health, since its members have a direct influence on the health of their honey bee colonies and the NBV can directly influence bee keeper education. However, their outcome power is limited when it comes to improve the living environment of bees or curbing pesticide use because the organisation does not manage lands.

NBV has got some social power. There is some capacity in the regional divisions of the association to approach municipalities in order to get them to change the way they manage their green areas. (Interview NBV) Furthermore, letters of NBV have been discussed in the Dutch house of representatives, and opinion pieces have been published in national newspapers. (e.g. Sebastian Menninga (2013))

Professional Association Dutch Beekeepers (Beroepsvereniging Nederlandse Imkers (BVNI))

Logo. Digital image. Beroepsimkers. Accessed January 22nd 2018. https://www.beroepsimkers.nl.

The spokesperson is member of BVNI with his company (Bijenhuis).

Professional Association for Dutch Beekeepers (BVNI)

BVNI is an advocacy organisation for professional beekeepers, which means they defend the interests of these professional beekeepers.

Interests

Because their honey bee colonies are the main source of income of the BVNI members, the association has a strong interest in maintaining healthy honey bee populations.
The factor that distinguishes BVNI from the other bee keeping organisations in the Netherlands is that its members are all 'professional bee keepers' as opposed to 'hobby bee keepers'. The difference being that for professional bee keepers their honey bee colonies, and in particular the pollination services they provide, are a main source of income, whereas

for hobby bee keepers managing their honey bee colonies is a recreational activity. This difference is of relevance for the interest of BVNI in the debate. More than other bee keeper associations, BVNI has an interest in maintaining a warm relationship with farmers since they are their main employer for pollination services. This works the other way around as well since fruit and vegetable growers need professional beekeepers to pollinate their crops. The BVNI spokesperson stated: *"The professional association is of course unique. We are speaking with all kinds of actors, for example in the bee strategy, but we were also involved with the devising of the honey plan. Our chair is involved with the developments at for example Bayer. So, the places that the average hobby bee keeper does not want to have anything to do with, that is where we are. Because the interest, let's say, of the professional bee keeper, and particularly regarding pollination, is of course very big. Because you cannot cry out, like: 'Well, crop protection agents, I am against them! We don't want them. They kill bees.'"* Interviewer: *"Because you deliver a similar service to the farmers that use these substances?"* BVNI: *"Well, precisely. And often, those farmers really cannot do much different than use certain crop protection agents. At the same time, they need those bees to pollinate. So, you need each other. So, you need to get together to move to the most optimal situation. And if you do this (beekeeping red.) as a hobby, why would you, why would you do that? I think all types of parties call out things that are not nuanced too easily. So that is unique about the professional association."*

Despite honey bees being their main interest, the BVNI spokesperson stated he sees the recognises the wild bee mortality issue, and the relevance of getting involved in solving it. The spokesperson articulated it in the following manner: "*That relates to that we benefit from, you know, the biodiversity story. Both wild bees and butterflies, yes, all benefit. We have a monoculture here, low biodiversity. With insects, number plate research was done, and we see: insects are doing poorly.* [Interviewee refers to a publication by Hallmann et al. (2017) which found a decline in the flying insect biomass in protected areas in Germany red.] *That makes sense, because biodiversity is not doing well. So, that bee, is also not doing well. […] Of course, it is in my interest that honey bees are doing well. But I know one thing for certain: If wild bees are doing well, and butterflies are doing well, my honey bees will also be doing fine."* (Interview BVNI) This indicates that BVNI thinks it will benefit from a focus on creating more suitable habitat for wild bees, since that will ultimately also benefit the health of their own honey bees.

Power

Just like NBV, BVNI has outcome power in the sense that its members can directly influence the living conditions for bees in their hives. But again, BVNI does not own or manage big amounts of land, limiting their outcome power.

Lack of social power was part of the reason for the establishment of BVNI four years ago. *"We had all known each other for years. And the reason was annoyance. Because we saw from a distance how all types of initiatives were created that 'sucked dry' sources of funding.*

And in reality, nothing was really happening. So that was when we said at a certain point: 'Yes, that needs to end.' So, we united ourselves, which enabled us to take part in the conversation with organisations." […] 'We really should make a fist, because NBV, ABTB and ANI [the other bee keeper organisations in the Netherlands red.] are not making their voices heard. They are often fighting among each other, and parties like the Ministry of Economic Affairs [now LNV red.] are also saying: 'guys, a position should be taken'.' There are three bee keeper organisations and they are disagreeing. Yes, that does not bring you anywhere." (Interview BVNI) This quote strongly indicates BVNI was established as a result of a desire of professional bee keepers to increase their power position in the national debate surrounding bee mortality. The quote also shows BVNI is included in consultations with other organisations involved in the debate. The reason stakeholders want to include BVNI in conversation has to do with how BVNI positioned itself when it was established, this can be attributed to skilful leadership. Another source of social power of BVNI is the information they have on their own beekeeping practices which apparently result in low winter mortality. They are in a sense an example of 'good practice' in terms of beekeeping. At least, that is how they are framed by some other actors (e.g. Bayer and Nefyto).

<u>Agriculture organisations</u>

Dutch Agriculture and Horticulture Association (Nederlandse Land- en Tuinbouworganisatie (LTO))

Logo. Digital image. LTO. Accessed January 22nd 2018. http://www.lto.nl/

The spokesperson for LTO the Netherlands is 'policy advisor plant health'. In her own description of the job: *"It entails that I deal with all issues that relate to plant health, which usually relate to more than one specific sector. When it involves a certain sector […] they usually have a certain expertise. I really look at the bigger picture and look at all the sectors and at the entirety of the Netherlands. And related to plant health, that is pretty broad, it is everything surrounding crop protection, sanitation issues, or quarantine organisms, which is a topic in which you often encounter trade related issues. It also encompasses biodiversity and plant breeding issues.* […] *Bee health is covered as well, since, you know, within LTO there is a couple of portfolios that don't neatly fit into one box. But bee health, bee populations, touch upon plant health the most because of the links to biodiversity and associations that are often made with crop protection agents. Both are issues we focus on in a similar manner [within the plant health portfolio red.]."* (Interview LTO)

Dutch Agriculture and Horticulture Association (LTO)

The Dutch Agriculture and Horticulture Association (referred to as LTO) is an advocacy organisation that is a collaborative federation representing three regional agrarian organisations. Through this construction LTO effectively represents the interest of 50.000 Dutch farmers on both the national and international level. The focus is on placing issues relating to the economic and societal position of these farmers on the political and societal agenda. LTO does not articulate its own mission and vision on their website. However, in their 'corporate story' they mention their motto: "Better with less". This motto refers to their ambition to find feasible solutions regarding, among other things, crop protection, animal health and animal welfare, and an attractive rural area. LTO wants Dutch farmers to produce better with less energy, less raw materials, and lower emissions. (LTO Nederland n.d.) Their spokesperson mentioned: "*We are striving for a sustainable production. We just published an ambition for 2030 regarding plant health, in which we have set ourselves the ambition to, in 2030, not only be a global leader in quality, which is something the Netherlands is already well known for, but also long-term feasibility. We take a clear responsibility regarding the manner in which crops are grown. And a healthy living environment is one of the three pillars in that. […] We are an important user of green space, and we should do that in a responsible manner." (Interview LTO)*

Interests

LTOs main interest in solving the bee mortality issue is to conserve pollination, as farmers, particularly the large portion of Dutch fruit growers that LTO represents, need pollination for the production of their crops. Thus, there is mainly an economic interest. Since recent academic findings concluded that honey bees and wild bees play complementary roles in the pollination of crops, LTO has an interest in both ensuring honey bee health and in conserving wild bee populations. Regarding the link between LTO and bee health the LTO spokesperson mentioned: *"It is twofold. Firstly, because it is in our interest* [to concern ourselves with bees red.]. *That is not the most important. But a reason is: it is in our own interest. Bees are pollinators, and we need pollinators for our crops."* (Interview LTO) As second reason, she referred to the previously mentioned ambitions for sustainable production. It is noteworthy that LTO stress that to find feasible solutions toward sustainable production farmers need space in terms of land and in terms of rules. (LTO Nederland n.d.) This seems to be reflected the attitude of LTO within the discussion regarding bee mortality: LTO takes responsibility and wants to take a role in solving the bee mortality problem, but in order to take that role LTO wants (or needs) support of other parties to build the required capacity to do so in the farmers they represent.

Power

LTO is arguably the strongest stakeholder when it comes to improving bee health in the Netherlands. They have high outcome power since, in general, the farmers they represent own and manage land, and thus have the direct power to influence two out of three of the

pressures on bee health that were identified in academic literature: (1) the living environment of bees and (2) the use of pesticides. On top of that LTO is a socially strong stakeholder as well. LTO has been able to express their views in mainstream media outlets such as De Telegraaf and Trouw when it comes to the discussion on pollinators (De Telegraaf 2017; Hakkenes 2018), and their perspectives are especially well documented in news outlets that target the farmer community in the Netherlands such as Boerderij.nl. LTO an advocacy association, and it has a strong lobby. According to research by the University of Amsterdam (UVA) LTO is the seventh most influential lobbying organisation in the Netherlands. (Sachtleven 2017) Information regarding the bee decline problem is limited within LTO. There is some potential capacity to mobilise members to make statements, though this has not been done in the recent past in the context of this issue. Information on the financial resources of LTO could not be found.

Royal Agrifirm Group (Koninklijke Coöperatie Agrifirm UA)

Logo. Digital image. Agrifirm. Accessed January 22nd 2018. https://www.agrifirm.nl/

The Agrifirm spokesperson is 'product manager crop protection'. "*Next to my job at Agrifirm, I am also part of the industry association, in the board of the industry association (of agriculture suppliers) 'Agrodis'. In that capacity, we also deal with the bee discussion.*" (Interview Agrifirm)

Agrifirm

Agrifirm is a cooperation in which 17.000 Dutch agrarians have joined their forces with the goal to increase purchasing advantages, share knowledge and expertise and to promote innovation in the sector. (Agrifirm 2018) Agrifirm's mission is: *"To create sustainable, measurable and relevant value for farm, field and industry."* (Agrifirm 2018, sec. Waarde voor de leden) This mission and the spokesperson's job within Agrifirm do relate to the bee mortality debate. The spokesperson explains: *"[My job entails red.] responsibility for purchase. Also, a bit of responsibility for margin. A piece of logistic responsibility and basically partially responsible for anything that relates to crop protection. This encompasses, for example, technical advice. We have our own technicians for that, but together we decide which products we want to purchase, which advice we want to give and the manner in which we are going to do that."* (Interview Agrifirm)

Interests

Agrifirms main interest in solving the bee mortality issue is to conserve pollination, as farmers need pollination for the production of their crops. Thus, there is mainly an economic interest. Since recent academic findings concluded that honey bees and wild bees play

complementary roles in the pollination of crops, Agrifirm has an interest in both ensuring honey bee health and in conserving wild bee populations. Regarding the connection between the company and the discussion around bee mortality the spokesperson said: *"Look, if you deal with crop protection agents, it is not just about advice and sales, which is what we do as Agrifirm, but also with all kinds of other interests within the sector. Including societal interests. We also have customers, and [supply red.] chain parties who are wondering: 'What are you doing to ensure that bees continue to stay [in existence in the Netherlands red.]?' The past few years it has improved, but before that bees were doing really badly. A connection was made by some organisations with certain substances. Is that really the cause, or does it have to do with wrong use of those substances? We directly or indirectly play a part in that matter."* With this last remark he refers to the advisory role agrifirm plays.

Power

Agrifirm has strong outcome power since the farmers that are part of this cooperation own lands and thus have some influence over potential bee habitat and which pesticides will be used.
Agrifirm somewhat socially powerful in the sense that they collect information on which plant protection products are available and what the costs and benefits are of alternatives. Based on that information they advise their members. In that regard the spokesperson stated: *"Yes, we have an advising role, and in general if we advise something, growers follow that advice."* (Interview Agrifirm) In terms of public opinion and media Agrifirm is not very visible. In theory Agrifirm has some 'mobilisable troops' available since the organisation has 17.000 members. However, Agrifirm does not seem to be very involved in making political statements through protests. Information regarding the financial resources and legal power of Agrifirm could not be found.

Environmental and/or Nature NGO's

Greenpeace the Netherlands (Greenpeace Nederland)

Logo Greenpeace. Digital image. Centraal Bureau Fondsenwerving. Accessed January 22nd 2018. https://www.cbf.nl/Instelling/896/Greenpeace-Nederland-St

The Greenpeace interviewee works as Campaigner in the topic areas of Genetic Engineering, Food, Agriculture, Environment, Biodiversity and Bees. (van Bekkem n.d.)

Greenpeace NL

Greenpeace Nederland (The Dutch division) has the following mission: *"Greenpeace finds the vitality of the earth fundamental to all life and therefore fights for a rapid realization of a*

sustainable balance between people and the environment. Greenpeace is an independent international environmental organization. Through nonviolent and inventive confrontations, we denounce environmental problems and we stimulate sustainable solutions." (Greenpeace Nederland 2017c, sec. Onze missie)

Interests

Greenpeace perceives bees as 'canaries in a coalmine', and their interest in mitigating bee decline links to their mission to 'denounce environmental problems and stimulate sustainable solutions'. The spokesperson explained: "*So, basically it [the campaign 'save the bee' red.] represents a deeper story regarding intensive agriculture and biodiversity. I could actually tell the same story about rain worms. If you cultivate land intensively and use lots of pesticides it will be at the expense of your rain worms. And you need those, because the organic matter in the soil, and the soil structure depend on rain worms. And if you have good soil, you have good crops. You can think up similar stories for hoverflies or Ichneumon wasps. If you ensure there is a spot on your farm for hoverflies and Ichneumon wasps, you can use less synthetic pesticides, because these critters help by eating aphids."* (Interview Greenpeace) Thus, their interest is mainly environmental. Even though the honey bee serves as the 'face' of their campaigns, Greenpeace is actually campaigning for a more biodiverse rural landscape in the Netherlands. The spokesperson stated: *"You have to do something about the biodiversity on fields, around fields, so the flowers and ensuring that there is always food available for useful biodiversity, and you need to get busy with reducing substance use, because that is just very high in the Netherlands."* (Interview Greenpeace) This indicates they have more of an interest in conserving wild bee populations.

Power

Greenpeace is very socially powerful. Through campaigns Greenpeace influences those stakeholders who have the power to influence the incentive structures of farmers (who have strong outcome power). *"We don't have much influence on the behaviour of farmers, at least not directly, just indirectly. Basically, we are concerning ourselves with two important things: Creating political change and creating change in the market. That causes change in the field, which then moves farmers to change their practices. […] I think that this role [of Greenpeace red.] has changed. The public work we do is mostly agenda-setting I think. Building public pressure. But we are a campaigning organisation, and within those campaigns we use, sort of, a palette of different tactics through which we attempt to achieve environmental gains. In one situation that is done by hanging up banners, or by starting a petition or a popular initiative. In another situation, we do it by writing a research report or commissioning external scientists or researchers to write such a research report. We have done a lot of research ourselves, so researching how much poison can be found on different plants, that type of stuff. Or check in supermarkets how much organic products are offered. Or look into who is responsible for sawing down trees in the Amazon. But also, consultations.*

Not many people are aware of our consultative side. We are also sitting in boring rooms, talking with people about how things should be done better." (Interview Greenpeace) Greenpeace does not solely focus on the governmental institutions, such as the European Commission and the Dutch government, but also targets other organisations that influence farmer incentives. For example, the campaign that targeted supermarket chains in the Netherlands. *So, our analysis regarding the food chain was basically: 'That bee mortality and substance use is not just a political discussion, we should also have that discussion in the food chain. And the bigger missing link in the whole debate regarding bee mortality was the retail. So, that is why we focussed our public campaigns on a couple of big players in the retail business."* (Interview Greenpeace) These quotes show that Greenpeace: (1) has access to mobilizable troops to perform public demonstrations or statements; (2) does research to get information about for example the benefits of policy alternatives; (3) is able to influence public opinion and media; (4) has some legal (lobby) power at the national level. The ability of Greenpeace to influence public opinion and gain media attention also becomes clear in their annual report. Moreover, the public campaign 'save the bee' of 2016 which targeted big Dutch supermarket chains and included radio spots on national radio stations, indicates that Greenpeace has financial resources available to exert social power. (Greenpeace Nederland 2017c)

Nature & Environment (Natuur & Milieu (N&M))

Logo Natuur&Milieu. Digital image. Natuur&MIlieu. Accessed January 22nd 2018. https://www.natuurenmilieu.nl/duurzamewarmte-partners/

Nature & Environment (N&M)

Nature & Environment (Referred to as N&M from here onward) is a Dutch NGO.

Interests

N&M has an environmental interest in mitigating bee decline. Further bee decline would not impact the financial revenues of the organisation, and in their mission and vision statement they mention: *"Our vision is that we believe in a beautiful, healthy, and sustainable world in which we can all, without damage to human, nature and environment, live, work and participate. We feel the urgency of climate- and environmental issues and see many opportunities to handle our planet in an ecologically responsible manner" (Natuur&Milieu n.d., sec. Missie & Visie)* They then state the following mission: *"We work with heart and head, together with others, on substantial climate- and environmental gain. We offer action perspectives to people, corporations and government by making sustainable policies and*

sustainable choices more attractive. Whenever necessary, we take a position and if we are out of alternative options we ask a judge to intervene." (Natuur&Milieu n.d., sec. Missie & Visie) Furthermore, to the question why N&M finds it important to be involved in the bee issues in the Netherlands the spokesperson answered that bees are a key species in ecosystems, and that the decrease of both wild bees and honey bees indicates a general pressure on biodiversity in the country. (Interview Natuur&Milieu)

Power

N&M does not have outcome power in the matter since they do not own lands or have the authority to decide over land management. Neither do they have the power to directly influence honey bee health.

In terms of social power N&M is a strong stakeholder. Regarding their own role in addressing the bee mortality issue in the Netherlands the N&M spokesperson stated they focus on promoting awareness regarding the issue, and the importance of protecting bees within the government and with the broader public. This is done by putting things on the political agenda, sparking debate when necessary, campaigning, and collaborating with other parties. (Interview Natuur&Milieu) This indicates N&M has power resources in the form of: (1) ability to influence public opinion and media; (2) mobilisable troops; (3) legal power. The latter is confirmed by research by the University of Amsterdam (UVA), which found that N&M is the nineteenth most influential lobbying organisation in the Netherlands. (Sachtleven 2017) Based on their annual financial report, financial resources of the organisation are modest in comparison to other stakeholders (About 6 million in 2016). (Natuur&Milieu 2017)

Natuurmonumenten

Logo Natuurmonumenten. Digital image. Natuurmonumenten. Accessed January 22nd 2018. https://www.natuurmonumenten.nl/logo-en-huisstijl

The Natuurmonumenten interviewee is ecologist in the 'nature and landscape' department. He advises four (nature)management units and helps the head of the department with policy issues. Within Natuurmonumenten he is considered an expert on insects. *"There are not many people within Natuurmonumenten that know a lot about insects, so when bees are discussed they often come to me. Among other things I worked in the department 'quality assurance' and evaluation about ten years ago: 'How does Natuurmonumenten manage bees and what type of policy should we have for that?'"* (Interview Natuurmonumenten)

Natuurmonumenten

Natuurmonumenten is a Dutch NGO and nature association with about 700.000 members.

Interests

Natuurmonumenten mainly has an environmental interest in mitigating bee decline. Their financial revenue would not be impacted by bee decline or proposed policy changes meant to mitigate bee decline. On their website the following mission statement can be found: *"Natuurmonumenten effectively secures nature, landscape and related cultural history by purchasing areas and managing them in a professional manner. In constructive collaboration with many others, she is constantly working on expanding the protected area. It gives a voice to the value of nature, landscape and related cultural history and always shows that nature and landscape protection is crucial for the liveability of the Netherlands. It offers people the opportunity to get in touch with nature and landscape in various ways and tirelessly builds public awareness and support."* (Natuurmonumenten 2016, sec. Missie) Natuurmonumenten thus has an interest in solving the mortality problem of wild bees. Both because wild bee species themselves can be considered the 'nature' that Natuurmonumenten vouches to secure and value in their mission statement, and because due to their role as pollinator wild bees play a vital role in maintaining biodiverse plant populations. Natuurmonumenten does not have a direct interest in contributing to conserving honey bees. When asked about Natuurmonumenten's position in the discussion regarding bee mortality the interviewee answered: *"It is questionable whether honey bees are native to the Netherlands, that really is a border case. It did not use to be the case, with climate change maybe it could just be possible that honey bees would be able to survive here. But if so, definitely not in the densities that you would get through bee keepers. So that is why we are very restrained. The flower-visiting insects already have it hard. Because honey bees are not threatened, and we are not responsible for conserving the bee keeping practice. So that is why we find it important to be careful about stationing honey bees [in our nature areas red.]"* (Interview Natuurmonumenten)

Power

Part of the mission statement that was quoted at the start of the previous section proofs that Natuurmonumenten has high outcome power since they own and manage lands and can thus contribute to creating and maintaining suitable habitat for bees. Their outcome power regarding honey bee health is limited since Natuurmonumenten is not a beekeeper organisation.

Based on the following power resources, Natuurmonumenten is considered to be socially powerful.

(1) Natuurmonumenten has some legal power in terms of ability to lobby at the national level. A vacancy for a 'senior public affairs employee for lobby in the Hague' indicates as much. (The Hague is the Dutch political capital) (Natuurmonumenten 2018)

(2) Natuurmonumenten has power over public opinion. Besides the fact that they have over 700.000 members in a country with a population of 17 million, the perspective of Natuurmonumenten has a platform in national newspapers such as Trouw, de Volkskrant, and NRC. (Bouma 2017a; Wolterbeek 2017; NRC 2018)
(3) The social power of Natuurmonumenten does not reside in their access to knowledge that other stakeholders do not have access to.
(4) Natuurmonumenten has, with 700.000 members, access to mobilizable troops for public statements or protests. Also, the foresters of Natuurmonumenten have been known to participates in protests. For example, in 2010 when the national government severely cut the nature budget, and recently in the Provence of Brabant for higher surveillance and enforcement budgets. (Damman 2010; van der Storm 2018)
(5) According to the annual financial report, Natuurmonumenten has substantial financial resources available compared to other NGOs: around 128 million. The biggest part of this budget is reserved for purchasing new nature areas and managing the current nature areas that Natuurmonumenten possesses. However, 23,4 million is reserved for 'being a movement'. (Natuurmonumenten 2017a) This is most likely the amount of financial resources Natuurmonumenten can utilise to exert social and political influence.

The Pollinators

Logo of The Pollinators. Digital image. Nudge. Accessed January 22nd 2018. https://www.nudge.nl/projects/pollinators/

The Pollinators

'The Pollinators' is a project of two foundations. Namely, 'Nudge' and 'the Tipping Point Foundation'. With help from 'de Bijenkorf' they executed the 'The Pollinators' project. The interviewee is an employee of the tipping point and works as project leader on the 'The Pollinators' project. (Interview the Pollinators)
A mission and vision statement could not be found. But in the 'about us' section of their website The Pollinators write: *"We strive for a healthy environment for pollinating animal species. We achieve that throughout own activities, but mostly though connecting local*

initiatives regarding biodiversity and pollination. That way we shape an involved and passionate community of 'pollinators'" (The Pollinators 2018a, ll. 2–6)

Interests

The financial resources of The Pollinators would not be negatively influenced should bee decline continue, nor would their financial streams be negatively affected by recent policy proposal that aim to mitigate bee decline. Therefore, the Pollinators do not have an economic interest in conserving bee populations. The 'about us' statement of the Pollinators shows their involvement in maintaining a 'healthy environment' and in supporting initiatives that promote biodiversity. Therefore, their main interest is considered to be environmental.

The spokesperson of the Pollinators gave an explanation of their role in mitigating bee decline as well as their revenue streams:
"Gradually we discovered […] that *much was already happening regarding bees. Also, that there were enough bee keepers available in the city [Amsterdam red.], more than there is food for the bees. So, that turned out not to be the core of the problem. And all those initiatives, for example, in the city, three things were happening by people who did not know of each other's existence. So, then the idea of the Pollinators emerged, to connect those initiatives, to connect knowledge, and materials, and skill, in order to enlarge the impact. But also, to investigate with each other: 'Is what we are doing good for bees?' If you have one project, we just see that many people are not asking themselves that, they are very focussed on their activity. But then it is nice to have some input from another side, feedback, and to see: 'we could still do this, or that.' Or: 'everyone is contributing.' That is what we want to show to the outside world. Many things are happening in the area of bees. But it is still happening in the old style, with big organisations. WE are trying to find a way to do it differently. So, more bottom-up. Those are the initiatives that are connected with us. We highlight those, and build a, sort of, community-based pollinators network. That is both online and offline. Offline we do that by sowings seeds in springtime, and with bulb planting campaigns, movie nights, soon there will be a diner at the Bijenkorf with all involved parties, so we try to get everyone involved. And for us there is also a role for businesses. Those are Bijenkorf, Patagonia, ASN and Triodos. Those are sustainable brands, at least they are trying their best. And together we attempt to generate some money out of that. That needs to happen from something. And we distribute that over the different initiatives and we build a community with that throughout the entire Netherlands at the moment. And starting next year we will expand abroad. […] That is our role at this time. And we are looking how we can really increase our impact and to actually generate more biodiversity. Because the theme has been going for about thirty years and since world war II biodiversity has been decreasing due to intensification of agriculture and the fact that we always want to have food available. And for thirty years we have been able to see, and Greenpeace and other nature organisations were also able to see, that it is decreasing and that their lobby has not worked yet. So, we try to attack from another side to create impact still. It is very much part of these times as well,*

because the theme is getting bigger and more important politically. In agriculture you do see change, even though that is very small, but it is all growing together." (Interview the Pollinators)

Power

The Pollinators does not have outcome power when it comes to the criteria that were established for this thesis. The organisation does not own or have agency over the management a piece of land. Neither does the organisation have the authority to decide whether pesticides are used on certain pieces of land. Lastly, the pollinators do not have direct influence over honey bee health.

The Pollinators also have some social power:

(1) Legal power is lacking, considering the fact that the project has chosen to focus on a bottom up approach, rather than on influencing politicians. This much became clear from the interview quote in the previous section. (Interview the Pollinators)
(2) In terms of public opinion and media the Pollinators enjoy some exposure in regional newspapers, (e.g. Stadsblad Utrecht (2017)) however, not so much in the national ones.
(3) The Pollinators does not seem to have access to information regarding the bee decline issue that other stakeholders are not at all aware of.
(4) The Pollinators do have some mobilisable troops for public actions, petitions and protests. This is evident due to, for example, the petition that the Pollinators co-initiated, or the sowing actions they organized. (Copijn, Molenaar, and Beek 2018; The Pollinators 2018b)
(5) Due to partnerships with several big Dutch corporations such as Bijenkorf, Patagonia, ASN and Triodos, the Pollinators have access to financial means to finance their projects. (Interview the Pollinators)

<u>Crop protection industry</u>

Bayer

Science For A Better Life

Logo. Digital image. Bayer. Accessed January 22nd 2018. https://www.bayer.nl/nl/over-bayer/missie-en-waarden/

Bayer

The interviewee of Bayer works as lobbyist or 'stakeholder affairs manager' regarding agriculture policy. He is also involved in developing policies within Bayer regarding sustainability. On Bayer's 'Forward Farm', he contributes to the development of concepts, and communication material for farmers and other stakeholders to show manners in which shifts towards more sustainable agriculture practices can be made. (Interview Bayer)

The Bayer mission is: 'Science for a better life' (Bayer Nederland 2016, sec. missie en waarden)

Interests: honey bee, wild bee, and economic

If bees would continue to decline in the Netherlands, it would directly impact Bayer's core business and revenues. The vegetable seeds department of Bayer in the Netherlands depends on pollination services of honey bees and other pollinators for the production of seeds. (Boonstra, personal communication, 23 May 2018) Bayer also has a clear incentive to be involved in the discussion surrounding bee mortality, due to the alleged impact of neonicotinoid pesticides on honey bee mortality and wild bee decline according to other stakeholders. As a producer of neonicotinoid substances such as imidacloprid, it is in Bayer's interest to protect their product against such claims. Regarding the interests of Bayer in the discussion surrounding bee mortality and bee health the Bayer spokesperson himself said: *"The discussion regarding bee mortality is a very strong one. Bayer is in the middle of this discussion because of our products, the neonicotinoids, you can't have missed that. So, from that angle there is a strong involvement […] I do think it is important to mention that in this whole debate, the honey bee has become a sort of symbol. It was the honey bee, this is now shifting somewhat towards wild bees or pollinators, and I assume it will shift to biodiversity in a later stage. But the discussion is about the impact a pesticide can have on its environment, in which the bee has been chosen as a symbol for a campaign against pesticides. Which is why there is a lot of attention for this issue, and that is why we need to pay attention to it."* (Interview Bayer)

Moreover, Bayer produces medicine for honey bees, and thus contributes to honey bee health through that route: "*And, of course, we are a veterinary company. So, we also produce medicine for bees. Thus, we are involved there as well. Here [on the Forward Farm red.] we have nine beehives. We also perform some bee related research in collaboration with other locations, this concerns honey bees, naturally. We work together with a bee keeper. So, the integration of honey bees in agriculture is part of the story we tell here regarding sustainable agriculture. But wild bees also, because we perform, and show, all types of measures that are good for pollinators, wild bees among them."* (Interview Bayer)

Although Bayer does not explicitly state commitment to biodiversity or the environment in their mission statement, Bayer does seem to have an environmental interest in the bee

decline issue. This is indicated by the Bayer Bee Care Programme which states on their webpage: *"As a responsible life science company with many years' experience in bee health topics, Bayer understands that healthy bees are necessary, not only as pollinators for sustainable food production and as honey producers but also for the important role they play in many ecosystems around the world."* (Bayer AG 2018, ll. 1–2)

Based all this information it can be concluded that Bayer has an environmental interest and a strong economic interest in the conservation of both honey bees and wild bees, and in participating in the bee decline debate.

Power

Bayer has a little outcome power. On the Forward Farm for example, Bayer works together with the owners of the farm (the Roubos family) to *"develop and demonstrate innovative solutions for integrated cultivation, with a strong focus on working responsibly."*(Bayer Crop Science NL 2018, ll. 1–2) This includes biodiversity measures that are attractive to bees. (Interview Bayer)

Bayer is a very socially powerful stakeholder:

(1) As the becomes clear from the position of the interviewee within Bayer (stakeholder affairs manager, aka lobbyist), the multinational has legal power in the shape of a lobby. Moreover, Bayer has the capacity to take decisions of the European Commission to the European Court of Justice. (Reuters 2018)
(2) The perspective of Bayer regarding the pesticide debate surrounding bee decline can be found in national media outlets. Showing the organisation has a platform to influence public opinion. However, in a recent news article, a Bayer spokesperson admitted that the company has not been very successful in getting their story across to Dutch society. (Bouma 2017b)
(3) Bayer has knowledge power resources in the sense that they use the Forward Farm to demonstrate innovative and sustainable agriculture approaches. The organisation uses this platform to share their knowledge on that subject and to provide farmers, policy makers and other stakeholders with advice. (Interview Bayer)
(4) Bayer does not have access to mobilizable 'troops' for public statements.
(5) Bayer is a big multinational with substantial financial resources. Their annual report shows that global sales of the company in 2017 accumulated to 35,015 million euros. (Bayer 2018)

Dutch Crop Protection Association (Nederlandse Stichting voor Fytofarmacie (Nefyto))

Logo. Digital image. Twitter. Accessed January 22nd 2018. https://twitter.com/nefytonl

The interviewees of Nefyto are the secretary and the intern of the organisation.

