The Dutch Long-Term Crop Protection Plan in the 1990s and Its Potential Impact on European Pesticide Reduction Policies

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Abstract

The Dutch pesticide reduction policy process in the 1990s has largely been unexplored from a social perspective, in that little to no data exists on how various stakeholders framed their strategies; how they described the policy process; and how they perceived the results. This research takes up this challenge by conducting a retrospective analysis of the significant strategies, actions, and power structures that emerged during the Dutch pesticide reduction policy process in the 1990s. It was hoped, at the outset, that such an analysis of approaches previously taken and the lessons learned during this Dutch process could significantly contribute to the development and implementation of the European Farm to Fork Strategy. Therefore, a document analysis was carried out and 17 semi-structured interviews were conducted with ministers, scientists, advocates, and advisors. The qualitative analysis demonstrated that the initial hypothesis, that is, that the Dutch pesticide reduction process in the 1990s could provide critical insights and lessons that need to be taken into account when current European pesticide reduction policies are being drafted can be rejected.

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1 Problem statement

The European Green Deal is an action plan that demonstrates the European Union's (EU's) commitment to tackle climate-change-related and environmental challenges, in that it aims to reformulate current policies and strategies related to the economies of its Member States in order to make them climate-neutral, sustainable, protective of the environment, and resource-efficient by 2050. This new deal is quite radical, in that it seeks nothing less than to restructure many economic activities, such as agriculture and industry, to make them "greener" and less damaging to the environment, to human society, and to human health. As the EU Commission (2019) has stated: "It is a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy" (p.2). In order to realise this goal, the EU has formulated radical proposals that seek to alter current human behaviours and agricultural and corporate practices.

One such policy that forms part of the EU's efforts to achieve sustainability is the Farm to Fork Strategy, a component at the very centre of the European Green Deal; this strategy takes a comprehensive and an environmentally friendly approach to the transition towards a sustainable food system. Its goals are manifold: to reduce the emission of greenhouse gasses; to support biodiversity; to reduce pesticide use, the manufacture of which is a significant contributor to greenhouse gas emissions (Audsley et al., 2009); to guarantee food security; to enhance nutrition and public health; and to support the affordability of food while generating fair economic returns (EU, 2020a). In order to achieve these goals and ensure that the EU food chain becomes fair, healthy, resilient, and sustainable, the Commission is in the process of drafting a legislative proposal for a framework that will implement a sustainable food system. A critical component of this proposal is the reduction of chemical pesticide usage with its accompanying risks, which include soil, water, and air pollution; loss of biodiversity; and damage to non-target plants, insects, birds, mammals, and amphibians (European Commission, 2020b). The Commission wants to reduce the use and risks of chemical pesticides by 50% by 2030.

For a pan-European policy supporting these initiatives to be successful and for all Member States to willingly come on board, the involvement and collaboration between all stakeholders in policy development are of essential importance in order to guarantee a high level of acceptance and willingness to obey the policies (Barzman & Dachbrodt-Saaydeh, 2011). Such collaboration is especially relevant in terms of pesticide reduction policies that have such a huge impact on the

entire agri-food sector. The Commission, therefore, considers it important that the structural changes that are needed to develop the desired sustainable food production system are brought about through just and inclusive collaboration between all the parties concerned. This necessitates that everyone—citizens; national, regional, and local authorities; civil society; industry, particularly the agricultural industry; and the EU's institutions and consultative bodies—work closely together in order to collectively take actions for all sectors (European Commission, 2019).

For such a radical transformation of the agricultural industry to take place, it is considered critical that the EU adopt a two-pronged approach. Firstly, after an effective consultative process, it needs to formulate an effective framework for creating a sustainable food system that radically reduces greenhouse emissions. Secondly, it needs to adopt mechanisms for implementation that guarantee successful collaboration and inclusive consultation; the representation of all stakeholders; and the willingness by all Member States to work together to achieve cooperation across the board.

It is in the context of all of the above that the question can be raised as to whether the Dutch are able to make a unique contribution to this process, in that they began to examine the fundamentals underpinning their agriculture production and their agricultural industry in the 1990's. During the last decade of the 20th century, the Dutch drafted the Long-Term Crop Protection Plan (*Meerjarenplan Gewasbescherming* or MJPG), which aimed to reduce the use of and dependence on pesticides, with a view to limiting greenhouse gas emissions (Oskam et al., 1992). The principal goal of this plan was to reduce the overall volume of pesticide use by 50% by 2000, relative to the reference period of 1984 to 1988. It would appear that Dutch efforts were successful: "The target was quickly reached without adversely affecting yields, in large part resulting from an 85% volume reduction in nematicide soil disinfectants" (Barzman & Dachbrodt-Saaydeh, 2011, p.67).

Previous work has analysed pesticide use and the pesticide reduction policy in the Netherlands in the 1990s from an environmental, agricultural, technical, and/or economic standpoint. In these studies, the main attention was given to providing solutions for the problem of high pesticide usage and its intensive application in the Dutch agricultural sector; some of these solutions involved developing environmentally friendly production systems (Ammerlan, 1995); researching the effect and compliance with buffer zones (De Snoo & De Wit, 1998); and investigating the efficacy of economic instruments which regulated pesticide use (Oskman et al., 1992). However, further study and documentation of the Dutch pesticide policy process in the 1990s needed to be conducted because these investigations did not examine how various stakeholders framed their arguments

nor the subsequent actions, strategies, and tactics that emerged from that framing. In addition, little data exists describing the relative effectiveness of the different policy strategies and instruments implemented at that time. In other words, the Dutch pesticide reduction policies formulated and implemented in the 1990s are largely unexplored from a social science perspective. This research took up this challenge by conducting a retrospective analysis of the significant strategies, actions, and power relations structures that emerged during that period. It was hoped that, by doing so, an analysis of approaches previously taken and the lessons learned during this Dutch process could provide critical insights that would significantly contribute to the development and implementation of the Farm to Fork Strategy. A key outcome of this investigation would indicate whether the Dutch approach to pesticide reduction in the 1990s was transferable across the European Continent.

2 Theoretical framework

The introduction above established the fact that, although research on Dutch pesticide reduction policies has been conducted for over 25 years (Lee et al., 2019), these studies are incomplete because they do not provide insights into critical aspects, such as policy strategies, actions, and instruments that were implemented at that time. In addition, previous analyses did not investigate concrete aspects of Dutch pesticide policies and whether and to what extent these policies were effective "on the ground". In that context, this study developed a framework for researching all that made these strategies effective. Therefore, this chapter introduces and describes public and private policy instruments; the concept of policy networks and their use of framing to influence policy processes; and the situational and contextual factors that influenced the extent to which certain frames became dominant, thus impacting the implementation of the strategies and decisions that grew out this process.

2.1 Characteristics of policy instruments

In order to measure whether and to what extent a policy instrument actually contributes to reaching a policy objective, a definition and explanation of the word "effectiveness" was initially formulated. In this study, effectiveness was defined as "the capability of a policy instrument to achieve the outcome of a degree of farm reduction of conventional pesticide use, whether or not due to the utilisation of alternative methods to protect their crops from pests and diseases" (Lee et al., 2019, p.2). In this case, the term "conventional pesticides" refers to all active ingredients that are synthetically produced to reduce, prevent, or destroy pests (EPA, 2020) and the word "reduction" in terms of pesticide use is applied to indicate the general progression made by the policy instrument to reach the policy objective.

To achieve effectiveness, public and private policy instruments should be crafted and applied in a manner that takes into account the situation in which they have to be implemented. Policy instruments are often referred to as effecting tools of the government, and have the aim of influencing and even altering the behaviour of actors (Mees et al., 2014). In this context, a policy instrument is defined as "a deliberate structured effort by governors to solve a policy problem by modifying actions of the governed" (Brukas & Sallnäs, 2012, p.606). Various scholars who have conducted research on policy instruments often use the parsimonious trichotomy of regulatory, economic, and informational instruments to classify policy instruments (Mees et al., 2014; Vedung, 1998; Brukas & Sallnäs, 2012). Each of these three policy instrument types "is based on a different

rationale regarding the way actors are steered: by restricting or allowing behavioral options (legal instruments), by changing the cost-to-benefit ratios of these options (economic instruments), or by informing about options (communication instruments)" (Mees et al., 2014, p.58).

In this study, however, a more comprehensive, elaborate, and meticulous classification and characterisation of policy instruments has been applied in order to analyse which policy instruments contributed to pesticide reduction in the Netherlands during the last decade of the 20th century. Based on an extensive literature study, Lee et al. (2019) identified five characteristics that constitute a policy instrument: the aim of the instrument; spatial orientation; the actors involved; the key strategy that has been adopted; and implementation. These five characteristics may either promote or hinder the effectiveness of the instrument to reduce pesticide use.

The first characteristic, the objective of the instrument or the instrument's desired outcome, needs to be clear and realistically articulated because this supports the concretisation of the policy objectives, and subsequently assists policy resources to be steered towards the attainment of a particular goal (Howlett, 2009; Hettiarachchi & Kshourad, 2019). The second characteristic that facilitates or hinders a policy instrument is its spatial orientation. The larger the geographical scope of the instrument, the greater the spatial diversity. However, it should be noted that spatial diversity can occur even within regions, districts, or communities (Mees et al., 2014). This means that the policy instrument needs to achieve social acceptance across this heterogeneous landscape in order for it to be successful (Lee et al., 2019). The third characteristic is related to who is involved in the process of formulating and implementing a policy instrument. Policy instruments are often formulated and implemented in a dynamic context, where a broad network of stakeholders interact with each other at multiple levels (Driessen et al., 2012). These actors can be politicians; entrepreneurs; trade unions; environmental and nature conservation groups; societal organisations; citizens; and scientists who/which all have differing interests or visions that tend to cluster over time into preferred sets of instruments (Howlett, 2009; Driessen et al., 2012).

The fourth characteristic, the key strategy, refers to the resources that are utilised to generate behavioural change. In relation to environmental issues, there are four strategies commonly identified within governance: these are described as regulatory, organisational, economic, and informative (Lee et al., 2019). The first strategy, which involves regulatory resources, "utilise[s] authority from government legal power and other obligatory mechanisms to restrict or permit certain behaviours" (Lee et al., 2019, p.2). Organisational tools, the second strategy, have as their

main objective the generation of structural changes in the way in which an organisation operates in order to alter its existing procedures, routines, and structures (Runhaar, 2016). The third, involving economic resources, can bring about behavioural change through the provision of incentives (promoting or encouraging certain actions) or disincentives (discouraging or restraining certain actions) (Borrás & Edquist, 2013). Fourthly, information resources make use of communicative and knowledge tools to alter societal behaviour (Lee et al., 2019). Finally, the last characteristic is instrument implementation, which refers to "whether the instrument is applied singularly, in conjunction with another instrument and the time frame for which it is applied" (Lee et al., 2019, p.2). It is generally understood that the application of a single policy instrument achieves less effective results than a mix of policy instruments that are implemented in a coherent, congruent, and convergent manner (Howlett, 2009).

This study used the more comprehensive and detailed framework put forward by Lee et al (2019) for an analysis of instrument effectiveness in order to examine the policy instruments presented in the MJPG. In other words, the MJPG policy instruments were evaluated on the basis of four of the five characteristics that are beneficial for pesticide use reduction.

