



# **Future imaginaries of pesticides**

Investigating differences, similarities, construction and possible influence of farmers' and scientists' imaginaries in France

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Degree project/Independent project • 30 credits  
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Environmental Communication and Management - Master's Programme  
Uppsala 2025



# Future imaginaries of pesticides: Investigating differences, similarities, construction and possible influence of farmers' and scientists' imaginaries in France

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<b>Credits:</b>	30 credits
<b>Level:</b>	Second cycle, A2E
<b>Course title:</b>	Master thesis in Environmental science, A2E
<b>Course code:</b>	EX0897
<b>Programme/education:</b>	Environmental Communication and Management - Master's Programme
<b>Course coordinating dept:</b>	Department of Aquatic Sciences and Assessment
<b>Place of publication:</b>	Uppsala
<b>Year of publication:</b>	2025
<b>Copyright:</b>	All featured images are used with permission from the copyright owner.
<b>Online publication:</b>	<a href="https://stud.epsilon.slu.se">https://stud.epsilon.slu.se</a>
<b>Keywords:</b>	pesticides, imaginaries, future, farming ,agriculture, scientist, farmer

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## Abstract

Pesticides are part of today's farming practices all over the world. In France, pesticides are still heavily used and quite controversial. Policies to frame pesticide use, are elaborated at European and national levels. Practices such as Integrated Pest Management (IPM) are encouraged and other alternatives have been researched during the past years. In France several plans have been established with the aim to drastically reduce pesticide use. Different groups of persons seem to have a say in the "pesticide debate". Two major groups would be the farmers and scientists. How they imagine pesticides within today's society and whether these imaginaries can influence practices and policies are interesting questions to address. This study aims at investigating farmers' and scientists' future imaginaries in France about pesticides. For both groups, imaginaries are understood as specific to the interviewee with recurring subjects between them such as consumers' role, the need of food production, or the deep-rooted place of pesticides within farming practices. The construction of these imaginaries could be due to different socio-economical factors and external social imaginaries/discourses. Even if this study cannot clearly conclude if and how these imaginaries will have impact on policy, I would argue that such impact is possible. Finally, this study aims at contributing to the understanding of future imaginaries of farmers and scientists in France about pesticides and its construction and influence on today's society.

*Keywords: pesticides, imaginaries, future, farming ,agriculture, scientist, farmer*

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# Abbreviations

Abbreviation	Description
IPM	Integrated Pest Management
SI1, 2, 3...	Scientist interviewee 1, 2, 3 ...
FI1, 2, 3...	Farmer interviewee 1, 2, 3 ...
ANSES	Agence Nationale de Sécurité Sanitaire de l'alimentation, de l'environnement et du travail, French Agency for Food, Environmental and Occupational Health & Safety
FAO	Food and Agriculture Organization of the United Nations

# 1. Introduction

Pesticide, a word that everyone has heard or talked about in today's world, a word that gets a great place in today's societal debate. The use of pesticides has systematically increased since 1990 until 2022, reaching 3.7 million tonnes in 2022 globally (FAO, 2024c). In the European Union, pesticide use has fluctuated over the years with 320,940.56 tonnes used in 2022, being the year with the lowest use since 2010 (FAO, 2024b). In 2022, France was the 10<sup>th</sup> country in the world in terms of pesticide use in agriculture (based on sales figures) (FAO, 2024b), the 2<sup>nd</sup> country in the world in terms of import of pesticides, and the 4<sup>th</sup> country in the world in terms of pesticides export (FAO, 2024a). Because of its position, France seems to be prominent in the pesticide debate and industry. In France, there is a quite vivid debate going on, about the role of pesticides in farming. There are many actors with stakes in this debate, such as farmers, politicians, consumers or even scientists. I wanted to understand the different perspectives in this debate, and I choose to focus on two actor groups: farmers and scientists.

One of the ways to investigate perspectives on pesticide use would be to let actors imagine the pesticide problem in the future. Indeed, how we imagine pesticides may be co-constructed socially by the different actors and influence their behaviours (Taylor, 2004). More particularly, this study looks into how pesticides are imagined in the future, with the assumption that future imaginaries could also influence present actions (Bazzani, 2023), including which and how policies are made. Future imaginaries can therefore be an engaging way of investigating actors influence on the pesticides question, and maybe touch upon the barriers that prevent changes in pesticides practices.

## 1.1 Problem formulation

Discussions around pesticides are part of every landscape, not only the natural landscape, but also the societal, media, political, and scientific landscapes. The pesticide debate is everywhere. Even though the risks of pesticide use on health and the environment are a concern for a great number of French citizens (Pesticide Action Network Europe, 2023), the exit of actual pesticide practices seems to be a complicated matter. Divergent opinions can be heard in the media, scientific and political spheres. There are disparities in opinion between farmers and non-farmers about pesticides in France with farmers explaining that their practices have received criticism (Bjørnåvold et al. 2022). Policies around pesticide practices have been also subject to criticism and have been evolving. For example, in 2018, neonicotinoid use became forbidden in France but until 2023 exemptions could be granted like for beetroot seeds (Agence Nationale de Sécurité Sanitaire de



l'alimentation, de l'environnement et du travail (ANSES), French Agency for Food, Environmental and Occupational Health & Safety, 2025).

The role of pesticides in agriculture is also a debated subject within science, with more than 2.9 million results being found when the key word “pesticide” is used on Google scholar. However, pesticide as a direct societal subject may not be as studied as in other scientific fields such as biology, chemistry or medicine and pesticides, though being an inherent part of today's society, it should also be studied as such.