Dutch Crop Protection Association (Nefyto)

Nefyto describes their mission statement in the following way:
"Nefyto represents the Dutch Crop Protection Industry and is a part of the European network of the crop protection sector. Nefyto propagates advanced technologies for the development of sustainable agri- and horticulture. Nefyto promotes understanding of the role of crop protection products in the production of healthy and qualitative agri- and horticulture products. Nefyto is open for dialogue regarding views, values and beliefs. […] Nefyto advocates for the creation of a predictable and balanced Dutch and European law and regulation that is based on a scientific and risk-based approach and that fosters innovation. This will allow the industry to work efficiently and protect intellectual property and reward the introduction of new technologies and practices. With the aim to make a profitable business for growers (end-users) possible and providing the consumer with qualitative and healthy products." (Nefyto 2011)

On a vision and ambition handout of Nefyto the following vision is articulated:
"Integrated pest management is an essential requirement for productive and sustainable agriculture. This system of agriculture is economically viable, ensures sufficient availability of healthy food, minimises environmental impact, leaves room for nature and thus promotes biodiversity." (Nefyto 2017a, sec. Vision)

Interests

Nefyto mainly has an economic interest within the debate surrounding bee decline. In the debate, certain stakeholders have advocated for a ban on neonicotinoid crop protection products of Nefyto's members. This proposal would have an impact on the financial revenues of the stakeholders' members. This is the main reason that Nefyto got involved in the bee decline debate, as becomes evident from the following explanation by the Nefyto spokesperson: *"I think we have always brought forward, like, the scientific basis for this and that. Is there a causal relation between the established decrease of bee health, bee mortality, and the use of crop protection agents? I think that we have stressed, every time, we do not see that causal relation. Often, we have asked the question, very consciously, as to make people think along, that the causal relation is not there. […] You can see a subject like that*

coming. At a certain point, we said to each other: 'That is something we need to deal with.' And since the issue, particularly at the start, was linked to that crop protection agent of Bayer, we felt at a point like: 'This is going to impact the whole industry'. […] There is a golden rule within Nefyto, which is something we ran into in this matter as well: 'We are not in charge of individual substances.' So, when the word 'imidacloprid' is mentioned, we say: 'that is not our responsibility.' But the word 'imidacloprid' can be mentioned, but the words 'bee health' can also be mentioned. And even though bee health is affiliated with imidacloprid, it is part of a larger theme. So, I've jokingly said at one point: 'I am not responsible for imidacloprid, but we have a responsibility regarding bee health. We are not responsible for glyphosate, but we have a responsibility regarding herbicide ratios.' […] [As advocate red.] you can try to consciously keep an issue small, or you can consciously try to enlarge an issue. […] Particularly in the beginning of the discussion, that link was really strong. Because it [the following red.] represents a common thread through all types of discussions. There is an authorisation policy for all types of crop protection substances. And substances are safe to use, provided that they are applied in accordance with the instructions for use. That is a line we often draw. And we basically defend the authorisation policy of pesticides." (Interview Nefyto)

Based on the specific mention of promoting biodiversity in the vision statement *(Nefyto 2017a, sec. Vision),* as well as an explicit remark of the stakeholder on the matter, Nefyto has an environmental interest in conserving bees. (Broeders, personal communication, 4 June 2018)

Nefyto has an interest in addressing issues that arise with honey bees as well as wild bees, since the alleged impact of neonicotinoid pesticides is both linked to honey bee and wild bee decline by other stakeholders. This link is what harms the economic interest of the Nefyto members.

Power

Nefyto has no outcome power. The organisation does not own or manage lands, nor do they have the authority to decide whether and which pesticides are used in a certain area. Lastly, Nefyto does not manage honey bee colonies and their health.

Nefyto does possess social power:

(1) Nefyto is an advocacy organisation and thus possesses lobby power. This becomes clear from the mission statement on the previous page. Moreover, the spokesperson referred to this advocacy role in the quote on the previous page. (Interview Nefyto)
(2) The perspective of Nefyto regarding the pesticide debate surrounding bee decline can be found in national media outlets such as Trouw and Volkskrant, as well as on outlets that focus more on farmers, such as Boerderij and Bloemisterij. (E.g. (Bloemisterij 2017; Bouma 2017b; Keulemans 2015))

(3) Nefyto does not seem to have access to information regarding the bee decline issue that other stakeholders are not at all aware of.
(4) Nefyto is a small organisation and does not have access to large numbers of 'troops' to mobilise for public statements. (Nefyto 2017b)
(5) Nefyto's total budget for communication activities such as information services to farmers, and in-house meetings, amounts to 800.000 euros. Moreover, Nefyto has been financing a large proportion of the Bee Surveillance Programme of Naturalis for the last five years. (Broeders, personal communication, 4 June 2018) This indicates that the organisation has a fair amount of financial resources at its disposal.

Knowledge centres

Naturalis Biodiversity Center

Logo. Digital image. Naturalis. Accessed January 22nd 2018. https://www.naturalis.nl/media/library/2012/07/Naturalis_logo_staand_rood_01.jpg

The interviewee of Naturalis Biodiversity Center is 'project manager'. She works together with Prof. Koos Biesmeijer who is 'scientific director and Professor', and particularly focusses on research into bees. Her job entails coordinating the projects that are conducted within Naturalis.

Naturalis Biodiversity Center

On their website, Naturalis has articulated the following mission:
"We want to describe, understand and explore biodiversity for human wellbeing and the future of our planet." (Naturalis 2018)

Interests

Naturalis does not have an economic interest in the bee decline issue since their sources of revenue do not depend on services that bees provide, such as pollination. The mission statement reflects their environmental interest in the topic.

Naturalis is both concerned with wild bees and honey bees. *"The project we do with 'Postcode Lottery' is particularly focussed on wild bees. So actually [we do red.] more with wild bees, but we also do that project with honey bees."* (Interview Naturalis)

Regarding the role of Naturalis within the societal debate surrounding bees the spokesperson mentioned:
"Yes, first and foremost we are a knowledge institute, and that is exactly what we want to be. We are not, like Greenpeace, an activist organisation, and that is not something we want to be. However, there is always a bit of a line. Also, with the research we conduct with honey bees for instance. If our findings in that, which is not the case, but if it would conclude that chemical substances are very bad, you would of course communicate that. Conclusions you would draw based on that cannot really be ignored from an activist perspective. But we are mostly known as a knowledge institute, which is what we want to remain. […] So, it is pretty difficult to solely remain a knowledge institute and not to seek out a more societal role. But that is a matter that is not completely clear yet for Naturalis as an institute, what could or should be the best way to go about that." (Interview Naturalis)

About the interest of Naturalis in the bee mortality issue she said: *"Particularly regarding wild bees, we just don't really know how the wild bees in the Netherlands are doing. Everyone may be saying they are decreasing, but factually… Look for honey bees it is easy to monitor, since honey bees belong to a bee keeper, so you can simply ask a bee keeper: How many honey bees do you have? How many died? With wild bees, it does not work like that, because there are so many bee species in the Netherlands and really not many people who can actually differentiate between them. On top of that those people cannot go to all the places to see how it is going. So, in the wild bee research our focus, and that connects perfectly with Naturalis, we want to know what there is we can describe. And if there is decrease, which is to be expected for some species, others are actually doing better due to climate change, to get to know that is what Naturalis wants. […] Our mission is discovering and describing biodiversity, for now and in the future."* To clarify why they deem this important, specifically in connection with the bee issues in the Netherlands, the researcher asked: *"Is this done based on the idea that pollinators are of importance for biodiversity? Or purely because as species, there is a lack of knowledge?"* To which she responded: *"Both. It is also because there is a knowledge gap. But earlier we did research with Alterra which showed that wild pollinators also in an economic sense, I don't know if you have found it, but Arjen Groot did that, the research into the importance of wild pollinators versus honey bees in agriculture, so for apples, pears, blueberries and strawberries. I partook in that at one point, which was fun. It showed that wild bees are also very important for the economy, so, in that sense it is more societal. But also, in the purest sense, precisely because they are important we need to know how they are doing, and we don't know that."* (Interview Naturalis)

Power

Naturalis has no outcome power since the organisation does not manage land or honey bee colonies.

Naturalis does have some social power. However, as was stated in the previous section, as a research institute Naturalis does not necessarily seek to promote a certain agenda or influence public opinion. However, when research they perform results in findings that are relevant to the debate, they communicate that publicly. (Interview Naturalis) This is their main social power resource.

Centre for Agriculture and Environment (Centrum voor landbouw en milieu (CLM))

Logo CLM. Digital image. CLM. Accessed January 22nd 2018. https://www.clm.nl/

The CLM spokesperson is team leader sustainable crop cultivation and healthy food.

Centre for Agriculture and Environment (CLM)

CLM does not clearly mention a mission statement on their website, but under the header 'what we stand for' they state: "*CLM wants to normalise sustainable agriculture in the Netherlands. We are convinced that healthy food, clean water, biodiversity, nature and cultural landscape are valuable. Together with other parties we are committed to retain these valuable elements for the future."* (CLM B.V. 2010, sec. Waar staan wij voor?)

Interests

CLM does not have an economic interest in the debate surrounding bee decline, since their revenues would not be negatively impacted by decline in bees. Based on the 'what we stand for' statement it can be concluded that the involvement of CLM in the debate has an environmental basis.

Regarding the interest of CLM in the bee mortality issue he mentioned: *"Due to our activities in the field of sustainable crop cultivation, we have focussed on the topics of crop protection and crop protection agents for years now. Also, on their negative impacts: 'How can you reduce those? How can you come to an alternative approach to combat pests and disease?' A couple of years ago, when the discussion around bee mortality started to emerge in the Netherlands, but also on a global level, we said to ourselves: 'right, what do we want with this, and what can we do with this?'" (Interview CLM)*

Since 'sustainable agriculture', as well as 'biodiversity' is what CLM concerns itself with, they have in interest in both honey bees and wild bees. Because, in terms of pollination services for agriculture both have been proven to be important, (De Groot et al. 2015, 2016) and

decline in wild bees would harm the environmental interest of the organisation. In the interview the spokesperson stated: *"We said from the start: "Honey bees are one thing, a lot is known about those, but we have 350 species of wild bees in the Netherlands, so look at all bees. So, look at both honey bees and wild bees and what is happening with them now.""* (Interview CLM)

Power

CLM does not possess outcome power since the organisation does not own lands or have agency over the way green areas are managed. CLM also does not have direct influence over health of honey bee populations.

CLM does have some social power which is mainly based on their knowledge resources, and the advisory role they assume towards growers.

Government

Ministerie van Landbouw, Natuur en Voedselkwaliteit

Dutch Ministry of Agriculture, Nature and Food Quality (Ministerie van Landbouw, Natuur en Voedselkwaliteit (LNV))

Logo of the Dutch Ministry of Agriculture, Nature and Food Quality. Digital image. NPPL. Accessed January 22nd 2018. http://www.proeftuinprecisielandbouw.nl/over-nppl/

The interviewee of the Ministry has been working there for eight years (at the time of the interview) and is responsible for the team 'crop protection'. *"All policy surrounding crop protection ends up with me." (Interview Ministry of LNV)*

Dutch Ministry of Agriculture, Nature and Food Quality (Ministry of LNV)

The Ministry of LNV articulates the following mission statement on their website:
"The Ministry of Agriculture, Nature and Food Quality (LNV) wants to offer farmers, growers and fishermen perspective. Everywhere in the world, Dutch farmers and fishermen are known for good, affordable and safe food. Together with all those involved, work is being done to restore and preserve Dutch nature. The Ministry of Agriculture, Nature and Food Quality wants to strengthen the international leading position of the agricultural sector, link nature and agriculture even more and at the same time improve the economic position of farmers." (Ministerie van Algemene Zaken 2017, sec. Missie)

Interests

Based on the mission statement of the Ministry, and the quote of Ministry spokesperson in the following section, it can be deduced that the Ministry has both an economic interest as well as an environmental interest in mitigating bee decline. The Ministry itself is not directly dependent on financial resources that depend on pollination. However, the function of the Ministry is to 'offer perspective to farmers', and thus to safeguard their ability to maintain their farming practices. For many of those farmers pollination is essential for their main source of income. Hence, the Ministry has an indirect economic interest. The mission statement and quote also confirm an environmental interest in the sentence: "*Together with all those involved, work is being done to restore and preserve Dutch nature*."(Ministerie van Algemene Zaken 2017, sec. Missie)

Regarding the manner in which the national government, thus the Ministry, is involved in the bee mortality issue, the spokesperson said: *"From the end of 2016 onward, Martijn van Dam –who was our State Secretary then- wanted us [the Ministry red.] to focus more on food related topics. So, in January a big 'food summit' was organised, and one of the topics he thought fitted in there were pollinators and pollination. […] If you think of food, in my opinion, you directly think of pollinators. I just explained, of course, not all food crops require pollination. But it is for a big part of what makes food fun, or beautiful, or attractive, or what we want to move towards. For example, we want people, or children, to eat more vegetables and fruits. Pollination is very important for that. But apart from the food, which was the reason, right, that the State Secretary wanted it. We said: we actually should organise a side-event at the food summit in which pollination and pollinators are a central component. And the question we asked there was: 'If you see that the wild bee species we have, there are 360 of them in the Netherlands, but half of them is not doing well. Well, that will make you scratch your head, is that meaningful? And if so, how so? And do you describe that? Which was sort of the start of: Do you see that something needs to be developed cooperatively? Do you see it is urgent? And who do you want to work with in this? And immediately it was said: food is one thing, but apart from that pollinators of course are important for many plants and biodiversity in our nature, if that is how you can, or want to call it. So, outside the managed lands, for example farmlands, pollinators also play a big role of course. So, pretty quickly, we came to the conclusion: yes, this is something we want to collaborate on. And many groupings will benefit from that, not just farmers, but also, us as a population. The landscape is determined by it, your biodiversity. And, of course, it all links together, so there is not one particular topic area you can completely focus on."* (Interview Ministry of LNV)

Power

The Ministry of LNV does not have any outcome power in the bee decline matter. Development and implementation of nature policy has been decentralised in recent years and is now the responsibility of the Provinces. (IPO 2013) Thus, the ministry has no agency over the management of public green spaces or nature areas.

The Ministry does possess social power: (1) The Minister of LNV and the Minister of LNV have legal power when it comes to agriculture policies as well as policies regarding crop protection agents. They can change legislation surrounding these topics if they manage to get support from the majority of the house of representatives and congress; (2) Though much of the financial resources for nature management have moved to the Provinces in recent years, the Ministry still has a hundred million available in its budget for nature and biodiversity in 2018. (Ministerie van EZ 2017); (3) The Minister of LNV has, due to her public role, a strong platform to influence public opinion in the media. However, in ther role as a politician she also has an interest in appealing to the public. So, in that sense she is also prone to influence of the public opinion. (4) The Ministry is a government organisation and has no mobilizable troops in terms of public demonstrations or statements. (5) The Ministry has the (financial) ability to commission research projects to collect information regarding the bee decline issue or the costs and benefits of policy alternatives.

The Province of Overijssel

Logo of the Dutch Province of Overijssel. Digital image. Provincie Overijssel. Accessed January 22nd 2018. https://www.overijssel.nl/over-overijssel/huisstijl-provincie/elementen/logo-provincie/

The Interviewee of the Province of Overijssel works at that organisation as nature policy developer.

Province of Overijssel

The Province of Overijssel is a Dutch regional government.
The mission statement of the Province of Overijssel is: *"The province of Overijssel is a middle management that innovates, inspires and takes initiative. […] If necessary as a director, we forge coalitions with numerous partners to achieve results for the inhabitants of Overijssel. Our goal is that everyone can live, work and recreate healthy and enjoyable here. In an environment with a balance between peace, space and dynamics. […], making Overijssel attractive and versatile."*

Interests

The Province of Overijssel has both an economic and an environmental interest. Though the provinces' mission statement does not directly reference promoting biodiversity or the natural environment (the use of the word environment seems to refer more to human living space), the Provinces have a responsibility for nature policy. The spokesperson mentioned in that regard: *"The Provinces are, of course, responsible for nature policy. That moved to the Provinces* [responsibility for Dutch nature policy was recently decentralised, previously it was

the responsibility of the national government red*.] So, we have a responsibility. But it is not the case that the responsibility is specifically: 'all bees are really important, as a Province we need to strongly commit to that.' You have to do something with it, you need to take care of it, but what that should be exactly, that is not set in stone." (Interview Province of Overijssel)*
In terms of the economic interest, the Province itself does not directly depend on pollination services for their source of income. However, in 2015 a motion was passed that called for active involvement of the Province in the protection of bees. The motion text indicated that bee protection is relevant due to the importance of bees for ecosystems, food security and society, and in an economic sense for 'our' agriculture. The same motion confirms that the Province of Overijssel has both an interest in conserving wild bees and honey bees. (Wissink and Eshuis 2015)
The spokesperson mentioned there might also be a political interest behind this specific focus on bees in the Province: *"The thing is, everyone knows bees. So, bees are close to people. And that is something politicians appreciate a lot, if there is a topic that everyone feels connected to. […] It also impacts the economy if you are talking about food security and the function of bees. We expanded it from bees to bumblebees, butterflies, and grasshoppers by the way. But the first step really was focussed on bees. […] If it does not hurt each other, it is easy to take these (other species) into account as well.*" (Interview Province of Overijssel)

Power

The Province of Overijssel has strong outcome power since their official tasks include "*to realise new nature and to maintain existing nature*" (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties 2012) which includes potential bee habitat. In the management of their nature areas they have influence over whether pesticides are used, and if so, which ones.

In terms of social power, the Province has a decent amount: (1) it has legal power since it creates the nature policy for Overijssel; (2) with the decentralisation of nature policy, funding for the implementation of nature policy also moved to the Provinces. In that sense the Provinces have the most funding available for addressing issue of bee decline relative to the other government levels. Through subsidies this can be used to influence incentives of other stakeholders; (3) the Province is a governmental organisation and does not have 'mobilisable troops' to protest; (4) Initiatives regarding bees by the Province of Overijssel get covered a bit by regional news outlets and news outlets with a focus on nature and agriculture (e.g. (Van Rossum 2017), but not so much in the national media outlets. ; (5) the Province does not necessarily have access to information regarding the bee decline issue that other stakeholders do not.

The influence of LTO on the Provincial board of the Province of Overijssel is strong because the constituency of the Provincial board is the largely the same as that of LTO. (Interview Province of Overijssel)

The Municipality of Houten (Gemeente Houten)

Logo of the Dutch Municipality of Houten. Digital image. Gemeente Houten. Accessed January 22nd 2018. https://www.houten.nl/home/

The interviewee of the municipality of Houten has been responsible for gardening and landscaping in Houten for the past 7 years.

The Municipality of Houten

Houten is one of the 380 Dutch municipalities. (Centraal Bureau voor de Statistiek 2018)

Interests

Municipalities do not have a direct interest in solving the bee mortality issue. There is not necessarily an economic connection to pollination services. Municipalities have some responsibility for nature since they have the task to test whether applications for planning permits meet the requirements of the 'Nature Protection Law'. (Ministerie van Algemene Zaken 2013)However, municipalities are not politically responsible for ensuring conservation and developing more biodiversity, so they do not necessarily have an environmental interest in mitigating bee decline. Based on the interview with the spokesperson it seems that Houten municipality started to promote bee habitat mostly because of an individual civil servant who was interested in bees: *"When I arrived at my job here in Houten seven years ago, everything [roadsides and public green spaces red.] was indeed tightly mown. Of course, I was interested in bees and butterflies, and I knew these animals were doing poorly. […] I am also doing this because, I am very interested in it, I am a nature guide for IVN [a Dutch nature organisation red.], so I think nature is very important. This way I am trying to incorporate that into the municipality a bit. […] So, I thought: 'I am just going to try out some projects.' I applied for some funding with the municipality, started up some small projects to change some of these lawns into flower rich meadows, but that was very difficult. Really, it was not*

easy. People were very sceptical whether it would work on this clay soil [Houten is geographically situated on a river clay soil type red.] When I, eventually, received some money, I did a couple of small projects, and a couple were doing very well. Then, the financial crisis hit, so budgets were cut and there was no money at all [for the projects red.] and everything sort of came to a stop. But, every time I had a little bit of money left, I just used it to convert a piece of lawn. […] But now you can see, currently we have ten hectares of flower rich meadow, and I increasingly receive positive reactions along the lines of: 'it actually looks really nice.' And also from the political side, the council and the board also say: 'it is actually really nice, all these flowers.' So now I see there is also more money available for this type of managing the green acreage." (Interview Municipality of Houten)

Power

Municipalities are connected to the bee mortality issue since one of their main tasks is managing the public space. This also encompasses green areas that could potentially serve as habitat for bees. It also means the municipality can decide whether they use pesticides in the public green spaces, and if so, which pesticides are used. The spokesperson mentioned: *"I think [as municipality red.] we have a very important role [in addressing bee mortality red.]. Also, to say to citizens: 'there is a lot that you can do yourself.' By promoting awareness. But we also own (manage) a lot of green acreage, right? Particularly a lot of tightly mown lawns. That is really something we need to change. I think as municipality we have a big role in achieving that. But, you know, money is often an issue, right? Which is the case everywhere of course."* (Interview Municipality of Houten) Therefore, municipalities, Houten among them, possess strong outcome power. However, the municipality has no direct influence over honey bee health.

The social power of the municipality in the context of the bee decline issue is limited, since (1) their views on the bee decline issue are not strongly represented in media; (2) there is legal power at the local level, in terms of for example municipal zoning plans, however this legal power is limited to the constraints of the municipal area; (3) as can be deduced from the quote in the previous section, municipalities have limited financial means for management of public green spaces, which is likely also the case for influencing other stakeholders' incentive structures when it comes to the bee debate; (4) the municipality does not have access to information that others do not have when it comes to the topic of bee decline; (5) there is no indication that the municipality takes on a leadership role in the bee decline matter.

Appendix II: List of interviewees

Dutch Beekeeper Association (NBV)
Marleen Boerjan – Board member
Interview took place: 16-08-2017

Professional Association for Dutch Beekeepers (BVNI)
Leo Gensen – Secretary
Interview took place 30-10-2017

Dutch Agriculture and Horticulture Association (LTO)
Annemarie Breukers – Policy Advisor Plant Health
Interview took place: 30-08-2017

Agrifirm
Andre Groot Nibbelink – Product Manager Crop Protection
Interview took place: 22-09-2017

Greenpeace NL
Herman van Bekkem – Campaigner
Interview took place: 25-09-2017

Nature & Environment (N&M)
Kawire Gosselink – Junior Researcher Food
Interview took place: 11-08-2017 (over the telephone)

Natuurmonumenten (NM)
Wouter van Steenis – Ecologist in the Nature and Landscape Department
Interview took place: 01-11-2017

The Pollinators
Peter de Koning – Project Manager
Interview took place: 09-11-2017

Bayer
Hinse Boonstra – Stakeholder Affairs Manager Agriculture Policy
Interview took place: 11-10-2017

Dutch Crop Protection Association (Nefyto)
Jo Ottenheim – Secretary
Kyra Broeders – Intern
Interview took place: 20-09-2017

Naturalis Biodiversity Center (NBC)
Nieke Knoben – Project Manager
Interview took place: 25-08-2017

Centre for Agriculture and Environment (CLM)
Peter Leendertse – Teamleader Sustainable Crop Cultivation and Healthy Food
Interview took place: 22-08-2017

Dutch Ministry of Agriculture, Nature and Food Quality (Ministry of LNV)
Susanne Sütterlin – Teamleader Team Crop Protection
Interview took place: 25-09-2017

Province of Overijssel
Fenneke van der Vegte – Nature Policy Developer
Interview took place: 25-09-2017

Municipality of Houten
Peter van Wieringen – Supervisor Green
Interview took place: 17-09-2017

Appendix III: Discourse coalitions

Group 1

The stakeholders that make up the first group that supports the same storyline regarding the causality of bee mortality in the Netherlands are:

Environmental and Nature Conservation NGO's	Knowledge Institutes
Greenpeace	CLM
Natuurmonumenten	
Natuur&Milieu	Government
The Pollinators	Province of Overijssel

Causality

Regarding the causality of bee mortality in the Netherlands this first group of stakeholders claims that: **Main causes for both honey bee and wild bee mortality are landscape change and pesticide use, which are both encompassed in the current Dutch agriculture practices. For honey bees specifically, disease and pests encompass another main cause.**
Warrants and backings that are used by the stakeholders to underpin this claim are displayed in figure 6. The following text provides a quick explanation of these warrants. This is followed by a detailed underpinning of figure 6.

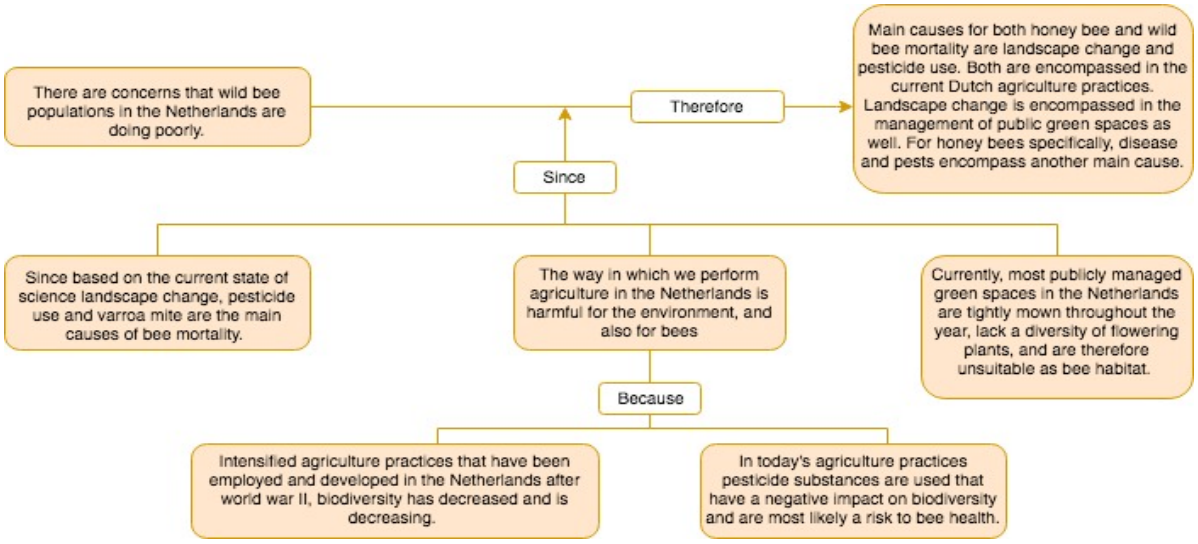

Figure 6: Toulmin's structural argument model displaying the storylines employed by the first stakeholder group regarding causality of bee mortality in the Netherlands.

This group of stakeholders uses three warrants to support their claim. The first of the warrants, explaining that this claim regarding causality of bee mortality is based on the current state of science, seems to be used to legitimise the claim. The spokesperson of CLM stated: *"Because you can see, scientists are not agreeing on what the cause is exactly. Some scientists swear that crop protection agents are THE most important cause. Other say the change of our landscape, with much less food for the bees, is really important. And a group says, particularly focussed on honey bees, the bee keepers have less and less knowledge, and*

they are not adequately controlling the Varroa mite, causing the bees to fall ill. So that is three causes that, in our view, probably all play a role." (Interview CLM) This quote does show there is still some scientific uncertainty. At the end of this chapter the effects this has on the broader debate regarding bee mortality will be addressed further.

The second and third warrant delve deeper into the content of the claim and provide an insight into the meaning that these stakeholders ascribe to the high mortality levels of bees in the Netherlands: Bees are a victim of agriculture practices and public green space management practices. The Greenpeace spokesperson warranted that: "*The way in which we perform agriculture is bad for nature, and nature provides services for farmers. There are no flowers on farmlands anymore and there is a lot of chemical pesticide use, that is bad for nature and, among others, bad for honey bees. And those honey bees give something back, namely pollination of apples and pears. So, as farmer you benefit from taking good care of the natural environment."* (Interview Greenpeace) The spokesperson of the pollinators agreed, stating: *"Since world war II, biodiversity has been declining due to intensification of agriculture practices and the fact we want to have food available at all times."* (Interview the Pollinators) The ecologist of Natuurmonumenten explains that agriculture practices also impact surrounding lands, such as Natuurmonumenten their own nature areas: "*What we really notice is that due to nitrogen deposition of the industry and agriculture, and desiccation due to agriculture, there are less plant species due to the nitrogen levels, and plants that are able to cope with drought are doing much better than other plant species. That is only a small spectrum of species, which are usually not flowering plants. So, within our nature areas we experience great difficulty to ensure sufficient numbers of flowering plant species. All due to external pressures."* (Interview Natuurmonumenten)

The interviewees of CLM and Natuurmonumenten also explain why, despite the difficulty to prove the existence of a relation between the use of certain pesticides and bee mortality, they think a potential impact of these pesticides should not be disregarded. *"When we are in conversation with growers, we do find it important to say: 'Pay attention that there are different research projects. Sometimes they contradict each other. But all of us know roughly that this and that pesticide should not be sprayed if bees are flying around. So, there are definitely effects. Whether those effects will manifest is difficult to research. But just employ some sort of precautionary principle and use as little as possible. That way you know that you do as little harm as possible.' That nuance is very important to us."* (Interview CLM) The Natuurmonumenten ecologist stated: *"And that is difficult to find out exactly [what the impact of certain pesticides is red.]. It is easy to call out: "Nothing is going on, get over it." But to prove that decrease of insects that are very difficult to count and difficult to follow, is caused by a pesticide, that is really difficult. And the industry lobby is of course very good. So, you hear from every direction that nothing is going on."* (Interview Natuurmonumenten) The answer by the Natuurmonumenten ecologist implies that the stakeholder is aware that the impact these pesticides have on the mortality of bees are downplayed by other

stakeholders, but also that he is not convinced that those stakeholders are right and that he does view pesticides as a threat for insects, thus bees.

The Pollinators' spokesperson also explain how apart from the impact certain pesticides might have on bees' nervous systems, the use of herbicides in particular also destroys weeds that could be a potential food source for bees. The Pollinators spokesperson explains*: "Yes, pesticides, that is something we would like to get rid of. That would also create more space for nature, because if you don't have the pesticide, something can grow."* (Interview the Pollinators)

Though this narrative where these stakeholders find common ground among each other has a strong focus on the role of agriculture practices, most of the stakeholders have explicitly stated that other landowners or managers also conduct practices that are a far cry from ideal when it comes to providing suitable habitat for bees. CLM stated: *"For example, the municipality of Oss is also participating in the Bee Deals project. About five years ago they changed their minds, but in the ten years before that they thought: 'We have many roadsides and long roads that cross through the city. If we sow in grass and mow that a couple of times each year, that is easy to maintain.' But what they did not think about is that in those roadsides flowering plants are growing, or were growing, that are also important for bees. You see that they are changing their minds now and are starting to sow plant seed mixtures throughout the season."* (Interview CLM)

<u>Detailed explanation of figure 6</u>

Warrant #1: Since based on the current state of science, these are the main causes of bee mortality. (Just CLM and Greenpeace)

CLM and Greenpeace are the stakeholders in this group that use this warrant. The following quotes from their respective interviews directly correspond with this warrant, even though they phrase it in different manners. The spokesperson of Greenpeace said the following: *"If you look at what accepted science is saying regarding the ground for bee mortality, they talk about three important root causes. Those are: bee disease such as Varroa, Nosema, that type of stuff. They talk about pesticides such as neonicotinoids, seedcotings, that type of thing. And they name the disappearance of gestation plants. For the wild bee, there is also the disappearance of nesting opportunity such as dead wood, unworked soil, basically places where critters can build nests. And a few more reasons like climate change, disappearance of biotopes, acidification and eutrophication are relevant for wild bees."* (Interview Greenpeace) The spokesperson of CLM stated: *"Because you can see, scientists are not agreeing on what the cause is exactly. Some scientists swear that crop protection agents are THE most important cause. Other say the change of our landscape, with much less food for the bees, is really important. And a group says, particularly focussed on honey bees, the bee keepers have less and less knowledge, and they are not adequately controlling the Varroa mite, causing the bees to fall ill. So that is three causes that, in our view, probably all play a*

role." (Interview CLM) This last answer does show there is still some scientific uncertainty. At the end of this chapter the effects this has on the broader debate regarding bee mortality will be addressed further.

Some of the stakeholders in this discourse coalition do not concisely and explicitly name certain factors as 'main causes' for bee mortality, but their vision is implied by some of their answers. The following warrants and backings reflect or underpin their views.

Warrant #2: Since the way in which we perform agriculture in the Netherlands is harmful for the natural environment, and also for bees.

The Greenpeace spokesperson warranted that: *"The way in which we perform agriculture is bad for nature, and nature provides services for farmers. There are no flowers on farmlands anymore and there is a lot of chemical pesticide use, that is bad for nature and, among others, bad for honey bees. And those honey bees give something back, namely pollination of apples and pears. So, as farmer you benefit from taking good care of the natural environment."* (Interview Greenpeace) The Natuurmonumenten ecologist expressed it in the following manner: "*Also, in the agricultural areas nothing is cluttered anymore. They plough all the way into the ditch edge. Spraying [of pesticides red.] is done up to three meters from the ditch edge because the water board does not allow spraying closer to the edge because it is bad for the water quality, but then they do spray so that those three meters to the ditch edge get a bit of natural biodiversity. The fields are now totally emaciated because fertilizer is being used there constantly. It won't take much more for the whole field system collapses. Because for the plants you do need soil fauna that makes the nutrients available. So, it's really bad, yes, the farming system is very much focused on emaciating.* (Interview Natuurmonumenten) The spokesperson of 'the Pollinators' explained why there is an issue with the agriculture system, rather than just with individual farming practices: The Pollinators: *"Because the [current red.] system is arranged in such a way that there always is food available, that ensures economic growth, mainly that as much as possible is produced as quickly as possible. Yes, and if you base that on growth, there is never going to be an end, that is what the system is designed for. We subsidize all kinds of things at European level to promote this. For example, look at the milk industry, which is gigantic but actually not profitable at all if you take the subsidies off. But it is being maintained to help the farmers. And that's fantastic. Those people need an income too. But if you look at the deeper layers of it, you see that it is not a sustainable business at all. Not economically, and certainly not for the earth. So that is the main point that requires change to promote bee policy. Because it is about pesticides, about intensive agriculture and, consequently, the destruction of ecosystems and biodiversity. If we have food available for bees and butterflies all year round everywhere in the Netherlands, and they are involved in pollinating our own food, because that's what they do after all, you get a very natural system. But as long as we [as a society red.] continue to believe in our current system, […] and especially that it cannot be done otherwise because the way it is now is 'just the way it is, it remains an obstacle for bee policy.*

[…] Now we're working with municipalities and provinces to facilitate the growth of more plants and trees, 'bee ribbons', but those are still relatively small steps, of course. As long as the whole system is not adjusted, you will […] continue to have a lack of healthy living environment for bees and ultimately for people. That is what we believe, if it is good for the bees, it is also good for the people."