2.2 Makers and shapers: Placing actors on the agenda

In order to fully comprehend the national formulation, implementation, and effectiveness of pesticide reduction policy instruments in the Netherlands in the 1990s, it is important to note that policy-making is not a rational, linear process that follows a standard procedure. In other words, it does not consist of a sequence of stages that progresses in a logical order: It does not move from problem emergence to policy formulation to decision-making to implementation to evaluation of outcomes. This rational, technical view of policy-making tends to focus on the determinate decisions made by policy-makers, which obscures "the management of uncertainty and the politics of interactions between different agents, positions and interests in the shaping of policy in practice" (Brock et al., 2001, p.3). Therefore, an approach to this research should be adopted that highlights the continually changing dynamics of stakeholder participation in pesticide reduction policies. Such an approach focuses on the wide variety of policy networks and communities that are involved in the policy formulation and implementation processes and that shape these processes by negotiation and contestation (Brock et al., 2001). A policy community is founded when a group of state and/or societal actors, who share specific interests and resources, are dependent on each other to reach their goals (Fawcett & Daugbjerg, 2012; Howlett, 2002). The concept of a policy

network/community provides a theoretical framework enabling an analysis to take place as to why certain perspectives or views of pesticide reduction achieve credibility and legitimacy, and to study which policy communities or policy entrepreneurs are able to open up policy spaces to contest the main, existing dogmas, to shift the focus of the policy debate, and to "reconfigure the relationships between actors" (Brock et al., 2001, p.7). In other words, putting policy networks into the picture can provide insights into the strategies, actions, and tactics various actors employ in order to shape policy processes and policy outcomes.

This line of argument is supported by the work of Keeley and Scoones (2003), which demonstrates that policy change occurs when a network of actors expressing an interest in alternative perspectives in relation to a certain subject matter successfully pursue various strategies in order to shift the policy agenda. This process of presenting alternative options for dealing with a social problem, together with bargaining and negotiating with other parties for selection of these alternatives, make and shape the policy agenda. These alternative options that are utilised to approach and deal with policy problems become institutionalised (Fawcett & Daugbjerg, 2012). As Rhodes states, "[E]ach policy community [...] has, in fact, an agenda of 'relevant' issues and problems. Only some matters will be deemed appropriate ones for decision" (1981, p.122). In addition, the way in which a policy community approaches a problem is based on "established routines of contact, shared perceptions and values, and the stock of tried knowledge and policies", which are applied to solve this problem (Rhodes, 1981, p. 118). Power is thus exercised through this network of actors and therefore is, according to Smith, structural. He states that "policy outputs [...] are the result of actors within structural locations making choices from a range of structurally determined options" (1993, p.73).

It should, however, be noted that the analytical viability of the concept of policy networks has been contested. The most important debate has centred around the question as to whether or not the characteristics of a network structure can help to explain, understand, and predict policy processes and outcomes (Fawcett & Daugbjerg, 2012; Howlett, 2002). Marsh and Smith (2000) address this criticism by developing a dialectical model. They argue that there is an iterative relationship between the following: 1) the network structure and the actors functioning within them; 2) the network and the context within which it operates; and 3) the network and the policy outcome (Marsh & Smith, 2000, p.4). In this context, networks are described as changing political structures which constrain or facilitate actors to influence policy decisions, in that they define actors' roles; determine the problems that are discussed and how they are managed; and contain distinct sets of

rules (Marsh & Smith, 2000). The structural context within which the network operates affects the network structure, network interaction, and the resources that actors have available to them. This is in an iterative process, in that, "exogenous change is mediated through the understanding of agents and interpreted in the context of" the network structure (Marsh & Smith, 2000, p.9). Network formation is thus influenced by external factors and actors' decisions. In this sense, "policy outcomes are the product of the interaction between agents and structures" (Marsh & Smith, 2000, p.11).

The concept of policy networks was applied to identify the actors that were involved in the policy process in the 1990s and to analyse the strategies, actions, and tactics that these actors employed in order to reach their goals and shape the policy-making process.

2.3 Framing policy problems

Marsh and Smith's dialectical model, introduced above, provides a basis for analysing how policy networks can have an influence on the effectiveness of policy instruments. However, in order to understand how the actions of policy networks affect policy outcomes and how policy networks interact with each other, it is important to analyse how actors frame the problem of pesticide use in a manner that either justifies or rejects the adoption of certain policy instruments, thus influencing regulatory intervention (Bain et al., 2017). In other words, policy actors try to influence and shape policy outcomes "through framing the policy discourse" (Browne et al., 2017, p.11). In this respect, the concept of frames provides the researcher with a theoretical framework for examining the underlying beliefs and interests that have led to the strategies employed by the actors, ultimately resulting in particular governance actions and regulatory responses.

Frames can be understood as "the process by which people develop a particular conceptualization of an issue or reorient their thinking about an issue" (Chong & Druckman, 2007, p. 104). Frames are not fixed but dynamic, and are continually (re)constructed in interactions. In these interactions, people apply certain frames by which they think they secure their interests and goals. The choice of a particular frame, therefore, depends not only on the repertoire of frames that are present in the minds of people, but also by the explicit and implicit cues others express during an interaction (Aarts et al., 2014). In this sense, frames can be best understood as a "construction of reality, shaped by cognitive processes [...], by social processes [...], and by the continuous interaction between both"

(van Bommel & Aarts, 2011, p.193). Frames are thus iterative, in that they determine the manner in which interactions take place and simultaneously are constructed during these interactions.

Framing analysis is relevant to the study of politics because it studies how political actors gather support for their political ideas. Frames can inform policy-makers and practitioners as to what needs to be incorporated or included in a policy and what measures need to be taken in order to reach the policy objectives (Jansen, 2008). Key stakeholders frame the cause of the problem; who or what is responsible for that problem; and the solution to this problem in varying terms. Political actors engage in the activity of framing by naming, categorising, and selecting some aspects of a certain problem as relevant or important, while deeming other factors irrelevant and not worth mentioning (van Hulst & Yanow, 2009). As Rein and Schön point out, "Whatever is said of a thing, denies something else of it" (1977, 239). Frame analysis can, therefore, provide a means of examining pesticide policy formulation and implementation processes, in that the study of frames discloses the "underlying structures of belief, perception and appreciation" that shape the development of a policy and that impact the outcome of this policy when it is put into action (Jansen, 2008, p.577). In other words, analysing the frames that were used by various stakeholders in the 1990s in relation to pesticide use can uncover the ideas, beliefs, and interests that influenced the national policies and policy instruments of that time. In this respect, it should be noted that frames cannot be comprehensively understood without analysing the contextual conditions in which framing occurs (van Bommel & Aarts, 2011). Framing analysis by itself cannot, therefore, demonstrate why certain frames are more successful in shaping policy formulation and implementations than others. Thus, an analysis of the social context in which framing takes place is of considerable importance.

In this context, the research returned to the policy networks approach. Policy network analysis can provide significant insights into the power structures of the network because it examines how a network either supports or constrains an actor's behaviour in the policy process and it enables an examination of the capacity of these individuals to influence the policy agenda (Browne, 2017; Holden & Lin, 2012). In other words, it provides the researcher with a framework to assess the complex socio-political resource-exchange relationships that shape policy making and implementation processes. Network analysis and frame analysis together can, therefore, provide a robust framework for analysing stakeholder activity in pesticide reduction policy processes.

In short, this study used framing analysis to explain why the actors involved in the Dutch pesticide reduction policy process in the 1990s interpreted and perceived this process and its outcomes the way that they did. In other words, the researcher sought to reveal the underlying ideas, beliefs, and interests that governed the actions of the actors involved.

2.4 Research questions

The proposed theoretical framework and the research areas led to the central research question and sub-questions, summarised below. The researcher posed the following questions at the outset of the investigation:

Central research question

How have particular framings applied by various policy networks shaped the formulation and implementation processes of policy instruments to reduce pesticide use in the Netherlands during the last decade of the 20th century?

Sub-questions

1. *Which policy communities were active in the policy debate on pesticide reduction and how did these policy communities frame pesticide use?*

This question entailed a description of the structure of the network, the actors that operated within the network, and the approach that they took to address pesticide usage in the Netherlands during the 1990s. It helped to analyse the frames these policy communities constructed in relation to the cause of the problem; who was responsible for the problem; and the solutions that were strategised to address this problem. This subsequently revealed how choices about framing were made, leading to some aspects being deemed by the policy communities as relevant and others not. This enabled an exploration to take place, one which analysed the tactics, actions, and strategies applied by these actors in order to shape the policy processes that took place in relation to pesticide reduction policy formulation and implementation during the last decade of the 20th century.

2. *In terms of pesticide reduction, which situational factors led to certain frames becoming dominant?*

This question facilitated an exploration of how the rejection or justification of the adoption of certain policy instruments by policy communities impacted regulatory intervention. In doing so, it led to an analysis into what extent governance actions and regulatory responses were influenced by networks of actors. It identified how the specific interests, beliefs, and ideas of one particular group coincided with alternative views on pesticide usage.

3. *By which processes and strategies were successes achieved and can these elements be successfully integrated into the EU's Farm to Fork policy-formulation and implementation processes?*

The last question helped to identify how various actors successfully tried to pursue differing strategies in order to influence policy processes and stimulated an investigation into whether insights gleaned from an analysis of the framing processes that unfolded in the 1990's could be extrapolated to the European context.

3 Methodology

This chapter elaborates on how the research data were gathered and analysed, a process that has resulted in the outcomes and conclusions of the research, which are elaborated upon in Chapter 3. The first section provides an outline and explains the motivation for the selection of the research methods, which involved a literature study and semi-structured interviews. In addition, this section also clarifies how the research participants were selected and recruited. The third section makes clear how the data was analysed. A reflection on the research methodology concludes this chapter.

3.1 Research approach and data collection

The main focus of this study was to acquire information on how the pesticide reduction policies in the 1990s was developed; how stakeholders framed the debate about this topic; and how the proposed policy instruments were implemented. A qualitative approach was adopted during the process of data-gathering; this facilitated the exploration and analysis of why the stakeholders that were consulted ascribed particular interpretations and meanings to various social problems (Cresswell, 2013). It should be pointed out that qualitative research is highly contextual, with data being gathered in a natural, real-life environment, often over extended periods of time. As a consequence, it can reveal how and why things took place and can show people's motivations, biases, and incidents of cooperation and conflict (Gray, 2019).

When a qualitative study is being carried out, the data can be collected in various forms, including interviews, observations, and document analysis (Gray, 2013). Due to the fact that the process being studied already ended in the 1990s and that first-hand observations thus could not be made, interviews and document analysis seemed the best methods to achieve the goals of this research.

Interviews are a method by which an actor's construction of specific interpretations of realities are explored. In other words, interviews can show how people make sense of and understand specific events, because people often construct these frames through interactions. By interviewing various policy communities and experts about the pesticide reduction policies in the Netherlands in the 1990s, these frames emerged and thus became an object of analysis. The interviews were carried out in a semi-structured fashion, meaning that a general script was followed and a written list of questions was covered. This form of conducting interviews was chosen because it generated a sufficient supply of data and also left enough room for new leads to be explored.

In addition, a document analysis was carried out in order for the researcher to gain a deeper understanding of the policy processes that took place in the 1990s in relation to pesticide reduction; to gather information on the topic of pesticide reduction; to bring the interviews and frames into context; and to focus more closely on certain topics.

3.2 Semi-structured interviews

Before the interviews were undertaken, an interview guide, based on the research questions, was constructed. The research questions were formulated into the language of objectives; each objective was translated into one or more topics, and for each topic, different aspects were identified (Edmons, 2021). Although the interview guide was not followed in a strict manner at all times (given the responses of the interviewees), it provided the researcher with a focused structure for the interview; presented a direction for the researcher to steer the conversation towards the research topics; and offered the participants some suggestions as to what to talk about (Kallio et al., 2016). The aim of the guide was to facilitate the collection of the same type of information from each research participant (Kallio et al., 2016). During the interviews, certain topics relevant to the subject of study emerged and were added to the list of topics. Based on these new topics, additional questions were formulated and were posed if they seemed appropriate and suitable in relation to the research participant. The interview guide can be found in the appendix (See Appendix I).