## 1.2 Aim and Research questions

This thesis aims at investigating the imaginaries of pesticides among two different groups of actors of the French society, farmers and scientists. By investigating these two groups, I wish to understand how pesticides are imagined within these groups, how these imaginaries are similar or diverse, as well as reflect a bit about how these imaginaries might impact pesticide use and policies in France today. To answer this, I have three research questions that will lead this thesis:

- *How are pesticides imagined amongst farmers and scientists in French society and is there a difference between them?*
- *How and why are these imaginaries constructed the way they are?*
- *How might these imaginaries influence pesticide use, and policies governing usage?*

## 1.3 Background

### 1.3.1 What are pesticides?

What do we mean by “pesticide”? Pesticides are defined in the Cambridge dictionary as “*a chemical substance used to kill harmful insects, small animals, wild plants, and other unwanted organisms*” (n.d.). Whereas according to the European Union, a pesticide :

*“prevents, destroys, or controls a harmful organism ('pest') or disease, or protects plants or plant products during production, storage and transport. They include, amongst others: herbicides, fungicides, insecticides, acaricides, nematocides, molluscicides, growth regulators, repellents, rodenticides and biocides.” (European Commission, n.d.)*

This definition also stipulated that plant protection products, which have at “*least one active substance*” and that are specific to plants, are a type of pesticide. (European commission, n.d). In France the definition given by the Ministry of work, health, solidarity and families is quite similar to the European commission one but not exactly. The definition goes as “*Active substances or the preparations used for*

*the prevention, the control or the elimination of undesirable organisms, whether they are plants, animals, fungi or bacteria*”(Ministère du travail, de la santé, des solidarités et des familles, French Ministry of work, health, solidarity and families, n.d.). Therefore we can understand that pesticides are not only active substances. France also has another designation for chemical pesticides, “phytosanitary product”. At a societal level when we talk about pesticides, we realise that everyone might understand this term slightly differently. Indeed, some may think only about synthetic pesticides others may include products that are also used in organic farming as described in the pesticide definition of the French Ministry of work, health, solidarity and families. This difference in understanding can cause confusion and complications within the pesticide debate, which will be explored within the results of this thesis.

### 1.3.2 A brief history on pesticide use and pest control

While being a quite common word today, the term pesticide was used for the first time around 1925 (Merriam Webster dictionary, n.d.). However, it does not mean pesticides were not used before, even though under different forms, practices or names. Indeed, agriculture is said to have started around 11,000 years ago, but it could be older (University of Cambridge, 2012), and therefore we can assume also the struggle to preserve crops and yield from insects, diseases, or what we today commonly call pests. According to Flint & Van Den Bosch (1981), the first pest control methods were based on “*mysticism or superstition*”, which means relying on God, prayers or offerings. However, before 2500 B.C, it seems that Sumerians used sulfuric compounds as a control method against insects whereas later in China, white arsenic has been used on rice plants (Flint & Van Den Bosch, 1981). These first evidences clearly showed that crop protection is a challenge that existed, and for which different solutions were proposed, for centuries. Whereas these methods seem quite simple, in the 17<sup>th</sup> century a great deal of discoveries in science allowed better insights of both “pests” and the means that might control them (Flint & Van Den Bosch, 1981). For example, Redi discovered in 1668 that the spontaneous generation (i.e. that an insect just “appears” without there being reproduction involved) did not exist (Duris, 2010), and Vallisnieri wrote a book in 1696 where he talked about insect parasitism (Tremblay and Masutti, 2005). Additionally, in 1629, vinegar was recommended against canker on trees, and in 1763 nicotine was used as an insecticide (Matthews, 2018). Around 1878, the Bordeaux mixture, a pest control product still used today, was developed against downy mildew on French vineyards (ibid.).

In France, before 1900, propaganda and subsidies were used to motivate farmers to use chemicals as pest control method (Jas, 2007). It resulted in 20,000 tons of arsenical insecticides used per year and an “*annual demand for copper sulphate for crop fungicide treatment reached 100,000 tons*” at the beginning of WWII (Jas,

2007:372). During this period, health care practitioners and doctors were already asking for a ban of arsenic products but also for a strict restriction for arsenic residues on food (Jas, 2007). In France, an early law passed in 1916 about “*the importation, sale, holding and use of poisonous substances*” (Jas, 2007:373). However, poor enforcement of this law led to the continuation of illegal use of products (ibid.).

After World War II, pesticides such as Neonicotinoids, Malathion, Dimethoate or Barban were used (Matthews, 2018). Biopesticides were also developed during this period such as Thuricide, however in 1960 these products were less efficient than non-biopesticides products and were therefore subject to less investment by the companies (ibid.).

People have come up with pest control methods for ages. While being useful and sometimes necessary in agriculture, the use of pesticides has its drawbacks. In 1962, *Silent Spring* by Rachel Carson was published. In this book, the author described the danger of insecticides such as DDT (Davis, 2019). As the book was available for everyone to read, it led to reactions from all layers of society but also allowed consumers to learn about pesticides, particularly about insecticide risks (Davis, 2019). In France, governmental agencies tried to reassure civilians by saying that the “*French pesticides registration system protected public health*” (Jas, 2007:370). Nevertheless, concerns and criticism started to arise in the following years, while the registration system, which relied on scientific authority, was still used as the primary motivation by authorities stating that allowed pesticides were safe (Jas, 2007).

### 1.3.3 Pesticides regulation in Europe and in France

As knowledge about pesticides grew, legislation to regulate its use has been elaborated. As explained previously, a law was passed in France in 1916 (Jas, 2007). The number of legal actions regarding pesticides in the EU seems to have really started around the year 2000, going from 50 to more than 250 actions in 2008 (Karabelas et al., 2009). More recently, in Europe, pesticides have been mainly regulated by the Regulation (EC) No 1107/2009 (European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC), which focuses on plant crops and states on which conditions an active substance can be approved while taking human health and the environment into account (ibid.). In Europe, once the active substance is approved by the EU, the placing on the market of a substance depends on the country where it is going to be sold (ANSES, 2023). This means that it is up to every member country to have stricter, but not more relaxed, regulations than the EU in terms of pesticide use (ibid.). At European level in 2021, there are 466 active substances (herbicides, insecticides and fungicides) approved and at French level there are 319 active substances with at least one

approval (Ladet, 2021). Also, even though some active substances may be forbidden for use in Europe, they could still be produced in Europe and exported to other countries which may then export products back to EU countries that have been produced using substances forbidden in EU agriculture (Karabelas et al., 2009). This has sometimes been referred to as the “*circle of poison*” (Weir and Schapiro, 1981 and Galt, 2008, see in Karabelas et al., 2009). In France, since 2022, a law was passed to forbid this practice, however it seems it has not led to changes (Cassard, 2024).