Backing #2.1: Because even though the exact impact of pesticides on different bee species is unclear, there is a clear risk in using them, which should be limited.

Regarding the role of pesticides, the ecologist of Natuurmonumenten mentioned: "*In certain areas, the concentrations [of substances like insecticides, or hormones red.] in the water is bizarrely high, and this all flushes into the sea. That contributes to the environmental pressure. And those neonicotinoids, that is very risky stuff. Because it impacts all insects, and as a seed coting it ends up in the environment. But it is already everywhere in the Netherlands, in risky concentrations. For example, in the Westlands there are places where the concentrations in the water exceed the norm a ten-thousand fold, because it is used bizarrely often in the greenhouses. And greenhouses still discharge a part on the surface water. So, something is definitely going on there. And that is difficult to find out exactly what. It is easy to call out: "Nothing is going on, get over it." But to prove that decrease of insects that are very difficult to count, and difficult to follow, is caused by a pesticide, that is really difficult. And the industry lobby is of course very good. So, you hear from every corner that nothing is going on."* (Interview Natuurmonumenten) The answer implies that the stakeholder is aware that the impact these pesticides have are downplayed by other stakeholders, but also that he is not convinced that those stakeholders are right and that he does view pesticides as a threat for insects, thus bees.

The Pollinators explain*: "Yes, pesticides, that is something we would like to get rid of. That would also create more space for nature, because if you don't have the pesticide, something can grow."* (Interview the Pollinators) These quotes explicitly show that landscape change, which was phrased as 'biodiversity decline, due to intensification of agriculture practices', as well as pesticide use are considered to be the main challenges for bees in the Netherlands in the perspective of the Pollinators.

The spokesperson of CLM uses the same storyline: *"When we are in conversation with growers, we do find it important to say: 'Pay attention that there are different research projects. Sometimes they contradict each other. But all of us know roughly that this and that pesticide should not be sprayed if bees are flying around. So, there are definitely effects. Whether those effects will manifest is difficult to research. But just employ some sort of precautionary principle and use as little as possible. That way you know that you do as little harm as possible.' That nuance is very important to us."*

Backing #2.2: Because due to the intensified agriculture practices that have been employed and developed in the Netherlands after world war II, biodiversity has decreased and is decreasing.

The spokesperson for 'the Pollinators' explained their perspective in the following manner: *"In the end, we were founded with the goal to create more of an impact and to actually generate more biodiversity. Because the issue is ongoing for thirty years already, and since world war II biodiversity has been declining due to intensification of agriculture practices and the fact we want to have food available at all times. […] Yes, the most important thing [for pollinators in the Netherlands red.], in our view, is biodiversity, but in combination with a reform of the agriculture system.* (Interview the Pollinators) A similar backing storyline is employed by Greenpeace in the following quote: *"They really use every square meter* [of the meadows red.] *for as much protein production as possible, because protein you need to produce more milk. 20-25 years ago, they were mowing about 3-4 times a year, and now that is 6! So basically, it has become a hyper-intensive monoculture of only English ryegrass. If you mow a lot, there is actually little room for flowers. Because there are no flowers the insects also disappear, and in this way also the birds, because insects are the food source for birds. […] Here is also a PBL chart, in which they have put statistics of plants, breeding birds and butterflies in a row. This research period is a comparison between 1990-2005 and 1975-1989. And you see that in the nature reserves, especially the vascular plants and the breeding birds are making a return, they are doing better. Butterflies are still doing pretty bad, but that is also due to eutrophication and climate change. Whilst in the agricultural areas it is really declining according to all indicators. This is a different view of the same table, just about all types are going down tremendously. So, grassland butterflies, for example, we still have 1/5 of what it was 20-25 years ago."* (Interview Greenpeace)

Backing #2.3: Because intensified agriculture practices make it difficult to maintain bee-friendly and biodiverse nature areas.

The ecologist of Natuurmonumenten mentioned: "*What we really notice is that due to nitrogen deposition of the industry and agriculture, and desiccation due to agriculture, there are less plant species due to the nitrogen levels, and plants that are able to cope with drought are doing much better than other plant species. That is only a small spectrum of species, which are usually not flowering plants. So, within our nature areas we experience great difficulty to ensure sufficient numbers of flowering plant species. All due to external pressures."* (Interview Natuurmonumenten) This view on land use does slightly differ from other stakeholders, in the sense that other stakeholders more often refer to a loss of biodiversity in rural areas in this context. However, based on this quote, Natuurmonumenten perceives these same agricultural practices, that are seen as the cause of biodiversity loss in rural areas, to be the reason good, bee-friendly, land management is so difficult in Natuurmonumenten's own nature areas as well.

Varroa mite

Within this group there are some differences regarding the role these stakeholders ascribe to disease and pests in causing bee mortality. CLM and Greenpeace do explicitly state they perceive Varroa mite as a threat for honey bees. Natuurmonumenten only briefly mentioned

Varroa in their interview in the following manner: *"And regarding bee keeping and that Varroa mite. We have also had a debate regarding whether it [Varroa mite red.] should be controlled. […] I don't know how it is now. But back then there were people who said: 'Controlling measures for Varroa mite are not necessary, because if you ensure that your bee populations are healthy, they have no problem surviving Varroa mite. And controlling Varroa is worse than not controlling, because you keep disturbing your colony by using poison that is bad for the Varroa mite but also not good for bees.'"* (Interview Natuurmonumenten) This quote shows Natuurmonumenten is aware that Varroa is an issue that bee keepers are dealing with, which is linked to honey bee mortality. It does not become completely clear from this quote whether Natuurmonumenten considers Varroa to be a main cause for honeybee mortality. It seems to imply that Varroa is not as much of an issue as pesticide use and land use, since biodiverse and pesticide-free areas would, according to some, result in the healthy bees that would be able to survive Varroa. But that is mostly speculation. The Pollinators' spokesperson did not mention disease, pests or Varroa mite at all. This might have to do with the fact that this stakeholder primarily focusses on wild bees, and thus is not as concerned with the threat that is mainly linked to honey bee mortality and not necessarily to wild bee mortality. Greenpeace for example mentioned: *"Varroa, that is something that needs to be dealt with, I get that, but that is not something I can do much about. We are a nature and environmental organisation, so we are mainly concerning ourselves with agriculture."* (Interview Greenpeace) The same could be the case for the Pollinators. However, this possible disagreement within this group of stakeholders regarding the role of pests and disease in relation to bee mortality does not seem relevant to pursue further since it does not fuel conflict. This might be because addressing the Varroa mite issue mostly is the responsibility of bee keepers, and the treatment of Varroa does not really cut into resources that are important for addressing the other two causes, or harm interests of important stakeholders.

Solutions

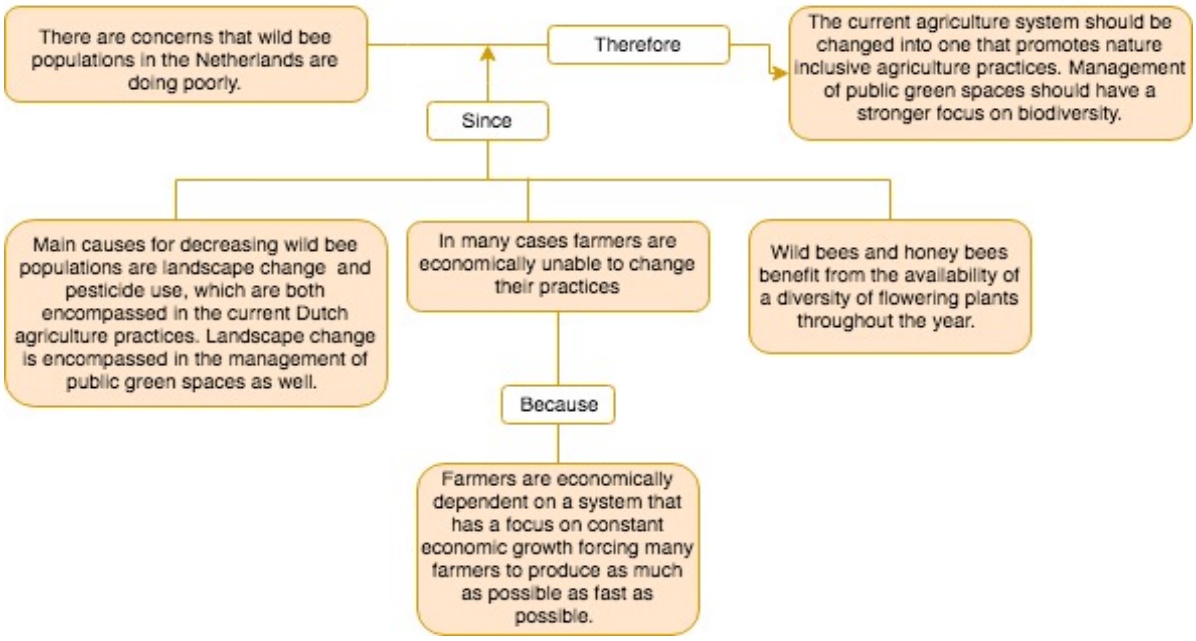

Figure 7: Toulmin's structural argument model displaying the storylines employed by the first stakeholder group regarding solutions to the issue of declined wild bee populations.

As a consequence of their belief that bee mortality is caused by an unsustainable approach to agriculture, the stakeholders in this group see a reform of those practices as a solution to the bee mortality problem in the Netherlands. The storylines they employ explain that the Dutch agriculture system needs to shift towards a more nature inclusive system with more space for biodiversity and reduced levels of (or no more) pesticide use. Though the focus for some of the stakeholders that support this narrative is on the agriculture system, many of the stakeholders expressed that all landowners in the Netherlands can contribute to increasing the availability of suitable habitat for bees. The following text and quotes display these storylines.

The reason stakeholders in this group opt for a 'system change' rather than just a change in agriculture practices, is that they believe that policies in both the private and public sphere put farmers in a position that forces them into practices that are increasingly unsustainable. Greenpeace explained this notion in the following manner: *"For years now, they [Dutch supermarket chains red.] are in the midst of a sort of supermarket war, in which they mainly compete in terms of the price they offer to consumers. So, everything needs to be as cheap as possible. With that, they keep farmers hostage in a social-economic position that drives them to keep intensifying their practices. So, for example, grassland farmers, or dairy farmers, who have been unable to get a higher price for their milk for years now, do need to increase their expenses. For example, in policies that remove milk quota, and by changes in the CAP, the market is increasingly left to its fate. This results in farmers needing to produce more and*

more milk for their business to survive. And the prices for milk are decreasing even further. The result is intensification of grassland management, less birds, more cows, and less flowers. (Interview Greenpeace) The spokesperson of the Pollinators summarised the issue with the current system in the following manner: "*Yes, the most important thing [for pollinators in the Netherlands red.], in our view, is biodiversity, but in combination with a reform of the agriculture system. […] Because the [current red.] system is arranged in such a way that there always is food available, that ensures economic growth, mainly that as much as possible is produced as quickly as possible. Yes, and if you base that on growth, there is never going to be an end, that is what the system is designed for. […] But if you look at the deeper layers of it, you see that it is not a sustainable business at all. Not economically, and certainly not for the earth. So that is the main point that requires change to promote bee policy. Because it is about pesticides, about intensive agriculture and, consequently, the destruction of ecosystems and biodiversity. […] As long as the whole system is not adjusted, you will […] continue to have a lack of healthy living environment for bees and ultimately for people."* (Interview the Pollinators)

The storylines employed by these stakeholders explain that the Dutch agriculture system needs to shift towards a more nature inclusive system with more space for biodiversity and reduced levels of (or no more) pesticide use. The spokesperson for Natuur&Milieu said in this regard: "*Agriculture should become more nature inclusive. Fields, barnyards and pastures need to become more attractive for bees again." (*Interview Natuur&Milieu) Greenpeace made a similar statement: *"But you have to do something about the biodiversity on fields, around fields, so the flowers and ensuring that there is always food available for useful biodiversity, and you need to get busy with reducing substance use, because that is just very high in the Netherlands."* (Interview Greenpeace) The spokesperson of 'the Pollinators' stated: *"Yes, biodiversity is the most important in our view, biodiversity, but combined with a reform of our agriculture."* Some of the stakeholders explained how closely connected the biodiversity and pesticide matters are connected, that more biodiversity on and in the direct surroundings of farmlands would reduce the necessity for pesticide use in general, and that in turn reducing the amounts of pesticides that are used are beneficial to the living environment of a diversity of flora and fauna. (Interview Greenpeace, Interview CLM) A more detailed explanation of this matter by the interviewees can be found in Appendix III.

The spokesperson for Natuur&Milieu said regarding the agriculture system: "*Agriculture should become more nature inclusive. Fields, barnyards and pastures need to become more attractive for bees again."* Greenpeace made a similar statement: *"You have to do something about the biodiversity on fields, around fields, so the flowers and ensuring that there is always food available for useful biodiversity, and you need to get busy with reducing substance use, because that is just very high in the Netherlands."* The spokesperson of 'the Pollinators' stated: "*If we have food available for bees and butterflies all year round*

everywhere in the Netherlands, and they are involved in pollinating our own food, because that's what they do after all, you get a very natural system. But as long as we [as a society red.] continue to believe in our current system, […] and especially that it cannot be done otherwise because the way it is now is 'just the way it is, it remains an obstacle for bee policy. […] Now we're working with municipalities and provinces to facilitate the growth of more plants and trees, 'bee ribbons', but those are still relatively small steps, of course. As long as the whole system is not adjusted, you will […] continue to have a lack of healthy living environment for bees and ultimately for people. That is what we believe, if it is good for the bees, it is also good for the people." The spokesperson for the Province of Overijssel argues similarly that farmers are stuck in a system, and that the Netherlands as a country is responsible to change that, not just individual farmers: *"Often people are quick to point at the farmers. I understand that, that is easy and perhaps also justified. But I think that oftentimes there is not enough attention to their side of the story. That is why I am happy that for example LTO is also in the 'bee movement'. Overijssel has huge rural areas and not that many cities. And it is true that that rural area is for the most part a [food red.] desert [for bees red.]. And yes, you can blame individual farmers for that. But I also think that that the complete system that is in place in the Netherlands is also responsible for that. So, it is not just the responsibility of the farmer in my opinion. And you need to help each other in that sense, not just press the sore spots so to say."* (Interview Province of Overijssel)

Some of the stakeholders explained that more biodiversity on, and in the direct surroundings of, farmlands would reduce the necessity for pesticide use in general. The CLM spokesperson explained: *"Second important thing is that the use of different substances, namely those that are harmful for pollinators, that you should reduce those as much as possible. Where it is not necessary, don't use it. And you see, for example, that with aphids in a certain crop, that you think: 'Oh, I need to interfere.' We currently know that there are many natural enemies: parasitic wasps; earwigs; lady bugs, that also eat aphids. And sometimes it is the case that you have a few aphids, but you do not need to spray, because they cause a bit of damage but that is insignificant for your harvest. And those natural enemies will come and eat them."* Greenpeace explained: *"In the first version of the national bee strategy the ideas were very compartmentalised. Sort of: 'We need more flowers and we need less substances.' Whilst, if you pull those two together you start doing interesting things. So, if you allow more biodiversity to exist on the barnyard, so if you plant more flowers that attract useful insects that eat aphids for example, you don't have to spray those pesticides anymore."* (Interview Greenpeace)

Though most of the stakeholders in this group emphasize the need for a change in Dutch agriculture practices, most also mention that anyone who manages green areas can make a significant contribution by employing more bee friendly management practices. The spokesperson of the Province of Overijssel mentioned: *"I do think there is much room for improvement in agriculture. But also, in the management of green areas in general, which is*

more of a municipal task. But the Water Boards could also play a role for example, farmers can do it, estates can do that, Vitens [a water company red.] also owns a fair amount of green grounds." (Interview Province of Overijssel) The CLM spokesperson mentioned: *"An important change that needs to happen is that all parties, municipalities, farmers, etc. All landowners or land managers, of land or roadsides, that they should not aim to remove all flowering plants. Of course, sometimes there are weeds, and that is difficult because it spreads it seeds through the wind. So, you do need to carefully think about what type of roadside you want to have and how to maintain that. Because it is true it can cause problems, and that is not the intention. So, in the whole story regarding food for insects and pollinators: 'Be cleverer about the way you design your public spaces and land management so that there are more flowering plants throughout the year.' That is an important one."* (interview CLM)

<u>The following quotes provide more evidence for the storylines that are displayed in figure 7:</u>

Naturalis: *"If I were allowed to create policy, it would be policy with a focus on making urban areas greener. And with greener I mean more natural. So, more natural field margins, and that this is really assured. […] I do think the government has a responsibility. But I don't think they are alone in that. […] Local governments, farmers, and actually everyone who has access to a garden* [also have a responsibility red.]. *Lots of people have their garden paved. That is not necessarily a good thing for bees. And we have quite some urban areas in the Netherlands. So, in that sense I think everyone is responsible."* (Interview Naturalis)

The ecologist of Natuurmonumenten explains the issue in the following manner: "*Also, in the agricultural areas nothing is cluttered anymore. They plough all the way into the ditch edge. Spraying [of pesticides red.] is done up to three meters from the ditch edge because the water board does not allow spraying closer to the edge because it is bad for the water quality, but then they do spray so that those three meters to the ditch edge get a bit of natural biodiversity. The fields are now totally emaciated because fertilizer is being used there constantly. It won't take much more for the whole field system collapses. Because for the plants you do need soil fauna that makes the nutrients available. So, it's really bad, yes, the farming system is very much focused on emaciating.* (Interview Natuurmonumenten)

Greenpeace: "Something you noticed at first was: "For bee health you need to deal with Varroa." And "Beekeepers need to do a better job" that is also something I tend to hear. Or some floral ribbons in the landscape and that's that. That is a bit simplistic, but that helps to get a clear idea. Pesticides are not mentioned much because they are a bit of the elephant in the room. Because if you try to get an agreement with LTO and Nefyto, the latter is the poison seller, it is non-negotiable if you want restrictions enforced on those. So, the outcome of such a strategy is: "We are not doing anything in the farming lands, because that would be at the expense of hectares that can be used to grow potatoes. We are going to get

municipalities to manage their roadsides in a bee friendly manner, and the beekeepers need to make work of controlling Varroa better." […] But you need to do something about biodiversity on fields, around fields, so with flowers, and ensure that there is always food available for useful biodiversity. And you need to make work of lowering pesticide use, because that is just really high in the Netherlands. […] The most important threats for healthy bee population in the Netherlands, how to curb those: Agrobiology. Very shortly stated, work with nature in a clever way."

Naturalis: *"When it comes to the wild bees, there are usually two things that are stated in terms of: 'we have to do something about that'. Namely, wild bees need B & B (bed and breakfast red.), they need to have a nesting place and they need to eat, and that is quite straightforward. So, that is manageable for everyone. Anyone can think: I want to help bees, I sow flower seeds. And that's a fine idea, but I think the biggest challenge is to maintain the attention for the issue. Right now, there is a lot of attention, and people want to do something, and that It's good, but the challenge is to hold on to it. Look, if your neighbour thinks: I want to help the wild bees, I sow a bag of bee seed in my garden. Good idea, but you have to make sure that it* [flower rich garden red.] *stays managed. You cannot do that once and then think it's solved."*

CLM: *"A second important one is that you reduce the use of various substances, in particular those that are harmful for pollinators, as much as possible. If it is not necessary, don't use it. You see that for example with aphids in certain crops, that if you see those you think: 'Oh, I need to intervene.' But we know now that there are many natural enemies -parasitic wasps, ladybugs, earwigs- that eat those aphids." (Interview CLM)*

The Pollinators: *"Yes, biodiversity is the most important in our view biodiversity, but combined with a reform of our agriculture. In that context we see options in, for example, food forests. But that is a very long-term project. Because you don't create a food forest overnight. But a transition from agriculture, for example, in steps, to food forest or, and then you can think in steps again, to organic farming practices." (Interview the Pollinators)*

Despite the strong focus on agricultural practices in a large proportion of the storylines used by these stakeholders, the group does believe that land managers other than farmers also have a responsibility to improve their practices. The following quotes embody this storyline.

CLM*: "I also think that governments, the lower governments we were talking about - municipalities, water boards, provinces- they can, of course, decide for themselves how they want to manage their areas. Just grass, or do you also want something that blooms. That is something they control that, so they can make the steps to do that. And we see huge differences between municipalities."* (Interview CLM)

Desirable measures

The following sections display quotes that display the storylines used by stakeholders in group 1 to describe desirable measures to come to the solution described in the previous paragraph.

Educate and promote awareness among farmers, municipalities and the general public

CLM*: "For many crops, there are threshold values now, as they are called. So, if you count the aphids on the leaf and the number is bellow twenty, you don't have to spray at all. So, by monitoring that, and by really only interfering if the infestation is likely to become so big it will significantly harm your crop. That integrated approach, it is used a bit right now, but there is still a lot of room for improvement. We have done a study for Greenpeace […] in which we concluded: less use is possible if all growers use the newest techniques and use these types of techniques for monitoring threshold values. Then the use of those substances and the risk of the use of those substances can vastly reduce." […] In addition, this also entails communicating, advising, also toward growers, to make clear that partially it is in their own interest. So, I think that education and communication are also part of that. Practical and solution oriented, based on things you encounter. But in addition, also education to make clear: 'This is also in your own interest'. Because you see, growers feel attacked quite quickly: 'We get blamed again, but the problem is with others who don't take care of their bees well. Those beekeepers should just do their job better.' So, they feel attacked quite quickly, but if you can then make clear: 'Wait a minute, it's not about attacking you, but bees are also important to you and if we take a step together, by simple measures you can contribute. […] Then you can even demonstrate to the society that you take the problem seriously and that you want to do something about it. So, you can even use it as PR for yourself: 'I'm pretty aware of my environment and I want to do something about it.'" So, in that sense we try to influence the mind-set of farmers and growers. 'Think of it as an opportunity and not as a reproach or threat.'" (Interview CLM)*

Province of Overijssel: *"Often there is some hostility between those saying "the farmers did it" and the farmers themselves, who are not aware of it or who are thinking: "I am also just a little part of the system. […] To me, the government should stand for the maintenance of a society which enables new generations to live, work, eat, everything. And, with what I see I think: 'It is not going so well.' As a government you have a responsibility to interfere. […] Interfere in terms of promoting knowledge and appreciation for what nature, in the broadest sense, gives us and how we need it. To get attention for that so that people take it into account more. And bees are a very tangible and cuddly part of nature. […] So, it is all a very human [centric red.] perspective on nature. But I think that that is the perspective that can convince many people to do something for it. Due the sense that it is in their own interest, or in the interest of the community, or anything like that.* […] *Of course, as a province we have responsibility for nature policy, and I think that also entails inspiring people. Raising awareness so that people feel more connected [with nature red.] so that they are more*

inclined to take action, or to stop doing certain things. […] And we can point that out to other parties as well, so to the residents, but also to organizations and other governmental institutions. [...] Because in landscape management you have of course landscape elements, so wooded banks and the like, with which you can do a lot for bees. And then of course the challenge for us is that when we are working on the program, these things are not enforceable, so it is voluntary based, so with network of farmers who provide knowledge and resources. Sometimes [we provide red.] support with 'how can you come to a good business model'. No direct support, because that is not allowed, and that is also something you would not want. But we do provide support in terms of knowledge or innovations that we can promote as government, so on that line, yes. I think that is the most important entry for [a more bee friendly red.] agriculture." (Interview Province of Overijssel)

Greenpeace: *"That project was managed from the Louis Bok institute, also with scientists who went into the field with farmers: 'this is this and that critter, it is useful against this and that, and it depends on this and that flower'. But also: 'okay, there are now aphids on your potato plant, how many aphids can a potato plant handle before you have to do something. Or is there a point where you can just accept such a pest and think: 'that's the food for my useful creatures.'' That project went on for a couple of years, but because of the disappearance of subsidy it did not survive. That is a real shame, a big loss. But like I said, most of those farmers were conventional arable farmers and they made very practical steps in reducing [chemical pesticide red.] substance use, and not only because there are useful creatures, but also because there was a shift in the way they were thinking about it." (Interview Greenpeace)*

Specification of the source of awareness and education for farmers:
Greenpeace: *"So, thinking about pest control with someone who does not sell substances was in itself a big step. […] The people who consult with the farmer 'I have a plague, what should we do about that?'. Most of those talks happen with people who are financially dependent on selling [pesticide red.] substances, and then it's not so strange that you'll start spraying those pesticide substances." (Interview Greenpeace)*

Ecologist of Natuurmonumenten: *"But we also see that agricultural nature management is used as an extra source of income in various places. So, farmers are doing things because they get extra money for that without an internalisation as to what that means and how that should be done. That is very difficult because with nature management it is very often the case that you can only do something one way to do it the right way. It is very easy to, if you leave things a bit, or do things a bit too early, you will not get the results that you want to have. And this is something you see in many places with agricultural nature management. […] I cannot look into their heads [of the farmers red.]. And knowledge plays a role. But in the past, it was certainly the case that motivation also played a role. And that system has changed, and that means that relatively more farmers that are doing agricultural nature*

management are really motivated. But it still does not happen that I think: Every euro there is spent optimally. […]
"And in the urban system you see that people prefer things clean, tight, and proper. They rather see tiles than grass. You also see that with the ban on 'roundup' [a herbicide red.] in the urban maintenance. Roundup is now banned because the water boards found concentrations of glyphosate in the water that surpassed the norms. I think that was the main reason. But residents have a hard time dealing with seeing everything become greener, with plants between the joints and stuff. But for nature it is much better." (Interview Natuurmonumenten)

Ecologist of Natuurmonumenten: *"Another phenomenon you see is that people do not see what they don't see. So, if people are walking around in for example a rural meadow landscape with cows in the pastures, and it is bright green, they like it. But if you show a picture of the same cows, the same spot, but with a very flower-rich pasture -because it hasn't been over-fertilized and sprayed to death- most people prefer that. But that is something they don't realise if they would walk around there. In the sense of: 'Hey, that could be different'. So, much can be gained in that sense with public awareness. […] You see that many bees live in cities and urban areas. So, at the moment the number of threatened bees that live in the city is relatively much higher than in rural areas. And you can find many different species in urban areas, but not so much in nature areas. So, the urban spaces are of great importance as well. And is that something we are active in? Barely. We do not have the capacity for that. We mainly concern ourselves with managing our own nature areas, and to get people enthusiastic and getting their support. But for wild bees there are many opportunities in urban areas as well. And a club like the bird protection association is much more active in that sense. Consumers help to make their gardens attractive for birds. The butterfly association is also active in that regard. And those are important things. Because at the same time you see that there is a trend of completely tiled gardens. And every year a certain amount of green surface is lost because people are tiling their garden. You also see that municipalities are starting to get in trouble because it speeds up water drainage, and there is no sufficient sewer capacity for that. But there is also a real opportunity for wild bees and other insects in that regard. […] Because of course there has been a lot of attention for bee related issues these last years. I am just naming Bijenkorf [a Dutch warehouse chain red.], they had a campaign this past summer to create more awareness. […] So many different things are happening, and we play a small part in that. We do think it is important, but it is not our core task. It is something that beekeepers could play a big role in [spreading awareness red.]. Because beekeepers are all very locally embedded. I don't exactly know how many beekeepers there are in the Netherlands, but I think there are thousands. That is much more than the 700 employees that we have. So those beekeepers are in much closer contact with normal citizens than we are. So, much could be gained there. The same goes for the management of green spaces in municipalities. You were talking about roadsides. But I think that in many city parks much can be gained for biodiversity as well. But that is difficult to*

combine with a feeling of safety and neatness. So, the average Dutch person wants a city park to consist of mowed grass and clipped trees. Yeah, there is no space for insects in such an environment. They need corners, rough grass and thickets. So, there is a lot to optimise in that sense. But that requires customisation, which demands time and much knowledge." (Interview Natuurmonumenten)

CLM: *"That includes communicating, advising, also towards growers. To clarify for them that part of it is in their own interest. So, informing and communicating are important I think. Practice based and solution-oriented, based on things you encounter in the field. But also informing to clarify: "This is in your own interest." Because you see that growers feel attacked very quickly: "Everyone blames us again, it is all because others do not take proper care of bees, those beekeepers should do a better job." So, they feel attacked quickly. But if you can clarify: "Wait a minute, it is not about attacking you. But bees are also important for you, and if we can stop [bee decline red.] together. You can contribute through simple measures. Then you can even show society that you take the problem seriously and that you want to do something about it. So, you can also use it as a PR for yourself: 'I am quite aware of my environment and I am willing to get involved.'" So, in that sense we try to influence the mindset of farmers and growers. See it as an opportunity and not as a reproach or a threat. [...] That awareness is of course already present. Fruit growers just know that the pollination is important, otherwise you will get deformed apples etcetera. But the awareness is mostly focussed on the honeybee. Traditionally there is this idea that that [the honeybee red.] is the most important pollinator for all crops. But recently, a study from Wageningen [by De Groot et al. (2015, 2016) red.] found that they [the wild bees red.] play a very important part in the pollination. So, I think that is the new development. That wild bees are also very important for growers. The idea from the old days was: "I just need to make an appointment with the beekeeper to put ten beehives in my orchard and then everything is done." But those ten hives with honeybees are only doing a part of the whole pollination that is necessary."* (Interview CLM)

"Create systems with actors to register the total environmental impact of pesticides." (Interview Natuur&Milieu)

Stricter authorisation procedure pesticides with independent review committee

Ecologist of Natuurmonumenten: *"Well, authorisation of pesticides could be stricter. The way in which nitrogen emissions are addressed could be stricter. The water boards -so the government as well- could put the natural interests in nature areas center-stage rather than the agricultural interests of the surrounding environment. That would be a great help. […] What we see right now is that lots of research is done by the producer [of the pesticide red.] so that he can ensure the dossier [required for authorisation red.] is complete.*" (Interview Natuurmonumenten) The Natuurmonumenten ecologist argues that the validity of the data that results from this research is questioned by scientists (Beckerman 2015; Harmsen 2018)

and members of parliament (Ouwehand 2012; Grashoff 2018) . (Van Steenis, personal communication, 8 June 2018) For this reason he stated in the interview: "*So, there should be an independent research institute that is still payed for by the industry, but independent, which really researcher the effects that those substances have. […] If there is an independent evaluation committee, where all parties that have an opinion about this matter are represented in [the research being financed by the industry would not be as much of a problem red.]. […] Because now it is the case that if the government says: "If you want to use or sell something you need to have done this and that research, and you make a dossier, and we will assess that." But then the research has already been done in a way that makes it difficult to assess it. Much of the research is also not publicly available due to competition risks and such. […] So, if you have a governmental club in which you have some sort of guidance commission in which all involved actors are represented, and they agree on: "this is the type of research we need to do", and the government outsources that research, you have much more distance between the people that perform the research and those who have a direct interest in the matter.* (Interview Natuurmonumenten) A disclaimer with this quote: The ecologist specifically stated that this is his own view on the matter, and that he does not know whether this is in line with an official position of Natuurmonumenten on this matter.