For the study, interviews were conducted with 17 different respondents. To be able to conduct the interviews, direct contact and snowball sampling were used to identify potential interviewees. The participants received an email, which included the following information:

1. an introduction to the researcher and her role in the research;
2. an explanation of the study and the importance of the study;
3. the reason why the participant was chosen and why his/her response was important; and
4. general information about the research procedure.

After the first stakeholders were identified, the researcher encouraged the use of a snowball effect, meaning that interviewees were encouraged to recommend other potential participants for her to contact (Shim et al., 2017). This technique was invaluable in that the policies concerned were implemented 30 years ago. After each interview, the participant was asked if s/he knew other important stakeholders that had been involved in the pesticide reduction policy process in the 1990s. In total, 17 different participants were interviewed who, at that time, worked for: the

Ministry of Agriculture, Nature and Food Quality; the Ministry of Housing, Spatial Planning and the Environment; the Dutch Agricultural and Horticultural Association (LTO); Nefyto; the Nature and Environment Organisation; and Vewin. In addition, two individuals were interviewed who are currently involved in recent Dutch pesticide reduction activities. These two interviews were conducted in order for the researcher to examine whether or not the policies formulated in the 1990s had contributed to current policies, thus enabling her to investigate if past approaches could potentially provide a basis for future European policies.

People who worked at the Ministry of Agriculture, Nature and Food Quality and the Ministry of Housing, Spatial Planning and the Environment were interviewed because they were heavily involved in the formulation and implementation of the pesticide reduction policies in the 1990s. Research participants who worked for the LTO and Nefyto were important stakeholders because they were part of the negotiation process and the execution of the MJPG. People associated with the Nature and Environment Organisation, Vewin, and researchers were consulted because they were able to provide an alternative perspective on the process.

Before the start of each interview, the researcher introduced herself, explained the purpose of the study, and asked permission to record the audio of the interview. Most interviews, except one, were conducted via Microsoft Teams (with video) between the 15th of February to the 28th of July 2021. The length of the interviews varied between 30 minutes and 1.5 hours.

3.3 Document analysis

This study involved a systematic literature review in order for the researcher to gain knowledge about Dutch pesticide policy instruments that were applied in the 1990s and how these strategies were developed; the critical role played by policy networks in formulating and implementing these policies; and the process of implementing the European Green Deal and what elements were crucial to its success. The following key research terms were used to identify relevant articles: "*Meerjarenplan Gewasbescherming*"; "Long-Term Crop Protection Plan"; "evaluatie van het *Meerjarenplan Gewasbescherming*"; "evaluation of the Long-Term Crop Protection Plan"; "Dutch pesticide reduction policies"; "Dutch pesticide reduction policy instruments"; "policy networks"; "the Farm-to-Fork Strategy"; and "the European Green Deal". The literature study helped the researcher to gain an understanding of the different processes that unfolded in the 1990s in

relation to pesticide reduction and made it easier for her to compare how the research participants viewed and described these processes with how the processes were documented.

In addition, the literature study also provided a good background for the development of interview questions. According to Arksey and Knight (1999), constructing interviewing schedules that include "questions drawn from the literature" enhances the validity of the interview (p.51). The following key research terms were used to identify relevant articles: "policy network involvement"; "policy network structures"; "policy network strategies"; "framing analysis"; "frame strength"; and "frame change". Databases such as Scopus, Google Scholar, and the WUR library were used to identify and collect relevant articles and information.

3.4 Data analysis

Qualitative semi-structured interviews were undertaken with 17 research participants. All the interviews were transcribed verbatim by the interviewer. The transcribed texts were analysed by means of a content-analysis approach. The first step in the coding process was to read the transcripts to establish a general impression of the data and to identify the main themes that emerged from the material (Malterud, 2012). After reviewing the full text, the researcher identified three main areas of interest: 1) the interviewees' perspectives on the policy process; 2) their interpretations of the results; and 3) their identification of which strategies and/or actions might be applicable to the EU Farm-to-Fork Strategy. Then, the researcher started the coding process by reviewing the interviews line by line in order to identify meaning units and marked them with a code; this meant that each sentence or paragraph was summarised in a few words that described and organised the data (Malterud, 2012). For the coding, both a top-down (using codes derived from the literature review) as well as a bottom-up approach (adding codes emerging from the interview) were used by means of the application of the qualitative data analysis software, Atlas.ti (version 9). After having attached codes to the interview transcripts, the researcher reread the collected codes and compared them in order to assign similar codes to a code group. In other words, codes were grouped together in sub-themes. This is an iterative process, during which some codes were excluded because there were not enough quotes to support the line of thought or because particular codes had been assigned to another main theme.

3.5 Reflection on the methodology and limitations

Although every researcher tries to closely examine his/her choices in relation to the formulation of the research questions and to the selection of methods before the start of the data collection, some implications of these choices only become apparent when one actually goes into the field, conducts the study, and reflects on it afterwards. Some of those reflections are discussed in this section. Clearly, interviews are a powerful scientific tool to gather data on people's perceptions of events, because only through structured conversations can the perceptions of the participants be constructed and reconstructed. However, as with every research method, interviews do have their limitations. This qualitative data collection method "is heavily dependent on the capacities of people to verbalize, interact, conceptualize and remember" (Mason, 2002, p.64). Because the subject of study was the Dutch pesticide reduction policy in the 1990s, it was difficult for the research participants to remember how they conceptualised events at the time or even to accurately remember particular facts. The majority of the interviewees also mentioned, at least one time during the interview, that they found it hard to recall in which year developments unfolded. The researcher tried to assist the research participant in the process by explicitly explaining the objective of the research and sending the participant the questions a couple of days before the interview.

In addition, a crucial fact is that an interview is a social interaction, during which none of the participants is a neutral player. An interview is delineated by social and situational factors, such as time and place. Rather than controlling these factors, it is more important for any researcher to seek to recognise and comprehend these dynamics. Due to the Covid 19 pandemic, all interviews were held online, which made it difficult for the researcher to interpret body language which, under more "normal" circumstances, provides critical information about the views and even the reliability of the respondents. Body language can often reveal hidden facets of the responses and whether the respondents are really comfortable with their answers. In addition, the social interactions that took place online were less spontaneous and less multi-dimensional, because even though the researcher started the interview with a casual conversation, there was no possibility to change the setting and to create a friendly atmosphere that could have put the respondent at ease and could have elicited more information. The fact that the interviews were conducted online also made it more difficult for the researcher to judge if rapport had been established before the start of the interview. It is simply a fact that online interactions are more "artificial" than one-to-one, personal exchanges. Second, it should also be noted that the answers provided during the interviews, as well

as the information provided in documents, were interpreted by a female Dutch student, who has a background in agriculture. It is, therefore, possible that some of the interpretations of the responses could have been impacted by varying perspectives on the part of both the participants and the researcher (although the researcher actively tried to be neutral, self-aware, and unbiased).

4 Research findings

The final conclusions, discussed below, are a result of the examination of the effectiveness of the pesticide reduction policy process undertaken in the 1990s and are based on a thorough analysis of the MJPG; information gleaned from related articles; and feedback that was received from research participants. In addition, the data gathered from the interviews also laid the foundation for the investigation of how the pesticide reduction policy process was perceived by the participants. Three main areas of interest emerged during the research and interviews: 1) the interviewees' perspectives on the policy process; 2) their interpretations of the results; and 3) their identification of which strategies and/or actions might be applicable to the EU Farm-to-Fork Strategy. This chapter is, therefore, divided into two sections. The first section analyses the policy instruments that were implemented in relation to the MJPG in terms of four elements: key strategies, implementation, stakeholder involvement, and spatial scale. The second section outlines the research participants' perspectives on the policy process, on the results, and on their actions and strategies.

4.1 Long-Term Crop Protection Plan

Before explaining the findings of this study, a brief history of Dutch crop protection policy will be provided. In September 1983, the Ministry of Agriculture, Nature and Food Quality published the policy document entitled "Crop Protection in the Netherlands", which had as its primary objective to stop the increasing use of chemical pesticides (Groenewegen et al., 1997). Unfortunately, this policy document can be regarded as inadequate in that a reduction in the use of crop protection products was not achieved (Oskam et al., 1992). In 1987, the Ministry of Agriculture, therefore, introduced a new policy document called 'Toward a Task-setting Multi-Year Programme for Crop Protection'. Both policy documents, 'together with the 'National Environmental Policy Plan' (1989) and the 'Structural Plan for Agriculture' (1990) formed the basis for the Long-Term Crop Protection Plan, which was drafted in 1991 (Groenewegen et al., 1997, p.127). This programme consisted of policy measures and instruments to bring about structural changes in the agricultural sector and aimed to reach the following three objectives by 2000: to reduce pesticide use; the dependency on pesticides; and emissions of plant protection products into the environment (Ministerie van Landbouw, Natuurbeheer en Visserij, 1991). Several external parties, such as the Farmers' Organisation, Nefyto which serves the interest of plant protection product producers, and environmental organisations, were asked to provide public comments on the policy proposal. From

the advice given by these organisations, it became apparent that they had divergent perspectives on the concrete implementation of the plan.

In 1993, after several rounds of negotiations, the parties involved signed an Administrative Agreement, making the execution of the Long-Term Crop Protection Plan possible (Groenewegen et al., 1997). This agreement can be seen as a "gentleman's agreement", in that it is not legally binding, but is, instead, underpinned by the agreement of those involved as to their social obligation to fulfil the objectives. This is reflected in the Long-Term Crop Protection Plan's focus on supporting policy tools, such as research, education, and information. It should be noted, however, that the environment, consumer, and water management organisations did not sign this Administrative Agreement (Groenewegen et al., 1997).

4.2 Effectiveness of policy instruments

The researcher examined the policy instruments presented in the MJPG by using the four of the five characteristics that define a policy instrument put forward by Lee et al. (2019): spatial orientation; the actors involved; the key strategies that have been adopted; and implementation.

4.2.1 The key strategy and implementation of the MJPG's policy instruments

A scrutiny of the Long-Term Crop Protection Plan demonstrates that two types of policy instruments were used, namely regulatory tools and informative resource-based tools. It is stated in the Long-Term Crop Protection Plan that the primary emphasis, focus, and attention were placed on research, extension services, education, and incentives, that is, on informative-based tools. The instrument of legislation and regulations was only used for a number of measures and was only applied if it became apparent that the voluntary measures had not been employed, all of which suggested that responsibility rested with the entrepreneur. The main legal instrument was provided by the Pesticides Act of 1962, which formed the basis for regulations in relation to the admission and use of pesticides.

Although the government placed primary efforts on informative resource-based tools, the majority of the research participants referred to the procedures that *controlled* the admission of plant-protection products at least once during the interview. One of the occurrences that they recall was the fact that during the 1990s, the admission of pesticides was passed on to the Board for Authorisation of Plant Protection Products. Previously, assessments of whether plant-protection

products were safe for humans, animals, and the environment and thus could be used and sold in the Netherlands was carried out by a committee that consisted of four ministries: the Ministry of Agriculture, Nature and Food Quality; the Ministry of Housing, Spatial Planning and the Environment; the Ministry of Health, Welfare and Sport; and the Ministry of Social Affairs and Employment. The research participants often drew attention to this fact in order to point out that policies and their implementation were not separated from each other; that political points of views hindered the whole process; and that this resulted in very slow outcomes. One of interviewees stated the following:

> [T]hey interfered so incredibly with that committee that it could, therefore, hardly reach a decision. So the admission process was very laborious and very slow. And yes, that of course blocked the banning of active substances that simply had to be banished from the world (p.6).