In France, a specific ban for pesticide use exists through the Labbé Law which states it is not allowed to use pesticides in public spaces (since 2017), regular citizens cannot buy or store pesticides for gardening (since 2019), pesticide use in collective places (such as cemeteries, campings etc.) is forbidden since 2021 (Office français de la biodiversité, French office of biodiversity, n.d). As a result of this new legislation, the non-professional use of pesticides outside agricultural fields has significantly decreased (European Environment Agency, 2023a).

### 1.3.4 Pesticides costs

When looking at the economic impact of pesticides we need to look at it from the conception time of the product and I would argue we should also look at what they cost within society (e.g: health treatment costs, compensation costs, research costs ...). Bourguet and Guillemaud (2016) talked about “*Regulatory costs*”, which are constituted of costs such as testing, registration, producing, disposing of pesticides but also costs such as the controls done by authorities or campaigns among others. They explained how these types of costs have been underestimated in research, and as not all regulations may be included in what is commonly counted as “*Regulatory cost*”, the costs listed as regulatory costs could be higher. They also talk about the “*Human Health costs*” which are related to the health of agricultural workers, consumers or any person indirectly affected by pesticides. Again, the authors highlighted that costs related to human health have been underestimated with the cost of long-term effect (causing cancer, diabetes or depression ...) not being taken into account in most research as well as deaths related to pesticides (ibid.). Lastly the authors developed on the “*Environmental costs*” of pesticides. These costs could be from all environmental impacts of pesticides on “*animals, plants, algae, microorganisms and pest resistance*”. Bourguet and Guillemaud (2016:82) explained that “*the monetary cost of pesticide impact on aquatic invertebrates, plants, algae and the soil community has never been estimated*” and concluded that “*Environmental costs*” have been underestimated. They also talked about the “*Defensive Expenditures*” of pesticides, which are commodities or precautions that people have to pay for to protect themselves or to avoid pesticides. These costs are mostly not considered when estimating the costs of pesticide use (Bourguet and Guillemaud, 2016). This highlights the global underestimation of what pesticide

use costs, and therefore the underestimation of pesticide economical impact, positive or negative, though it may be. The total cost of impact of pesticides in France would be complicated to calculate, as multiple factors have to be considered but also because the cost could vary for one pesticide to another, therefore calculation for each pesticide should be done. Indeed, there are disparities due to the inability to attribute some costs to the particular pesticide use or the impossibility to calculate a specific cost (Alliot et al., 2022). It does show the complexity of estimating the real cost of pesticide use.

### 1.3.5 Pesticides benefits and risks

Synthetic pesticide development has helped to improve work conditions for farmers. Before, farmers were spending a lot of time in the field and paid a lot of workers to ensure a good yield from a crop. The use of pesticides helped to improve efficiency and productivity but also facilitate disease prevention (Zhou et al., 2025). The improvement of food productivity due to pesticides cannot be neglected as it helped reducing crops losses (Aktar et al., 2009), but it also helped to get “*nicer looking*” products which would sell better. For developing countries, it has been stated that having access to fresh vegetables is more important than the possible risks of pesticides residues (Brown, 2004 see in Aktar et al., 2009), and pesticides can help. Therefore, pesticides became an inherent part of the agricultural model. Pesticides have become a great tool in farming practices. Pesticides also play a part in public health control as it can be used against disease vector animals such as mosquitoes or ticks (Tudi et al., 2021).

When talking about pesticide risks, two types of risks come to mind: the risk for the environment and the risk for human health. Various impacts of pesticides on biodiversity have been reported. One is the impact of insecticides, herbicides and fungicides, on pollinators which can be “*lethal andsublethal*” (Basu et al., 2024:8). Pesticides also have an impact on soil health, water, and the microbial community (Zhou et al., 2025). In French soils, pesticides such as glyphosate or fluopyram were found, with most of the contaminated soils coming from arable farming or vineyard soils. Pesticides were also found in non-treated soils, which cause a risk for the soil health (Froger et al., 2023). Pesticides can harm plants and organisms that were not targeted during their original application (Aktar et al., 2009).

There are also several examples of how pesticides pose risks to human health. An infamous example would be the Chlordecone contamination of water and soil in the French territories of Martinique and Guadeloupe. Exposure to Chlordecone could have had an effect on the gestation time of pregnant woman, an increase preterm birth, problems with male fertility, or increase risk of cancer (Multigner et al., 2016). According to Cabidoche et al. (2009) the contamination of soil by the Chlordecone could take from some decades (for the nitisol) until centuries (for the andosol) to be decontaminated. Although this is a particular example of health risk

due to pesticides, other studies showed that head and neck cancers could be caused by pesticides (Leonel et al., 2020). The role of pesticides in Parkinson disease has also been studied, and the risk of Parkinson disease seems to be increased for farmers when exposed to pesticides in France (Pouchieu et al., 2018). Other health issues that have been associated with pesticides are cardiovascular diseases, reproductive capacities, cognitive impairments between others (European Environment Agency, 2023b).

Nevertheless, case-control studies which consider pesticides roles in cancer, have been limited (Leonel et al., 2020). It is supported by Karabelas et al. (2009), they mentioned how new authorised active substances were lacking toxicity assessment, and shared their concern for lacking scientific informations to “*carry out meaningful health impact assessment studies*” (2009:1103).