Independent Research to close knowledge gaps

Ecologist of Natuurmonumenten: *"The academic sector could help us get more clarity regarding certain points by performing good research: 'What exactly is the deal with those neonicotinoids?'; 'A three-quarter decline in insects and biodiversity, what is the exact cause?'. Because those things are very important to know for us in order to understand which buttons we need to operate. […] Of course, there is all this research done by authorisationers of pesticides. They are required to do that research to get their substance registered at all. However, I do have the impression that that research is biased. You know that in health research if people know whether they get a medicine or not they react differently. It is the same with researchers. Researchers are paid by producers of pesticides. So, that already makes you a bit biased towards: 'there is not so much effect.' That is inherent to our human nature, to lean that way a bit, and then you will see that in your findings more easily. And there is much less space for independent research to really look into this. Because the government states: 'The producer needs to perform the research, because they are going to make money off of it eventually, so they need to arrange all this.' Yes, that does not guarantee that the research is as objective as it can be."* (Interview Natuurmonumenten)

Greenpeace: "*There is still a challenge in the development and spreading independent knowledge. The manner in which knowledge and technology is developed in the agriculture sector, and specifically in the Netherlands, is very much going together with the industry. You see that in Wageningen as well.* (Wageningen houses Wageningen University, which has a strong agriculture department, as well as several research institutes that perform research

relevant to the agriculture sector red.) […] *So, for example, within Plant Research International there is a lot of cooperation with Bayer, with Syngenta, with Monsanto, all those guys. And they are fully involved in thinking about what the research agenda should look like and the types of questions that are asked. So, to a large extend, they also have a say in the outcomes in terms of new technology developments in the agriculture sector. Those technologies are then brought onto the market and marketed by companies through what they call 'extension services'. These things used to be a public affair, it was done by the Ministry. But these days it has been privatised. There is a revenue model behind it. It is just like if a vet earns money by selling antibiotics, it does not necessarily incentivise that vet to prescribe and use less antibiotics. That is something that needs to change I think. There should be more independent research and technology development, and more independent knowledge directed at the farmer on the field."* (Interview Greenpeace)

Stimulate desirable practices with governmental reward systems

Province Overijssel: *"Yeah, farmers simply don't have it easy. There are many rules that they need to comply with. That is difficult, because you are educated to be a farmer not a rule manager, at least that is what I always think. I also think there is so much going on and so much asked of them that it quickly feels like an extra burden really quick. That is why people are inclined to keep it off, or even start resisting: "Here are those nature supporters again who want something from us, do they want to have a piece of my land again?" Land is something we simply need for the food supply in the Netherlands, and of course we also export a lot of it. But for an individual farmer, if it feels like that, it feels like that for him. So, I think that forceful mechanisms do not work, they only cause more resistance. So, I think you need to get there through seductions. But, yeah, how do you seduce people that are just very busy with their company and for whom it really feels like something extra? I don't know. With this target group I don't know. […] Of course, you always have frontrunners. But usually those are the organic farmers, and they usually don't really fit in the mainstream. So, you should have some examples of people who are enthusiastic about this stuff and that can inspire others with their enthusiasm. And making it easy, that always helps. Just making it super easy. And it is a challenge to seduce without being preachy."* (Interview Province of Overijssel)

Natuur&Milieu, Greenpeace: Utilise CAP greening measures and Ecological focus areas, or a similar reward system for farmers to make land available for biodiverse, flower rich areas.

Natuur&Milieu: *"Agriculture should be less intensive, this could be stimulated through other reward systems. […] It is not financially advantageous to perform nature inclusive agriculture. […] Government: Create a system in cooperation with stakeholders in which the total environmental pressure of pesticides is registered. Put higher taxes on pesticides than on organic (green?) substances. Also create criteria for the manner in which the substances must be sprayed. Lower levels government: create nesting places and food availability, more*

voluntary route. For field edges, use the CAP, make use of the measures that benefit bees. […] Field edges, flower strips etc. are not stimulated sufficiently, financially or otherwise. Not in municipalities either. It is a common perception that bee friendly land management is more expensive, also in municipalities. I don't know if you should work with obligations there. For farmers it is not financially beneficial to perform nature inclusive farming practices. Practical obstacles are that setting up vegetation in the field margins may attract pest animals. A behavioural change is necessary. Not just with farmers, but also with people in the garden. It is a habitual or mentality thing. If you start mowing and you leave a strip for bees…. It is just what we are used to." (Interview Natuur&Milieu)

Greenpeace: *"Something that people were thinking about* [in the meetings regarding the national bee strategy red.] *was: "Should we have a role for these flower-rich field margins in the new Common Agricultural Policy?" So, the European agriculture subsidy. If you could reserve some money for these types of smart things, for example flowers around field edges so you'd have to spray less* [pesticides red.], *then you're going in the right direction. That is why I was pretty enthusiastic when I was there. I thought: "Finally, the penny is starting to drop." […] If you allow more biodiversity on your barnyard, so if you plant more flowers that attract useful insects, for example insects that eat aphids, you don't need to spray anymore. […] In the jargon they call it FAB, Functional Agro Biodiversity. It works like a charm. Many farmers are working this way very enthusiastically. But it would help the farmers, and thus the bee, if there would be a bit more agriculture subsidy available for that. And in the end agriculture subsidy is tax money, that should be spend on public things. This would be a very useful cause. […] So yeah, utilising greening measures of the CAP seems like a good idea to me. However, we do need to ask the question how we are going to do that. And it does need to lead to actual results. One of the manners with which we can ensure it will lead to results is to allow those funds to be used for functional agrobiodiversity, for example with flower-rich field margins, or for innovations that farmers can use to replace pesticides."* (Interview Greenpeace)

Governmental responsibility: The preach, the carrot and the stick

Greenpeace: *"It is still the case that, a step back in helicopter mode, if you as a government trust that the business itself can always come up with solutions for problems, that sometimes does not work. Because you ask me about the role of government. It is the role of the government, I think, to create frameworks in the shape of: the carrot the preach and the whip. That's the government. The preach could be: 'we want agriculture to be independent of pesticides in 2030'. And then you have the carrots: the subsidies that they can use to encourage farmers to go that way. And the whip is law and regulations and checking and enforcing those laws and regulations to ensure that the laggards don't stay behind too much. I think that in the last twenty years the government has been more about self-regulating, and trusting the industry, the sector itself, to self-regulate. But I think that is something you cannot expect them to do. I think that you can expect of farmers that are stuck in a system*

because they are unable to get out financially, that they are able to set up a radically different agricultural model all of a sudden. I also find it very naive to think that Bayer would suddenly come up with a different agricultural model that is much better for the bees, I just do not believe it, that is not their business model that is not their core business. At the same time, as a result of globalization and market thinking, the government is giving away a lot of control. In a number of cases everybody is expecting the government to strongly steer, but that steering wheel is simply not there anymore. Use of substances is one of those cases, it was basically given away to the industry." (Interview Greenpeace)

Retail responsibility

Greenpeace: *"And in terms of businesses, if you look at this graph, this is an overview of the Dutch food chain. Here you see, at that time, it is a graph from 2012 I think, back then we had 65000 farmers, and here on the other side of the chain are 17 million consumers. And that goes through the food manufacturers, suppliers, the purchasing offices of the supermarkets and the supermarket formats to the individual supermarkets to finally end up in the households and onto 17 million plates. Our analysis was, those supermarkets, this is a typical hourglass, the supermarkets are in a special spot in the food chain. There are just five purchase offices of the supermarkets, and they are thus extremely powerful when it comes to what ends up on the consumers' plates, but also when it comes to what is growing on the fields, what it costs, how it is made, and all those things. For years now, they are caught up in a type of supermarket war, in which they mainly compete based on price. So, everything needs to be as cheap as possible. And with that, they keep farmers in sort of a trapped in their social-economic position, which drives them to further intensivise their practices. So, for example, dairy farmers who, for years now, are not getting a higher price for their milk. Their costs are increasing. Due to policies such as the removal of the milk quote and changes in the CAP the market is left to its own devices more and more, driving farmers to produce more and more milk just to stay afloat, which in turn drives the milk prices further down. The result is more intensification of grassland, less birds, more cows and less flowers. That is the outcome. You see the same in bell pepper growers, Brussel sprouts, potatoes, onions, etcetera. Due to that insane efficiency drive they are kept in a trap of producing more for less money. The outcome is this agriculture model that is bad for bees, with less flowers and more poison. So, our analysis regarding the food chain was basically: 'That bee mortality and substance use is not just a political discussion, we should also have that discussion in the food chain. And the bigger missing link in the whole debate regarding bee mortality was the retail. So, that is why we focussed our public campaigns on a couple of big players in the retail business."* (Interview Greenpeace)

Natuur & Milieu*: "Albert Heijn* [Dutch supermarket chain red.]*, retail and the gardening industry can play a role by making demands of growers. We do have to make sure that no unobtainable demands are made. For example, a grower won't be able to ban neonicotinoids overnight, a period of transition is necessary." (Interview Natuur &Milieu)*

CLM: "I think that if you look at the supermarkets, they can have a big influence on how products which they sell are developed. Indirectly there is also consumer influence in that respect. [...] So, a big group of consumers is mostly looking at the price. Yes, price is probably on top of the list. And nature and bees will probably be less high [on the list red.]. But a supermarket can say of course: "We think it is our responsibility to do something about it." [...] So, responsibility was taken. And supermarkets simply have a strong influence on what growers do. So, if a supermarket says: "We want you to stop using these pesticides", or that you at least have a flowering hedge around the edges of your fruit plot, if the growers would want to keep delivering to that supermarket they need to take action. In that sense the purchaser, the supermarket, has a big influence of what the grower does. We are also active in the field of livestock farming, busy with clovers in meadows, to make sure that they are good for the bee. Also in livestock farming there are ample opportunities. (Interview CLM)

Develop sustainable alternatives to chemical pesticides

Greenpeace: *"So yes, I understand that for some crops it is more ambitious. So, if you look at a lot of greenhouse products, for example, you can easily take very big steps. If you look at potatoes, which have more robust starting material, you can really take great steps in reducing substance use. I also understand that there are still crops that are more susceptible to things like fungi or specific pests, where you just have to find innovations to be able to take steps. So, in that sense I get that it is going fast. But it is not the case that we have agreed with Jumbo (a Dutch supermarket franchise red.) it must be fixed by June 2016, what we have agreed to is that they will gradually, till 2020, raise the bar. So, I think they are now understanding the bottlenecks, and I would hope that everyone is investing and coming up with smart innovations to solve those."* (Interview Greenpeace)

CLM: *"That controversy* (regarding pesticides red.) *will remain. But we know that it is necessary to take a step towards sustainability and look for alternatives to those crop protection products. So, then it is also necessary to search for alternatives. So, we encourage that. Ensure that, at some point, you can do without these substances. There are interesting examples that show that you can go a long way without them. We are currently working on a European study. We look at neonicotinoids in a dozen crops. we look at: where can we actually easily do without, where can you do without them but the replacements are not much better, and where can you do without and do you really have alternatives that are much less harmful? That actually results in an interesting picture. Actually, you can often do without them. Not always. But where you cannot do without them there are innovations needed get to that situation. So, we say: 'There is hope, because if you just take those steps, then you can reduce the need for these substances. But steps are needed to get there.' Because often the argument is: 'We cannot do without them now.' Well, that is true in some cultivations. [...] There is a whole pile of innovations, but they are stacked away on the shelf*

in a manner of speaking, and they are not nearly stimulated enough to bring them further." (Interview CLM)

Government leads by example

Province Overijssel: *"As Province there are different things we can do. One is that we have to set a good example ourselves. We have many kilometres of roads and waterways, and those roads have verges, and insects live in those verges. So, we naturally have to take into account many different interests in our roadside management. Safety comes first. But I think ecology can come second. So, what can you do, or how can you manage the verges so that they are safe and harbour as many animals as possible. So that is a very clear role that we think I have. And of course, municipalities, water boards, water companies could also have that role, Rijkswaterstaat, of course. Well, one does a bit better than the other, but in general there is attention for it and more and more attention is paid to it."* (Interview Province of Overijssel)

Centralise and coordinate the current efforts

Naturalis: *"Something that is also quite a challenge is that so much is happening now. We are going to make a map in that project with which initiatives there are. That is such an unprecedented amount. Yes, that is very difficult, because that is also one of the main challenges of that project, precisely in the project we are working with so many partners. How are we going to ensure that this is not just another project that does a few things but does not really change anything meaningful? And how are we going to connect all those current projects?" Interviewer: "So, coordination and centralization of the energy that is put into it." Interviewee: "Yes, though you should not want to go too far with that either, because if people want to do something, it is hard to say: 'Do not do it because there is a better way to do it.' But to get something good out of all the efforts is still a bit of a challenge."* (Interview Naturalis)

Enforce a ban on neonicotinoid use

This might be the most controversial and written about claim in the debate surrounding bee mortality. It is one of the only propositions that other stakeholders within the group blatantly disagree with. The storylines used by the discourse coalition that supports this solution as well as the storylines used by the discourse coalitions that oppose this proposed solution are found in paragraph 4.2.3 (Areas of conflict) of the thesis.

Group 2

The stakeholders that make up this second group of stakeholders that share the same storylines (displayed in figure 6) regarding the causality of bee mortality in the Netherlands are:

Beekeeping organisations
BVNI
NBV

Agriculture organisations
LTO
Agrifirm

Governmental organisations
Ministry of LNV

Knowledge institutes
Naturalis

Crop protection industry
Bayer
Nefyto

Perspective on Causality

Claim: The main causes of bee mortality are current landscape management, disease and pests, and beekeeping practices. The causal impact of pesticide use should not be overstated. (Ministry of LNV, LTO and BVNI)

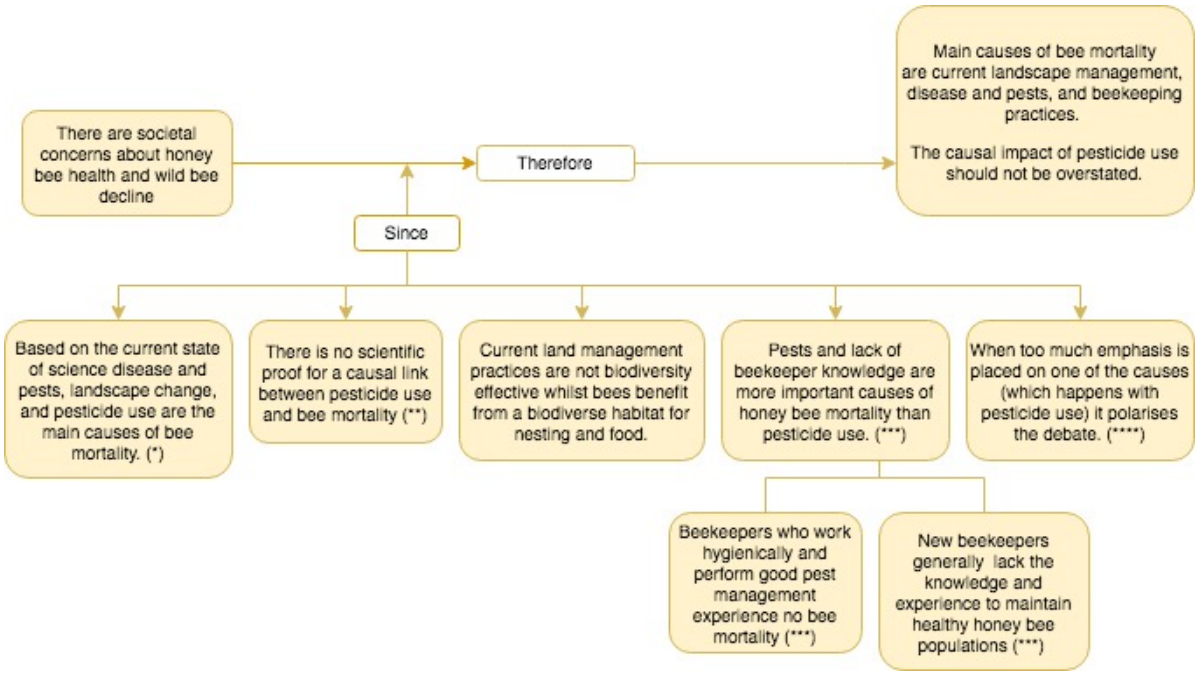

Figure 9: Toulmin's structural argument model of the second perspective on causality of bee mortality in the Netherlands.

Note: (*) Argument employed by Ministry of LNV, LTO and BVNI only; (**) Argument employed by Bayer and Nefyto only; (***) Argument employed by all but Naturalis; (****) Argument employed by LTO only.

The causality claim of group 2 can be split up into two parts. The first part of the claim, which names disease and pests, landscape change and pesticide use as main causes of bee mortality, is identical to that of group 1. The second part of the claim significantly differs from the claim of group 1, since stakeholders in group 2 think that even though pesticide use may have an influence on bee mortality, this impact is limited and should not be overstated. This differs from the storylines used by group 1 in which pesticides played a definite and significant role in bee decline. A variety of warrants is used by different stakeholders in group 2 to substantiate this second part of the claim.

The first two warrants show that there is a split between the stakeholders in group 2 in terms of whether they consider pesticide use to be a cause of bee decline, though not the most important one, or whether they do not consider it to be a cause at all. Both warrants are used to legitimise their amount of weight they ascribe to pesticides as a cause by describing how it is endorsed by the current state of science. The spokesperson for the Ministry of LNV referred to a UN report in which scientific findings regarding the causes of bee mortality were collected: *"There is a famous UN-report which discusses that there are actually a number of causes, and those can be organised a bit. Crop protection agents, that is in there, is important, but really not the most important cause. That is more in how we manage our landscapes these days, about availability of food and nesting areas. Disease and pests in honey bees was an important one back then, and still is I think. And also, honey bees are kept animals of course, so something else that was established was that knowledge of bee keepers, or the training opportunities for bee keepers was lacking, so that just was not good."* (Interview Ministry of LNV) The quote shows that this stakeholder attributes different weights to the three causes in relation to bee mortality, and considers pesticide use to be the least important one. Nefyto stated: *"I think to a significant extend we have always brought forward, say, the scientific basis for this and that: 'Is there a causal link between the established reduction in bee health, bee mortality, and the use of crop protection substances?' And I think that we have emphasized every time that we do not see that causal relation."* (Interview Nefyto) This split does not appear to be very consequential since the point all stakeholders make is that it is more useful to focus on the other causes.

This distinction that the stakeholder in this group make between pesticide use and the other three causes becomes clear in the second warrant. The spokesperson of the Ministry of LNV mentioned: *"Studies have looked into that as well, and there it is habitat. That is the most important one. So, can those [bee red.] species find food and nesting sites. So, bed and breakfast. Those are the main things you need to think about with wild species. And, of course, if you manage your landscape in a way that deprives those animals of the opportunity to find enough food; or in the period when they need it; or of the right nesting opportunities, it will not go well. Those are much more determining factors, I was assured as much by scientists, than crop protection agents. But I do think there are risks with honey bees*

when crop protection agents are applied. That is something you need to be very strict and precise about." (Interview Ministry of LNV)

Another storyline that is employed by a few stakeholders is that due to a new influx of hobby beekeepers, a big group of beekeepers does not have the knowledge on how to keep their honey bee colonies alive. Some stakeholders explain how this lack of knowledge results in (1) new beekeepers failing to provide their bees with access to an environment with sufficiently nutritious food sources; (2) new beekeepers failing to perform adequate pest control when it comes to the Varroa mite. The BVNI spokesperson stated: *"Here in my store I see beekeepers buying jerry cans with sugar water as early as June. That is something I cannot wrap my head around. And they say: 'Yeah, I have no gestation plants, what else can I do? Otherwise they die.' And I get that if you put me on a diet of hamburgers in June and it becomes winter and I get the flu, I will feel pretty damn awful. That is just based on a bit of horse sense. But sugar water and honey are energy sources, but bees also require pollen, those are the proteins. So, if I cannot get my bees a varied diet, it won't take much for them to die. […] Exterminating Varroa -the mite- can in a short time weaken a bee colony. If you don't exterminate well, and if you are not alert, and think: "Oh it is Saturday, I have a bit of time for my hobby beekeeping." That won't work. So, due to bad execution of treatments against Varroa honey bee colonies are weakened, and eventually it can kill them too."* (Interview BVNI) The reason for this lack of knowledge, according to the two beekeeping organisations that were interviewed, is that it is no longer common for new beekeepers to tag along with more experienced beekeepers, who can continue to teach the new beekeepers once the bee courses are finished. NVB explained it in the following manner: "*In the past, if you became a beekeeper you did a bee course, that is still the case. […] But when there were more bees and many beekeepers, it was very common for new beekeepers to tag along with a group of more experienced bee keepers. […] So, as a new beekeeper, you received a lot of information through those experienced bee keepers. And new beekeepers, that are educated right now, not all of them, but they are very interested in the substantive knowledge, so they come to the information days that are organised by the departments. But the beekeeping itself, working with the bee colonies, that happens alone more often."* (Interview NBV)

Lastly, in a storyline used only by LTO their spokesperson pointed out that placing emphasis on pesticides as a cause for bee mortality works polarising. Which is not helpful in the process of coming up with a joint solution for the bee mortality problem according to her. She stated: *"You see that often things are taken out of context and that everything is being linked to crop protection. And those parties are then saying: 'wait, guys, there is more to it.' This is not me trying to disprove that crop protection plays a role. But by highlighting that one single element, you create a situation in which the party that is associated with that becomes very defensive. Because they feel directly attacked, because they are singled out as the only one responsible for bee mortality. […] we have a joint challenge, a joint mission, we*

know that it has multiple facets, and it is in no one's interest to highlight certain things, and it is in no one's interest to deny certain things." (Interview LTO)

Detailed explanation of figure 9

Warrant #1: Since based on the current state of science landscape change, pesticide use and disease and pests are the main causes of bee mortality.

The spokesperson for the Ministry of LNV referred to a UN-report in which scientific findings regarding the causes of bee mortality were collected: *"There is a famous UN-report which discusses that there are actually a number of causes, and those can be organised a bit. Crop protection agents, that is in there, is important, but really not the most important cause. That is more in how we manage our landscapes these days, about availability of food and nesting areas. Disease and pests in honey bees was an important one back then, and still is I think. And also, honey bees are kept animals of course, so something else that was established was that knowledge of bee keepers, or the training opportunities for bee keepers was lacking, so that just was not good."* (Interview Ministry of LNV) The quote already underpins that, even though the same causes are named as in perspective 1, this stakeholder interprets that information differently when it comes to the relative weight of the three causes in relation to bee mortality.

LTO stated: *"I think, that particularly the relation between the factors is of influence on the bee population. So, we know that there are different aspects that play a role. Those are: the management of the environment -so ensuring that you are not creating a desert landscape for bees, just to call it that-; Enough food and living space for bees; no threats in the sense of crop protection agents; bee disease; and the right bee keeping practice. […] Look, it is a complex correlation of factors and that is reflected in, for example, how the EFSA [European Food Safety Authority red.] communicates about it. You can see that in the research that is going on at the national level, that monitoring. I do not know all the studies, but I know that a specific project has been set up precisely to look at that coherence."* (Interview LTO)

The BVNI spokesperson does not necessarily refer to scientific sources but implies that the bee mortality causes he names are common knowledge in the field. He stated: *"But bee mortality can be related to a few things, right? That is crop protection agents, those do have an impact on bee mortality. Varroa mite, that one is underestimated. That is knowledge of the bee keepers. There is a saying: "The biggest cause of bee mortality is standing behind the bee hive." […] And that [one of the things that bee mortality can be related to red.] is biodiversity."* (Interview BVNI)

Warrant #2: Since there is no scientific basis for a causal link between bee mortality and the use of crop protection substances. (Just Nefyto and Bayer)

The Nefyto spokesperson said: *"I think to a significant extend we have always brought forward, say, the scientific basis for this and that: 'Is there a causal link between the*

established reduction in bee health, bee mortality, and the use of crop protection substances?' And I think that we have emphasized every time that we do not see that causal relation." (Interview Nefyto)
Bayer stated specifically regarding neonicotinoid pesticides: *"We also think that this scientific discourse should be there. But we do think that when we look at the total body of evidence, you can definitely use neonicotinoids. And yes, we see that for honeybees, and more and more people agree that for honeybees, okay, neonicotinoids can have an effect, especially if you use them incorrectly. And an effect on health cannot be ruled out. But we cannot find hard proof for it either. And now we say: it is the wild bees. There are 360 species of wild bees in the Netherlands. 2000 in Europe. 20,000 worldwide. Tell me. Which wild bee is decreasing due to neonicotinoids? We do not know, and we have no proof that it is happening. We cannot exclude the possibility either because we are not going to test 360 species of bees in the Netherlands. That is not possible. If only because there are no validated test systems for those animals."* (Interview Bayer)

Warrant #3: Since current land management practices are not biodiversity effective whilst bees benefit from a biodiverse habitat for nesting and food.
Bayer stated: *"Right now, it [public land red.] is managed in a way that is cost effective, but absolutely not biodiversity effective, and wild bees and honey bees can profit from that [more natural vegetation with flowers red.]. Particularly, if there are times when less flowers bloom, which is usually the case in summer and late summer, it is nice if there is a larger area where flowers are available."* (Interview Bayer)

Nefyto mentioned: *"Well, something that needs to be done in any case, and a lot is still possible in that respect, is biodiversity. Availability of food for bees, that could be better in the rural areas. There is still something to be done there."* (Interview Nefyto)

The Bayer spokesperson explained this idea in a bit more detail: *"Look around in this landscape, you won't find many wild bees. And there are reasons for that. And it is not because neonicotinoids are used here, those are not used here a lot, that is very little. But it has completely different reasons. And I know exactly why that is. For example, that flail mower that just drove by, that mowed down everything that flourished. Or that plough that destroyed every wild bee nest. So, there is no wild bee left anymore. And thus, also no generation for next year. And a couple that survive will be able to get going in the year thereafter, so at the end of the year you will have some wild bees again. But every year that is cut back again."* (Interview Bayer)

Naturalis stated: *"When talking about wild bees there are often two things that are pointed out as: those need work. Namely, wild bees need bed and breakfast. They need a nesting place and they need food. And that is rather straightforward."* (Interview Naturalis)

Bayer stated: "*Like Koos Biesmeijer always says: 'Bed and Breakfast'. That is simply the most important. Those animals [wild bees red.] need a place to live, build a nest, and of course they need flowers to feed off of. That applies to bees, but of course that also applies to biodiversity in general. And if you do not have that place, that's the end of it anyway"* (Interview Bayer)

The spokesperson of the Ministry of LNV mentioned: *"Studies have looked into that as well, and there it is habitat. That is the most important one. So, can those [bee red.] species find food and nesting sites. So, bed and breakfast. Those are the main things you need to think about with wild species. And, of course, if you manage your landscape in a way that deprive those animals of the opportunity to find enough food; or in the period when they need it; or of the right nesting opportunities, it will not go well. Those are much more determining factors, I was assured as much by scientists, than crop protection agents. But I do think there are risks with honey bees when crop protection agents are applied. That is something you need to be very strict and precise about."* (Interview Ministry of LNV)

The spokesperson of the BVNI, has a similar view and expressed: "*And biodiversity. What we see is we bring bee colonies to greenhouses. They go there healthy, and when we pick them up they return weakened. And then it depends a bit on how long [they were exposed red.] and on the crop, it varies from weakened to very weakened. And if I take that weakened bee colony to an area where they can eat well, the colony will recuperate. And then the colony is again employable for new assignments. That is the very simplified story. But what I see is that, it is the same for me: If you eat healthy you build up resistance. And if you fall ill you will recover quickly. I think it is the same for bees. So, it is in my interest that biodiversity is addressed. Because with that I compensate for a piece of harm when it comes to crop protection. […] To just shout that bee mortality is high because everything is sprayed [with pesticides red.], that is not true. You know. If you look at it well, I believe, a small part of the crop protection agents is truly harmful for bees. A small part of the total. And those are only used on crops that are not attractive for bees. Of course, that absolutely has indirect implications. But I think that it should be articulated in a more nuanced manner. Because it is simply not true that bee mortality is only caused by crop protection agents. Which is why I focus much more on biodiversity. Because I am convinced that this contributes so enormously to the improvement of bee-like insects, that is unprecedented. If that butterfly can eat well, that bumblebee can eat well, you know, varied, then everyone profits. So, for me it starts there. Those crop protection products, those will be fine."* (Interview BVNI)

Warrant #4: Since pests and lack of beekeeper knowledge are more important causes of honey bee mortality than pesticide use.

The Agrifirm spokesperson said: *"I think the Varroa mite is the most important threat for the honey bee. The way I interpret it based on everything I read and hear. On top of that, I speak*

to bee keepers who are active in that area, and they tell me that if you perform good pest control on that Varroa mite, that substances, when used correctly, because that is part of it, are of much less influence than the Varroa mite. And I do not say it is nothing, because nothing is very little of course. But that that cannot in fact explain bee mortality." (Interview Agrifirm)

Backing #4.1: Because beekeepers who work hygienically and perform good pest management experience no, or barely any, bee mortality.

Bayer stated: *"As a matter of fact, we are of the opinion that the most important cause [for honey bee mortality red.] is pests. […] And we are definitely not saying that that [disease and pests red.] is the only thing. It is always a combination of factors. Disease and pests can impact bees if, for example, they enter the winter in a weakened state after a cold summer, or because the feeding conditions were bad. These are all possibilities. Or there are hygienic causes. For example, the comb. How hygienic are you as bee keeper? Do you replace the comb foundation regularly? How do you handle your bees? Do you disturb them often? How do you treat pests and diseases? I mean, if you just add oxalic acid or formic acid that is not good for honey bees, that needs to be dosed, which is quite difficult. That type of discussions, which varies greatly. It is always multifactorial. […] "Growers or bee keepers that have a well-controlled pest management, do not, or barely, experience bee mortality. That is very clear. The bee surveillance programme makes this clear, but it also becomes clear if you talk to beekeepers."* (Interview Bayer)

Nefyto mentioned *"There is a very large professional beekeeper in the Netherlands with hundreds of bee hives. And they are not suffering from bee mortality. So, you can assume that if you are not just a normal urban beekeeper, but a real professional that offers to fruit growers, to rapeseed fields and the like, at the request of the growers, you offer your bees to take care of pollination, [...] If there is a group of bees that is at high risk of being exposed to pesticides, it is [the ones owned by red.] someone who is really professionally offering pollination through bees. But they do not suffer from bee mortality.*" (Interview Nefyto)

Backing #4.2: Because new beekeepers often lack the knowledge and experience to maintain the health of their colony

One of the interviewees of Nefyto mentioned: *"Incidentally I spoke with a few beekeepers last Monday. And they were also saying that the biggest part of the bee mortality, also of last winter, was found with hobby beekeepers, and not with the professionals. And what the beekeepers were saying […] [was red.] "If you are talking about hygiene, they don't replace the beeswax in time, the hobby beekeepers." And then the bees don't have the space for the larvae to properly develop, which makes them week, so they cannot survive. Also, hobby beekeepers often don't treat Varroa mite. Whilst professional bee keepers do."* (Interview Nefyto)

BVNI: "Here in my store I see beekeepers buying jerry cans with sugar water as early as June. That is something I cannot wrap my head around. And they say: 'Yeah, I have no gestation plants, what else can I do? Otherwise they die.' And I get that if you put me on a diet of hamburgers in June and it becomes winter and I get the flu, I will feel pretty damn awful. That is just based on a bit of horse sense. But sugar water and honey are energy sources, but bees also require pollen, those are the proteins. So, if I cannot get my bees a varied diet, it won't take much for them to die. […] Apart from beekeepers saying: 'I am not traveling with my colonies', they also lack knowledge. And that is sad. […] That hive needs to be filled with pollen [before winter red.] because those are proteins. And whether you give them [the bees red.] sugar or honey before the winter, that does not matter, that has been researched, those bees will get through it. […] If you don't treat against Varroa properly that can weaken your colonies as well and can cause them to die too. So, you have crop protection: bees weaken but with sufficient biodiverse food sources they can gain their strength back. You have the Varroa treatment, and you have knowledge [of the beekeeper red.]. In the past years we have seen an increase of new beekeepers. […] They start to keep some bees and follow a course and take a few colonies. The first year often goes well, but in the second year they experience bee mortality. Then there is a bit of a restart, and often it kind of lingers there. There is a huge lack of knowledge. […] [I advise my students red.] take a gestation plant course. Because you need to know what grows and blooms in your surroundings and whether that is enough for the bees to get through the complete season. That is something you need to know. And if you don't, you need to take action. You need to plant, sow, or pick up your hive and bring it to an area where they [the bees red.] can find enough food. And if you do that they will survive. But that does not usually happen." (Interview BVNI) This storyline links LTO*: "If you talk to people* [beekeepers red.] *on a confidential, individual basis, you hear that in the last years there has been a big increase in new hobby beekeepers. But it does require a certain skillset."* (Interview LTO)

NBV: *"As a new beekeeper you used to get a lot of info from the experienced beekeepers every year, and new beekeepers who are now being trained, not all of them, but they are usually very interested in content-related knowledge. So, they will go to the information days in the departments [of the NBV red.]. But the beekeeping itself -working with the bee population- tends happens alone more often. And there is almost no traveling [with the colony red.]. I think you know that there are still beekeepers who still do that. That is one side of the matter. This means that they have much less experience and knowledge, and that is also a source of mortality."* (Interview NBV)

Warrant #5: Since when too much emphasis is placed on one of the causes it polarises the debate. (Just LTO)

The LTO spokesperson points out that placing emphasis on pesticides as a cause for bee mortality works polarising, which is not helpful in the process of coming up with a joint

solution for the bee mortality problem in their view. She stated: *"You see that often things are taken out of context and that everything is being linked to crop protection. And those parties are then saying: wait, guys, there is more to it. This is not me trying to disprove that crop protection plays a role. But by highlighting that one single element, you create a situation in which the party that is associated with that becomes very defensive. Because they feel directly attacked, because they are singled out as the only one responsible for bee mortality. […] we have a joint challenge, a joint mission, we know that it has multiple facets, and it is in no one's interest to highlight certain things, and it is in no one's interest to deny certain things."* (Interview LTO)

Solutions: Increase suitable bee habitat, reduce pesticide use, improve beekeeper education

Stakeholders from group 2 used three separate storylines regarding solutions for bee decline, each corresponding with one of the perceived causes: Ensuring the increase of available biodiversity for bees, improving the knowledge of beekeepers, and promoting a more sustainable approach to crop protection. The following sections display the storylines and quotes used by stakeholders to support these solution claims.