This quote demonstrates that the way the Committee operated was, in his view, inefficient and ineffective. However, even after the admission had been assigned to the Board for Authorisation of Plant Protection Products, most of the participants declared, despite their different interests, their negative perspective on the admission procedure of pesticides.

In general, the research participants were more positive about the advisory services that were provided by the government and that formed the core group related to the MJGP (Kerngroep MJGP) to produce and deliver desired information products and services. In order to ensure that awareness processes and changes in mentality and behaviour were taking place, a base-line study was carried out to provide insights into the farmers' attitudes towards human and environmentally friendly crop protection and environmental policies (van der Ley & Proost, 1992). In addition, an end-evaluation was conducted to determine the progress that was being made and to identify aspects that could be further improved for future advisory services (Proost et al., 1995). When asked about the effectiveness of the advisory services, the majority of the respondents stated that it was difficult to assess how effective the extension services had been because of the fact that awareness and changes in behaviour are difficult to quantify. However, they still argued that a lot of information products and services had been provided and that a considerable number of initiatives had been set into motion. One of the participants summarised this view in the following observation: "Yes, some things were effective and I also definitely think it made a difference [...].

There were education products, evenings, educators who were better instructed so it certainly did have an effect" (p.11).

The document analysis and interview data demonstrate that a two-instrument mix was used in the Netherlands in the 1990s to reduce pesticide usage, an approach which is crucial for the effectiveness of the results. However, the primary emphasis was placed on low authoritative instrument application and coercive tools were regarded as a last-resort option. Lee, et al. (2019) argue that a policy mix is effective when both soft and hard power resource-based tools (that is a use of both the "carrot" and the "stick") are applied because while carrots help to induce change and help to elicit the desired behaviours, thus altering the performance of farmers, the use of sticks are not to be underestimated, in that they push people towards the desired behaviours. The fact that low authoritative or voluntary policy instruments were favoured in the Netherlands in the 1990s can be explained in two ways, namely the specific tradition of negotiation that shapes Dutch agri-environmental policy and an economic paradigm shift towards neoliberalism that had taken place in the 1980s.

The Dutch policy style is traditionally marked by accommodation and consensus, and therefore encourages collaboration among a broad network of stakeholders (Schenkel, 2000; Barzman and Dachbrodt-Saaydeh, 2011; Cadel, et al., 2020). Low formalisation of state-society interactions and the high participation of civil society organisations in decision-making processes are, therefore, favoured (Van Waarden, 1992). This form of policy-making is often referred to as the Dutch polder model, according to which different stakeholders try to explore the extent to which they can achieve their individual objectives through cooperation and compromise. The aim of any negotiation is to reach a consensus about the content and implementation or execution of any type of policy. The agri-environmental policymaking has been historically dominated by this approach of negotiation, often termed integrative bargaining. One of the research participants pointed out that a typical example of polderen is starting with the application of extension services, the softest instrument, and shifting the use of hard instruments into the long-term. She stated the following:

> So it was also a polder model to start with education. It's actually the softest instrument, of course, because actually you [need] a mixture of instruments to really set things in motion. But we [started] with the softest instrument, because it was most naturally agreed upon to start with that (p.16).

A second explanation for the focus on voluntary agreements is the economic paradigm shift that took place at the beginning of the 1980s. The main idea was that the state should no longer intervene to control market conditions and should adopt a more passive role (Van Waarden, 1992). This was pointed out by various research participants; however one interviewee explicitly stated the following:

> In the 1990s, you had that neoliberal narrative where it was said [that] the government shouldn't do anything anymore; the government should leave everything to the market; [and] the market neatly regulates everything, including sustainability. And then the government actually stopped regulating and only started making covenants with the polluters actually (p.1).

This quote underlines the argument that governance was carried out in a fashion that is marked by limited government and self-regulated markets. It can be stated, therefore, that these two developments indirectly influenced political choices during the time when the two policy instruments were being formulated and implemented.

4.2.2 Stakeholder involvement in the MJPG'S application of policy instruments

The second policy characteristic identified by Lee, et al. (2019) is that of stakeholder involvement, which states that a broad network of actors who are involved in the implementation of a policy instrument is beneficial when it comes to pesticide-use reduction. A combination of government officials, agricultural workers, scientists, conservationists, and traders working together on the realisation of a policy aim contributes to effective outcomes because "it helps to ensure a high level of buy-in" (Barzman and Dachbrodt-Saaydeh, 2011, p.1482). It should, however, be stated that interactions between the government and public and private actors are particularly constructive and effective when the government sets boundaries before the start of any interaction (Lee, et al., 2019). In other words, actors from both the public and private domain cooperate best when the central state is involved.

In terms of stakeholder involvement in the MJPG negotiations, it is apparent that only a restricted number of actors were part of the initial policy processes. The Administrative Agreement of the implementation of MJPG was signed by the following: the Ministry of Agriculture, Nature and Food Quality; the Ministry of Housing, Spatial Planning and the Environment; the advocacy group for

agricultural entrepreneurs (LTO); and the advocacy group for the producers of chemical and biological crop-protection products (Nefyto). Although other organisations and advisory bodies had been asked to provide recommendations on how to reduce pesticide usage, they were not involved in the negotiation process itself. Research participants stated that it was only after the Administrative Agreement had been signed and the process of implementation had been initiated, parties such as the water boards, water companies, nature conservation organisations, and NGOs joined the conversation about pesticide reduction. The following quote illustrates this observation:

> There were only a very limited number of players in the Long-Term Crop Protection Plan, each with their own interests, but at that time new players appeared in the field, for example the VEWIN, but [also] in its wake, the union of water boards (p.2).

This line of argument was also supported by another research participant who stated that:

> [A]t that time, Nefyto and the fresh LTO were actually at the table and not the environmental movement. So it was not the case that, as with the energy agreement in 2013, that the environmental movement was really leading the way (p.3).

Both statements demonstrate that, after the agri-environmental policy outlined in the MJPG had already been agreed upon, the set of stakeholders expanded and got more diverse. The fact that only the pesticide industry and farmer organisations were part of the initial stages of the pesticide policy formation and that other stakeholders were only involved later in the process can be explained by the power of the neo-corporatist system of agriculture in the Netherlands: "The agri-environmental policymaking had traditionally been dominated by a neo-corporatist policy regime, consisting of the ministry, farmer interest groups, and agricultural portfolio holders in Parliament" (Candel, et al., p.8, 2020). In this way, the representation and advocacy of agricultural interests and formulation and implementation of agricultural-oriented policy were interwoven (Frouws, 1994). However, this changed during the 1980s and 1990s, when a reversal in agricultural policy focus took place. While previously, innovation and remediation were the primary focus of agricultural politics, in the 1990s the centre of attention shifted towards market orientation and sustainability, leading to sweeping reforms in the agricultural sector. These market and environmental problems caused permanent turmoil in the agricultural policy sector and generated a reassessment of the positions and strategies of policy-makers and interest groups. As a result, the neo-corporatist

system in the Dutch agricultural sector was gradually replaced by pluralism (Frouws, 1994). While Frouws argues that the political shift in priority towards the environment and nature conservation has led to pluriformity among the agricultural interest groups, the argument can also be made that this reversal has demonstrated that other actors should also be involved as stakeholders in all aspects of policy implementation and formulation.

Despite the fact that some research participants joined the policy process at a later stage, an analysis of their perceptions on the willingness of various stakeholders to cooperate can still be carried out. It can be unambiguously stated that their perspectives varied considerably. Some of the respondents were positive about what had been achieved, and often pointed out that people had changed their views and altered their behaviours, even if only slightly, and had demonstrated a willingness to work together. Others were more negative and often referred to the differences in perspectives on the severity of the problem or what the solution to the problem should be. However, in a few cases, it also became apparent by their reactions, which were a mixture of both the negative and the positive, that their assessments as to the efficacy of cooperation were ambivalent. For example, one research participant mentioned the differences between the VROM and the Vewin and the LTO, stating that the LTO was reluctant to start thinking in terms of environmental impact, while the VROM and the VEWIN were on the same page on this subject, and thus did not want to disarrange the governance agreement because this would provide room for manoeuvre for the LTO. However, later on in the conversation, he stated that he had worked together with LTO on a project and at a certain point, he saw that they started to embrace the environmental impact approach (p.2).

4.2.3 The spatial scale of the MJPG's policy instruments

The spatial scale of a policy application has an impact on the effectiveness of a policy instrument. Research has indicated that a farm or regional-level instrument application is conducive to success when informative resource-based tools are being used. Bruce (2016) and Levitan (2000) in their studies explain this finding by indicating that farmers seek information and knowledge that can be practised at their farm, and therefore value site-specific information more than general data. Besides the application of regional-level informative-based instruments, instruments employed at various and interacting scales are also beneficial for achieving pesticide use reduction (Lee, et al., 2019). While locally oriented policy instruments recognise and adopt heterogeneous farm

characteristics, nationally directed tools acknowledge the need to realise behavioural changes (Lee, et al., 2019).

The MJPG was formulated and constructed partially on the basis of sector work groups, meaning that each work group drafted a plan on how to tackle the problem of pesticides in their sectors. These sector groups consisted of scientists, advisors, and representatives from the ministries, who collectively constructed solutions to reduce pesticide usage and to promote sustainable crop protection. As a result, the application of the informative policy instruments was organised per sector. Thus, campaigns, meetings, research, evaluations, and other extension services were produced with this sectoral thinking in mind. In total, ten crop-based sectors were differentiated, of which nine belonged to the agricultural sector. Examples of sectors were field vegetable cultivation, vegetable cultivation under glass, fruit cultivation, mushrooms, flower bulb cultivation, and arable farming. One research participant even pointed out that the MJPG was constructed in terms of sectors. He stated that: "[T]he whole plan consisted of 9 sectors, because, of course, each sector has its own characteristics and specialties and problems, so you had to choose a sector-oriented approach" (p.6).

However, besides thinking in terms of sectors when it comes to policy instrument application, the MJPG also adopted a national approach. The admission of plant-protection products has been nationally organised, meaning that the CTgb (back then, CTB) needed to assess an application based on national and European law and regulation. In addition, when the CTgb decided that a product or a substance could not be sold or used, this decision applied to the whole country. It can, therefore, be stated that both local as well as national policy instrument applications were employed in the Netherlands in the 1990s in order to reduce pesticide usage.

4.3 Framing the pesticide reduction policy process

As has been previously stated, the second section of the research findings focuses on the data gathered from the interviews. This information laid the foundation for the researcher's analysis of how various stakeholders framed their strategies, actions, and tactics; how they described the policy process; and how they perceived the results. In addition, the interview data provided a basis for the investigations that were carried out into the research participant's perceptions on the lessons learned during the Dutch pesticide reduction policy process.

4.3.1 Stakeholders' strategies, actions, and tactics

A review of the interview data made it apparent that every policy network had applied a different strategy during the Dutch pesticide reduction policy process in the 1990s to reach their objectives. It should be mentioned that, out of the 17 research participants, only 13 belonged to a policy network that was involved in the formulation and implementation processes at that time. The four other research participants were either currently involved in the recent Dutch pesticide reduction debate or were researchers who could provide critical insights into the subject matter. These four interviewees, therefore, could provide a broader and balanced perspective on the Dutch pesticide reduction policy process because they themselves were not involved in that process. In short, they could provide an analytical and a more nuanced outsiders' perspective.