### 1.3.6 Actions taken to reduce the pesticide use and possible alternatives

In France, the Ecophyto II+ plan aims at reducing the use of phytopharmaceutique products of 50% by 2025 and stopping glyphosate use in 2022 at the latest (Ministère de l’agriculture et de la souveraineté alimentaire, French Ministry of Agriculture and of Food Sovereignty, 2022). However, it does not seem that this plan was achieved as glyphosate has been reapproved at the European level for 10 years in 2023 (European Commission, 2023), which means that pesticides who contain glyphosate could be approved for use in France. In 2024, 13 products containing glyphosate were authorised in France (E-Phy, 2025). A new plan has been introduced in France in 2024, the Ecophyto 2030 plan. This plan continues to aim at reducing pesticide use by 50% compared to the 2011-2013 mean (Ministère de l’agriculture et de la souveraineté alimentaire, 2024). However, it must be noted that one of the previous Ecophyto plans (Ecophyto I) with a similar adapted aim seems to have not been successful in achieving this (Guichard et al., 2017).

In addition to a potential governmental plan, alternatives to pesticides exist. Some of them are Integrated Pest Management (IPM) methods. IPM integrates the need to consider all possible and pertinent methods, the use of non-chemical or other alternatives should be favored to pesticides as their use is not prohibited but should be motivated by economic and ecological thresholds with minimal risks for human and environmental health (European Commission, n.d). Such methods could be: the use of pheromone traps, release of predator, microbial control by viruses, bacteria or fungi, pest or weather monitoring (Angon et al., 2023). For an effective control, a combination of methods should be used. IPM has been successfully implemented in the Southern hemisphere but often stopped for various reasons such as programme termination or change in priorities (Deguine et al., 2021:6). In general, IPM methods have not been satisfactorily implemented due to different barriers such as limited knowledge, limited support or methods being perceived as

complicated and associated with uncertain benefits, but also due to the reluctance of farmers to give up on pesticides (Deguine et al., 2021).

Another alternative are the biopesticides. Biopesticides are “*naturally occurring substances from living organisms (natural enemies) or their products (microbial products, phytochemicals) or their by-products (semiochemicals) that can control pest by nontoxic mechanisms*” (Salma and Jogen, 2011 in Tijjani et al., 2016:2). There are several categories of pesticides: microbial, biochemical, semiochemicals pesticides and Plant-Incorporated-Protectants (Tijjani et al., 2016).

## 2. Theoretical framework

To answer my research questions which are oriented toward imagination and perception, I will use imaginaries theories. These theories, according to Strauss (2006), are based on society and culture. As I am investigating pesticides as a societal subject, I will delve into the “Social imaginaries”. Charles Taylor defined social imaginary as:

*“the ways people imagine their social existence, how they fit together with others, how things go on between them and their fellows, the expectations that are normally met, and the deeper normative notions and images that underline these expectations”*  
(Taylor, 2004:23).

Therefore, we can understand that these imaginaries are within our societies and practices and they are created by them. Additionally, O’Neill (2016) concluded a review by saying that the “*dominant moral purpose and moral order of a society*” could be studied by social imaginary but also that such study:

*“requires an analysis of the ways in which societies over time change their shared understandings of socially just economic and social settlements, and the events through which old settlements are abandoned in favour of others that appear to have greater moral purpose and utility.”* (O’Neill, 2016:8)

By investigating pesticides through social imaginaries, it would be interesting to see how pesticides are understood by the society under which moral and how this understanding evolved resulting in how society induced practices around pesticides. This is also explained by Taylor (2004:23) “*Social imaginary is that common understanding that makes possible common practices and a widely shared sense of legitimacy*”.

A great deal of studies building on “Social imaginaries” can be found such as future imaginaries, economic imaginaries, political imaginaries, or sociotechnical imaginaries. For this thesis, I will focus on future imaginaries.

### 2.1 Future imaginaries

The future seems to always have fascinated people and imagining how the future will look like has been a subject of many movies, books or else. Future imaginaries investigate how the future is envisioned, and therefore how people imagine their future. In this research, the idea of future imaginaries would be used to study how pesticides are envisioned in the future. An important aspect of future imaginaries reside in the present with the “practical consciousness” (Giddens, 1984, see in Bazzani, 2023) and the disruption of habits or routines which could be changed



based on how ideas of the future change (Bazzani, 2023). Disrupting an idea of the future may induce people to rethink their habits and therefore their practices within this said future. According to Giddens (1984, see in Bazzani, 2023:384), “*practices that take place at the level of practical consciousness are replaced by discursive consciousness, which ‘means being able to put things into words’*”. With the discursive consciousness, it calls for an active re-evaluation of how the future is imagined because of new possibilities (Bazzani, 2023). During the interviews, different scenarios were proposed to the interviewees, and these scenarios may disrupt their actual practices or understanding which would allow to investigate how future is imagined, reevaluated and how they project themselves within the proposed futures.

### 2.1.1 Expectations

Expectations are an inherent part of envisioning of the future, and are embedded within the present. In Mische (2009), Zimbardo and Boyd (2008:137) argued: “*Beliefs and expectations of the future in part determine what happens in the present by contributing to how people think, feel, and behave*”. Actions we make in the present are, consciously or not, influenced by what we are expecting of the future (Bazzani, 2023). However here, I am not looking only at individuals’ expectations and the influence of future imaginaries on how individuals perceive the future, but also at the societal expectations toward pesticides that may be rooted within individuals. This may be related to second-order expectations (Galtung, 1959, and Mead ,1967 see in Bazzani, 2023). These second-order expectations are created according to others’ expectations of your expectation, the “*expected expectations*” (Bazzani,2023). Expectations can be understood as constructed based on the past but also constructed within social structures and norms (Beckert, 2016 see in Bazzani,2023). Brown and Michael (2003) proposed two ways understanding expectations:

- Retrospective Prospects: how the future has been portrayed in the past, “*people memories of the futures*”
- Prospective Prospects: how these past portrayals of the future are used in the present prospects of the future

These “prospects” would allow to see how pesticides have been imagined in the past and how it influences how pesticides are imagined in the future.