Ensure increase available biodiversity for bees

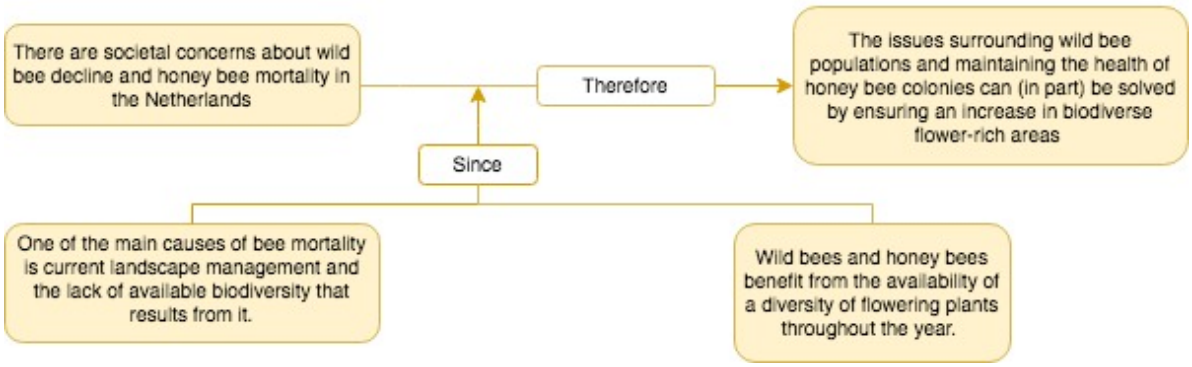

Figure 10: Toulmin's structural argument model of the 'increasing availability of biodiverse and flower-rich areas is a solution to the bee decline issue' claim.

All stakeholders in this second group agree that biodiversity increase should be promoted. The storylines they used to underpin this claim are displayed in figure 10. The first warrant is part of the causality claim that was explained in the explanation of figure 9 in the previous paragraph. BVNI mentioned regarding biodiversity increase: *"Which is why I focus much more on biodiversity. Because I am convinced that this contributes so enormously to the improvement of bee-like insects, that is unprecedented. If that butterfly can eat well, that bumblebee can eat well, you know, varied, then everyone profits. So, for me it starts there." (Interview BVNI)* In order for this to happen, stakeholders claim that land management practices of farmers, growers, municipalities and other land-owning organisations should focus on promoting more biodiversity. *R*egarding their own role in solving the issue of decreasing biodiversity, also on farmlands, the LTO spokesperson stated: *"[The goal is to red.] In any case not exert negative pressure on biodiversity and if possible stimulate the*

biodiversity in and around our parcels, including verges, field borders, etc. And in such a way that biodiversity does justice to the various functions of that biodiversity and the surroundings." (Interview LTO) The NBV stated: *"For beekeeping, it would be a fantastic solution if in animal husbandry with grazing we have grasslands and grainlands where cornflower can bloom, grasslands where flowers can grow. That is better for, for the butterflies, for the honeybee and for the beekeepers. But that is grassland so you should talk to an organic farmer for that. That is grassland that produces excellent milk but maybe requires more labour."* (Interview NBV) The Naturalis spokesperson stated: *"If I were in a position to design policies, I would create policy towards turning rural areas greener. And by greener, I mean more natural, so more [flower rich red.] field margins."* (Interview Naturalis)

Stakeholder quotes that display above mentioned storylines:
LTO: Regarding their own role in solving the issue of decreasing biodiversity, also on farmlands the LTO spokesperson stated: *"[The goal is to red.] In any case not exert negative pressure on biodiversity and if possible stimulate the biodiversity in and around our parcels, including verges, field borders, etc. And in such a way that biodiversity does justice to the various functions of that biodiversity and the surroundings. […] The agriculture and horticulture cannot be at the expense of the environment and vice versa. Agriculture and horticulture are not philanthropic institutions, so a farmer is not going to invest in biodiversity if that will cause him harm or put him at a disadvantage. […] But if you see that there are compensation mechanisms, or you make agreements in that regard. […] I think in many cases win-win situations can be created where you [as a farmer red.] contribute to biodiversity which improves your own production. For example, effective control of disease and pests by natural enemies."* (Interview LTO) Striking about this statement by LTO is how much it corresponds with the solution of the first stakeholder group. There are some differences, in the sense that

NBV: *"This fall it is really terrible in terms of gestation plants, so you need to feed in time. So, much attention is paid to improving availability of gestation plants, gestation plant improvement. Within NBV there is a commission focussed on improving availability of gestation plants. People from the whole country are in that commission, people who are very active. On the one hang they are busy with the local municipalities and with supporting people in terms of how to approach a municipality. But they are also active on the national level. But they help farmers to get subsidies for sowing sunflower seeds into their field margins. That is all incidental, it isn't a structural improvement. […] Professor Zonderwijk, […] he generated a lot of attention for […] mowing management of roadsides. I think Rijkswaterstaat is doing that pretty well, they probably have people who know a lot about it. They have also been busy with the vegetation at the water supply stations and such"* (Interview NBV)

To the question whether Agrifirm, apart from honey bees, also concerned itself with wild bee populations the spokesperson answered: *"Also a bit, but less is known about that. We are involved in advising growers about ways in which they can stimulate honey bees, but also other bees. Those are more general aspects that do not relate to our profession but do relate to the total biodiversity."* The answer implies they see a relation between stimulating wild bees and honey bees and biodiversity that is available on barnyards.

NBV: "The biggest problem is the commitment, yes, it is actually the earning structure [in agriculture red.] *[…] We cannot* [do something about that as NBV red.]. *What is a solution? For beekeeping, it would be a fantastic solution if in animal husbandry with grazing we have grasslands and grainlands where cornflower can bloom, grasslands where flowers can grow. That is better for, for the butterflies, for the honeybee and for the beekeepers.* But that is grassland so you should talk to an organic farmer for that. *That is grassland that produces excellent milk but maybe requires more labour. [...] And that would also solve the entire Bayer problem, because then we have would have a huge variety in pollen grain quality."* (Interview NBV)

Bayer: "I think that it is definitely the case that in publicly managed spaces you can do much more in terms of natural vegetation, with flowers and such. Right now, it is managed in a way that is cost effective, but absolutely not biodiversity effective, and wild bees and honey bees can profit from that [more natural vegetation with flowers red.]. Particularly, if there are times when less flowers bloom, which is usually the case in summer and late summer, it is nice if there is a larger area where flowers are available. That is something that is manageable. It does cost money, and as a society you need to be willing to pay for that. But it is possible." (Interview Bayer)

Nefyto: *"Well, what has to be done in any case, and there is still a lot that is possible in that area, is biodiversity, availability of food for bees, that can be improved in the countryside. There is still a lot to do there." (Interview Nefyto)*

"The idea [of the 'Netherlands buzzes' project red.] is that we tell municipalities how to manage their green spaces in a bee friendly manner. And that idea needs to sink in, particularly into the organisation of municipalities and provinces, so that it is maintained. And not that for one-year people think: "We sow some flowers, and we are done." Because you need to mow in the right manner, not to early. And those are things that are important to keep doing." (Interview Naturalis)

Improve knowledge and practices of new beekeepers (NBV, BVNI, Ministry of LNV)

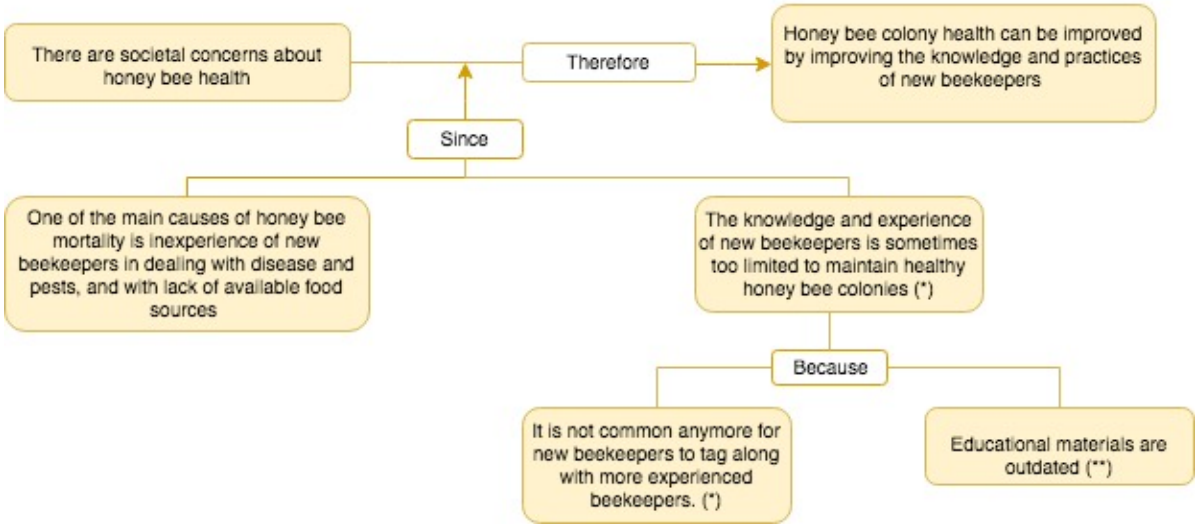

Figure 11: Toulmin's structural argument model of the 'improving knowledge and practices of new beekeepers can solve the issues surrounding honey bee colony health' claim.
(*) Argument employed by NBV and BVNI only; (**) Argument employed by BVNI only

Most stakeholders in group 2 agree that beekeeper knowledge, or the lack thereof, regarding things like treatment of pests and ensuring bees have access to sufficient food sources, is an important cause of honey bee mortality. This became clear in the paragraph regarding causality. Only a few explicitly stated that improving that knowledge needs to be addressed to solve the issue. The spokesperson for the Ministry of LNV stated: *"And then the honey bee is, of course, managed by beekeepers. So, something that was also detected was that the knowledge of beekeepers, or the educational opportunities for beekeepers were somewhat lacking. So, that was just not good. And all these causes, we think as government, need to be addressed in the right balance."* (Interview Ministry of LNV)
Figure 11 shows the storylines that were used to explain this notion. The first warrant is part of the causality claim that was explained in the explanation of figure 9.

The second warrant shows that both beekeeper organisations that were interviewed agreed that a reason for the lack of knowledge with new beekeepers, has to do with the fact that it is less common these days for new beekeepers to tag along with more experienced ones. NBV stated*: "Ever since the high bee mortality five years ago, it was higher than twenty percent for a couple of years, now it is back to around 10 percent, the honey bee received a lot of attention. And now I get to your question: "What does NBV do regarding those points?" At one point there has been a lot of attention for the courses of beekeepers. […]* [There are attempts to make it more common for new beekeepers to hang out more with experienced beekeepers red.] *Yes. But that is not organised, it is not formalised. Because that really depends on the local association, the local beekeepers. […] This is something that is detected, and there is explicit deliberation about how we can ensure that there is more exchange of experiences. What kind of methods we can employ to that end. But everything is*

on a voluntary basis. That makes a big difference. Because you can make requests at departments, but you need to understand that it depends on the department [what they do with it red.]." (Interview NBV) BVNI made a similar statement: "*Also, in terms of the guidance of new beekeepers. I myself am a member of the board of a hobby-association in Driebergen-Doren [region in the Netherlands red.]. Beekeepers that are starting need to be taken by the hand for the first two or three years. But there are not many people who are willing to do that. So, we are performing our beekeeping activities very individually. In general, it is difficult to get something done in your association. We have a beekeeping café. But people prefer to search the answers to their questions on the internet instead of coming to this evening where knowledge and experiences are shared. That is something we should get to take off more. But society changes. Everyone is busy. But that is something that the bee suffers under, that change."* (Interview BVNI) So, both beekeeper organisations agree that more contact and exchange between new and more experienced beekeepers would be a solution to new beekeepers having difficulty maintaining a healthy colony. However, they do explain that because all transfer of knowledge when it comes to beekeeping is done on a voluntary basis, they have limited power in that regard.

BVNI also explained that the course material that is currently used is somewhat outdated: "*I am not saying that the current course is completely wrong. But the beekeeper course is conducted based on a certain business method, and that is taught in a certain manner. And in my opinion the developments in society should be taken into account more. […] climate is changing. I mean, in the course books it still says that you need to finish wintering (certain preparatory actions before the winter season red.) before October first. But that has been in the booklets for maybe thirty years already, just to get an idea. But people, look around. Climate is changing. That is something you should do something about. Biodiversity is changing, that is something you should do something about. So, the writings should reflect the context of the time."* (Interview BVNI)

Stakeholder quotes that display above mentioned storylines:
LTO: *"In neighbouring countries, you see that beekeeping is considered a real craft or craftsmanship. Whilst here in the Netherlands it is considered a hobby. I think that is a devaluation of the beekeeping practice."* (Interview LTO)

NBV: *"As a new beekeeper you used to get a lot of info from the experienced beekeepers every year, and new beekeepers who are now being trained, not all of them, but they are usually very interested in content-related knowledge. So, they will go to the information days in the departments (of the NBV red.). But the beekeeping itself -working with the bee population- tends happens alone more often. And there is almost no traveling (with the colony red.). I think you know that there are still beekeepers who still do that. That is one side of the matter. This means that they have much less experience and knowledge, and that is also a source of mortality." (Interview NBV)*

Ministry of LNV: *"And then the honey bee is, of course, managed by beekeepers. So, something that was also detected was that the knowledge of beekeepers, or the educational opportunities for beekeepers were somewhat lacking. So, that was just not good. And all these causes, we think as government, need to be addressed in the right balance."* (Interview Ministry of LNV)

Both of the beekeeper organisations that were interviewed agreed that a reason for the lack of knowledge with new beekeepers, has to do with the fact that it is less common these days for new beekeepers to tag along with more experienced beekeepers. NBV stated*: "Ever since the high bee mortality five years ago, it was higher than twenty percent for a couple of years, now it is back to around 10 percent, the honey bee received a lot of attention. And now I get to your question: "What does NBV do regarding those points?" At one point there has been a lot of attention for the courses of beekeepers. […] In the past, if you became a beekeeper you did a bee course, that is still the case. […] But when there were more bees and many beekeepers, it was very common for new beekeepers to tag along with a group of more experienced bee keepers. […] So, as a new beekeeper, you received a lot of information through those experienced bee keepers. And new beekeepers, that are educated right now, not all of them, but they are very interested in the substantive knowledge, so they come to the information days that are organised by the departments. But the beekeeping itself, working with the bee colonies, that happens alone more often.* […] [There are attempts to make it more common for new beekeepers to hang out more with experienced beekeepers red.] *Yes. But that is not organised, it is not formalised. Because that really depends on the local association, the local beekeepers. […] This is something that is detected, and there is explicit deliberation about how we can ensure that there is more exchange of experiences. What kind of methods we can employ to that end. But everything is on a voluntary basis. That makes a big difference. Because you can make requests at departments, but you need to understand that it depends on the department [what they do with it red.]. (Interview NBV)* BVNI made a similar statement: "*Also, in terms of the guidance of new beekeepers. I myself am a member of the board of a hobby-association in Driebergen-Doren [region in the Netherlands red.]. Beekeepers that are starting need to be taken by the hand for the first two or three years. But there are not many people who are willing to do that. So, we are performing our beekeeping activities very individually. In general, it is difficult to get something done in your association. We have a beekeeping café. But people prefer to search the answers to their questions on the internet instead of coming to this evening where knowledge and experiences are shared. That is something we should get to take off more. But society changes. Everyone is busy. But that is something that the bee suffers under, that change."* (Interview BVNI)

BVNI also explained that the course material that is currently used is somewhat outdated: "*I am not saying that the current course is completely wrong. But the beekeeper course is conducted based on a certain business method, and that is taught in a certain manner. And*

in my opinion the developments in society should be taken into account more. […] climate is changing. I mean, in the course books it still says that you need to finish wintering (certain preparatory actions before the winter season red.) before October first. But that has been in the booklets for maybe thirty years already, just to get an idea. But people, look around. Climate is changing. That is something you should do something about. Biodiversity is changing, that is something you should do something about. So, the writings should reflect the context of the time." (Interview BVNI)

Promote sustainable approach to crop protection (Ministry of LNV, LTO, Nefyto, Bayer and Agrifirm)

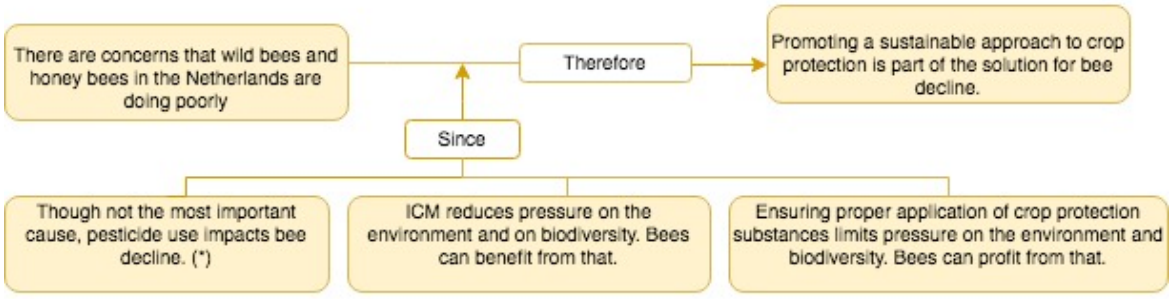

Figure 12: Toulmin's structural argument model of the 'improving knowledge and practices of new beekeepers can solve the issues surrounding honey bee colony health' claim.

A group of stakeholders (Ministry of LNV, LTO, Nefyto, Bayer and Agrifirm) explained how promoting a sustainable approach to crop protection does help control the environmental impact of agriculture practices and how this would be favourable for bees. The storylines they used are displayed in figure 12. The following text will provide an explanation of the content of the model. More quotes that underpin the model can be found in Appendix III.

The stakeholders considered the Integrated Crop Management (ICM) approach to be one that leads to a sustainable use of pesticides. The spokesperson for the Dutch Ministry of LNV explained it in the following way: *"Yes, it is true that it is a politically sensitive topic, it is not easy and definitely not straightforward. But the question is of course whether you can, through a different system approach, change the manner in which farmers treat their crops in a manner that less crop protection agents need to be used. So, an integrative crop protection. So, thinking about -if you think about it as a pyramid-: 'What should be the base material? What are the circumstances of knowledge? How are you going to plant the crop? What is you input on that?' And in that manner, you develop a situation where you have less pest pressure because you see crop protection substances as a last resort. And that is how we as government look at the issue* (Interview Ministry of LNV)

The spokespeople of Agrifirm, Bayer and Nefyto agree that pesticide substances need to be used in a responsible manner to ensure they do not significantly impact bee populations.

The Bayer spokesperson explained: *"Pesticides are a means to realise a sustainable cultivation. And you can use a means or appliance, just like a tractor or every other input that you use on a farm, in a good or in a bad way. This is the same for a pesticide substance. You can use a neonicotoid the proper way or in a bad way, for example in a manner that makes it seep into the ditch, or in a way that harms the bees of the neighbour. That is possible, but it does not have to be the case. But if you follow the instructions on the label you don't inflict unacceptable effects onto your surroundings. […] And when it comes to pesticides, we will continue to carefully look at what happens with the application and what goes wrong. And together with the sector we need to strongly steer in the right direction so that things don't go wrong. Doing that you can reduce the impact on biodiversity. The less emission into the environment the better, that is crystal clear." (Interview Bayer)*

Lastly, the LTO spokesperson explained how improving biodiversity might contribute to more sustainable crop protection: "*I think in many cases win-win situations can be created where you [as a farmer red.] contribute to biodiversity which improves your own production. For example, effective control of disease and pests by natural enemies."* (Interview LTO) Striking about this statement by LTO is how much it corresponds with storylines that were used by stakeholders in the first group.

Stakeholder quotes that display above mentioned storylines:

<u>Integrated Crop Management</u>
Ministry of LNV: *"Yes, it is true that it is a politically sensitive topic, it is not easy and definitely not straightforward. But the question is of course whether you can, through a different system approach, change the manner in which farmers treat their crops in a manner that less crop protection agents need to be used. So, thinking about -if you think about it as a pyramid-: 'What should be the base material? What are the circumstances of knowledge? How are you going to plant the crop? What is you input on that?' And in that manner, you develop a situation where you have less pest pressure because you see crop protection substances as a last resort. And that is how we as government look at the issue* (Interview Ministry of LNV)

"Look, sustainability and effects of [pesticide red.] substances have something to do with each other, but they are also very different. To us, crop protection substances, whether they are chemical or organic, are a tool for a farmer. If you use the system of integrated farming for example, which consists of doing everything to keep a plant healthy, to ensure that you have a good starting position to realise a good yield, that is your full story. You have diagnostics, so the following of the health of the plant throughout the growing season, that is incredibly important. For example, do I need to give more water, or use more fertiliser, or do I have to intervene with a pesticide. You need to know when you have to do that, and for that you need diagnostics. And in the end, you need to be able to heal, to restore [the plant

red.]. So, it can be the case that your plant does not have enough fertiliser, so, you add more fertiliser. But it can also be that case that you use pesticides. Pesticides are a means to realise a sustainable cultivation. And you can use a means or appliance, just like a tractor or every other input that you use on a farm, in a good or in a bad way. This is the same for a pesticide substance. You can use a neonicotoid the proper way or in a bad way, for example in a manner that makes it seep into the ditch, or in a way that harms the bees of the neighbour. That is possible, but it does not have to be the case. But if you follow the instructions on the label you don't inflict unacceptable effects onto your surroundings." (Interview Bayer)

"How can you turn this in a way in which you say: 'We are looking for a way in which we use those substances as little as possible', without saying: 'They need to be banned'" (Interview LTO)

Application

The spokespeople of Agrifirm, Bayer and Nefyto agree that pesticide substances need to be used in a responsible manner to ensure they do not significantly impact bee populations. They do see the relevance in continuously making improvements, for example on pesticide application. The Nefyto said in this regard: *"With the societal task of reducing the risks, also comes a sense of self-preservation that you have to move in into that direction. And that is also because science is not rigid, and what we thought was normal ten years ago no longer is. So that new models for bees are developed, that model that I just explained of aquatic organisms and that sort of thing [substances need to be tested on three trophic levels to be eligible for authorisation red.], there comes a moment when things are looked at differently. […] So, especially the field of science is not stable and stable has a negative connotation, but I mean science is progressing, well, you will have to move along with that. [...] And perhaps that is very good. Because new substances are constantly being developed, more and more sustainable, lower and lower in risk, that sort of thing. But that is why it is also very important that substances cannot be banned from one moment to the next without a scientific basis. Because for a company it costs a lot of money to create a substance, and predictability is therefore a very important criterion to keep this influx of sustainable new resources going. So that companies dare to take that step. Because otherwise they won't dare make investments in new substances. Otherwise you have a new substance and immediately, even though it passed the authorisation requirements, suddenly it's removed from the market, just because it is possible, so to say. And it is very important, particularly to become more sustainable, that predictability is maintained. And currently the environment is not sufficiently predictable."* (Interview Nefyto)

Bayer stated: *"Pesticides are a means to realise a sustainable cultivation. And you can use a means or appliance, just like a tractor or every other input that you use on a farm, in a good or in a bad way. This is the same for a pesticide substance. You can use a neonicotoid the*

proper way or in a bad way, for example in a manner that makes it seep into the ditch, or in a way that harms the bees of the neighbour. That is possible, but it does not have to be the case. But if you follow the instructions on the label you don't inflict unacceptable effects onto your surroundings. […] And when it comes to pesticides, we will continue to carefully look at what happens with the application and what goes wrong. And together with the sector we need to strongly steer in the right direction so that things don't go wrong. Doing that you can reduce the impact on biodiversity. The less emission into the environment the better, that is crystal clear. And right now, we are not meeting the norms [when it comes to concentrations of imidacloprid in surface water red.], so there is room of improvement. And we cannot exclude, particularly if there are norms are exceeded, you cannot exclude possible harm to biodiversity. And possibly there could be harm to wild pollinators. But it is difficult. It is mostly the surface water, so yeah, I don't know to what extend wild bees have a clear connection to that." (Interview Bayer)

Agrifirm had an example of an issue with the application he encountered: *"In the spraying technique [of pesticides by growers red.] there is still a lot of room for improvement. Generally, they have good spraying material, but growers still have some things to learn about how to use them. […] When to spray, with the right spray head, the right pressure, the right driving speed, the right amount of water, the concentration of the substance in the water, that combination. […] That is very much in their interest. […] Recently, we invited five growers to come over and spray a piece [of land red.], each a lane, in the way in which they always spray their own parcel. They all used the same substance on the same soil type, and we looked if there was a difference. We were shocked by how stark the differences were. And that was all solely due to spraying technique. So, that is when we think: "improvement is possible for growers in that regard". Those are also aspects of our advice: 'How can you use the substance in the best possible way?' And not just within the parcel. But also, in a way that prevents the substance ending up outside the parcel. I am talking about emission. Because, of course, often there is a connection between bees and emissions. Because outside of the parcels there is also flowers blooming that are attractive to bees. If a lot of the substance ends up where it does not belong, that can be harmful for the bee. So, better spraying technique can contribute a bit to bee friendliness. Did we pay attention to that? Yes always. And did we pay sufficient attention to that? Apparently not. Because apparently not all growers are sufficiently knowledgeable in that regard. So, we still have some challenges."* (Agrifirm)

<u>Continues strive for more sustainable approach</u>

The Agrifirm spokesperson explained: *"I have got colleagues who say: "All those substances have an authorisation, so they have been thoroughly tested. So, with those authorisations we should be able to advice everything?" I do not think that is true. I think that we need to think one step further. We need to think now about which things we can do more sustainable in five years' time, and how we can get there in five years. But then you should not start in four*

years, you have to start today. And every day use all available knowledge to go as sustainable as possible. And bees are a part of that." (Interview Agrifirm)

Desirable measures

The following sections show the quotes that underpin table 3 of paragraph 4.2.1

Knowledge development

Ministry of LNV: *"And particularly because much information needed to be developed to know: 'what is the situation now?* [with regard to the honey bee colonies red.]*'. We had to come to a baseline measurement for example. […] "We think a number of key themes that have to do something with pollinators can be identified. Those are (1) biodiversity, (2) the interaction between agriculture and nature, and also the honeybee as an important pollinator. Yes, and then you quickly feel that people, well, once again, are concerned about things, but also still cope with a lot of knowledge gaps. And that was really a big point. […] So, he [Martijn van Dam, Minister at the time of the interview red.] wants to generate an impulse of knowledge with this [budget for research red.], for 5 years, in a program. And, as always, when we generate that, it is always publicly available. […] That is one of the things of which we said: 'that is something that as the State we can do.' So, to say: 'If you have questions, we can try to hear them well and generate information on them.' […] Of course, we have figured out where the knowledge gaps are. We did that in cooperation with scientists, not only from Wageningen but also from Naturalis, and from Stichting EIS for example, who really have knowledge of those pollinators and bees. [...] And what we added to this is that we said: 'We really have to […] get a practical component.' So, we would really like to get… let's call them practice networks for convenience. So that you also test and review somewhere. And so that, for example, where you know: 'there is an initiative', that you use that as a case to look at: 'Okay so in this or that aspect (of the initiative red.) things go wrong.'"* (Interview Ministry of LNV)

Specifically: Increase development of applicable knowledge

LTO: "[Our new ambition is red.] an ambition with milestones also with respect to biodiversity, we want to have an objective baseline measurement of what is the status of biodiversity specifically in agriculture and horticulture, because that has not yet been mapped out in such a way it has produced 'buttons to push'. (And we want red.) follow-up milestones for 2025 and 2030 to improve biodiversity. Which concrete actions result from that (the ambition red.) has yet to be determined, so I cannot say much about that at the moment. (Interview LTO)

LTO: *"But you need to look at: 'How?' If you look at field margins, I think much more would be possible through customisation. It is about: 'how do you manage your field margin in a way in which you don't increase the weed pressure in the lot making you apply more herbicides, because that would be putting the cart before the horse. But I think it is more a*

matter of figuring out: 'how can the field margin be managed in a way that it serves both purposes?' We need to look for win-win's. They exist, I am convinced of that, but we have not found them in all matters. […] Partially, I think, that has to do with knowledge. Maybe that knowledge is there on a more fundamental level, but you see a bump when it comes to translating fundamental knowledge into practice. Particularly in the current manner in which knowledge is structured. At a certain moment in the knowledge development process they say: "This question has to do with application of knowledge, that is no knowledge development anymore." Whilst I think: "The knowledge is still not available in a way in which farmers or growers can do something with it and apply it in their practices." (Interview LTO)

NBV: "*But if you say: 'Beekeeping is important for a part of the agricultural production, if it disappears we can no longer cultivate any tomatoes or blackberries'. If that is recognized by the government, then I think that it is necessary to think about a structure similar to the testing stations. I do not want to go back to the testing stations because those suited the context of that time. But an organization that is financed by the government, and not just money for all agricultural branches, but a (governmentally red.) financed organization with the task to provide people who are involved in land management or beekeeping with information. So, not just for the beekeepers, but that also for Natuurmonumenten for example. And if you provide information, at some point you must also conduct research and substantiate the existence of competition (for food sources between wild bees and managed honey bees red.). And that is something the government should facilitate.* […] *So that there the contradictions surface and are jointly acknowledged and solved. Not 'you' but 'we', we try to do it together, so that solutions are collaborative and sustainable. That you try to make the conflicts visible*. […] *I am naming the testing stations because those were practice-oriented. Because I thought we can also go to the NIOO (Dutch Institute for Ecology red.) which is fine, and it is very good that it exists. But I would think that if you have an independent institute or a testing station, that you have the people there and that it is easier to discuss these conflicts.* […] *Independent in the sense that if a municipality has a question [regarding bees red.] it is not going to be jumped by Natuurmonumenten for example. In that organisation structure the perspectives of Natuurmonumenten and beekeepers [on for example whether there is competition between wild bees and honey bees red.] are represented, so that the municipality gets a balanced overview of those perspectives."* (Interview NBV)

Naturalis: *"Because they [municipalities, provinces, but also Rijkswaterstaat, Prorail or landschappen NL, people who manage terrains, these could be all types of organisations red.] are, I think, indeed responsible for the management of their terrain and to do that in the right sustainable manner. But they do need to know how. And oftentimes that is not the case. And that is also an important aspect of projects that we are involved in. That we look at: 'How can we ensure knowledge that is available reaches the right places. That is not necessarily an obstruction, because it is possible, but what is difficult for us is that we don't*

quite know how those organisations work. With a municipality we know by now that there are civil servants and they write policy plans. But subsequently there are executors that are actually on the tractor and mowing. And they should do that in the right manner. And how the information of the policy all the way there, and how we can advise in that, that is a challenge. Particularly because we are not quite sure what the best way is to do that. Which tone, how specific, what do they know and what don't they know. We can easily create a plan in terms of 'you need to mow this and that way, because that is the best way.' But if they say: 'But then the grass grows too tall and the cars cannot see anything anymore, and safety comes first.'" (Interview Naturalis)

Naturalis: "*For municipalities as well as provinces. Because in that Postcode Lottery project […] we also make management plans for municipalities. The idea is that we then tell them how to manage their ground in a very bee friendly way. That is really something that should really get through to these organisations, especially in municipalities and provinces, so that that it is also guaranteed and that people don't think we sow something in one year and then it's done. Because you have to mow it in the right way, not too early, all sorts of things are important in that respect. [...] Many of these organizations are also working on it themselves: 'we want something'. […] But it is up to us and them (a few other organisations: EIS, the Butterfly foundation, RAVON and SOVON red.) to ensure that these municipalities can have something to work with. Because I think they are indeed responsible for the management of their premises and to do so in the right sustainable way. But they have to know how. And often that is not the case. And then it is an important aspect of the projects that we do, that we look at: 'how can we get the knowledge that is already available in the right place.' [...] Indeed, that is very good. We've also seen the action of 'de Bijenkorf' (Dutch warehouse chain red.), something we would have never done the way they've done it, in how fancy it is. But I think it is very good, because it reaches a whole different audience that we would never reach with our research and the like. So, I think it is a good thing for commercial parties to jump in. Those should mainly be parties that are involved with the sector themselves. I don't think many people would say that about 'de Bijenkorf', but with their name they could not really ignore the issue (Bijenkorf means beehive in Dutch red.). But I think it is a good idea, because like I just said: that responsibility of citizens, they don't all of a sudden know and come up with the idea: 'I should do something'. So, I think this is a really good way to create awareness among citizens in general."* (Interview Naturalis)