It could be stated that the main strategies applied by Nefyto, which serves the interest of Dutch crop-protection producers, was to argue for a European harmonisation of pesticide reduction policies; to focus on science; to lobby; and to keep close ties with the Dutch Agricultural and Horticultural Association. The main reason for concentrating on European harmonisation was two-fold: First and foremost, such an approach would not differentiate between the range of crop protection products that could be used in the Netherlands and those that could be applied in other European countries. Secondly, a differentiation between European countries caused problems to arise in those regions lying on the borders of those countries. Therefore, they also considered it important that Dutch, as well as European, authorisation of plant-protection products was based on scientific proof, because such an approach, according to them, would avoid the danger of the admission or withdrawal of products being too heavily influenced by political opinions. In trying to reach these objectives, Nefyto, during negotiations with the government, lobbied to influence the decision-making process and cooperated with the LTO. Cooperation was beneficial for both parties, in that their interests were aligned. Thus, consulting with each other about possible next moves to make and informing each other about developments that were taking place was a strategy carried out by Nefyto as well as the LTO.

Besides maintaining good connections with Nefyto and other parties, such as the *Plantenziektenkundige Dienst*, the main other strategy that the LTO applied was lobbying. For example, the LTO was against the initiative to introduce a tax on plant-production products in order to finance extension and education products. During negotiations with the government, they stated that they were willing to come to an agreement about the execution of the extension services if the

issue of tax was off the table and the Board of Agriculture would finance the programme. Although the LTO viewed this as an effective tactic or strategy, two other research participants had a different opinion about this approach. They also pointed out that the lobbying from the agricultural sector had resulted in the fact that the tax on plant-production products was stopped and emphasised that this had resulted in a stagnation of the extension programme (p.16, p.17)

The strategies applied by the *Stichting Natuur en Milieu* were the use of legal instruments, the launching of campaigns, and cooperating with other relevant parties. The admission of active substances and plant-protection products was given primary attention by Stichting Natuur en Milieu. In the MJPG, a preliminary list of selected substances was compiled; it was stated that this list should be revised and updated before 1995. The environmental movement would then take legal action if the authorisation of these substances were not actually withdrawn; in addition, it would go to court and file a lawsuit against the state of other parties such as Nefyto. They argued that what they did at the time "was not so much to criticise the content of that plan, but mainly to try to get it implemented by using legal instruments" (p.4). Besides trying to reach their objectives through lawsuits, they also created and executed public campaigns. However, one of them mentioned that this strategy was less successful because campaigns needed to last for many years in order for them to achieve their aims. In addition, they stated that, at that time, it was more difficult to launch campaigns about the impact of pesticides on the environment because people were less concerned about the environmental deterioration that was being caused by pesticide usage (p.1, p.4). One research participant stated the following: "[A]t that time, it was not really a good campaign theme, because people thought: 'If insects die, then we are rid of them'" (p.1). Therefore, the environmental organisation cooperated with supermarkets.

It is interesting to note, however, that when asked if there were any other stakeholders that the environmental movement would have liked to cooperate with, but were reluctant to do so, the research participant referred to the VEWIN. The person from Stichting Natuur en Milieu stated that they tried to get the VEWIN on board, but that the VEWIN was too scared to take drastic actions. In other words, the VEWIN did not want to take the same kind of measures that the interviewee from Stichting Natuur en Milieu deemed necessary to achieve their goals. The person who worked at the VEWIN stated that the environmental movement had a negative attitude. This research participant actually did not agree with the environmental movement's way of operating and stated that, although they had invested a lot of time in legal proceedings against pesticide approval and had

been successful for a time, he felt that they should instead try to engage in conversations with other parties in order to reach common ground.

To find shared ideas, beliefs, and interests and to agree on a common approach was the main strategy applied by the VEWIN and the Centre of Agriculture and Environment Foundation (CLM). At that time, the VEWIN cooperated with the CLM in order to remove the dichotomy/division between agriculture and environment. The adage at that time, according to the research participant, was the following: What was good for the environment could not be good for the agricultural sector, and vice versa (p.2). The actions taken by the VEWIN and the CLM were precisely aimed at tackling this problem and on developing solutions that were good for both the agricultural sector and the environment. Therefore, they also often cooperated with the pesticide industry, the agricultural sector, and the union of water boards on projects such as "*Schoon water voor Brabant*" ("Clean water for Brabant").

At the Ministry of Housing, Spatial Planning, and the Environment, primary attention was given to the formulation and implementation of the admission policy of plant-protection products and active substances. The main reason for focusing on the development of an effective and acceptable admission policy was that, with concrete and precisely formulated standards and criteria, plant-protection products and the active substance in pesticides could be evaluated and either approved or rejected. This meant that certain substances could be banned and therefore could no longer be used. It is interesting to note that another research participant also pointed out that the Ministry primarily concentrated on the admission process. However, he argued that this was not an effective strategy, in that the Ministry should not have focussed only on the admission policy but should instead have expanded the issues on which it focused. Another strategy applied by this Ministry, which was outlined by one of the research participants, was the mutual gains approach. He stated the following:

> [W]e're not going to fight on the barricade; we're just going to negotiate, take into account mutual interest, to arrive at an approach that leads to solutions and not to [engage in] conflict. That kind of culture [...] was actually pretty firmly deployed at the time by VROM (p.3).

This quote demonstrates that understanding each other's interests was at the core of the mutual gains approach, in that this tactic acknowledges the fact that, during negotiations, many different

stakeholders are involved, all of whom have varying goals, concerns, and issues. A central tenet of this approach is that these interests can be addressed in the agreements the various parties reach.

At the beginning of the 1990s, the implementation of the admission policy of plant-production products and active substances in pesticides was also the main focus of the Ministry of Agriculture, Nature, and Food Quality. However, the strategy chosen was centred around the implementation phase. One of the research participants stated that the admission process was slow and hindered by the contrasting political opinions of the various departments. Therefore, he started to seek an alternative way of addressing the admission problem by going to other countries to see how they approached authorisations of plant-protection products. He found that, in other countries, an independent committee was in charge of this process, and convinced his colleagues that the same approach should be taken in the Netherlands (p.6). Another approach that was taken by the Ministry when drafting and formulating the MJPG was focusing on the sectors, meaning that every sector had one work group that consisted of scientists, advisors, and representatives from the ministries, who worked together on finding solutions to tackle the problem of pesticide usage in their sector.

4.3.2 After the consensus: Creating spaces for change in pesticide usage

The perceptions of the research participants on the policy process varied. People who at that time worked in the agricultural sector, for example at the Ministry or for an advocacy group, were more positive about the developments and series of actions that were being taken than people who advocated for the protection of the environment. For example, two people who worked at Stichting Natuur en Milieu were not impressed with the formulation and the implementation of the MJPG. They both argued that, although the government at the beginning of the process appeared to be enthusiastic and seemed to have an aspiration to tackle the problem of pesticide usage in the Netherlands, it soon became clear that, later on in the process, their determination weakened. Both provide a differing explanation as to why this was the case. The first research participant argued that the decline in enthusiasm was a consequence of neoliberal influences that had emerged in the 1990s, which resulted in the withdrawal of the state in drafting regulations and led to the privatisation of extension services. In addition, he argued that the main belief was that the market should regulate everything, including sustainability; he also was of the view that the government at the time was focusing on drafting covenants with the polluters (p1). The other interviewee stated that stagnation had occurred because the government did not oversee the consequences of their

actions, thus allowing counterforces to become stronger. According to him, this factor resulted in the fact that everything became regulated and moved into the sphere of general rules (law), which were not always visible to the people who were involved. He argued that only well-organised lobby groups could, therefore, influence the policy decision-making process because only they have the capability of reaching out to Members of the House of Representatives. He also mentioned that the MJPG was not comprehensive, elaborate, and detailed, and stated the following:

> I have to say that the Long-Term Crop Protection Plan was not yet that elaborate. It was still a rather thin book, but if you knew what to look for, the problem analysis was still quite clear and so was the way they wanted to tackle it (p.4).

The interview data clearly illustrate that the research participants who advocated for the protection of the environment were of the opinion that the government should take the lead in the debate about the use of crop-protection products and should, therefore, take drastic measures to reduce pesticide usage. However, they now consider that the government at the time was incapable of taking up this challenge because the state favoured the perspectives of the agricultural sector, which was characterised by a focus on increasing production. It could, therefore, be stated that the way they framed the pesticide policy debate in the Netherlands in the 1990s presents core beliefs of the anti-pesticide frame identified by Jansen (2008). Another theme that is present in the anti-pesticide frame is the environmental movement's distrust in the agricultural advocacy groups and in the pesticide industry. They (environmentalists) believe that both sectors have the ability to shape situations and events to please their own interests (Jansen, 2008).

When people operating in the agricultural sector were asked to explain, in a few words, the policy process that had taken place in the 1990s, they also referred to the MJPG, but in a positive way. They stated that, before the MJPG, no successes had been achieved (p.7); that the MJPG had ensured that steps were taken to address the problem (p.13); and that they were content with the negotiation process that had taken place when the document was being drafted (p.8). One research participant even provided a completely different answer in comparison to the answer given by the person who worked at Stichting Natuur en Milieu, as he said the following:

> [T]he ones who prepared the Long-Term Crop Protection Plan did a clever job. It is very well written. It's a 300-page report. They wrote down to the smallest details [about] what

substances should be banned and when, and how. All kinds of studies preceded this and it's just a great piece of work (p.6).

It is also worth noting that research participants who worked at Nefyto and the LTO mentioned that they had the feeling that they (Nefyto and LTO) did not hinder or obstruct the policy process. One of them, for example, stated the following: "I also never felt, let me put it this way, that we blocked the process in any way" (p.8). Other interviewees, however, in one way or another, stated that they felt that certain developments had been blocked by the agricultural sector. One research participant explicitly declared this by saying: "[I]t was visible that people [referring to the agricultural sector] were mainly concerned with slowing down the process" (p.10). In this context, the interviewees who worked at Nefyto and the LTO often referred to the importance of science in the admission process of plant-protection products. They argued that the criteria and norms for the approval or removal of chemical substances needed to be science-based. One of them argued that, if at a certain point, scientific evidence indicated that a certain product could no longer be used, the advocacy services stopped their support for a particular initiative, meaning that they would accept and obey the decision. In addition, the interviewee also asserted that farmers did not use pesticides "for fun", but that farmers sought to cultivate their crops in an effective, efficient, and cost-effective manner. And if a high-crop yield could be achieved without the use of chemical substances, this type of cultivation would be adopted as a matter of preference (p.8).

The interview material gathered from the discussions conducted with people from the agricultural sector illustrated that plant-protection products could be used because these products had undergone scientific scrutiny before they were placed on the market. Moreover, these chemical substances needed to be in place in order for the farmers to generate high-crop yields and to maintain their high-performance position in the world market. It could, therefore, be stated that the way the various stakeholders framed the pesticide policy debate in the Netherlands in the 1990s embodies the core beliefs of what the researcher has called the agricultural production frame. One of the core beliefs in this frame was that the environmental movement obstructed the actions by the agricultural sector and formulated everything that the agricultural sector did in a negative light.

Others provided a more nuanced answer when they were asked how they would phrase the policy process in a few words. One of them was of the opinion that the policy process had become more mature, in that, previously, the Ministry of Agriculture and the Ministry of the Environment had

been diametrically opposed, but now they had adopted a more harmonious approach. He argued that, at that time, the Ministry of Agriculture was focusing on the reduction of plant-protection products, while the Ministry of the Environment was concentrating on getting pesticides banned. He stated that, over time, these contradictory perspectives had been replaced by a shared understanding that everyone needed to work together in order to tackle the problem. This approach resulted in a more comprehensive policy; however, this changed perspective still lacked hard policy instruments (p.5). Other research participants followed the same line of argument, stating that the MPJG needed to bring the two completely different views of the two Ministries together (p.15). They acknowledged that initial steps had been made, but that the ideas written down in the MJPG needed to be developed and that the MJPG had, in fact, provided a new way of thinking (p.17). Two research participants also stated that, after the targets of the MJPG had been discussed and written down on paper, consensus had been reached on the fact that they had to take up the challenge together and had to work in a unified manner in order to be able to reduce pesticide usage.