### 2.1.2 Projectivity

Projectivity is a dominant aspect of future imaginaries. How people project themselves in future scenarios is interlinked with how they imagine the future. Projections of the future are created through “*communicative interaction within groups, organizations, and institutional settings*” (Mische, 2014:441). Mische (2009) explains that there are nine dimensions of projectivity as seen in Table 1.

Table 1. The nine dimensions of projectivity. Source: adapted from Ann Mische, *Projects and Possibilities: Researching Futures in Action* (2009).

	Projectivity dimensions	Definitions
Cognitive contours	Reach	How much is the future imagined at different time length
	Breach	The spectrum of possibilities within the temporality
	Clarity	How in depth the imagined future is detailed
	Contingency	The degree on how the imagined future is set or is undetermined
Actions orientation	Expendability	How much are future possibilities are seen as opened or closed
	Volition	Is the future coming to us or are we going to the future
	Sociability	The degree to which future projections are interlinked with others while also situating ourselves with others
	Connectivity	How the result of future actions are logically linked within the imaginary
	Genre	<i>“the recognizable discursive ‘mode’ in which future projections are elaborated.”</i> (Mische, 2009:701)

These dimensions can be used to understand and analyse imagined futures, and how they can induce actions toward the said future. Indeed an imagined future can be “clear” for a certain person whereas the same scenario could be less clear for someone else. Mische (2014) also categorised these dimensions in three: cognitive contours, actions orientations and genre, as seen in Table 1. Ehgartner and Welch (2024) used these dimensions as frameworks to analyse imagined future, and it will be used here similarly to analyse the different imagined futures of the interviewee.

However, these dimensions will not be used as codes, and the obtained imaginaries will be analysed to compare them through the dimensions (e.g scientists have a clearer imagined future on the short term than the farmers...).

## 3. Method

### 3.1 Data collection

In this thesis I see imaginary as a personal perspective which may differ or be constructed similarly by a group. Therefore, I investigated the disparities between individuals within decided groups and between the said groups. To achieve this, I primarily relied on semi-structured interviews.

#### *Interviews*

The two groups that I interviewed are farmers and scientists. Before the interviews, an information sheet was sent to every interested potential interviewee. In this sheet I tried to give information about the study as clearly as possible. You can find information such as the aim of the study, why I contacted the potential interviewee, that I wish to record the interview, how the interview will go on, how I will transcribe, how the interview will be used, that they can stop being part of the project until mid May, that the thesis will be publicly available, and finally some information about the treatment of personal data. Then when the interviewee and I decided on a date for the interview, a consent form about the treatment of personal data was sent. The interviews were conducted through Zoom using my university account and recorded if the interviewee gave consent.

I used different topic-guides for the interviews in the two different groups (Annexe 1 and 2). I placed the hypothetical futures in a “*specific temporal sphere*” (Beckert and Suckert, 2021:11), which is composed of the present, a future in 2 years and a future in 20 years, to investigate how the future is imagined. The questions were about worries and hopes toward the future use of pesticides, the relations and practices of the interviewee with pesticides. The guides were tested in pilot interviews before the real interviews. Some questions also evolved, were deleted or added after the first interviews. While listening to the answers the interviewee gave, I added follow up questions which therefore may differ depending on the interviewee. The interviews lasted between 25 minutes and 1.15 hour.

The interviews, as well as the information sheet and consent form were done in French, with the consent form based on the SLU provided template. This template informed interviewees about personal data processing by SLU, and gave contacts to the interviewee. I modified the template to specify which personal data I aimed at collecting. Every translation was done by me, from English to French. The consent needed to be fully informed and follow the GDPR, therefore as English or Swedish are not the mother tongues of French citizens, there was a need to provide information in French. As the consent form provided by SLU was not available in French, I translated it. The intent was for the interviewee to fully understand what

it implied signing this form and taking part of the study. Citations used in the results section were later translated in English for the sake of the thesis.

For the first group of interviewees, the scientists, I contacted people that seemed to have worked or are working with pesticides as a subject. I also received assistance from a teacher in the university. I performed 7 interviews in total with this group.

For the second group of interviewees, the farmers, I contacted people who were producing edible plants, in organic or non-organic systems. I contacted every potential interviewee by e-mail first, and I also tried to contact some by phone. I performed 5 interviews in total with this group.

## 3.2 Data analysis

The twelve interviews were transcribed manually to get a first interaction with the data. It allowed me to be close with the collected data. Due to time restriction, for the last interview I transcribed only the interesting bits of the interview. All interviews were coded inductively following Bowen's (2006) grounded theory and therefore the themes for the analysis emerged from the data. Since I wanted to understand the different and personalised imaginaries of the participants, during the coding, I took every interview as individual and tried to forget the themes I created with previous analysis, resulting in a variety of themes. To create the themes I kept my research questions in mind, and I also kept in mind the interviewee perspective as explain in Creswell and Creswell (2018: 259):

*"The researchers keep a focus on learning the meaning that the participants hold about the problem or issue, not the meaning that the researchers bring to the research or that writers express in the literature."*

This coding gave a great number of codes which were regrouped later in broader themes within each interview and compared between the overall interviews. Only after I finished the coding did I try to see if there were common and recurrent themes among all (or at least several) of the interviews. The themes were compared between interviews from the same group, then compared between the two groups. Only certain themes are shared in this thesis, as not all of them could be analysed due to time and word-limit restrictions. The nine dimensions from Mische (2009) were used to analyse the interviews as framework, to help comparing the imaginaries. The interviewee's anonymity was preserved by using pseudonyms and neutral genders pronouns. The pseudo for scientists are Scientist Interviewee followed by a number from one to seven, and the abbreviation SI1 or SI2 are used. For farmers, Farmer Interviewee is used as a pseudonym followed by the number one to five, and abbreviated by FI1 or FI2 in this thesis for example. These

pseudonyms allowed me to preserve the interviewees' anonymity but still making a distinction between them and between the two groups.