Agrifirm: *"To provide knowledge, I think that is the most important [thing other stakeholders could do to help contribute to a shift towards more sustainable agriculture red.]. We have access to quite a lot of knowledge, but there where there are still shortages or new knowledge, we would like to receive that. And we are really good at making that groundwork knowledge applicable and ready for practice for growers, and to advise them. That is our role. But all knowledge there is, to gather as much of that as possible. We do that ourselves as well, of course, but we don't know if all knowledge reaches us."* (Interview Agrifirm)

Agrifirm: *"In the spraying technique [of pesticides by growers red.] there is still a lot of room for improvement. Generally, they have good spraying material, but growers still have some things to learn about how to use them. […] When to spray, with the right spray head, the right pressure, the right driving speed, the right amount of water, the concentration of the substance in the water, that combination. […] That is very much in their interest. […] Recently, we invited five growers to come over and spray a piece [of land red.], each a lane, in the way in which they always spray their own parcel. They all used the same substance on the same soil type, and we looked if there was a difference. We were shocked by how stark the differences were. And that was all solely due to spraying technique. So, that is when we think: "improvement is possible for growers in that regard". Those are also aspects of our advice: 'How can you use the substance in the best possible way?' And not just within the parcel. But also, in a way that prevents the substance ending up outside the parcel. I am talking about emission. Because, of course, often there is a connection between bees and emissions. Because outside of the parcels there is also flowers blooming that are attractive to bees. If a lot of the substance ends up where it does not belong, that can be harmful for the bee. So, better spraying technique can contribute a bit to bee friendliness. Did we pay attention to that? Yes always. And did we pay sufficient attention to that? Apparently not. Because apparently not all growers are sufficiently knowledgeable in that regard. So, we still have some challenges."* (Agrifirm)

Increase awareness among farmers, municipalities and other landowners

LTO: *Partially, it also has to do with awareness. Also, in agriculture and horticulture. Also, because in many cases it is still not clear how farmers can profit, or at least won't be worse off. That is something we need to get a better overview off.* […] *On a policy level I think there should be better, I don't know if it is cooperation, between the different policy levels. On municipal level you see sometimes that they are dropping stitches, and that is solely because they are not aware. They don't know. They have received certain tasks that they were not equipped for at that time. And they need help with that, just like individuals that sometimes need help. To create awareness that: it is possible. And to quit seeing bumps in the road. So, we need to help each other with that in a constructive manner. You see that with the water authorities, more and more regions, it differs for each water board, but more and more of them think: how can I help entrepreneurs? Think along with them and hand them solutions rather than pointing fingers and handing out fines. Because too often it happens out of ignorance: 'It is not that bad', and they don't realise a. the impact, and b. how it could be done differently, more so than out of deliberate violation of the rules. And where that does happen I think: 'you should definitely put a high fine on that, because those who do that ruin it for everyone who is making a good effort.' So that, just start the conversation positively and try to help each other and show understanding for each other's viewpoints without necessarily agreeing with each other."* (Interview LTO)

Ministry of LNV: *"And sometimes it is also, for example, ignorance. For example, managers, they are not thinking about it at all. For example, 'Rijkswaterstaat' they just say: 'the dikes need to be safe and we have programme x for that. We've done it that way for decades, if not centuries.' And of course, then for us it becomes a challenge to provide the idea that: 'if you do it like this, or if you strengthen this one measure, it does not have to cost more or be more complicated. If that is anchored you have something that is contributing [to combatting bee mortality red.] without much costs or difficulties for your organisation.' […] And I think certain sectors in the Netherlands are doing really well, in other sectors that might not quite be the case. And there I think we, as government, want to monitor whether sectors are doing all they can. […] For example, we have a programme in which we want to check how to experiment further with we look at what's called 'system approach' to check how you can further experiment with that, so that you can go beyond what is already common in that field. And we look at how you could arrange that. We could provide a field for experimentation and use that to crystallize recommendations. Identify best practices, or good practices, and pass that on to the others in the field. Because you always have a couple of front-runners in the Netherlands. But how do you get the 60 percent (of farmers red.) that are lingering a bit [in their current practices red.], to start moving alongside the 10 or 20 percent of leaders? That is something that we are dealing with as a government. So that's one thing we'll dive into. We also try to establish requirements and continue to be in conversation with LTO."* (Interview Ministry of LNV)

Agrifirm: *"What we see clearly is that it is about awareness. Growers are much more aware than five to ten years ago that it is not just about producing in accordance with the law, but that more aspects play a role that they need to have answers for. And one of those aspects, an important one, is sustainability; and within sustainability biodiversity; and within biodiversity you also have to deal with bees* […] *It* [the awareness of growers regarding sustainability and consumers valuing sustainability red.] *is always connected. I think it is mainly societal pressure that causes the realisation that: "Hey, this is something we should pay attention to. This is important for us." And the pressure can come from magazines, newspapers and news articles. That pressure can also come from the direction of their customers* [retail red.]. *All growers are certified in one way or another, and I think that through that certification the awareness is getting off the ground more and more."*

Naturalis: *"And it is not the case for every farmer, but fruit growers definitely have an interest. But a potato farmer, or a dairy farmer of course not very directly.* […] *In the research I mentioned earlier, with Alterra, I interviewed farmers to ask them how much they know about pollination. And how much of it is due to wild bees, and how much due to honey bees. They do not really have an idea about these things. I thought that was really interesting and kind of surprising as well. Because look, a lot of fruit growers use honeybees, they have beehives places at the moment that their crops are flowering to make sure that they will be pollinated. Obviously, they know that this is to pollinate the crops. But they do not*

necessarily really think about these things. They do it like this because they have always been doing it like this, and their dad did it before them. But there are also farmers that don't do it because they do not think it is necessary and their dads did not do it either. I was not really convinced that, I was not really impressed by what they knew about this, what they wanted from this. Because yes, I asked them why they did or did not do it: because they always did it like this, because it went well like it was. And in certain areas there is enough pollinators flying around. So, it is not necessary to put something extra there. But I did not get the impression that they knew that that was because there were already wild pollinators there. And some of them just had a beekeeper as a neighbour. So, they did not put extra bees there, but they [bees red.] came anyway. But I was not really impressed." (Interview Naturalis)

Bayer: "*But I also develop policy within Bayer in the field of sustainability. And on the place where we are now, the Bayer Forward Farm, I participate in the development of concepts. Communication material for farmers and stakeholders to show them how you can make agriculture more sustainable."* (Interview Bayer)

Stimulate desirable practices for landowners

Ministry of LNV: *"But then it is also the idea that you continue to converse with one another about what could would be helpful, that farmers are also going to apply a variety of measures. That is something we also hear from the scientists. That does not only apply to farmers, I say that explicitly. This also applies to municipalities, to industrial managers, to provinces. That the measures are often fairly one-sided, and that is actually never good. You often have to look for it in the diversity of measures to be able to carry on better. […] Because fair is fair, yes, everything in the EU is decided of course now by 28 and will be decided by 27 [member states red.]. So, I cannot give any guarantees that this will be it. But we can see how we will make the Dutch implementation of this [the greening measures of the CAP red.] as favourable as possible. So, by strengthening and promoting and preserving our bees [by means of the greening measures of the CAP red.]"* (Interview Ministry of LNV)

LTO: *In part it is also legislation that is in the way. For example, if you look at the CAP [EU's Common Agricultural Policy red.] opportunities for greening in there. From the perspective of enforcement and practicality everything has been made equal in the whole of the Netherlands and even for the whole of Europe, so every lot has to meet the same requirements. But within one region you could possibly do much more, because there are other margins, or other crops, or a different pest and disease pressure, or a different soil, or a combination. Whilst in another region they may be unable to do anything with the prescribed requirements because they don't suit the situation there, but maybe something else is possible. I think you need to do more at the regional level when stimulating biodiversity.* […] *What I can say is that we are working on a project, also in the context of the pollinator strategy, 'bee friendly barnyard' in which we want to create a bee friendly barnyard lay-out on 500 barnyards in the coming two years. So that is a very specific example where we say:*

'break through the desert and make sure that you set up your yard in such a way that it will be attractive for bees and pollinators.' [...] Another example where this is very concrete is the 'sustainable dairy chain', an initiative of the dairy farming sector, in which biodiversity is one of the indicators of which farmers must demonstrate how they are working to make their business more sustainable. And where LTO is also one of the partners, and coordinators. " (Interview LTO)

BVNI: *"We hope that the new bee strategy will give an impulse and result in legislation in terms of biodiversity. That guidelines are created, that stimulation funds arise, or anything like that. So, yeah, just good for people themselves and […] we also benefit. We would piggyback along on that [biodiversity red.] story, just like the butterfly association and many other actors. So, that would be a huge victory."* (Interview BVNI)

Bayer: *"And I think, farmers can do something too, right? With the greening measures. We of course have the catch crops, so the green manures are in bloom right now. Perfect for honey bees. I understood from the WUR that it is not as great for wild bees, because those are at the end of their lifecycle at the moment. Though I do see some bumblebees on them [the green manures red.]. But those are general bumblebee species, so the red list species are not helped with it right now. Field margins, if you would incorporate those as greening measures for the CAP and farmers are forced to do something with that, ensure that they are planting native flowering vegetation. That helps. Or different ditch edge management. But you might need to subsidise that, because that does cost a lot of money. And yeah, if the consumer is not willing to pay that in the product, and that is the case, we know that, because consumers prefer cheaper options, yeah, then it becomes difficult."* (Interview Bayer)

Naturalis: *"But if you would for example reward farmers if they make extra ground available. In the Netherlands those types of things are more difficult than in other countries, because in the Netherlands farming grounds and ground in general costs a fortune. So, it is easy to say: "Yeah, so, maybe you just sow your crops two meters away from the ditch and you'll have a nice floral field edge." But that just costs a lot of money. So, I think that as the Dutch government, or with those rules at the European level, you should look at how we can ensure that bees can profit from that. Or that the Netherlands applies a comparable idea. […] So, that [reward systems for farmers at both a European level and at the Dutch national level red.] would be ideal. And then the focus should be on creating more habitat. And I mention farmers first, because that is simply the largest land area and I think the most can be gained there and on the roadsides. But, you can also do it with another organisation. […] And in particular with farmers, they have many obligations of course. Because the dairy, those are of course dairy farmers that don't have much clear use [for pollinators red.]. And they already have to do lots of things with the godwits and such. So, I can imagine that they are getting a bit tired of all this. But it is a good group to do something with because they can make a big difference. So, I think it would be a good start."* (Interview Naturalis)

Retail responsible

Agrifirm: *"What we do think is that it is a job for us, for example to communicate to retail organisations: "You want as many sustainable products as possible, we are seeing this, we are seeing that. This more expensive substance is more sustainable, that is possible, and the grower is not doing it because it will be at the expense of his returns. If you can compensate for that piece of the returns, everything is arranged again and the grower can pick a more sustainable substance. You also see the tendency, I think in the last years, where NGOs are also pressuring retail in terms of: Pay attention! The grower wants to move towards sustainable. But then you do need to give them a chance to obtain his returns in a normal way. So, reward them for that [sustainable practices red.]."* (Interview Agrifirm)

LTO: "*Because what we see is that we all want the same things in the end. Namely, less dependence on crop protection agents. And all parties know that investments are necessary towards that, that cost many companies money, who then have to increase the cost price of their products. You then want to distinguish those products within the market, so that the farmer can in some way get appreciation for that practice. And whether it is done through a better price or better delivery guarantees, just that you know: I can make deliveries there, and I have a good relationship with my customers and I get a bit of security in return. You can flesh out different ways to do that. But in the end, it was Greenpeace that, admittedly on page 3 of the entire press release, argued that precursors [in sustainable farming practices red.] should be rewarded by supermarkets. That is something we had a conversation about with each other: 'Could we use each other to get a step further?'. That did not work out in the end. But those are things that make me think: 'Those are things you can help each other out with.' So, you need to look at 'what unites us' rather than 'what divides us'." (Interview LTO)*

Make more areas available for beekeepers to station their beehives

BVNI: "We have a huge need for food for bees. So, we would really like to be able to go to locations of Natuurmonumenten, Staatsbosbeheer, the water boards, or Prorail, or other landowners. Very much. But that is often very difficult. […] To gain access to those areas. And then there is also the issue of the diversity in those areas. So, yeah, it is very difficult. (Interview BVNI)

Find creative sponsorships

NBV*: "This fall it is really terrible in terms of gestation plants, so you need to feed in time. So, much attention is paid to improving availability of gestation plants, gestation plant improvement. We try to do that at the national level, by showing departments how they can reach municipalities to, for example, improve the vegetation in the municipalities. That linden trees are not cut down but are moved. But there are also departments that have really fun initiatives, such as Breda, they have been busy planting all types of bulbs in spring. And the other day I was in Epen, and there the bee keeping association had been busy finding*

companies that wanted to sponsor the improvement of the planting of roundabouts. I was there not too long ago for a bee market, and on every roundabout, you see other types of flowers in bloom, with a nameplate of the company that sponsored it." (Interview NBV)

Improve beekeeper education

BVNI: *"So, knowledge. Knowledge of the beekeeper. That is something the [beekeeping red.] associations should pay much more attention to. And that does happen. Lectures are organised and courses are organised. Yes, and you see in Germany again, that beekeeper training takes three years, here in the Netherlands it is one season. Of course, in the end that results, in my perspective, in higher bee mortality. Unless by chance you have a good winter, then it will be lower. You often see with softer winters that bee mortality is low, but even then, colonies come out of winter in a weakened state. And if you would do the measurement a three months later all the weaker colonies will not have made it. Because they were not able to develop sufficiently to make it, and then they collapse anyway. So, they do make it through the winter, but later in the season they collapse anyway. So yeah, in my perspective that is the combination that causes bees to do poorly. Biodiversity, varroa mite, beekeepers' knowledge, and crop protection substances. […] But there should be more exchange of knowledge in those areas. In the meantime, because we are a professional association now, we are at the table with organisations like that. […] And we have also offered the NBV to help out in the education and training of hobby-beekeepers. Knowledge, knowledge, knowledge. That is just where it often goes wrong. […] There are many things [that can be improved in the training of beekeepers red.]. I am not saying that the current course is completely wrong. But the beekeeper course is conducted based on a certain business method, and that is taught in a certain manner. And in my opinion the developments in society should be taken into account more. People that keep bees these days do it because they want to help the bee. They think that is fun and would prefer to do everything as organic as possible. There is even a small group that want to do it biodynamically, as natural as possible. That is something the course does not anticipate. Also, climate is changing. I mean, in the course books it still says that you need to finish wintering (certain preparatory actions before the winter season red.) before October first. But that has been in the booklets for maybe thirty years already, just to get an idea. But people, look around. Climate is changing. That is something you should do something about. Biodiversity is changing, that is something you should do something about. So, the writings should reflect the context of the time. And there are all sorts of initiatives by individual beekeepers. I have a book here by Ben Som de Cerff. He writes about practical beekeeping. He does that based on the current time. He also writes that people like to use different types of hives for their beekeeping practices. They have a different intention, and do not care much about honey. But that is something you do not see back in beekeeper education. […] It is outdated, yes. That is definitely much room for improvement there. Also, in terms of the guidance of new beekeepers. I myself am a member of the board of a hobby-association in Driebergen-Doren (region in the Netherlands red.). Beekeepers that are starting need to be taken by the hand for the first two or three*

years. But there are not many people who are willing to do that. So, we are performing our beekeeping activities very individually. In general, it is difficult to get something done in your association. We have a beekeeping café. But people prefer to search the answers to their questions on the internet instead of coming to this evening where knowledge and experiences are shared. That is something we should get to take off more. But society changes. Everyone is busy. But that is something that the bee suffers under, that change. Look, to me my bees are like cows, for me they are living resources. The healthier they are the better for me. So yeah, because it is my profession I treat it differently than if it were a hobby. I know that, because I have done it as a hobby as well in the past. So yeah, I get that. But knowledge transfer would be nice. I often hear people panic about: 'the book says that you need to do the spring inspection on April first and that you need to be wintered by October first!'. I always tell my students once they finished the course: 'Now throw out all your books, in the sense of just use them as source of reference. What it is about now is that you learn to read your bee colony. Because those bees have been living for millions of years, so they can do without us. It is just that we want pollination and honey. But the bee colony will absolutely let you know if something is wrong. And that is something you need to learn. It is not something you can learn easily, only if you can hear things from experienced beekeepers, if you can tag along with them, or that if something is wrong you ask an experienced beekeeper to take a look.' That is all knowledge, but again, there is still much to be improved in that area. […] That is absolutely a shared task (for the beekeeping associations red.) […] And associations are aware of the issue. But again, you get: 'advantage, disadvantage, stop.' And getting those beekeepers away from their computers is really difficult. We notice that at the association level. On the other side it is also difficult to mobilise people from the association to commit themselves toward that goal. […] In the sense of: 'Come along, you can tag along with me for a year.' Or: 'Call me if you need anything'. That is difficult. It is the biggest problem though, I think. Because the knowledge is there. Literature, research papers, reports, everything. But you need to get people into motion, and that is very difficult. Because those practical skills are so dependent on climate and nature. Are you stationed in an area that is biodiverse or not very biodiverse? Then you also have the whole cultivation of queen-bees aspect as well. So, it is difficult. (Interview BVNI)

Bayer: *"I think we are already on a very effective path. Wageningen University has developed a 'three-course meal'. So: removing drone brood in spring, because the Varroa mite can multiply in those very easily; In the summer treatment with oxalic acid and formic acid; and in the winter once again. The beekeepers that implement that properly are doing really well in terms of winter mortality. So, I think that is wonderful, and that is good practice in terms of: how do I handle disease and pests? That also partially includes hive hygiene. There are many beekeeper courses for it, and those are just really good course. That is simply good, if beekeepers are well educated"* (Interview Bayer)

Design policies that are flexible, stimulating and goal oriented rather than rigid and measure oriented

In general, the perspective of LTO on which methods are desirable to come to a reduced dependency on pesticides and more room for biodiversity on farm grounds is summed up in the following statement: "*A more regional approach, customisation, a more integral vision or cohesion between vision and implementation on different policy levels. So national, regional and local. And especially: stimulating policy. So, don't say: 'everything has to…'. I think you need to focus on the spirit of the law rather than the letter of the law. […] The moment you start to prescribe a very specific set of rules, and this also has to do with customisation, it will amount to nothing for one, whilst it is not possible for the other, so those rules will accumulate to nothing. You stay exactly where you are. In the spirit of the law I think more: 'What is the goal'. So, the goal should be central. Not measure oriented, but goal oriented. So, anything that serves that goal should be stimulated rather than obstructed. And at this moment there are still some blockades, and on other points there are measures that don't contribute. […] The point is: 'the goal is to stimulate, […] and I don't mean just on paper, you have to be able to demonstrate, but if you demonstrably are contributing, that should be stimulated. And THAT is what policy should be tailored towards. Right now, you see that the policy is sort of poking and pushing the lower limits, they pull everyone at the lower limits to a similar level. But I think you can make much more progress if you are able to stimulate the top. The growers that are willing, they take steps, and if you are able to stimulate those steps you can make a lot of progress. Whilst, in the lower limits, all you are actually doing is just a bit of tinkering about at the edges. The ones that are digging in their heels will always be able to find a way around the requirements. They will get out of it or meet the requirements with a minimum of effort. And the people at the top, who really want to improve, are not helped with it." (*Interview LTO)

"In part it is also legislation that is in the way. For example, if you look at the CAP [EU's Common Agricultural Policy red.] opportunities for greening in there. From the perspective of enforcement and practicality everything has been made equal in the whole of the Netherlands and even for the whole of Europe, so every lot has to meet the same requirements. But within one region you could possibly do much more, because there are other margins, or other crops, or a different pest and disease pressure, or a different soil, or a combination. Whilst in another region they may be unable to do anything with the prescribed requirements because they don't suit the situation there, but maybe something else is possible. I think you need to do more at the regional level when stimulating biodiversity. (Interview LTO)

Work through initial logistic hiccups and toward structural, broadly supported solutions

"Prorail [Dutch railway corporation red.] for example calls: "We have many [plant red.] strips along the railways, and oftentimes there is a lot of wonderful gestation plants there. Feel free to put some hives there." But then another actor calls out: "Yeah, but you cannot just do

that. You need to take safety into consideration." You know. […] The same thing with ideas of farmers regarding mowing policies of Rijkswaterstaat: "Could you maybe alternate between areas that you mow?" Amazing idea. Rijkswaterstaat said: "Good idea." But then someone raises their hand and says: "Yeah, but that is not possible, we have contracts with subcontractors, so we cannot do that." So, that is how it often goes. At the one side there is a willingness, and at the other side a problem is mentioned, and then the whole story comes to a halt. So, there is not an actor that says: "Okay, in that case we are going to sit around the table with the subcontractors."; or "We are going to sit around the table to figure out how we can ensure the safety of the beekeeper if he works beside the train tracks." Because I am not saying there aren't any problems. But now something calls something, yet another report is written, end of the story ***. So, there is no pushing through obstacles, and that is a pity. Because, in my perspective, issues are definitely resolvable****. […] I think that is a government responsibility. But that is difficult of course because then you get back at being a hobby, and the agriculture sector. Because I am convinced that if in the Netherlands beekeeping would be considered part of agriculture you would get policy, something would have to be done, then it won't stop with: "Pro, con, end." […] Because we have enough reports. So, let us not discuss any more about whether there is or isn't a problem. Reports enough. So, all those consultancy firms, they can stop. There are projects for field margins; vegetation on the barnyard. Report, report, report. A hundred grand here, a hundred grand there. Flower seeds are sown in the field margins; subsidy is removed; gone is the flower-rich field margin. That is all useless.* ***We need to look for structural solutions that are broadly supported****. And am glad that the government is now saying: "We want to create some policy regarding this matter. So, guys: 'Think along.' Yeah, great. And now I am hoping they will follow through. Because, that is something that is lacking in the Netherlands. There will be policy shortly, but there needs to be a controlling body. Because believe me when I say that someone at Economic Affairs [Now the Ministry of LNV red.] who has biodiversity in their portfolio, or someone at any municipality you enter deals with a piece of safety, mowing policy, replanting or planting of a new housing estate. But they need to be able to follow through. I am not quite sure how it would work in practice. But it would be wonderful if someone says: "I would love a nice avenue with linden trees" and that that would actually happen. And the Netherlands is a difficult country right? […] I have been at situations of consultation. Talk, talk, talk, talk. Everyone has good intentions. In the end nothing happens. And that is something we need to get rid of. And we can only get rid of it if everyone understands that if we don't do something we will have a serious problem in a while."* (Interview BVNI)

LTO does not refer to logistic hiccups so much but does stress the relevance of including NGOs in the conversation in order to obtain broad support: *"There are no specific actors I want to name specifically [as being important for combatting bee mortality]. I do think that, look, you used to have the classic trinity: government, research and business. I think you can add society to that list. There should be four now. So societal organisations, NGOs, those need to be at the table. If you exclude NGOs it won't work. That makes sense, because they*

represent a large portion of society. So, if you don't let them be part of the conversation, I would be frustrated as well if I worked at an NGO. Like: 'Guys, this is a very societally important issue, and we are not at the table when it is discussed.' They are simply a part of it. They also have a role, and that can be very positive!" (Interview LTO)

Work with 'soft-lists' of pesticides that should be used with great care and as a last resort

LTO's perspective on how to deal with pesticide use is in line with the notion that a focus should be on the spirit of the law rather than the letter of the law: *"How can you turn this in a way in which you say: 'We are looking for a way in which we use those substances as little as possible', without saying: 'They need to be banned'. So that it is not the case that when, for example, a cultivation system spins out of control because of heavy weather, you would not be able to make adjustments for that situation." […] You see that certain partners conclude for themselves: we compare different scenarios of crop protection agents, and we conclude it should be about soft lists with substances that you should not use."* (Interview LTO)

No stronger (government) interference necessary in terms of pesticides

BVNI: *"Those crop protection substances, those will be fine. Because trust me, at Bayer they are also not happy with all the publicity and that they are doing their best to do all types of organic… Because the consumer… Well, Bayer is also not happy. And there are a few more that feel the same. So, those will themselves take the initiative to move forward. Because if they don't move it will hurt them in their wallets. […] Because society is no longer tolerating it. That is the same for many others, because sustainable and, like I just said, people want to know: "Where is it [the product red.] coming from? Is it healthy?""* The spokesperson of BVNI compared the situation of the pesticide producers to a scandal surrounding Intratuin, a chain of garden supply stores in the Netherlands. Research commissioned by Greenpeace had found pesticide residues on 81 out of 84 plants that were purchased at four big garden supply stores in the Netherlands, Intratuin among them. A total of 571 residues was found, of which 58 were of a substance that was either illegal in the Netherlands or in the total European Union. The story and research were broadcasted on national television in the tv show GroenLicht. (Vroege Vogels 2017) In the words of the BVNI spokesperson: *"You see the same with Intratuin with those plants. The consumer calls out: "We don't want that" Well, Intratuin had to [take measures red.]. It is the same with crop protection substances. Consumers are calling: "We don't want those." Well, in that case those commercial actors are inventive enough to come up with alternatives. So, I think that, you'll never completely solve it, but there will definitely be a strong movement. So, I am not too concerned about that so to say." (Interview BVNI)*

The Nefyto spokesperson explained that pesticide producers take their responsibility when things go wrong in the current system. They do not need more government interference. The current system works well. "*And, let's be clear about this, where Jeroen [Prof. van der*

*Sluijs red.] said at one point: 'We have bee mortality in Germany', you see the reflex of Bayer, where we say: "There [in Germany red.] the seed coting, the seed coting technique, the way in which it was used, went wrong." So, that seed coting was improved, and the manner of application was adjusted. So heretofore, that stuff with air pressure, it all sprayed into the air. Never denied either that if a bee, again the substance was really poisonous for bees, so if a bee flies through a cloud of dust like that because the seed coting was not applied properly, the bee will die. No discussion about that. And what I see when I look back to that moment, is that the problem was addressed in a good manner. […] Because that went wrong, so it was adjusted. And the moment in which too much imidacloprid [a neonicotinoid substance red.] was found in the surface waters surrounding greenhouse horticulture areas, treatment plants are arranged. So, in that sense I determine that the industry takes its responsibility for the things that matter. (*Interview Nefyto)

Bayer stated: "I mean, we look, we monitor in the surface water. So, we look at which chemical substances exceed the norm. And if it happens that a certain chemical substance exceeds the norm again and again, the industry will be instructed: "You will research your chemical substance to find what is the problem and you will draft an emission reduction plan. If that does not work, firm restrictions on your substance will follow." And that is of course the CTGB who will do that and who takes a look which complementing measures should be taken. That is, according to us, a rational way of working with substances. Because every substance can cause harm if the exposure is high enough. But if you can reduce the exposure by exposure reducing measures it is fine to use a substance." (Interview Bayer)

Create policies, guidelines, stimulating funds etc. to promote an increase of bee friendly habitat and to professionalise beekeepers (use Germany as an example)

"But I am also member of the German beekeeper federation, and the local association. Yeah, and Germany, I think, manages the things well. So, the Netherlands: Talk to the neighbouring countries. We don't have to invent the wheel. We are all acting so dramatically. […] You see, for example, that [in Germany red.] the education for beekeepers is already different. The German beekeeper federation has all affairs better arranged than the Dutch one in my opinion. If I, it already starts with the fact that if I have beehives I have to sign up at the municipality: "I live here, I have this many hives, and they are stationed there." That is a plus in itself, because here in the Netherlands we really don't know all that. If a disease breaks out here: No idea. If I want to travel with my bee colonies, that is very much possible within the Kreis [name for the regional administrative unit in Germany red.]. However, if I would go from Rijnwestfalen to, just to name something, Schwarzwald, which is in a different Kreis, I need to report that. If I am a professional beekeeper, and that is the case for me in Germany because a couple the areas I use for my bee to forage are in Germany, I need to sign in at the Landwischaft, the agriculture. They follow the complete process. They follow the beekeeper. Professional beekeepers also get financing easily. If I go to a bank [in the Netherlands red.] right now and say: "I am a beekeeper and I would like to take a loan of one euro." They say: "Eh, yeah, what do you mean?" It is just a completely different picture. I also notice in

Germany, I just have to ring the doorbell of a farmer and ask: "Can I station my bee colonies here?" [And they respond red.] "Ja! Kein Problem!" It is also a different culture, very different, they look at bees in a very different manner. The same with honey. That has something to do with it as well. But there are so many things. You also see that the involvement of the government is much better, which is the reason that there is policy, and because of that [financial red.] means. So, if you are a professional beekeeper and you would need that, you can claim some of that. I also know that Ari Krijken, who is in Brussels right now, is making a proposal for beekeeping in Europe. And all these things that I mentioned are addressed in that. I also think that for the Netherlands it is a matter of time, they are going to have to go along with the European legislation. Yeah, so there [in Germany red.] I think it is much more professional. I realise Germany is many times bigger than the Netherlands, and also has much more beekeepers than the Netherlands. I know all of that. But it is about policy and strategy." (Interview BVNI)

Utilise the available techniques to limit plant protection product use

Agrifirm: *"You need to work with the possibilities that you have got. And look, we know which techniques in terms of plant protection products are on their way. However, they won't be there before 2020, and some not even before 2025. Sometimes, you have political themes. CIS-genesis, for example, is not yet allowed. If that were allowed it would result in a serious reduction is certain substance use. And I am talking in a broader sense than bees now. But, if you spray less, that won't be worse for bees. So, those types of things [prohibitions red.] obstruct certain things. But we are also dependent on how other European countries see that. Countries like France and Germany can be rather conservative. […] CIS-genesis won't get an authorisation any time soon, at least that is my own estimation. In Wageningen there is a lot of lobbying going on like: "Guys, it is plant genes that you would insert into different plants. You do the same with natural breeding, except if you do that you lose lots of desirable traits, and it takes years. And with CIS-genesis you cut out a piece of DNA, you put it in another plant giving it double resistance, enabling you to be set for years and needing much less substances. And if these types of things have been developed but are not allowed on the market or to be used, it obstructs a faster shift to sustainable production.*" (Interview Agrifirm)

Reverse the budget cuts for nature and realise the national nature network

"If you truly mean that you want to get that fifty percent of our 350-360 bee species that are on the red list, off that red list, you really need other measures [than the measures in the national bee strategy]. In that case you need a 'delta plan wild bees', and the big question is whether that is justifiable for wild bees. I think it would be better to say: "Let's increase the nature budget. Let's make serious work of the national nature network. And let's reverse those measures in which the nature budget was cut by half and the nature network project was diminished." If you do that, you are doing something substantial for biodiversity. And then you can also, if you are making work of increasing nature policy anyway, work the veins

of green- and blue in the rural area. And you can absolutely call on farmers for that, you can obtain a lot by doing that." (Interview Bayer)

Appendix IV: Areas of conflict

Neonicotinoids: to ban or not to ban

Pro-ban storylines

The stakeholders support a ban on neonicotinoid use in the Netherlands are:

Environmental- and Nature Conservation
NGO's
Greenpeace
Natuurmonumenten
The Pollinators
Natuur&Milieu

Figure 13 provides an overview of the storylines used by the above-mentioned stakeholders to underpin their belief that neonicotinoid use should be banned in the Netherlands. The storylines will be explained in more detail in the following text.

The 'neonicotinoid use should be banned' narrative is supported by all four environmental NGOs that were interviewed. All four were part of group 1, thus viewed pesticides and the intensive agriculture system as a threat to bees. Figure 13, which can be found on the next page, provides an overview of the storylines used by these stakeholders to underpin their perspective on neonicotinoids. A more detailed explanation, as well as the underpinning of the model (including sources) can be found in the section after the figure.

Looking at figure 13 it becomes clear that mainly the first two warrants were used by all stakeholders. These are the ones that (1) legitimise the claim that neonicotinoids are in fact harmful for bees, and (2) explain why the restrictions that were imposed on neonicotinoid use in 2013 do not sufficiently protect bees against exposure to neonicotinoids. (Interview Greenpeace; Natuurmonumenten; The Pollinators) A large portion of the other storylines was used by Greenpeace only. One of these explains how the preventive manner in which neonicotinoids are applied (as a seed coting) contradicts the concept of Integrative Pest Control (IPC). Within the IPC approach, which has been mandatory for farmers in the EU since 2014, a pesticide is only applied as a last resort. (Kodde 2015) The Natuurmonumenten ecologist explains that it has come to his attention that scientists and members of parliament have questioned the authorisation procedure of (neonicotinoid) pesticide, and the research that underpins this. He expressed that in his view it would be desirable that these procedures are reviewed and altered so that their outcome can no longer be considered disputed. (Interview Natuurmonumenten; Van Steenis, personal communication, 8 June 2018) The scientists he refers to are Henk Tennekes and Prof. Dr. Jeroen van der Sluijs, who have expressed concerns about the validity of data used in current authorisation procedures. These scientists question this validity because the research that produces the data is financed by producers of the pesticides, who have a stake in the outcome.