There is not a concise and clear frame that can be applied to this group of people who framed the policy process in terms of the growing realisation that mutual understanding and working together was essential for tackling the problem of pesticide reduction in the Netherlands in the 1990s. The main reason that a precise frame cannot be formulated is because this group of stakeholders consisted of people, all of whom have varying beliefs about pesticide usage and only agree on the fact that the MJPG has brought the various Ministries together to tackle this problem.

4.3.3 Before and after the policies were applied: Was progress real or illusory?

The perceptions of the respondents also varied on what the cause of the problem of pesticide usage was; how this problem had to be tackled; and how they viewed the results of the MJPG. The interviewees often either pointed out the differences between themselves and the opposing party or framed the actions, perspectives, and beliefs of the opposing parties in a negative way. When talking about the others, the research participants often referred to the mistakes that had been made by the opposing party, while drawing attention to their own successes. For example, one interviewee stated that they had won a court case because they and the opponent had submitted the same file document to make the case. The person from Stichting Natuur en Milieu had presented that document to demonstrate that the mesocosm study was not representative, while the other party provided the same document to convince the judge that the substance could be used.

However, the interviewee of Stichting Natuur and Milieu stated that there was a sentence in that article that "blatantly" stated that the research was not representative in terms of evaluating the phytotoxicology of the active substance. By formulating such a narrative and by using the word "blatantly" (*glashard*) to describe the fact that the information had been provided within a particular document, the interviewee emphasised his assessment of the imperfection of the other and demonstrated, in his view, the accomplishments of the environmental organisation and quality of its approach. In addition, research participants would also frame the other in a negative way by articulating/centering the response of the opponent to a particular event in an exaggerated manner. The interviewees often used this manner of speech when talking about a development that had had a negative impact on the other party. For example, one research participant from the agricultural sector stated that that the environmental movement "cried blue murder" when a particular active substance was approved by the CTgb, while the other (referring to themselves) shrugged their shoulders. Another interviewee used the same style of speech to express the reaction of the agricultural sector:

> Atrazine [...] was widely used in maize cultivation at the time; it was a cheap product; and well the agricultural organisations screamed blue murder for a while if that product would disappear (p.2).

Although framing was mainly applied to discredit and blame the other, providing examples or generating comparisons between the subject under study and another object were used by some research participants to express their perspective on the subject matter. For example, one person argued that the fact that the pesticide trade is a highly influential source of information for the agricultural entrepreneur was upsetting. He made the following comparison or example to explain why he thought this was a problem:

> I want an awning and if you invite an awning salesman well, there's no way he's going to prescribe a glass canopy for you. So it also works a bit like that with the salespeople (p.14).

The responses demonstrate that, when both groups talked about the other, they both used the blame frame, in that, they both held the other responsible for their problems and therefore highlighted the mistakes that had been made by the other. This frame is based on the notion that the actions taken by the agricultural sector harms the environment and vice versa.

In terms of the results of the MJPG, the reactions of the research participants were either positive, negative, or nuanced. Most people from the agricultural sector working at a Ministry of Agriculture or for a lobbying organisation were of the opinion that achievements had been made and often referred to the fact that the first target, reducing the volume of pesticides used, had been reached. They often underlined their argument by pointing out that a major decrease in soil disinfection usage had been realised. The following quote demonstrates this argument: "There was an evaluation of the Long-Term Crop Protection Plan and it showed that the objective of [a] 50% [reduction] had been achieved, more than even [...] 50%" (p.6). People concerned with the milieu/environmental aspects who were working at the Ministry of the Environment or for interest groups, on the other hand, were often more sceptical about the results. They stated that not enough attention had been paid towards the negative effects of pesticides on the environment. They also referred to the decrease in the usage of soil-disinfectant products to stress their point, by stating that only the first target of the MJPG had been reached because of a reduction in the usage of soil-disinfectant products. An overall decrease had been achieved. A third group of people, who were more nuanced about the results of the MJPG, phrased the outcomes in the following ways: "a good first step" (p.17); "it has set things in motion" (p.5); and "some things were effective" (p.11). These reactions often demonstrated that the initial steps had been taken to reduce pesticide usage in the Netherlands and that certain goals had been realised, but that the objectives of the MJPG had not been fully attained. The varying assessments of the participants clearly demonstrated that the manner in which they formulated the problem and the language that they used to articulate their arguments indicated the fact that the way they framed these issues affected their analyses.

4.3.4 Devising the Farm-to-Fork Strategy

The answers to the following questions are critical to the discussion: "Which of the strategies/approaches that you applied in the 1990s are transferable to the EU as a whole?" or to the question "What did you learn from previous efforts?"; the responses can be grouped together under the umbrella of extension services, stakeholder involvement, food chain perspectives, policy instruments, and research. The research participants who referred to extension services in their answers often pointed out that the provision of good education and training programmes are essential when agroecological transition is being implemented. In this context, they provided examples of what worked or which elements needed to be taken into account in order to deliver information and extension services. For instance, one person stated that what she had learned from the policy process in the 1990s was that farmer study clubs work well, because agricultural

entrepreneurs exchange information and learn from each other's experiences. She argued, therefore, that farmer study clubs on a European level could also be a beneficial element for achieving the reduction of pesticide use among farmers (p.11). This approach suggests that sources of information that are closer to the farmer are considered to be of great importance. This argument is in line with the answer provided by another interviewee, who argued that taking into account the differences in farm and farm characteristics was important when the creation, development, and production of appropriate extension services is taking place. In other words, customisation of information helps to connect the agricultural entrepreneur with the advice or instructions that are provided (p.16).

This comment leads to the following classification of answers, which is stakeholder involvement. Six research participants explained in various ways the importance of involving the agricultural sector in the policy process. For example, one interviewee mentioned that the farmers need to be able to participate in the debate because "Often they have pretty good ideas about how things can be done differently" (p.12). In addition, she said the following: "I mean from behind your desk you can't think of that [an idea generated by farmers]" (p.12). This line of argument was also corroborated by another research participant, who argued that it is important that that sector is engaged in the policy process and that such a process allows for the agricultural entrepreneur to use his/her craftsmanship in order to come up with possible solutions as to how to tackle a problem. In the group of answers around stakeholder involvement, another person stated that a lesson he had learned was that it is important to create a plan that is sector or cultivation specific, and that professionals from that specific field should be asked to think about solutions to the problem (p.13).

Other research participants also referred to stakeholder involvement, but on a broader scale; they argued that policies should be aimed at all actors in the food production chain. In other words, they demonstrated in their answers that policies should focus not only on the supply side of the food system and on farmers, but should also concentrate on the demand side of the production chain and on those actors who wield increasing power. For example, one interviewee stated that the farmers need to be stimulated to cultivate their products in a sustainable manner which, according to this research participant, could be stimulated through actions taken by supermarkets and pressure groups. In addition, she argued that the focus should not simply be on the production side of the food chain, because production is an answer to demand. Instead, everyone needs to work

together in order to tackle the problem. Another research participant had the same line of reasoning, stating:

> [W]hen the problem is placed entirely on the grower, who has to produce exactly what the buyer wants, then the whole crop-protection policy is the responsibility of the grower. But that should be the responsibility of the entire chain, as it is with the Farm to Fork [Strategy] (p.12).

While this interviewee made a link with the Farm to Fork Strategy to indicate that this strategy had already incorporated a food-chain perspective, another participant argued that it is important that the various objectives of the Farm to Fork Strategy operated as a unified whole, meaning that every element is interconnected (p.13). Otherwise, it becomes difficult for the agricultural entrepreneur to realise all the goals set out by this Strategy.

Two people stated that what they had learned was that there should never be a focus on one, single aspect but, instead, there needs to be an application of a mixture of policy instruments. They argued that a combination of different types of policy instruments needed to be employed in order to achieve policy objectives (p.5, p.17).

Five participants also mentioned that research is an essential component that can contribute to a reduction in pesticide usage. They argued that it is necessary to conduct research that is aimed at developing alternative agricultural systems. Thus, searching for methods or approaches that prevent plant diseases, weeds, and the proliferation of pests needs to take place, so that fewer plant-protection products are needed. In this context, they often refer to the development of resistant varieties, because this would ensure the permanent control of diseases and pests. One interviewee also stated that research could be conducted on a pan-European level, meaning that an analysis should be carried out in the various European Member States in order to identify where the bottlenecks are in terms of identifying those pesticides that are most harmful for the environment and trying to developing replacements for these plant-protection products (p.17).

5 Discussion

This chapter summarises the reflections on the findings by her questioning and explaining how these findings have been constructed. In general, this section, therefore, critically analyses the whole process of enquiry and takes into account the current science on the matter. First, an indication is given as to what extent the research questions have been answered and how the theoretical and methodological framework contributed to answering those questions. Second, suggestions are made for future research. Finally, an explanation, based on all of the above, emerges in relation to the implications of the findings.

5.1 Reflections on the research findings and suggestions for future research

Although various scholars have examined Dutch pesticide reduction policy from an environmental, agricultural, and/or economic standpoint (Ammerlan, 1995; De Snoo & De Wit, 1998; Oskam et al., 1992), little to no research analysing how various stakeholders framed their arguments has taken place, nor have the subsequent actions, strategies, and tactics emerging from that framing been studied in depth. In addition, little data exists describing the relative effectiveness of the different policy strategies and instruments implemented at that time. In other words, the power relations between the various actors that were involved; the strategies applied by these actors; the frames they used to describe the policy processes and the outcomes; and the efficacy of the policy instruments applied have not yet been studied in depth. In this study, a retrospective analysis was carried out to examine the strategies, power relations structures, and frames that emerged during the Dutch policy process in the 1990s and to investigate the effectiveness of the policy instruments employed during that time period.

The analysis of the effectiveness of the MJPG's policy instruments led to the conclusion that, despite the fact that these policy tools consisted of various characteristics that were conducive for reducing pesticide use, certain aspects were only partially taken into account and implemented. Although an analysis of the aim of the various policies applied at that time was beyond the scope of this research, the four other characteristics that determine the effectiveness of a policy instrument were studied in depth. First, the examination of the key strategies that were adopted and an analysis of how the policy instruments were applied indicated that a combination of two policy instruments was used during the Dutch policy reduction process in the 1990s—namely regulatory and informative-based tools. However, primary attention was given at that time towards extension services, education, and research, that is, on low-authority instrument application, while regulatory measures were

regarded as a last resource. The results, therefore, indicate that the policy instruments were not entirely effective because although a policy mix was applied, it consisted of two types of instruments only, while a mix of regulatory, economic, and informative governance resources is considered by Lee et al. (2019) to be more beneficial in terms of reducing pesticide usage. In addition, the primary emphasis on informative-based tools failed to recognise the fact that a policy mix is only effective when both low authoritative and coercive resource tools are applied, that is, when both a "carrot" and a "stick" approach is used.

Second, an analysis of the network of actors who were involved in the formulation and implementation of the MJPG's policy instruments demonstrated that only a limited number of stakeholders were part of this process. Although the proposed policy was sent to various parties, seeking their advice and comments, the interactive governance arrangements only took place at the beginning of the policy process between the four ministries, the pesticide industry, and the advocacy group for agricultural entrepreneurs. In other words, the results might have been more beneficial if all the actors had continued to be engaged at every stage. The findings indicate that a multi-stakeholder approach, which is invaluable for reaching the objective of reducing the use of and dependence on pesticides, was not implemented in full. This indicates that the aim of this policy characteristic was not entirely realised.