### 3.3 Reflexivity on the researcher position

As I performed interviews, there is a need to reflect on my position as a researcher. As explain by Creswell and Creswell (2018:260), the researcher should reflect on two main points: *"Past experiences and how past experiences shape interpretations"*.

I started this thesis with a plant science background and a previous master thesis about pesticide, therefore I have personal understanding of pesticides which may have been shaped by these past experiences. These past experiences already directed me into choosing the subject of this thesis. I have personal interests into pesticides and the role of science within society. I also recognize that this background may have influenced the way I structured the interview guides. This background may have also influenced my choice in interviewees. During the interviews I tried to stay open to any opinion that may be shared during the interviews. I tried to stay as engaged and neutral as possible during the interviews, in order to create a safe place for the interviewees to share their answers. The analysis of the collected data may have been affected by my own perspective. Indeed I had to make choices, in which data I was going to share in this thesis, my personal background could have had a play in which themes I deemed more "important" to share in this thesis. However, I seek to share contradictory and diverse opinions within the results as openly as possible. I reported results as they were shared with me and decided to include direct citations from all twelve interviews, to be show as many opinions as possible.

## 4. Results

### 4.1 Scientists results

#### 4.1.1 Pesticide as an old embedded tool

“There is also a societal challenge because pesticides, we can see them as common goods, tools for plants protection and, so limiting the resistance phenomena it is a way to protect this common good in the long term”

These statements made by SI3 highlighted the place of pesticides as more than a practical tool in the agricultural world. Pesticides are understood as an important actor of the society and the French economy. When asking about actual practices and possible futures around pesticides, a subject that came up as common between most of the interviews is that pesticides are not just a tool by themselves but are part of a bigger model. Indeed pesticides are part of the agricultural model and are described as embedded in it without a real possibility to see it outside of this model. This is supported by SI4 and SI7:

“The farming model is so integrated today, integrated in the sense so many things are so hooked”. (SI4)

“ Indeed it is to realise how pesticides are only a micro dimension of a more global farming model” (SI7)

Here pesticides are enclosed within the agricultural production as one of the main tools that allow to keep up with the production demand. Therefore, pesticides are not an object outside of the society but a tool created by and for the society. As pesticides are described as an integral part of the system, continuing this said system without it seems not possible under the actual agricultural conditions. This argument could be understood as a justification to continue pesticide use, which has been a result of farming intensification. SI1 explained that pesticides

“Existed for a long time, but their use has increased when agriculture intensified to feed populations after WWII. Therefore there was a need to protect crops to guarantee a certain yield”.

The idea of removing pesticides induced worries for the farmers according to the scientists. Most of the scientists, when asked about the possibility of removing pesticides, talked about farmers' incomes, and how we are not ready to support a system like that. Possible alternatives cannot compensate for the loss of yield and therefore the loss of incomes. This situation is not seen as favourable or even possible without support as previously explained by SI3 and supported by SI5:

*“I think we are also realising that setting up alternatives for pesticides will generate a greater uncertainty about yield and farmers’ incomes so we need a diversity within practices or crops to maintain a safety [net] for farmers” (SI5)*

*“There should eventually be a source of incomes for the farmers who would put it [alternatives methods] into practice to compensate the small income losses” (SI5)*

The need of a change at societal level to effectively reduce pesticide use is mentioned by several interviewees such as SI2 :

*“But if we want to go toward very consequent reductions, we need to give ourselves the means at societal level and not just at the farming level.”*

From a scientific perspective, proposed alternatives are not as effective as pesticides. They require more work and time in the field to assure their efficacy, whereas pesticides do not require that much work. SI6 related to this:

*“I see that there are technical impasses so we try to substitute pesticides, especially synthetic pesticides by products from natural origins and we see that they are less effective. It implies to go over crops several times whereas with a synthetic product, only one time is enough.”*

Pesticides are described as a tool that help producing incomes thus it could be understood that pesticides are an integral part of the national economy. As explained by SI3, this aspect can be forgotten, inducing to perceive pesticides only as a production tool. From an external point of view, the understanding of pesticides only as a production tool leads to perceive pesticides as easier to remove from agricultural practices.

*“When we talk about pesticides we cannot just say that they are toxic molecules, it’s true but it is more complicated than that, there is a lot of other aspects. But it’s true that in the collective imaginary, we have a tendency to reduce these aspects.”*

As pesticides became an inherent part of the agricultural model over the years, they became an essential work tool that help produce financial benefits but also support human food production. The food perspective is one of the main arguments from the scientists as for why pesticide use cannot be completely stopped. Without pesticides, the food production would not be possible at the existing level. Yield and income are seen as important arguments for keeping pesticides. As stated explain by SI1:

*“We need to guarantee a certain level of harvest to feed the population.”*

Pesticides are needed to support food production. Therefore, reducing pesticide use would require a deep societal reflexion and change that cannot happen only at one



level. It has been explained that a change in food consumption patterns could be a necessity if we wish to reduce pesticide use. To change this pattern there is a need to bring all actors who are deemed important for this conversation around the table as supported by SI7 :

*“I think that at the same time there is farmers but who are taken in a chain [of value] that concern the industrial[...] until the consumers [...] there is a great number of concerned actors.”*

One of the most important actors apart from the farmers, that scientists mentioned in the interviews, are the consumers. Consumers are described as actors who can influence what is produced meaning that it could also influence pesticide use. Indeed as explained by SI5 :

*“There is a need to educate the consumers because for example, a strawberry variety needs very less treatment, it is genetically resistant to a fungus but the consumers, this variety, it does not sound familiar for them so they [consumers] do not buy it so farmers are not producing it.”*