(Beckerman 2015; Harmsen 2018) Examples of members of parliament that asked parliamentary questions on this issue are Esther Ouwehand from the Party for the Animals (PVDD) and Rik Grashoff of the GreenLeft party. (Ouwehand 2012; Grashoff 2018)

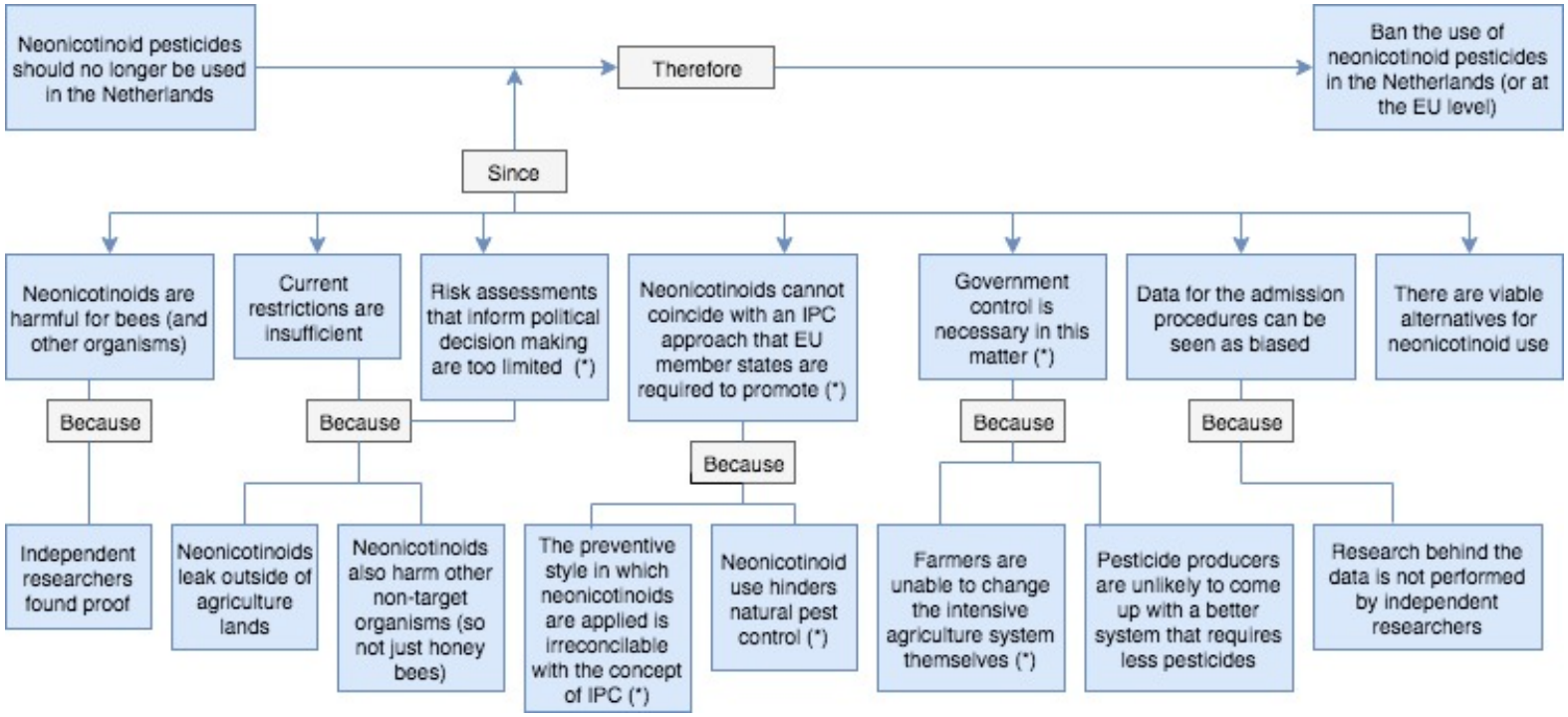

Figure 13: Toulmin's structural argument model of storylines used by stakeholders supporting the 'neonicotinoids should be banned narrative.
Note: (*) Storyline only used by Greenpeace; (**) Storyline only used by Natuurmonumenten

Warrant #1: Neonicotinoids are harmful for bees (and other organisms).
Greenpeace consistently refers to neonicotinoid pesticides as "bee poison" and argues in multiple press releases and studies that neonicotinoids are harmful for bees, as well as other useful organisms. (Kodde 2015; Greenpeace Nederland 2015, 2017a)

N&M also uses this warrant. Their spokesperson explains that N&M does not support banning any very harmful substance 'without carefully considering the consequences', stating that banning one pesticide can result in a higher environmental burden if farmers start using available alternatives that have a higher accumulative environmental impact. However, the organisation does consider neonicotinoid pesticides to be very harmful for bees and supports a ban on these substances. (Gosselink, personal communication, 8 June 2018) On the website of N&M they state their position on the use of crop protection agents in the following manner: *"The authorisation of pesticides that contain neonicotinoids (very harmful for bees and birds) needs to be withdrawn."* (Natuur&Milieu 2018, sec. Gewasbescherming)

Backing #1.1: Because this was proven by independent researchers.
To underpin the nation that neonicotinoid pesticides are harmful to bees and other organisms, Greenpeace refers to research reports they commissioned (Johnston et al. 2014; Wood and Goulson 2017) and research reports by EFSA (2016) and EASAC (2015). Natuurmonumenten has made similar claims. In 2014 they wrote on their website: *"Research concludes that [neonicotinoid red.] pesticides play a big part in the decrease of insect eating birds like the skylark and the barn swallow. Earlier there were strong indicators that neonicotinoids play a part in bee mortality."* (Natuurmonumenten 2014) The research they referred to was a study by Hallmann et al. (2014). More recently, in a petition that 'the Pollinators' co-produced with two other NGOs, Minister Schouten (currently Minister for LNV) is urged to vote in favour of the neonicotinoid ban in the European Commission. The petition makers argue it is 'code red' for the 360 bee species in the Netherlands, referring to a recent study by Hallmann et al. (2017) which found that flying insects in Germany had declined by 75% in the last 27 years. The petition text argues: *"Besides the disappearance of food and nesting sites for insects, the use of herbicides and insecticides in agriculture play a crucial part in this."* Both Natuurmonumenten and Greenpeace proclaimed their support for this petition. (Copijn, Molenaar, and Beek 2018)

Warrant 2: Since current restrictions are too limited
The Greenpeace spokesperson stated: *"For example in the European Commission a couple of neonicotinoid substances were partially banned. That ban only applied to crops that are attractive to honey bees […] However, that is much too limited in our view. There are new proposals now, and they are broader, but still they are only looking at bee health, which we still find too limited"* (Interview Greenpeace)

Backing 2.1: Because risk assessments that inform political decision making are too limited.

The full context in which the quote of warrant 2 was made provides a backing, linking the limitation of the restrictions on certain neonicotinoids to limitations in the risk assessment: *"For example in the European Commission a couple of neonicotinoid substances were partially banned. That ban only applied to crops that are attractive to honey bees because the risk assessment has only been done for honey bees. However, that is much too limited in our view. There are new proposals now, and they are broader, but still they are only looking at bee health, which we still find too limited. I think, look, we can have this conversation about honeybees and why we find those important. But actually, I think it is much more important to say that to use honey bees are sort of like a canary in a coal mine. So, if bees are doing poorly, it is an indicator for how they rest [of the species red.] are doing."* (Interview Greenpeace)

Backing 2.2: Since neonicotinoids leak into the environment outside agricultural lands. So, non-target organisms, bees among them, are being exposed to the neonicotinoid substances.

The Natuurmonumenten ecologist stated: *"Those neonicotinoids are truly risky stuff because they impact all insects. As a seed coting they end up in the environment. It is already present everywhere in the Netherlands in concentrations that are also very risky. For example, in the Westland you have areas in the water where the concentrations exceed the norm a ten-thousand-fold because it is used a lot in greenhouses. And greenhouses still discharge into the surface water. So, something is going on there."* (Interview Natuurmonumenten)
Greenpeace stated in a press release: "*The poisonous substances [neonicotinoids red.] end up in the environment because they flush out of fields, blow out of sowing and spraying machines and because they are discharged with the wastewater of greenhouses into the surface water. The poison is also spread through the nectar and pollen of wild flowers that grow at the edges of fields, because the flowers absorb it from the soil*." (Greenpeace Nederland 2017b) So, these stakeholders argue that non-target organisms are actually exposed to neonicotinoid substances due to the manner in which they are currently used.

Warrant 3: Since neonicotinoid pesticide use cannot coincide with an IPC approach that EU member states are required to promote. (Just Greenpeace)

In a news article on their website Greenpeace stated: *"Above all, the use of 'bee poison' is irreconcilable with the Integrated Pest Control policy that the European Union and the Netherlands pay lip service to, according to the EASAC report." (Kodde 2015)*

Backing 3.1: Because neonicotinoid pesticide use is irreconcilable with the concept of integrated crop protection

Greenpeace wrote the following on their website, citing a study by EASAC (2015):

"This approach [integrated crop protection red.] entails preventing pesticide use as much as possible through certain measures and monitoring of crops. Pesticides are a last resort and are only used if the pest pressure is too high and other measures have not worked. Neonicotinoids turn this logic around completely: the pesticides are used 'preventively' (for example through a seed coating). In doing so, the marriage between agriculture and pesticides becomes permanent: no longer taking into account if a pest will occur, the pesticide is sown together with the plant, only to leak into the environment. This is, of course, a very profitable model for big pesticide companies like Bayer and Syngenta, but disastrous for pollinators, useful insects and our surface waters." (Kodde 2015)

Backing 3.2: Neonicotinoid pesticide use hinders natural pest control

Natural pest control is one of the pillars of ICP. The Greenpeace spokesperson explained why pesticide use, neonicotinoid use among that, is harmful to natural pest control: *"For example, in the first version of the national bee strategy the ideas were very compartmentalised. Sort of: 'We need more flowers and we need less substances.' Whilst, if you pull those two together you start doing interesting things. So, if you allow more biodiversity to exist on the barnyard, so if you plant more flowers that attract useful insects that eat aphids for example, you don't have to spray those pesticides anymore."* (Interview Greenpeace) In a news article regarding neonicotinoid pesticides on their website Greenpeace explained it in the following way: *"The use of harmful pesticides does not just harm pollinators such as wild bees and butterflies. The EASAC research* (EASAC (2015) red.) *points out the negative effects of these substances on natural pest control. Nature is full of insects and birds that eat pest insects, without anyone needing to pay a penny. […] These 'natural enemies' in particular, such as parasitic bugs, ladybugs and beetles, die do to the unnecessary use of pesticides. For that reason, agriculture gets more and more stuck in a downward spiral: the pesticides undermine the pest-eating insects, resulting in the necessity of using more pesticides to control the pests, resulting in less useful insects, resulting in more pests, ad infinitum." (Kodde 2015)*

Warrant 4: Government control is necessary in this matter (Just Greenpeace)

Greenpeace explained that they think the government should regulate the pesticide market firmly: *"Yeah, I think that the government followed a line of self-regulation, and of trust in the self-regulation of the industry. Whilst I think that you cannot expect that. I think that you cannot expect farmers that are stuck in a system, because they are unable to financially escape it, to radically change the agriculture model all of a sudden. I also think it is naïve to think that Bayer will come up with a different agriculture model all of a sudden that is much better for bees, I just don't believe that, because that is just not in line with their business-model, it is not their core-business. At the same time, due to globalisation and the strong market entered thinking the government started to give up control. And everyone is expecting the government to be firm and steer in a certain direction, but the steering wheel is*

simply not there anymore. [Pesticide red.] substance use is an example of that, it has simply been handed over to the industry." (Interview Greenpeace)

Warrant 5: Currently data handed in for the authorisation procedure are described as biased by certain researchers (Just Natuurmonumenten)

The Natuurmonumenten ecologist explained that the current construction in which pesticide producers provide data for the authorisation procedure, oftentimes based on research performed by themselves. *"Right now, it is common for the producer* [of the pesticide red.] *to perform research in order to fill the required dossier."* (Interview Natuurmonumenten) The ecologist stated that validity of the data that result from this has been questioned by scientists and members of Dutch parliament. Sources to underpin this include Beckerman (2015); Harmsen (2018); Ouwehand (2012) and Grashoff (2018). (Van Steenis, personal communication, 8 June 2018)

Warrant 6: There are viable alternatives (Just Greenpeace)

Greenpeace disagreed with an argument made by other stakeholders (explained and displayed in the next section on the 'no-ban storylines) that there are currently no suitable alternatives for, among other pesticides, neonicotinoids. Interestingly, in this the spokesperson referred to research by CLM to underpin his point. He stated: *"We had that [the notion that there are not yet suitable alternatives for neonicotinoids available red.] researched, and it is simply not true. What we did, we asked CLM: Can you make an estimation of how feasible our ideas are? […] They concluded: if you look at the sustainable frontrunners [in agriculture red.], the Milieukeur [a certification scheme red.] farmers are using half the substances [compared to mainstream farmers red.]. Those are still in a relatively conventional segment, they still use chemical substances, but in a way that is in line with integrated pest management. So, they utilise strong base material, use better decision methods to decide on damage thresholds, those kinds of things. And with the currently available innovations and insights those farmers can do with half the substances. And it is even possible to do better. Because organic farmers do not use any chemical substances at all. However, the conclusion was also if you want al farmers to move to the Milieukeur standard, a bit more money is necessary. We are talking a couple of cents more on every kilogram of potatoes. […] I think they understand by now where the pain points are. And I would hope that everyone is investing in smart innovations to solve those pain points"* (Interview Greenpeace)

No-ban storylines

The stakeholders that explicitly expressed disagreement with the proposal to ban neonicotinoids in the Netherlands are:

Beekeeping organisations	Knowledge Institutes
BVNI	
NBV	CLM
	Naturalis
Governmental organisations	**Agriculture organisations**
Ministry of LNV	LTO
	Agrifirm

The 'neonicotinoids should not be banned' narrative is carried by stakeholders from both groups that were identified in the earlier analysis based on their views on the causality of bee decline. This is striking, since the main aspect of division in these groups was the weight they ascribed to pesticide use as a contributor to bee decline. When looking at figure 13 it becomes clear, however, that this division is still somewhat present in the backings that stakeholders used to underpin the claim that a ban on neonicotinoid use is not desirable. Of all the storylines displayed in figure 14, the stakeholder from group 1, CLM, (from the analysis in paragraph 4.2.1) only used one. They argued that due to a lack of suitable alternatives to neonicotinoid pesticides, there is a risk that farmers start using alternatives that have a stronger impact on the environment.

Whilst figure 14 provides an overview of the storylines utilised, a more detailed underpinning of the figure in the section that follows it.

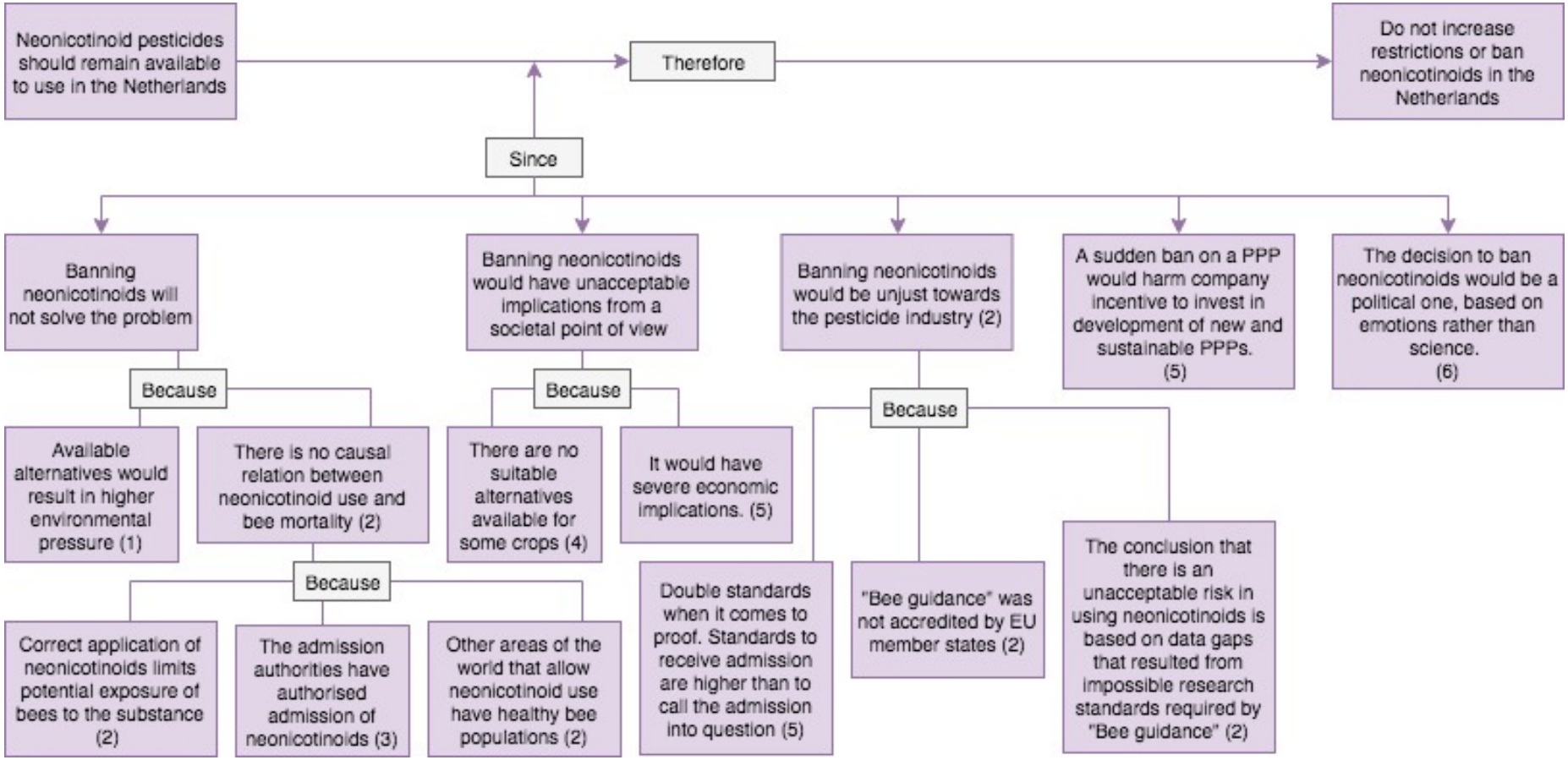

Figure 14: Toulmin's structural argument model of storylines used by stakeholders supporting the 'neonicotinoids should not be banned narrative
Note: (1) Storyline only used by CLM, LTO, Naturalis and Nefyto; (2) Storyline only used by Bayer, Nefyto and Agrifirm; (3) Storyline only used by Ministry of LNV, LTO, Nefyto, Bayer and Agrifirm; (4) Storyline only used by LTO and Nefyto; (5) Storyline only used by Nefyto; (6) Storyline only used by Agrifirm, Bayer and Nefyto.

Warrant #1: Since banning neonicotinoids will not solve the problem.
In the interviews, different stakeholders expressed that in their view banning neonicotinoid pesticides would not result in an improvement of the environmental pressure on bees. These are explained in the following backings.

Backing #1.1: **Because, the alternative crop protection agents that are currently available to farmers may result in a higher environmental pressure (therefore perhaps more damage to bee populations) than neonicotinoids. (CLM, LTO, Naturalis, Nefyto)**
CLM is very critical towards the use of pesticides in the current agriculture model of the Netherlands. In general, they argue that Dutch agriculture practices should move towards a more nature inclusive model, and that the use of pesticides, particularly those that impact pollinators, should be reduced as much as possible. However, the organisation argues against a neonicotinoid ban at this moment. The CLM interviewee explains that the idea that if neonicotinoid substances will be banned in Europe the bee mortality problem is solved might not actually be an accurate one. Difficult pests, such as aphids, will not disappear suddenly, and will remain a problem for farmers. Therefore, farmers will remain dependent on methods to keep these pests under control if they wish to continue to produce food crops. According to CLM, there is a risk of shifting, and possibly exacerbating the problem if neonicotinoid substances are banned. They think farmers will simply start using other substances that have received an authorisation if neonicotinoids should be banned. The risk is that these alternatives might end up doing more harm than the neonicotinoids would have, because higher volumes need to be applied for a similar effect for instance, and that the total environmental impact will increase if these other substances are used as an alternative for neonicotinoids. Which would be more harmful for Dutch pollinator populations than the neonicotinoids are now. (Interview CLM)

Nefyto also used this storyline, explaining: "*Another aspect linked to this, which I would find a shame, that neonicotinoids are very much linked to seed coting. So, you can have a discussion about whether you should spray or use seed coting. Well considered, seed coting is, in terms of exposure and the emission of crop protection agents into surface water, an amazing method. Very little needed, effective. […] If you can protect (a seedling or plant red.), and that protection lasts 6-7 weeks. The alternative is available as well, that you need to spray 3-4 times with a substance, admittedly one that is admitted so the risks are acceptable, but one that has, I think, a much more negative effect on the environment than the small amount that is applied to a seed*." (Interview Nefyto)

This storyline was also used by the LTO representative, who explained that in her perspective within the public neonicotinoid discussion, the risks associated with neonicotinoid substances are not placed in perspective sufficiently. According to her, the current application of neonicotinoid substances -as a seed-coting- might have a lower overall

environmental impact than the available alternatives at the moment: *"In perspective, it can very well be that certain applications of neonicotinoid substances, the way we use them now as seed coting, relatively have a lower environmental impact than the alternatives that are currently available. This does not mean that if these substances really cross a line for bees specifically, we should continue to use them. […] But we see that certain matters are magnified to such levels that they completely push away other factors that should be considered when determining the strategy that you want to follow. This can cause you to miss the mark in terms of environmental impact. That you lose sight of the bigger environmental picture. And that is a risk in my opinion."* (Interview LTO)

The Naturalis spokesperson also confirmed this rhetoric, stating that it is important to consider what society would go back to if a neonicotinoid ban should come through. She agreed with the previously cited sources that farmers would have to use other crop protecting products in such a case, and that these alternatives would probably either be more harmful and toxic, or used more often than neonicotinoid substances. (Interview Naturalis)

LTO stated: *"Anyway, if you recklessly say: "these substances, we are immediately banning them." the end of the scenario in which we don't use those anymore is not favourable at all. You need to see things in their entirety, if you remove something in one spot, it could have effects at another spot that may be much more disadvantageous."* (Interview LTO)

Backing #1.2: **Because there is no strong causal relation between neonicotinoid use in practice and bee mortality**. (Nefyto, Bayer, Agrifirm)
Three stakeholders explicitly stated no causal relation has been proven between the use of neonicotinoid pesticides and bee mortality or bee decline. This was backed up using the following storylines.

Backing #1.2.1: Correct application of neonicotinoids limits potential exposure of bees to the substance. (Agrifirm, Bayer, Nefyto)
A point that is made often by stakeholders that oppose the proposal to ban neonicotinoid pesticides is that there is no doubt that neonicotinoid substances are toxic for bees. (Interview Agrifirm; Interview Bayer; Interview Naturalis; Interview Nefyto) However, they see this as irrelevant to the discussion since every substance can be harmful if the dosage is high enough. Members of the coalition explain that if the discussion is about whether the use of neonicotinoids as they are used by farmers, has a significant impact on bee mortality in the Netherlands, one should not just consider how toxic a substance is, but also take into account some other basic concepts of toxicology. (Interview Bayer; Interview Nefyto) They explain that when a substance is tested to receive authorisation by the CTGB or EFSA, a risk evaluation is made. This risk assessment is a calculation in which the hazard value of the substance, so in this case the toxicity for bees, is multiplied by the exposure to the

substance. (Interview Nefyto) Because if a bee is not exposed to a substance, it will not be affected no matter how hazardous or toxic the substance is. (Interview Agrifirm; Interview Nefyto) When a neonicotinoid pesticide is used in accordance with the label provided by the manufacturer, the exposure has been limited through various ways and measures, ranging from concentration of the substance that is used to the manner in which it is applied. Because for every neonicotinoid substance on the market CTGB has analysed and concluded that risks in using this substance in accordance with the label are acceptable, the pesticide industry argues that the innocence of these products in relation to the high honey bee mortality levels a couple of years ago have been proven. (Interview Agrifirm; Interview Bayer; Interview Nefyto)

Backing #1.2.2: **Because the authorisation authorities have authorised authorisations for neonicotinoid substances. (LTO, Nefyto, Bayer, Agrifirm)**

The spokesperson of the Ministry of LNV explained: *"We think it is important that the assessment of substances and active components […] that the effect on 'non-targets' as we call it, so non-target organisms. And if a risk is detected by EFSA, our food authority, that measures should be taken. It is as simple as that. But where no risks are detected, no measures are necessary. If I dislike lilac sweaters, I am not going to remove all lilac sweaters from the shelves of the clothing stores so that others cannot buy them. That is not how it works. As long as those sweaters are safe and well produced, they are allowed to be on the shelves. But I can stimulate that, for diversities' sake, it might be better to not take the lilac sweater if you do not really need it. […] EFSA is the biggest authority for Europe and the member states in terms of [risk assessment red.]. The rapporteur member state has a big say as well. So, it does not always have to be CTGB. It can also be one of the other 27 [member states red.] that report about such an active substance. But in the end CTGB will always be involved, because you won't get an authorisation for a substance in the 28 member states if CTGB has not given an authorisation or authorised it. So, there [at the CTGB red.] they check once more: 'This active substance is stated to be in this substance, and the substance is applied in this or that manner with this dosage, this frequency, for this crop, against this pest. Is that acceptable in the Netherlands? Because, as you know, the Netherlands is a delta so water is always very important to us. So, we will always be a bit more attention to that in comparison to other member states who don't have that much to do with groundwater and surface water. […] I am not in support of completely cutting it [neonicotinoid pesticides red.] off. So, if they [EFSA and CTGB red.] have looked into the risks of those substances, in my view you don't have to cut them out completely. We also don't forbid people to smoke, or to drink [alcohol red.], and that is much more dangerous than plant protection products I think. But again, I think this [pesticide use red.] is just one aspect. And I think that other aspects are much more influential. Which I did not necessarily expect at the start [of the debate red.]."* (Interview Ministry of LNV)

Nefyto*: "Because in the political debate the Minister asked CTGB: 'Where are we standing [with regard to neonicotinoid pesticides red.]?' And the conclusion of CTGB was: 'We have carefully looked at the complete dossier again and within the scientific framework that CTGB was prescribed to use, this story is correct* [meets the requirements red.]. (Interview Nefyto)

LTO: *"And to take an example: those neonicotinoids. As soon as it is certain that those neonicotinoids are of unacceptable risk for people, animals or the environment, and that they are very harmful for bees, and because of that those substances no longer pass the risk assessment; we are not going to advocate to keep those neonicotinoids because they are indispensable for us. No, the risk will always come first."* (Interview LTO)

Agrifirm: *"If you make a very broad group* [of pesticides red.] *disappear for political reasons, I think that is by definition a bad thing. You have to approach it scientifically. And as far as I know, there are lots of differences between one neonicotinoid and another. So, you just have to assess per substance: What is acceptable and what is not acceptable? And until now it was all acceptable. And then when you start being a bit stricter when it comes to the standards, part of the pesticides may be cut, and others will probably stay. But you have to do that scientifically, in a framework that measures harmfulness for bees, among other things."*

Backing #1.2.3: Because healthy bee populations are found in other areas in the world that allow neonicotinoid use.

A backing used by Nefyto and Bayer to substantiate the idea that there is not a causal relation between neonicotinoid use in agriculture and bee mortality, is that there are countries in the world that do not have bee-mortality problems, but where imidacloprid –a neonicotinoid substance- is widely used. Australia is a country that is named in that context. These actors, who generally think that Varroa mite is among the main threats to honey bee population health, also explain that in Australia Varroa does not occur. (Interview Bayer; Interview Nefyto) In the interview with Nefyto their spokesperson explained: *"There are still countries with high bee mortality. And it is striking that in the Netherlands neonicotinoid substances are still used and bee mortality levels are back to normal. And in countries where neonicotinoids are also used there is still high bee mortality. But there are also countries where no neonicotinoids are used and there is still high bee mortality. In any case, there is no causal relationship there, to say it like that. Which is the reason we say: "Disease and pests are incredibly important"."* (Interview Nefyto) The Bayer spokesperson stated: *"And it is striking that neonicotinoids are still used in the Netherlands and bee mortality is normal again. And in those countries where neonicotinoids are also used there is still high bee mortality, but there are also countries where no neonicotinoids are used and they also have high bee mortality. There is in any case no causal correlative link, let's put it that way. So that is why we say: those diseases and pests are simply very important."* (Interview Bayer)

Warrant #2: **Since it would have unacceptable implications from a societal point of view.** A couple of stakeholders argued that a ban on neonicotinoid pesticides would have implications for Dutch. This warrant was backed up with the following storylines.

Backing #2.1: **Because, currently, some neonicotinoid protection agents are still necessary in certain crop types for sufficient production levels. In some of those cases there are no viable alternatives.**
LTO: "*We also want a cultivation that is profitable, so there has to be an alternative, and in some cases in this era, you cannot escape using crop protection agents. And you see that neonicotinoids are framed as some sort of uberpoison, whilst there is mostly an alleged association, an alleged association about which there are still many questions, between neonicotinoids and bees. Whilst, if you put it in the whole spectrum of crop protection agents […] it can very well be that certain, seed coting, applications of neonicotinoids as we use them right now, accumulate to a lower environmental pressure than the currently available alternatives."* (Interview LTO)

Backing #2.2*:* **Banning neonicotinoids will have severe economic implications for farmers, pesticide producers and, in extension, for the Netherlands in general.**
Nefyto: *"We are talking about the production of our food here. And the crops are in the field. […] To just say to the growers from one season to the next, or maybe even within a season: "Stop! Let those insects do their thing." That can have huge economic implications. And that is not even taking into account, that is our reasoning, the producer also made big investments in a substance like that, he proved that it can be used safely. And then somewhere else a problem occurs. I am not trying to diminish that problem, that is serious. And indeed, what do you have to do to say: "This is where it all goes wrong. Full stop. The economic interests of the agri- and horticulture we will disregard, the economic interests of the industry we will disregard." In other words, you get a weighing of interests that the government needs to look into closely at the least."* (Interview Nefyto)

Backing #2.3: **Pesticide use is an important insurance for global food safety (Just Nefyto)**
"*We are talking about the production of agricultural and horticultural products, of our food. […] And, like one of our members told at one point to the Minister of agriculture: "I have the best job in the world, because I am working on feeding the world." And without pesticides there is 20 percent less yield. […] And that 20 percent less, if we want to continue feeding the world, you would have to get back through cutting tropical rainforests; and food waste, something can be won there as well; and eating less meat, that is also an area where something can be won still. But those are discussions about the global nutrition issue that we are a part of in that sense."* (Interview Nefyto)
Warrant #3**: Since it would be unjust towards the pesticide industry. (Just Nefyto and Bayer)**

Both the Bayer and the Nefyto spokespeople explain how in their view, a European ban on neonicotinoid pesticides would, taken into account the foundation for such a decision, be unjust. The following backings were used to underpin this sentiment.