Third, an investigation of the spatial scale of the policy instruments illustrated that many of them were both locally oriented and nationally directed, in that the MJPG was partially constructed on the basis of sector work groups, while the authorisation of plant-protection products was nationally organised. With regard to this policy characteristic it can, therefore, be stated that the policy instruments acknowledged to a great extent the heterogeneous farm characteristics by applying a sectoral approach and recognised the importance of generating behavioural change on a large scale through the implementation of a national admission policy. The analysis made clear that the presence of the following policy characteristics are conducive for reducing pesticide usage: a combination of regulatory, economic, and informative tools; a blend of both soft and hard resource-based tools; the presence of multi-stakeholder involvement in the formulation and implementation process; and the use of an instrument application mechanism which is both locally oriented and nationally directed. These characteristics were only partially realised during the policy process in the 1990s, meaning that the realisation of the policy objectives of the MJPG were not fully achieved. These developments were further analysed through an examination of how the research participants framed the pesticide policy process.

An analysis of the interviews demonstrated that the research participants applied divergent strategies, actions, and tactics to achieve their objectives and that they perceived the policy process of the 1990s and the outcomes of this policy process in differing and sometimes diverging fashions. When looking at the way the interviewees talked about the strategies they employed or the actions they had taken, it becomes apparent that, although research participants viewed their own strategies as positive and effective, others interpreted those actions in opposing terms as they highlighted the negative effects of a particular approach. The same argument can be made about how the research participants expressed their perceptions on the policy process and the outcomes. Two frames were distinguished when the research participant talked about the policy process: the anti-pesticide frame and the agricultural production frame. The anti-pesticide frame is characterised by the notion that the government should actively forbid the use of pesticide use, but that it is incompetent to do so. In addition, this frame is based on a distrust in agricultural advocacy groups and in the pesticide industry. The agricultural production frame is defined by the belief that plant-protection products are safe because they have undergone scientific scrutiny; by the notion that they are needed to produce high yields; and by a distrust in the environmental movement. A third group of actors who described the process in more nuanced terms was identified; however, a frame could not be applied because these actors had varying beliefs about pesticide usage and were only grouped together because they defined the policy process on the basis of the growing realisation by the ministries that cooperation was critical.

In addition, the research participants often called attention to the differences between themselves and their "opponents"; in other words, one party framed the actions, beliefs, and interests of their opponents in a negative manner. The research participants used two fashions of framing. First, they pointed out the mistakes made by the opposing party, while referring to their own successes and second, they articulated the response of the opponent to a particular event in an exaggerated manner. Thus, various actors used the blame frame when talking about the actions of the other. In addition, the research participants also framed the policy process and its outcomes in a specific manner to demonstrate their approval or disagreement with the formulation and implementation of certain policy instruments.

The difference in perceptions of the policy processes and its outcomes indicates that there were multiple views/perspectives on reality in relation to the interpretation of what actually took place. The way the research participants formulated their answers demonstrated that they applied different frames of reference and took (un)conscious strategic decisions to emphasise certain

aspects or elements of the policy process. They selected some aspects because they considered these to be relevant or important and chose to ignore other factors because they regarded them as irrelevant and not worth mentioning. In other words, by framing the characteristics of the policy process and its outcomes in a particular way, the stakeholders involved attempted to actively shape the discourses and strategically used those discourses to promote their own interests. The fact that the interviewees framed the Dutch pesticide reduction policy process in the 1990s and its outcomes in various fashions is, therefore, not unexpected, because all stakeholders have different backgrounds that influence the way in which they view the world. The results from the interviews clearly demonstrated that stakeholders described the policy process of pesticide reduction in the Netherlands in the 1990s according to their own values and beliefs because their perceptions governed their interpretation of the results.

This brings us to the methodological reflections on the process of enquiry. Based on the research findings, it can be stated that all research questions were answered. In the first section of the results, the researcher was able to analyse and determine the effectiveness of the Dutch policy instruments in the 1990s. The second section identified the approaches, strategies, and actions taken by the various policy communities to address the problem of the high use of pesticides in the Netherlands: It specified the particular interests, beliefs, and ideas of these policy communities and demonstrated how certain policy instruments were rejected or justified by these policy communities. The articles and reports that documented, reported, and analysed the Long-Term Crop Protection Plan were extremely valuable for defining the research focus and exploring areas of interests during the interviews with research participants. In addition, the information provided in the articles and reports, and the data gathered from the interviews helped the researcher to develop a comprehensive understanding of the Dutch policy process in the 1990s. It can, therefore, be stated that the methodological framework helped in the collection of the essential data that was needed to answer the research questions, in that the document analysis and interviews complemented each other, thus facilitating the collection of in-depth information about the phenomenon being studied and in providing a more complete picture of perceptions and actions taken by the research participants.

The theoretical framework provided a logical foundation for the examination of the efficacy of the policy instruments outlined in the MJPG. The framework for an analysis of instrument effectiveness constructed by Lee et al. (2019) was certainly helpful in providing a structure and a vision for describing the results, in that it presented a detailed and comprehensive description of

characteristics that constitute a policy instrument. The evaluation of the policy instruments applied during the 1990s was, therefore, straightforward and uncomplicated because the framework facilitated the assessment of the policy tools.

The concept of policy networks helped during the analysis of the strategies, actions, and tactics that the actors involved employed in order to reach their goals and shape the policy process. Although it was not possible to observe how these policy communities interacted and how they fought for their particular perspectives at that time (because the subject was the Dutch pesticide reduction process in the 1990s), it helped to identify the actors involved in the policy process; to determine the nature of the power relations; and to analyse if there was collaboration or conflict between the various actors involved.

Framing analysis proved to be a fundamental research method, in that this theoretical tool demonstrated that people use certain frames to secure their own interests, beliefs, and goals. In other words, framing analysis helped to explain why the research participants interpreted and perceived the Dutch policy process in the 1990s in the way that they did and how they came to certain outcomes. Considering that each interviewee had a different interest or goal that they wanted to secure, it was unambiguous that their frames about pesticide reduction policy also varied. Building on these various theories enabled the researcher to uncover tensions between specific strategies, actions, tactics, and contradictions between the applied frames, and to identify which aspects of a particular policy instrument could be improved. This study confirms the fact that policy-making is not a linear process, but is a rather chaotic one. Inherent to policy-making on pesticide reduction is a complex pattern of interactions between actors who have different strategies and interests (Brock et al., 2001). It is, therefore, important that any research focuses on these dynamic human systems.

After having worked with the theoretical and methodological framework, the researcher arrived at various conclusions about the strengths and shortcomings of the research decisions that had been taken. With hindsight, it is always clearer and more obvious as to how the research approach could have been improved; however, the reflections that have emerged can still provide critical insights and lessons for future studies. If a similar study with more time and funding is conducted in the future, the subsequent analysis should be carried out immediately after the policy process has ended. Due to the fact that the subject of enquiry occurred 30 years ago, it was a challenge to find research participants who were involved in the policy process at that time because some people

were no longer alive and some had already retired, which made it difficult to obtain contact details. In addition, some research participants who were able to conduct an interview found it difficult to answer certain questions, to recall particular events, to mention the dates on which important developments took place, and to remember the names of other actors who were involved in the process. In addition, it can safely be said that it is not uncommon for human beings to exaggerate the nature of their own accomplishments and denigrate, often unconsciously, the efforts of their opponents. The fact that the pesticide reduction process took place 30 years ago also made it rather difficult, if not impossible, to observe the dynamics between the different policy communities. As a result of this, an on-the-ground examination of the (in)formal interactions between the various stakeholders could not be carried out. This information was also difficult to obtain through interviews.

The researcher also intended to conduct interviews with government officials, especially those who are currently working to create a framework for a sustainable food system in Brussels, in order to gain insights into the progress being made in formulating this strategy. However, such a study was beyond the scope of this research, because examining the strategies, actions, and tactics currently being applied by the Dutch and European stakeholders and analysing the perceptions of the actors involved could not be carried out in the time period that was planned for this research. This type of study would, however, shed light on the approaches these government officials are taking to translate their ideas about pesticide reduction into current public policies. Such a study would require a more complex theoretical and methodological approach, because such an endeavour would require participant observation to be used in order to gather information about the dynamics and interactions of the actors involved. In addition, the concept of discourse could be added to the theoretical framework in order to analyse how the ensemble of ideas, information, and communication constructs the experiences of the research participants and how similar perceptions can be grouped together.

A more wide-ranging and complex analysis would not only require more time, but necessitates that the limited nature of the particular research questions formulated in this study be expanded and enhanced. The 1990s were given primary attention; however, an exploration of what has taken place since then and of the whole Dutch pesticide-reduction policy process would yield invaluable lessons, providing solutions as to how improvements could be made in relation to subsequent pesticide reduction processes. A fuller investigation could definitely answer what was a success and what was not, what works and what does not.

Future research should be aimed at examining the relevance of this study and whether the results could contribute to the formulation and development of sustainable food chain frameworks in developing countries. The main focus of such an analysis should then be to investigate whether or not the approaches previously taken by the actors involved in the Dutch pesticide reduction process in the 1990s and the lessons learned during this process are able to contribute to the development and implementation of pesticide reduction policies in developing countries. In other words, a central question is: "Can the results discussed in this thesis be extrapolated into a broader, more global, context?"

5.2 The practical implications of the findings for European policy-makers

This section of the discussion answers the following question: "What are the implications of this research for the European Farm to Fork Strategy?" The research findings of this study demonstrate that the formulation and implementation of pesticide reduction policy is a complex process because of the social interactions and power relations between the various actors involved. These stakeholders all have different, and sometimes conflicting, interests, beliefs, and perspectives and, therefore, constantly negotiate, bargain, and discuss who or what is responsible for the problem and how and who can solve the issue. In addition, they attempt to shape the debate in accordance with their particular objectives. Thus, it can be stated that the issue of pesticide reduction is deeply embedded in social and political contexts. Besides the social-political intricacies involved, there are technical complexities inherent to pesticide reduction. Pesticides move through and interact in countless ways with the environment into which they are applied. In this context, the effect of pesticides on the environment is a consequence of a wide range of factors that are interconnected. This raises the following question: "What can European policymakers and practitioners do to tackle these socio-political and technical problems?"

The first important step, therefore, is to take into account that pesticide reduction is not solely a technical issue, but is, instead, a human-made problem with inherent socio-economic and political ramifications. Addressing the contemporary problem of chemical pesticide usage in the European Union entails a realisation and a full grasp of these complex and interwoven social aspects. This is of great importance because an in-depth acknowledgement and comprehension of the social factors that influence the pesticide policy process can contribute to better environmental activities, regulations, and policies, in that such an understanding demonstrates that policies from a single perspective cannot solve the problem of chemical pesticide usage. Instead, integral and

multidimensional approaches are urgently needed to address this intricate problem. In this context, policy processes that recognise the power structures, issues of accountability and responsibility, and differing interests are highly recommended and, indeed, are crucial to any debate. This process also calls for policy making that is aimed at encouraging multi-stakeholder participation, which is critical to any success.

In addition, the complex social-political nature of pesticide reduction reveals that policy-making is not a rational, linear process that consists of a sequence of stages that progresses in a logical order. It is, therefore, of significant importance that the various stages of the policy process accommodate conditions that favour fair and impartial negotiation processes, during which various actors have the power to shape these processes. Addressing the problem of pesticide reduction, therefore, calls for public participation, democratisation, and collaboration.

The analysis of the policy instruments presents the second step that needs to be taken by the European policy-makers in order to address the intricate issue of chemical pesticide usage. When formulating and implementing policy instruments, policy practitioners need to make sure that the policy tools present a mix that consists of regulatory, economic, and informative tools, that is, that any recommendations/solutions are comprised of both soft and hard resource-based tools; that the policy process involves various actors; and that the instrument application is both locally and nationally oriented.