To enhance this, SI3 explained that consumer's sensibilisation and education are imperative:

*“It is necessary to form users, produce scientific and technical knowledge for them for the products to be used with the smartest way and with the smallest impact possible.”*

Another problem that was brought up regarding the consumers by the interviewees, was the difficulties for consumers to clearly understand what it implies to stop using pesticides. They explained that:

*“Do you agree to get rid of pesticides? Everyone will say yes but if we tell you that we are getting rid of pesticides but increasing the food price by three, because of the consequences that would follow. Here, we are going to tell you it's more complicated” (SI4)*

Therefore, we can wonder if this is a barrier to change the actual farming model. Regardless of the previous justifications of pesticide use, scientists have brought up problems with it. One of them is the increase of resistance of pests to pesticides, which seems to be a threat to the actual farming model. This call for a change in practices as the future pesticide use is threatened by these resistances. Another problem to the possibility of stopping pesticide use would be the absence of effective alternatives according to the scientists. Therefore pesticides are a multi layered problem for which some interviewees called for change from society to proceed with an effective practices shift.

Following some examples of this argument:

*“So dealing with resistance it’s really a challenge that concerns several aspects. Firstly, the protection of the environment and of the human health but also keeping tools that are economically usable, profitable for the farmers and which can also allow to protect harvests in quantity and quality” (SI3)*

*“It is also [needed to] tolerate the presence [of pests], without systematically resort to treatment. Also to tolerate the yield declining a little. I think we really need to change paradigm to successfully limit their use.” (SI5)*

#### 4.1.2 Pesticides as dangerous

All scientists interviewed acknowledged the dangerousness and toxicity of pesticides for the health and the environment. They brought up pesticide impact on neurodegenerative diseases as a health concern, water pollution for example or pollinator decrease and impacts on bird populations as environmental concerns. Another concern is that negative effects could only be visible in few years, as we are only seeing today effect of past use. SI7 encapsulated it with the following reflexion:

*“Indeed, today when we see the sanitary, human health, biodiversity, or water pollution impacts of these products which are scientifically proven. The question about the possibility to maintain their use arise. In parallel with the fact that they are contributing to develop a farming system which question its durability at medium/long term.”*

#### 4.1.3 Pesticides in future imaginaries

I proposed three different scenarios to the interviewees: a future where pesticide use are forbidden, a future where pesticide use is compulsory, and a future continuing today on a time scale of 2 years and 20 years.

Before diving into the different scenarios it is important to note that in most interviews not every theme mentioned below are mentioned by all interviewees. During the interview, if a subject is not brought up spontaneously by the interviewee (economy, environment or society) I may have specifically asked a question about it.

The meaning of the term pesticides has been specified by most of the interviewees before delving into the scenarios. Interviewees asked about what I meant by pesticides, and sometimes added that organic products are also pesticides. This is highlighted by the following citation from SI3 :

*“So here, I guess you are talking to me about synthetic pesticides only? So it means that we can use biocontrol products or natural pesticides. Although natural pesticides does not mean without impacts, we need to be aware of that.”*

### *Scenario 1: Pesticide use is forbidden*

#### *In 2 years*

Different futures were imagined among scientists. All scientists had different imagined future, however some themes were recurrent. The first theme would be the achievability of this scenario within 2 years. Depending of the interviewee, it could be achievable or not, but this achievability also depends on the societal subject. For example most of the interviewees did not think that this scenario would have visible results regarding the environmental impacts within 2 years. As SI5 explained:

*“So I think that a very short term... We need time for the equilibrium to happen between the different species at a territory scale. So maybe we would not see too much effect at the 2 years’ scale.”*

Whereas SI1 said that effects of non-pesticide use could be visible within 2 years. The impact of such scenario on productivity was also brought up. Within most of the imaginaries the productivity would be negatively impacted. Such as within SI2 imaginary where they stated:

*“Yes in 2 years there is an immediate production collapse. But a collapse in the sense that there is a strong diminution of production. If the ban [the interdiction] is applied obviously.”*

This has been supported by SI3:

*“I think we would see a decline of farming production and so it means that from an economic point of view less export and more import. So from an economic point of view it would be complicated.”*

The productivity is therefore interlinked with the import or export and on a bigger scale the overall economy. Several interviewees talked about the export and import that would either be reduced or increased. Respectively SI6 and SI7 also brought up such subject:

*“It depends if other countries would also have the ban [the interdiction] or not, I think. In my opinion, if they do not have it, there would be a tendency to import massively to cover the yield’ losses that would happen in France”*

*“I think here again there would be a major societal crisis which would not involve the same actors. It would certainly cause a very big economic crisis also because there would, obviously, be a very sharp decline in yields on production that is strongly destined to export today.”*

The future is also quite negatively thought in a general aspect. The impact of such scenario on the farmers and the farming model was brought up several times. As the actual model still relies on pesticide use, getting rid of it would mean a need of a complete change of this model. This resulted in an uncertain or a chaotic future.

*“I think that in a first time, it would probably be quite catastrophic because ,at the moment, alternatives are not available, at least for some crops and some pathogens” (SI3)*

*“So there would be an uncertainty on what it would cause for the farming model. Would we still have a farm concentration always so important? It is not evident, because the farms’ concentrations do not only depend on pesticide use.” (SI4)*

Some solutions to face these uncertainties were brought up such as an economical compensation for the productivity and yield loss, or more a general help for the farmers are needed within this scenario. Solutions weren’t brought up by all interviewees. These solutions would be necessary in order for this scenario to happen but also for this scenario to stay possible as long as possible. It is highlighted by the two following examples :

*“Farmers are producing a crop, have an activity because it generates an income for them so from the moment where the crop is not profitable anymore for them, they will stop this activity. We need to give them the means to make this crop, this investment worthy of generating an income” (SI3)*

*“What is needed is that the farmers have incentives[motivational] aids to eventually put into place agroecological infrastructures in order to favorise everything that is biological control by conservation.” (SI5)*

### *In 20 years*

Most of the interviewees imagined the future within this scenario similar as within 2 years, but when asked about the environment, 20 years seemed to be a more acceptable time scale to see results of non-pesticide use.