Backing #3.1: **Because, the guideline was not accredited by European Union member states in accordance to European rules. Therefore, the guideline is possibly lacking validity and it should not be used to base political decisions. (Just Bayer and Nefyto)**
Bayer: *"And so far, the Commission has said: "Yeah, okay, that Bee Guidance is not perfect, we need to do something about that. But the Commission has not done anything about that. And of course, in 2013 they did base on that guidance; which still has not been admitted in Europe, there is still no consensus between the member states about that. Procedurally speaking a guidance should first be accredited by the member states before it is applied. And the Commission stated: "No, we don't want that." And we think that is political, because the whole bee health story has grown to be very political. […] And the Commission decided [in 2013 to impose restrictions on the use of neonicotinoid pesticides red.] based on that guidance. Despite the fact that there was not a qualified majority for that decision by member states. And now we have a set of restrictions based on that same bee guidance, which still has not been revised. And then it makes sense that you get new restrictions. Because much of the research we have done is rejected because it does not comply with the guidance. And the Commission just continues with that. We have, of course, brought this to the European court. So, those are the restrictions from 2013, and we are curious to know what the judge thinks of those. And that does not have to do with content, but with the process. We basically asked the judge: "Is it even legal to use that guidance?"* (Interview Bayer)

Nefyto: *"They are currently working on a new bee model. The last word about that has not yet been spoken. […] So, a discussion about neonicotinoids and bees arises, EFSA is asked to look into that. You already deal with an assignment to EFSA. EFSA asked: "Yeah, which model am I going to use." What happened is that the European Commission said about that: "It makes sense, even though it has not been accredited, to use that new model. After all, that is the latest state of science and technology." So EFSA says: "Okay, if that is the assignment, that is what we will do." So, with that new model in their hands -again, it was not yet accredited [by the member states red.]- they looked at the dossiers. Subsequently, they establish that a number of items were not in the dossier. That was not possible because it is a new model and it required other data. And then EFSA said: "Yes, we have not been able to establish that the risks are acceptable, because there are gaps in the file." The permit responded: "Yes, of course there are gaps in the file, these are things I have never had to deliver so I did not do that." And then the conclusion of EFSA, and that has been taken over by the European Commission, is that there are gaps in the file and that therefore authorisations had to be withdrawn. And the manufacturer then said: "Come on, I have not*

been given the time and opportunity to respond to questions in this dossier. And it is not like you can just fly in those data in a few weeks' time." (Interview Nefyto)

***Backing #3.2*: Because, based on the bee guidance neonicotinoid substances are ascribed an unacceptable risk due to data gaps that result from unrealistic requirements for PPP producers. (Just Bayer and Nefyto)**

Bayer: *"The current restrictions on neonicotinoids stem from 2013 and they are based on an EFSA advice, and that advice came into being because EFSA utilised the Bee Guidance, as the thing is called. It is a prominent guidance within the bee debate. They are new guidelines for bee research. And in our view those guidelines are disproportionate. They are strongly theoretical which makes it impossible to comply in practice. That is not just the case for neonicotinoids, but for plant protection products in general. If you use that guidance on plant protection products you will conclude for nearly all of them that there are either knowledge gaps, or possible risks. EFSA is the risk assessor, but for the [European red.] Commission which is the risk manager, that could be reason to impose restrictions on the use of those substances. That happened in 2013 based on that Bee Guidance. Of which we say: "The bee guidance is a good idea, guidelines are necessary for bee research. But those guidelines should be realistic and feasible in practice."* (Interview Bayer)

Nefyto: *"And then the conclusion of EFSA, and that has been taken over by the European Commission, is that there are gaps in the file and that therefore authorisations had to be withdrawn. And the manufacturer then said: "Come on, I have not been given the time and opportunity to respond to questions in this dossier. And it is not like you can just fly in those data in a few weeks' time. And to give you an idea, one of the elements that was not in the other model and in the new model is what they call guttation [liquid excreted by plants]. […] Well, then Efsa then says: "I have no data about guttation. So, it could very well be that the plant protection products can be found in guttation. Bee is thirsty, bee thinks: "good water, I am going to drink it"; and is exposed too much. That was not in the dossier, it was never asked. That one of those elements that makes me think: "Can you reasonably expect Bayer to have looked into that?" Yeah, due to that sense of justice I just mentioned, I find that really difficult. That you are actually put away as an industry in this way without- The model has not been accredited, and you have hardly had the opportunity to provide the data within such a model. Yet, still a conclusion is drawn and the authorisation of that substance is withdrawn."* (Interview Nefyto)

Backing #3.3: **Because, there seems to be a double standard when it comes to the evidence that pesticide manufacturers have to provide to proof their product meets the standards for authorisation, and the proof opposing actors need to provide to call into question this authorisation. (Just Nefyto)**

The Nefyto spokesperson stated: *"The difficult part is, that authorisation research that manufacturers perform need to be GLP: Good Laboratory Practice. Much research that is done, also regarding bees, is not GLP. Those can draw conclusions. But it is unfair in a way that if a manufacturer wants something, it needs to be GLP, but if other parties want something, any level of quality in terms of laboratory research can be utilised. However, as an authorisation authority you should care about that. Or you should say: "Look, for an authorisation you need GLP, so for withdrawal of an authorisation you also need GLP. So, what is sauce for the goose is sauce for the gander."* (Interview Nefyto)

Warrant #4: Since a sudden ban on a PPP would harm incentive of companies to invest in innovative and more sustainable PPPs. (Just Nefyto)

"New substances are developed all the time, more and more sustainable, and with less and less risks, those types of things. But precisely for that reason it is important that a substance cannot suddenly be banned without any scientific foundation. Because for a company it costs a lot of money to develop a substance, so predictability [of the ability to get the substance on the market red.] is extremely important to maintain this influx of new sustainable substances. So that companies dare to take that step." (Interview Nefyto)

Warrant #5: Since the decision to ban neonicotinoids would be a political one, based on emotions rather than science. (Just Agrifirm, Bayer and Nefyto)

To the question what his perspective was on the plans at the European level to ban the use of neonicotinoid pesticides the Agrifirm spokesperson answered:

"If you make a very broad group [of pesticides red.] *disappear for political reasons, I think that is by definition a bad thing. You have to approach it scientifically. And as far as I know, there are lots of differences between one neonicotinoid and another. So, you just have to assess per substance: What is acceptable and what is not acceptable? And until now it was all acceptable. And then when you start being a bit stricter when it comes to the standards, part of the pesticides may be cut, and others will probably stay. But you have to do that scientifically, in a framework that measures harmfulness for bees, among other things. […] You just see that the neonicotinoid and glyphosate discussion don't have a basis in science, it is based on emotion. And that's what you get when politics gets involved. Those people [politicians red.] are not experts, that is not their field. And that is why politics and the government must ensure that there are independent experts and good people who can properly assess this. That's where it should go."* (Interview Agrifirm)

Bayer made a similar statement: *"Because, like the Commission said it: "We know that pesticide use is not the main reason that health of honey bees is in jeopardy." This was at the*

time of high winter mortality. But they also said: "We know that other factors are harder to influence. And pesticides we can regulate with a 'basic legal act'. So, that is what we are doing now because of the political pressure on the matter." And that is true. Beekeeper behaviour you cannot regulate with legislation. Ensuring that roadsides and ditch edges get more flower-rich, you cannot just regulate that. Let alone the weather. So, those are things that you cannot get a grip on so easily as a government. But with pesticides you can. Super easy. It also looks favourable in the public debate. Pesticides are 'bad' anyway. Environmental organisations know how to spin that. So, it is easy to place your attention there. But the problem is, you will not safe bees that way." (Interview Bayer)

Although the Nefyto spokespeople did not directly use this storyline in the interview, they communicated that they consider this to be their main argument and storyline against a neonicotinoid ban. (Broeders & Ottenheim, personal communication, 8 June 2018) News

***Claim*: Therefore, do not increase restrictions or ban neonicotinoid use on a European level, national level and/or supermarket level.**

Honey bees and wild bees: Competition or complementary?

This paragraph provides the quotes underpinning section 4.2.3.2.

Storylines Natuurmonumenten

Claim: For wild bees it is good to limit the amount of honey bee colonies in their nature areas to one on every hundred hectares.

Warrant #1: Research shows that honey bees compete with wild bees for the same food sources

"Well it starts with the fact that we need to position ourselves, because different bee keepers ask us: 'Can we station our beehives on your terrains?' And, as you know, ten years ago it was already clear that other flower-visiting insects that live of nectar and pollen are under serious pressure. And yeah, honey bees use the same [nectar and pollen red.] sources as butterflies, other species, hoverflies. And we see that in our areas that that is decreasing, both availability of flowers and biomass for wild bees and other flower-visitors. So that is how we are involved. […] I would be really happy if there would be hard evidence that honey bees and wild bees would, in any ratio, have zero influence on one another, that would make things much easier for us. In that case we would say: place your colonies here. However, research that we see makes us think: "There is a really high risk that there is competition going on, and that there are negative effects [on wild bees red.], so we have to be careful." (Interview Natuurmonumenten) Natuurmonumenten bases their policy on scientific literature reviews. Examples are the studies by Mallinger, Gaines-Day, and Gratton (2017) and by Wojcik et al. (2018). These papers conclude that a majority of reviewed studies on

the topic report that managed honey bees have a negative impact on wild bee populations. Natuurmonumenten follows the advice of these studies to be careful with honey bees in nature areas.

Warrant #2: Availability of flowers and biomass for wild bees and flower-visitors is decreasing
"And we see that in our areas that that is decreasing, both availability of flowers and biomass for wild bees and other flower-visitors." (Interview Natuurmonumenten)

Warrant #3: Many wild bee species are threatened; honey bees are not
Natuurmonumenten: *"It is questionable whether honey bees are native to the Netherlands, that really is a border case. It did not use to be the case, with climate change maybe it could just be possible that honey bees would be able to survive here. But if so, definitely not in the densities that you would get through bee keepers. So, that is why we are very restrained. The flower-visiting insects already have it hard. Because honey bees are not threatened, and we are not responsible for conserving the bee keeping practice. So, that is why we find it important to be careful about stationing honey bees [in our nature areas red.] […] If wild bees in the Netherlands were doing very well, we would have some more space to embrace bee keepers and permit them to station their colonies in our nature areas. But two thirds of the wild bees in the Netherlands are threatened. So, something definitely is up. And it may very well be that competition with honey bees is only the fifth threat, relative to other threats. But if not the not allowing [more honey bee colonies in the nature areas red.] is the thing that makes the difference between a species surviving or not surviving, we want to make sure that the species does survive. So, beekeepers are right, there are much larger problems, and we try to address those too. But we simply cannot take the risk that species disappear because of competition with honey bees that we permit access. That is simply something we do not want."* (Interview Natuurmonumenten)

Warrant #4: The association council of Natuurmonumenten fully endorsed the policy to limit the honey bee colonies that are allowed in the nature areas to one on every hundred hectares.
"Something that is relevant for the whole discussion is that we are an association with 700.000 members. Those 700.000 members are allowed to have a say in the policies of the association. And the association council has determined our stance on bees: That we take a careful stance regarding honey bees, that it is up to the manager of an area to determine whether honey bees are welcome at all, and that if bees are welcome not more than one colony for every hundred hectares. Unless you have massive amounts of gestation plants, common heather for example, you can place more colonies. But even then, never more than four on every hundred hectares. Those types of guidelines. Our association has completely endorsed that. So, five percent of Dutch citizens agrees on that. And for us, yeah, the association council makes that we feel very comfortable with continuing on that track. If the

association council agrees with us, and decides that, it is not something that a few people just cooked up casually." (Interview Natuurmonumenten)

Warrant #5: Formulas of Natuurmonumenten to determine how many honey bee colonies they allow in their nature areas is a good solution.

Province of Overijssel:
"There is always a bit of tension. Because the nature conservationists say: "The honey bee just supresses wild bees." If you station beehives in areas for honey bees to forage, wild bees can no longer forage there. It is as simple as that. On the other hand, the beekeepers say: "Maybe that is true, but exactly because so many people are busy with honey bees, with the care for our landscape, also municipalities and other organisations, more gestation plants become available which is, in the end, benefits wild bees. Because those hives are not there year-round. In some places they are, but in most areas, they are moved around a bit. So, those are very different perspectives. And both have merit, that is my view. Of course, you should not place hives in places where wild bees and insects in general are doing very poorly. But, place them in more suitable areas. So, you need to think carefully about that. You cannot do that mindlessly. I have talked about this with Natuurmonumenten at one point. They actually have policy for this. If a beekeeper requests to station hives, they use a formula to determine how many hives are allowed on a certain number of hectares. That was you maintain the connection with beekeepers, but wild bees are not completely suppressed, because you want to conserve those. I think that is a wonderful solution. The same with beekeepers that ensure the planting of willows or almond willows. That is really great for the wild bees, I think that is really fantastic. Because the honey bees are not always there, so wild bees benefit as well. In general, it is good for biodiversity in the landscape." (Interview Province of Overijssel)

Storylines Beekeepers

Claim: Landowners should allow more honey bee colonies to be stationed on their lands.
Although this claim is never literally made in the storylines, it is heavily implied by the following warrants.

Warrant #1: It is difficult for beekeepers to find areas with sufficient food sources for their honey bee colonies.

"We run into a lot of resistance in that regard. We have a huge need for food sources for bees. So, we would love to go to locations of Natuurmonumenten, Staatsbosbeheer [manages nature areas on behalf of the government red.], the water boards, Prorail [railway company red.], or landowners. That is often difficult. I can imagine that someone who has a hobby, and in general a hobby beekeeper manages five colonies, that if you call Staatsbosbeheer and say: "I am a hobby beekeeper and I would like a spot to place four or

five hives" it might not be a problem. But if I, or one of my colleagues calls with the question: "I've got twenty, twenty-five, thirty hives", that is, of course, a different story. And I get that. But that is a major difficulty, to get access to those areas. And then again there is the issue of the diversity of all those areas. So, that is difficult." (Interview BVNI)

"There is also some debate with Natuurmonumenten and Staatsbosbeheer, but they have a very different perspective. Because they think that the honey bee suppresses solitary bees. So, the honey bee is no longer welcome in those nature areas. Unless the organisation says: "Okay, I can allow it, but you cannot place hundreds of beehives in a row. I want a limited amount of bee colonies per hectare. […] NBV finds that difficult." (Interview NBV)

Warrant #2: Wild bees are not suppressed by honey bees

[With diversity of the area I mean red.] the biodiversity of the food sources. Because those wild bees, very often with a preference for a particular flower species, they will manage. I do not believe at all that they are suppressed by honey bees. You know, I believe those work really well together. There is a professional colleague, he was stationed in a nature area for years with his honey bees, and then the discussion arose: "Do honey bees suppress wild bees?" And he had to leave. So, he left. I believe a year and a half, or two years later, he was asked to come back, because they established that biodiversity was actually declining in that area when the honey bees were gone. Because those honey bees are, of course, very good pollinators. So, the wild bees benefitted from that as well, because due to the pollination of honey bees, plants species did well and because of that wild bees and butterflies could thrive. So, they returned. Which is why I think: "That is a good example." You see that they can definitely complement one another. And now it is framed like it is contradictory [to have both wild bees and honey bees in the same area red.], over-ruling, but that is not the case." (Interview BVNI)

Warrant #3: It is unclear how much competition takes place between honey bees and wild bees.

NBV: *"It is true that a few years ago there was some type of assessment was done, this is a while ago, maybe fifteen years ago already. But solitary bees have a very different lifecycle [from honey bees red.], much shorter. And if you look at the solitary bee, some of them you only see in March and April, and others in a different period. And often they prefer one particular flower species, which is not always a suitable food source for honey bees. So, to me, it is not clear how big that competition actually is. But I can imagine, as a beekeeper you know that if you place hundreds of colonies next to each other on a piece of heather, the resources are spread thin for everybody, also for beekeepers. Having a discussion about that is something that I personally think is very good. But we should not do that based on emotion, and emotion is there on both sides. And I find that a bit difficult."* (Interview NBV)

Appendix V: Preconditions for Negotiation

In the third analytical step of this thesis the preconditions for negotiation and integrative negotiation were tested for the key stakeholders in two conflicts that were identified in the discourse analysis. Namely the conflict regarding neonicotinoids and the conflict regarding competition for food sources between wild bees and honey bees. The two paragraphs of this appendix provide an overview of the reasoning and data that underpins table 4 and table 5 which were displayed in paragraph 4.3 of this thesis. These tables show the results of the third analytical step and answer the third main research question of this thesis: *Would integrative negotiation be a suitable conflict resolution strategy for the conflicts that can be identified in debate regarding causes and solutions for the bee mortality issue in the Netherlands?*

Neonicotinoid conflict

Based on the information collected in the stakeholder analysis, key stakeholders in this conflict are:

LTO: Has, out of all stakeholders, the highest outcome power when it comes to pesticide use. Also has a strong interest in maintaining the neonicotinoid authorisation.

Bayer and Nefyto: Have a strong interest in maintaining the neonicotinoid authorisations dependence on authorisations of neonicotinoids and are socially powerful.

Greenpeace: Has a strong interest in the issue and is the most socially powerful proponent of a neonicotinoid ban.

Table 4 Overview of the presence of preconditions for successful negotiation and successful integrative negotiation in involved stakeholders. The O signifies the presence of the precondition in a stakeholder, the X signifies a lack of this precondition in a stakeholder, O/X signifies that the precondition is partially present (for example only with respect to a certain stakeholder)

		LTO	Bayer	Nefyto	Greenpeace
Negotiation	Perceive probability of obtaining conflict goals through other strategies (increasingly) unlikely	O	O	O	X
	Relative costs of conflict goals pursuit increase relative to conflict goal value	X	X	X	X
	Areas of common ground and compatible interests exist between stakeholders	O	X	X	O/X
	Leadership flexible enough to consider negotiation	O	O	O	O/X
Integrative Negotiation	Belief in validity and importance of positions other stakeholders	O	X/O	X/O	X
	Motivation and commitment to work together	O			O/X

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The following sections will provide a more detailed explanation of the content of table 4. Each section covers one of the preconditions.

Probability of obtaining conflict goals through other strategies than problem solving
When analysing how these stakeholders perceive the probability of obtaining their conflict goal through strategies other than problem solving (or compromising), a couple of factors need to be understood.

Firstly, what are the conflict goals of stakeholders involved? From paragraph 4.2.1 and 4.2.3 it has become clear that there are two sides in this conflict with opposing conflict goals. The conflict goal of Greenpeace and Natuurmonumenten is, ultimately, to ensure that neonicotinoids are no longer used by farmers or other land managers in the Netherlands. (Interview Greenpeace; Natuurmonumenten) The conflict goal of LTO is to ensure that farmers continue to have access to crop protection substances that are necessary to realise a profitable yield. Since they perceive neonicotinoid pesticides to be irreplaceable for certain crops at this time, that includes neonicotinoids. (Interview LTO) Lastly, the conflict goal of Nefyto and Bayer is to protect the authorisations of their (or their member's) neonicotinoid products. (Interview Bayer; Nefyto)

Secondly, what conflict strategies are the stakeholders assuming? The contending storylines that were described in paragraph 4.2.1 and 4.2.3, and which are to a large extend used by the stakeholders in public media (e.g. Wiepkema (2017) and Bouma (2015)), show that all stakeholders are using a contending strategy.

Lastly, is it increasingly unlikely for stakeholders to obtain their conflict goals through this contending strategy? This differs for the respective stakeholders. The short answer is that the contending strategy is increasingly likely to: (1) have positive results for the conflict goal of Greenpeace and Natuurmonumenten; (2) have negative results for the conflict goals of LTO, Nefyto and Bayer. This becomes evident through the shift in the dominant discourse at the Dutch national level and at the EC level. The following overview of statements by relevant ministers between 2010 and 2018 illustrate this point.

Minister Gerda Verburg stated in 2010 there was: *"no reason for a moratorium"* (Verburg 2010, 5) Henk Bleker, who was minister in 2012, stated in response to MPs that questioned the authorisations of neonicotinoid substances based on two new studies: *"With help of the reaction of CTGB I conclude that both articles do not shine a new light on previously executed assessments of the group of substances based on neonicotinoids".* (Bleker 2012, 1) In 2013 the European Commission restricted the use of three neonicotinoid substances. (European Commission 2013) This decision was supported by minister at the time Sharon Dijksma, who stated: *"The Netherlands supported this proposal by the European Commission."* (Dijksma 2013, 2) In 2018 the European Commission imposed even stronger restrictions. The draft

proposal in 2017 was supported by minister Martijn van Dam, who wrote: *"Based on the findings of EFSA I am of the opinion that action within Europe is required regarding risky applications of the three neonicotinoids imidacloprid, clothianidin and thiamethoxam and therefore support the proposals of the EC. Despite EFSA having used a non-approved assessment framework, I think the findings justify European action."* (Van Dam 2017, 4) Carola Schouten, who took office as minister after the Dutch elections in 2017, endorsed the EC proposal in 2018: *"The findings of EFSA and CTGB suggest that the conditions of approval of the three neonicotinoids imidacloprid, clothianidin and thiamethoxam need to be tightened. Therefore, I will support the proposals of the EC."* (Schouten 2018, 3–4)

The current dominance of their discourse at the decision-making level indicates that the contending strategy Greenpeace is working in its favour. After all, the current strategy is getting them to their conflict goal. Whereas LTO, Nefyto and Bayer may be more open to making a shift to the problem solution strategy since the dominant discourse both at the Dutch national level as at the EU level shifts further away from their own.

Taking into account the previous points, it can be concluded that this first precondition cannot be met.

The relative costs of pursuing the conflict goals is increasing relative to the value of the conflict goals

Whether this second precondition is prevalent is difficult to proof. This has to do with the fact that data regarding the costs that are made by each stakeholder to pursue the conflict goal are not publicly available. Also, the value of obtaining the conflict goal is, for some stakeholders, difficult to estimate. In the following text a rough estimation will be made.

The costs of pursuing the conflict for LTO are most likely outweighed by the value of the conflict goals. This has to do with the lack of suitable alternatives to neonicotinoid pesticides in the Dutch apple, maize, sugar beet, oilseed rape, seed potatoes, grass seed, hop, and uncovered flower bulb cultivation. Thus, a total ban on neonicotinoids would economically impact growers of these crops. (Allema et al. 2017; NVWA 2017)

Because detailed sales figures regarding the neonicotinoid products of Bayer are not publicly available due to competition considerations, it is difficult to estimate what the economic impact of a neonicotinoid ban would be on the Bayer revenue. Sales figures of 2009 show that the annual turnover of Bayer's imidacloprid (a neonicotinoid pesticide) ranked as the highest in the world, valued at US $1.09 billion. (Simon-Delso et al. 2015) Although these numbers are dated and do not reflect the value of the substance at the Dutch or European market at this time, it does indicate that a ban on neonicotinoids would cost Bayer the revenue of one of their best-selling pesticides.

Based on Greenpeace's success in the pursuit of their conflict goal, as indicated in the previous section, it is unlikely that the costs of this pursuit outweigh the benefits. Perhaps more importantly, for Greenpeace the pursuit of the conflict goal is beneficial for brand awareness.

To sum up, for all of the stakeholders the value of the conflict goal outweighs the conflict costs. Thus, the precondition is not met.

Areas of common ground and compatible interests exist between the stakeholders
In paragraph 4.2.2 it became clear that, in the broader debate surrounding bee decline areas of common ground can be identified among all stakeholders, particularly in terms of promoting biodiversity and knowledge creation. However, when it comes to the issue of neonicotinoids, and pesticide use in general, the perceived interests of the involved stakeholders are incompatible.

The LTO and Greenpeace spokespeople mentioned themselves that their long-term goal for the Dutch agriculture system do align for the most part. (Interview LTO; Greenpeace) However, they disagree on the details of how that goal should be reached. (Interview Greenpeace)

Apart from the interests that relate to the content of the conflict and ideologies of the organisations, stakeholders have a strong interest in keeping their members and supporters satisfied. It is not in the interest of stakeholders to upset their members or donors by making deals with 'the other side'. This was explained by LTO in the following manner: *"But in the end, you will always be confronted with the fact that NGO's have members as well and, just to be blunt, if Greenpeace says: "LTO, absolutely great, you guys are doing marvellously and we don't talk about it anymore", tomorrow half their members would terminate their membership, that is their nature. Just like it would be our nature that we would rub our grassroots support the wrong way if we would say: "Greenpeace, you have a world campaign on your hands here.* [Referring to the campaign save the bee, make the supermarket poison free red.] *Keep going strong!' It does not fit. But that does not mean that we cannot be in conversation with one another regularly. And that is the case for all stakeholders."* (Interview LTO)

Therefore, this precondition is not met.

Leadership flexible enough to consider negotiation
Whether stakeholders consider negotiation depends on the other potential negotiator. Greenpeace for example, would not likely engage in a negotiation with Bayer or Syngenta: *"it is not likely you will see us around the table with Bayer or Monsanto themselves, because we don't believe we will be able to cover much ground with that approach. Because their*

business model is selling substances that are bad for, for example, bees. That is their core business." (Interview Greenpeace) However, according to the LTO spokesperson, Greenpeace has engaged in a negotiation with LTO in the past (albeit an unsuccessful one): "*It was Greenpeace that, admittedly on page 3 of the entire press release, argued that precursors [in sustainable farming practices red.] should be rewarded by supermarkets. That is something we had a conversation about with each other: "Could we use each other to get a step further?". That did not work out in the end. But those are things that make me think: "Those are things you can help each other out with." So, you need to look at 'what unites us' rather than 'what divides us'" (*Interview LTO) Considering the previous preconditions, however, it seems unlikely that Greenpeace would also be willing to engage in a negotiation with LTO regarding the neonicotinoid issue.

Nefyto states in its mission statement that: "*Nefyto is open for dialogue regarding views, values and beliefs"* (Nefyto 2011) Which implies that Nefyto would be open to conversation, and possibly in negotiation.

The above indicates that this precondition can potentially be met for LTO and Greenpeace. However, it has not been met for the combination of Greenpeace and Nefyto.

Belief in validity and importance positions of other stakeholders
The stakeholders differ in their views on the validity of other stakeholders' positions.

LTO stated: *"Look, an NGO such as Greenpeace wants to get rid of crop protection, because they want to move towards organic agriculture. And there are many reasons behind that, and part of those are legitimate. It is their right to advocate that."* (Interview LTO)
Which clearly establishes that LTO views Greenpeace's views as partially valid.

Greenpeace does not really believe in the validity of most of the positions used by the other key stakeholders. The quotes from the stakeholder interview establish that Greenpeace has a strong belief in an agriculture system without use of chemical pesticides. The positions of Bayer and Nefyto on for example sustainable use of pesticides is not something that Greenpeace views as valid. Partially because Greenpeace seems to distrust the intentions of the pesticide industry. The quote "*Because their business model is selling substances that are bad for, for example, bees. That is their core business."* (Interview Greenpeace), captures that. Greenpeace is not as distrustful of LTO since Greenpeace also believes it to be in the interest of farmers to does seem to believe some of LTOs positions to be valid. For example, However,

Although Bayer and Nefyto are open for conversation with stakeholders that have other ideas, they do not appear to see Greenpeace's positions with regard to pesticides as valid or important. Nefyto for example mentioned: *"You cannot see that as separate from existing*

sentiments about multinationals. The big multinational that kills the poor bees. […] Unless you are already considered wrong as a company just for bringing pesticides onto the market. Because that is what it seems to be the issue sometimes. That that is a phenomenon in itself that you need to be against." (Interview Nefyto)

Motivation and commitment to work together

Greenpeace does not believe that negotiating or collaborating with the pesticide industry will be a meaningful way to spend their time and resources. They believe it is not in the pesticide industries' interest to make a significant contribution to changing the current agriculture system, which Greenpeace deems necessary for a more bee friendly environment in the Netherlands. The spokesperson stated: *"it is not likely you will see us around the table with Bayer or Monsanto themselves, because we don't believe we will be able to cover much ground with that approach. Because their business model is selling substances that are bad for, for example, bees. That is their core business."* (Interview Greenpeace)

The spokesperson of LTO described an instance when LTO and Greenpeace were making an attempt to work together: *"You can flesh out different ways to do that. But in the end, it was Greenpeace that, admittedly on page 3 of the entire press release, argued that precursors [in sustainable farming practices red.] should be rewarded by supermarkets. That is something we had a conversation about with each other: "Could we use each other to get a step further?". That did not work out in the end. But those are things that make me think: "Those are things you can help each other out with." So, you need to look at 'what unites us' rather than 'what divides us'" (*Interview LTO)

Thus: Preconditions for a successful negotiation as well as preconditions for a successful integrative negotiation are not present in this conflict area. Other possible solutions, such as joint fact finding to bridge knowledge gaps are not likely to happen due to the fundamental differences, and unwillingness of some stakeholders to work together, but could be explored. Third party intervention that imposes solution seems.

Table 5 Overview of the presence of preconditions for successful negotiation and successful integrative negotiation in key stakeholders in the 'competition between wild bees and honey bees' conflict. The O signifies the presence of the precondition in a stakeholder, the X signifies a lack of this precondition in a stakeholder, O/X signifies that the precondition is partially present (for example only with respect to a certain stakeholder)

		Natuurmonumenten	BVNI	NBV
Negotiation	Perceive probability of obtaining conflict goals through other strategies (increasingly) unlikely	X	O	O
	Relative costs of conflict goals pursuit increase relative to conflict goal value	x	x	x
	Areas of common ground and compatible interests exist between stakeholders	O	O	O
	Leadership flexible enough to consider negotiation	x	O	O
Integrative Negotiation	Belief in validity and importance of positions other stakeholders	x	x	x
	Motivation and commitment to work together	O	O	O

Perceived probability of obtaining conflict goals through other strategies then problem solving

Based on the storylines that were analysed in paragraph 4.2.3.2, the conflict goal of Natuurmonumenten is to maintain the policy in which they limit the amount of honey bee colonies they allow in their nature areas to one per hundred hectares. The conflict goal of BVNI and NBV seemingly is to gain access to more flower-rich and biodiverse areas, the Natuurmonumenten nature areas among them, with their bee colonies.

All key stakeholders have a high concern for own outcome, and varying concerns for the outcome of the opposing party. The current strategy of BVNI and NBV can be seen as contending, as they dispute the notion that honey bees can suppress wild bees in their storylines. This contending strategy is not bringing them closer to their conflict goal thus far. It is relevant to note that in this particular situation, there is an asymmetrical power dynamic, since Natuurmonumenten is the owner of their nature areas. Therefore, Natuurmonumenten has the power and right to decide whether they are willing to allow bee keepers to place their bee colonies in their nature areas. Natuurmonumenten is not

necessarily dependent on beekeepers, which makes the power dynamic in the context of this particular conflict lopsided. It also means that Natuurmonumenten already reached its conflict goal. The conflict strategy of Natuurmonumenten can be considered to be contending, since they display a high concern for self and a low concern for the other by stating: *"It is not Natuurmonumentens task to support beekeepers."* (Interview Natuurmonumenten) That said, the current policy does not entail a complete ban of honey bee hives within the nature areas, it allows one honey bee colony on every hundred hectares. This can be considered a compromise or even a problem solution strategy in which Natuurmonumenten took into consideration the interest of beekeepers to the extent that they considered unharmful for their own interest.

Therefore, this precondition is not met.

The relative costs of conflict goal pursuit are increasing relative to the conflict goal value
For neither of the key stakeholder the pursuit of the conflict goal seems very costly. Natuurmonumenten can continue to uphold their policy without any costs. There is also no indication that BVNI or NBV are making costs with their contending strategy, as this strategy mostly entails using some contending storylines.

Therefore, this precondition is not met.

Areas of common ground and compatible interests exists between stakeholders
Both Natuurmonumenten and the beekeeper associations are aware of their shared interests when it comes to promoting the development of more biodiverse and flower-rich areas in the Netherlands. (Van Steenis, personal communication, 8 June 2018; Interview BVNI)

This conflict can be considered a symptom of a resource scarcity, in this case gestation plants. Thus, the key stakeholders in this conflict have a shared interest in ensuring the increase of that resource.

Therefore, this precondition is met.

Leadership flexible enough to consider negotiation
In general, it is unlikely that stakeholder leaderships would object to cooperation and even negotiation when it comes to increasing biodiversity and gestation plants. However, it is highly unlikely that Natuurmonumenten is open to negotiate about their access limitation policy for honey bees. The reason for this is that the association council, which represents the 700.000 members of Natuurmonumenten, has fully endorsed the policy. (Interview Natuurmonumenten) If Natuurmonumenten would consider negotiating with beekeepers to

change this policy, they would have to justify this toward the association council. However, even that consideration would be unlikely due to the scientific basis for the policy.

Therefore, this precondition is not met.

Belief in the validity and importance of the positions of other stakeholders
In the context of the debate regarding whether or not wild bees and honey bees compete for food sources, none of the key stakeholders seems to perceive positions of the opposing party to be valid. (Interview Natuurmonumenten; BVNI; NBV) This became clear from the opposing storylines in this conflict that were explained in Appendix IV.

Therefore, this precondition is not met.

Motivation and commitment to work together
The Natuurmonumenten ecologist has expressed that Natuurmonumenten would be happy to collaborate with beekeepers to realise shared goals. (Van Steenis, personal communication, 8 June 2018)

BVNI and NBV have not specifically expressed that they want to cooperate with Natuurmonumenten, however, mainly BVNI has explained how he understands how promoting the increase of biodiverse and flower-rich areas for wild bees, also benefits beekeepers and their honey bees. (Interview BVNI)

Therefore, this precondition is met.

Appendix VI: Interview guide

List of topic areas

Power
Interests
Conflict
Cause
Solution
Desirable measures
Identifying other stakeholders
Concern for others

Topic area	Example question
Outcome power Social power	1. How would you describe the role of [organisation] in addressing the bee decline issue in the Netherlands?
Interest	2. Why does [organisation] find it important to be involved in mitigating bee decline in the Netherlands?
Interests Outcome power Social power	3. In what manner does [organisation] get involved in maintaining health of bee populations in the Netherlands?
Perspective	4. What are, in your perspective, the most important challenges for addressing bee decline in the Netherlands?
Interests	5. Does [organisation] consider the bee issues as a shared problem?
Identifying stakeholders Power Cause	6. Which other actors are important in addressing bee decline in the Netherlands?
Conflict	7. What are, in the perspective of [organisation] the most important controversies in terms of pollinator policy or management in the Netherlands?
Concern for others Interests	8. Does [Organisation] attempt to get some insight into the reasons behind the behaviour of other actors that is not in line with the vision of [organisation] with regard to how bees are dealt with?
Interests Cause Solution Desirable measures	9. What would the ideal bee policy or bee management look like according to [Organisation]?
Cause	10. What are, in your perspective, the most important obstacles for effective bee policy in the Netherlands at this moment?
Solution	11. How does [Organisation] think those obstacles can be overcome?