The examination of the data gathered from the interviews introduces the third step. The research participants indicated that the provision of good education and training programmes is essential to reducing pesticide usage. Zhanping (2020) also acknowledges the importance of effective extension services and provides insightful and essential information on how to produce and deliver efficient advisory services. He states that the decision of farmers to use pesticides is not only influenced by knowledge and information, but is also determined by cost-to-benefit ratios, management styles, and labour processes. As a result, extension services should operate in tandem with larger and more extensive socio-economic and political reforms, something which can alleviate the entire spectrum of political-economic constraints that agricultural workers face (Zhanping, 2020). In addition, Zhanping also argues that education and training programmes need to be crafted and conducted in an collaborative and participatory manner. Extensive and interactive stakeholder engagement during the programme design and execution process is essential for turning knowledge into action and/or for behavioural change to take place. However, the research

participants pointed out that the involvement of the agricultural sector is also of extreme importance when pesticide policies are being drafted and implemented. European policy-makers should, therefore, provide the various stakeholders with a platform to express their interests and concerns because such exchanges can impact the effectiveness of the policy.

The fourth lesson learned is that research focusing on developing alternative agricultural systems is also essential for facilitating sustainable agricultural transition. Zhanping (2020) describes the favourable conditions that need to be in place in order for these agroecological practices to be adopted. He states that agricultural regime transformation must be aligned with changes in the structures of the rural communities because "agriculture is embedded in the socio-economic and political contexts of rural society" (Zhanping, 2020, p.14). Thus, besides focussing on the development of alternative agricultural practices, research must also pay attention to the mechanisms that are beneficial for sustainable rural transformations. Therefore, policymakers should allocate research funding to studies that promote sustainable agriculture and environmentally friendly rural communities.

6 Conclusions

The research that was undertaken focused on examining how particular framings applied by various policy networks shaped the formulation and implementation policy processes that were applied to reduce pesticide use in the Netherlands during the last decade of the 20th century. A retrospective analysis of the significant strategies, actions, and power relations structures that emerged during that time was carried out by the researcher in order to investigate if the lessons learned during this Dutch process could provide critical insights that could significantly contribute to the development and implementation of the Farm to Fork Strategy. In order to investigate this subject, a number of research questions were formulated:

1. Which policy communities were active in the policy debate on pesticide reduction and how did these policy communities frame their interpretation of pesticide use?
2. In terms of pesticide reduction, which situational factors led to certain frames becoming dominant?
3. By which processes and strategies were demonstrable successes achieved and can these elements be successfully integrated into the EU's Farm to Fork policy formulation and implementation processes?

The research findings from the analysis of instrument effectiveness seem to indicate that European policy-makers need to ensure that the policy instruments that they draft in the future include a mix of regulatory, economic, and informative tools; that this policy mix consists of both high and low degrees of authoritative tools; that the policy process involves multiple stakeholders; and that the instrument application takes place on both the local and national level. When drafting and implementing the policy instruments, these policy-practitioners need to take these policy characteristics into account.

On the basis of the qualitative interviews, it can unequivocally be stated that the research participants employed varying strategies to reach their competing objectives and interpreted the Dutch policy process in the 1990s in differing ways. Thus the interviewees described this process in accordance with their own beliefs, norms, and values. European policy-makers should, therefore, be aware of and comprehend the social aspects of the contemporary problem posed by chemical pesticide usage. An acknowledgement, realisation, and full grasp of the conflicting frames found in the pesticide policy debate can enhance the examination of beliefs, judgments, and practices during

future policy-making processes. Understanding how certain stakeholders place the responsibility of the problem on particular groups, individuals or aspects; how they address solutions to this problem; and how they define the boundaries between different parties can provide critical insights on what needs to be included and what needs to be excluded in the policy-making process. In addition, the interview results demonstrated that the research participants learned various lessons from the Dutch pesticide reduction policy process in the 1990s. They pointed out the importance of creating good extension services; of involving multiple stakeholders; of taking a food chain perspective; of applying a mix of policy instruments; and of conducting sound research.

The in-depth examination of documents and the detailed analysis of the semi-structured interviews that were undertaken demonstrated that the initial hypothesis, that is, that the Dutch pesticide reduction process in the 1990s could provide critical recommendations and invaluable lessons that need to be taken into account when current European pesticide reduction policies are being drafted can be rejected. However, although this study did not prove that the Long-Term Crop Production Plan and past efforts are relevant to current European initiatives, it did provide some insights as to what elements need to be examined and strengthened in order to enhance a more holistic and impactful approach in relation to any future initiatives.

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Appendix I: Interview Blueprint

1. Which policy communities were active in the policy debates on pesticide reduction in the 1990s?
    a. **Objective 1:** To identify the relevant policy communities that were part of the pesticide reduction policy process in the 1990s:
        i. *Topic*: Policy community involvement
            1. Aspect 1: Ministry of Agriculture, Nature, and Food Quality
            2. Aspect 2: Local government
            3. Aspect 3: Farmers/agricultural workers
            4. Aspect 4: Pesticide industry
            5. Aspect 5: Environmental and nature conservation groups
            6. Aspect 6: Citizens
            7. Aspect 7: the scientific community
    b. **Objective 2:** To understand how policy communities view the impact of their involvement
        i. *Topic*: Interviewee's perception about the involvement
            1. Aspect 1: Positive
            2. Aspect 2: Negative
            3. Aspect 3: Neutral
    c. **Objective 3:** To understand the structure of these policy networks
        i. *Topic:* Interviewee's explanation of the network structure
            1. Aspect 1: Network closure
            2. Aspect 2: Network heterogeneity
2. How did these policy communities frame pesticide use during the policy debate?
    a. **Objective 1:** To identify how the different policy communities framed the issue
        i. *Topic:* Interviewee's description of pesticide reduction policies
            1. Aspect 1: Economic benefits/goals
            2. Aspect 2: Environmental impact
            3. Aspect 3: Health impact
            4. Aspect 4: Technical aspects
    b. **Objective 2:** To identify the narratives that what were formulated by these policy communities
        i. *Topic*: Interviewee's story of pesticide reduction policy
            4. Aspect 1: Positive
            5. Aspect 2: Negative
            6. Aspect 3: Neutral
    c. **Objective 3:** To find out if the framing of these policy communities changed over time
        i. *Topic*: Interviewee's perception of frame changes
            1. Aspect 1: Conforming (Actors construct the same frames over time.)
            2. Aspect 2: Bureaucratising (Actors are aware of other frames, but do not recognize these frames and do not change their own frames.)

            3. Aspect 3: Creating (Actors construct new, unexpected and original frames.)
            4. Aspect 4: Innovating (Actors construct problem-solving frames.)
3. In terms of pesticide reduction, which contextual and situational factors led to certain frames becoming dominant?
    a. **Objective 1:** To identify the factors that made certain frames stand out
        i. *Topic:* Interviewee's explanation of the strength of his/her particular frame
            1. Aspect 1: The frame elicits strong emotional reactions.
            2. Aspect 2: The frame shapes the impact of emotional reactions
            3. Aspect 3:. The frame has a specific focal point eliciting reaction
    b. **Objective 2:** To understand how these frames influenced governance actions and regulatory responses
        i. *Topic:* Interviewee's explanations of his/her impact on regulatory intervention
            1. Aspect 1: Major impact
            2. Aspect 2: No impact
            3. Aspect 3: Some impact
4. By which processes and strategies were successes achieved and can these elements be successfully integrated into the EU's farm to fork policy-formulation and implementation processes?
    a. **Objective 1:** To identify the successful strategies employed by the policy communities during the pesticide reduction policy process in the 1990s
        i. *Topic:* Policy communities' strategies
            1. Aspect 1: Collaboration with other stakeholders
            2. Aspect 2: Negotiation
            3. Aspect 3: Bargaining
    b. **Objective 2:** To identify the elements that can be translated to the European context
        i. *Topic*: Interviewee's description of strategies that can be extrapolated to the European context
            1. Aspect 1: Incorporation of information from various stakeholders
            2. Aspect 2: Respect for each other's views
            3. Aspect 3: Trying to reach consensus
            4. Aspect 4: There are no elements that can be translated

Appendix II: Interview Guide

Interview Opening

Introduction for the interviewee

First, I would like to thank you for your time and for agreeing to speak with me. My name is Elise Stegehuis and I am a MSc student in International Development Studies at Wageningen University. My particular field of study is food security, and I am writing my thesis on the policies that were implemented in the 1990s in relation to the reduction of pesticide use. I am interested in your thoughts and perceptions on this process. And what you learned as a result. The interview will take approximately 45 minutes. Your answers will be used to contribute to my research objectives, which are to get a deeper understanding of the policy processes that took place in the 1990s surrounding pesticide use in the Netherlands. Your feedback will be invaluable not only in terms of understanding what took place, but will contribute to future discussions of this topic, especially in the EU.

Would it be okay if this interview were recorded? In this way, I would be able to listen again to your answers, to make sure I have understood you correctly, and to make more detailed descriptions of your responses. The recordings will be erased after the study has been completed. The data will only be accessible to me and my supervisor so the information you provide will be kept strictly confidential.

I will appreciate your sharing your knowledge, opinions, and perceptions of the pesticide-reduction policy process that took place in the 1990s. Feel free to take your time to think about the questions, to formulate your answers, and to ask for clarification if any questions are unclear to you.

Main Questions

Policy community involvement/perceptions/network structure

- In what way were you involved in the pesticide-reduction policy process of the 1990s?
- What motivated you to participate in this process?
- Which other stakeholders were involved?
- With whom were you in contact?
- For what purposes did you have contact with these stakeholders?
- Were some people more influential than others? If so, why?

- Could you describe your experience of working with the other actors involved in the process?
- Given your experience, how would you change the dynamics of the people you were in contact with?

Policy communities' strategies

- What strategies were adopted by the group working in the 1990s to reduce pesticide use in the Netherlands?
- How was agreement on these strategies reached?
- Why were these particular strategies adopted?
- Which strategies worked and which did not?
    - Could you please provide specific examples?
- Looking back on your experience, what would you do differently?
    - Which strategies would be changed/added?

Interviewee's description of pesticide reduction policy

- In what terms would you describe the pesticide reduction policy process of the 1990s?
- Why would you describe the process in this way?
- How would you describe your view on the outcome of the pesticide reduction process?
- What is your assessment of the outcomes and why?
- What did these outcomes mean for the farmers/pesticide industry/environment?
- In your view, why do you think that that pesticide reduction was on the political agenda in the 1990s?

Frame change

- Did your view of this process remain constant or did it change during the whole process? Please explain.
- What factors caused you to change, or not change, your views on the process?
- With hindsight, what is your view right now on the process?

Interviewee's explanation of frame strength

- Did you have the feeling that you had an influence in the pesticide reduction policy process?
    - If yes, how did your actions influence the pesticide-reduction policy process?
    - If not, why is this the case?
- Did you have the feeling that you had an impact on the outcome of the pesticide reduction debate in the 1990s?
    - If yes, how did your actions influence the outcome of the pesticide reduction debate in the 1990s?
    - If not, why not?

European context

- Which of the strategies/approaches that you applied in the 1990s are transferable to the EU as a whole?
    - What makes these strategies transferable?
- What would you do differently in terms of the EU Green Deal, the Farm to Fork Framework?
- What did you learn from previous efforts?

Closing

I have covered all our questions, is there anything else you like to share? Are there any specific details that would be relevant to this research? Could you recommend any information/publications that others in your community have published or would be willing to make available?