*“On the contrary, we would see clearly an effect on the environment with a diminution of soil or water contamination. Organisms who would be capable to colonize again a certain number of habitats who were not accessible because they were treated, wich will induce an increase of biodiversity [...] That’s a virtuous circle which would lead to an amelioration of health and the environment.” (SI1)*

*“So yes, at the environmental level it starts very quickly, in 2 years we will not see enough things but in 20 years, there is a potential rebound of insect population.” (SI2)*

However, SI2, brought up the uncertainty of a real impact of stopping pesticides. Indeed, they explained that climate change is also a huge factor for the environment,

therefore only stopping pesticide use does not guarantee a better environment. This highlights the perceived position of pesticides within society at large.

Another thing that was highlighted in these future scenarios was the possibility of actually transforming the way farming is done. Indeed, some interviewees said that the 20 years' time scale would actually allow to put a new farming model into practice, such as buying directly from farmers :

*“Knowing that farmers produce less, they will need to sell more expensively so going through middlemen will increase the price more, so people will not buy. I think people go to the supermarket, for example, because there is choices and I am telling myself that if everything is available at the farms, for fruits and vegetables, then maybe it would encourage people to go there and there would be fewer middlemen” (SI6)*

Lastly this scenario was not imaginable for SI2 if this happened only at the French level because of the European Union rules. This scenario would not be beneficial for the French farmers who would be in competition with other European farmers within the French market as explained:

*“It is not possible. At the French scale only it is not possible. What is the most problematic with your scenario is not that France does not have pesticides anymore but it is that it is not homogenous at the European level” (SI2)*

## *Scenario 2 : Pesticide use is compulsory*

### *In 2 years*

In this scenario, its feasibility in a 2 year time scale is questioned again. The perspective of seeing the results of the scenario is not very sure and clear.

*“In 2 years, we would start to see effects because from the moment where a pesticide is applied, it will be found in the soil, in the water according to their mobility and persistence properties.” (SI1)*

Interviewees envisioned a variety of imagined futures with different themes. The environmental theme is also talked about among the interviewees. However, in this scenario the imaginaries are more negative than previously. Under this scenario, the environment could be worse than today.

*“I think that it would be quite easy, you would have totally impoverished soil in 2 years, maybe we would not see it at this scale but we would start to have weakened soils. We would start to have farming that is becoming even more intensive, in any case this is the scenario we could imagine because you know that chemistry, pesticides accompany the intensive farming.” SI4*

The scientists also brought up the problem that mandatory pesticide use could possibly cause to the organic farming. If pesticides are compulsory to use, it was

brought up by several interviewees that it would not affect all farmers. Indeed farmers who are already in conventional farming would continue with “business as usual”. Another effect of such a scenario would be the intensification of farming. Crops would be bigger and less diverse as explained by SI4:

*“An intensification, it means that a grouping of big farming exploitation, so there is always this movement. Bigger farming exploitation who does more and more savings, being owned by a group who is ever more restricted”*

And supported by SI5:

*“We can imagine that we would have a uniformity in term of production conditions of big surfaces , finally we would go back on something very intensive in term of crops.”*

Interestingly, some scientists started their answer by a question, looking for a deeper explanation of this scenario. SI4 wondered if that meant no more alternative methods and SI3 asked if compulsory meant that we still could use alternatives methods. This could show that this scenario induces more uncertainty than the scenario where pesticides are forbidden to use. Human health was also brought up as a concern. Following I give you an example:

*“There is more diseases, because with more use of pesticides that are less controlled etc, so there would be more and more direct and indirect diseases.” SI4*

When asked about how the economy would look like in this scenario, interviewees brought up the differences that could be caused between the companies that are producing pesticides and the companies that produce organic products for example, as explained by SI7. For SI3, the economy would be valorised on the short term but not on the long one due to the environmental impacts which would not be “compensated by the yield anymore”.

For some interviewees this scenario would be really negative, which would be worse than our actual situation. SI4 described the future within this scenario as “a world that will not be so much better but would be way much worse” than the actual one.

### *In 20 years*

For some interviewees the time scale of 20 years increased the effects of the 2 year’s scale. SI1 talked about “major effects on biodiversity and habitat contamination”, SI2 about how in 20 years “we could have real pollination problems” and SI4 said “It would be probably worse” compared to the 2 years time scale, SI4 also described this future as “apocalyptic”. SI6 also stated that “I think in 20 years, there would be more standardization”. If everyone can project themselves in 20 years,

the future under this scenario would not be great for human or for the environment. This vision of the future is nicely explained by SI5:

*“I think that we clearly see at short term we cannot see some things because it will depend, as we say if there is a decline in reproduction rate for example of birds, in 10 years there will be an important drop in their numbers and then it will accentuate in 20 years, we risk to have really important losses in all food chains”.*

### *Scenario 3: Continuing with today as a basis*

#### *In 2 years*

This scenario was added after few interviews, therefore not all interviewees had the opportunity to reflect on it. The interviewees had different visions of this future. SI4 had quite a negative vision as they stated that it would mostly be *“a future in which we globally exhaust the planet resources”*. On the contrary SI6 stated that in 2 years it would be the same as today. And lastly SI3 explored a third possibility as they explain that *“today we are not in an extreme”*, that *“things are moving”* and *“a lot of initiatives to promote alternatives practices”* are happening. Here we can see three different future imaginaries, a negative one, a “business as usual” one and a lastly a positive imaginary. SI7 brought up the uncertainty that farmers need to face regarding pesticides legislation which do not help to see how the future would look like. Lastly the feasibility of a future in a time scale of 2 years was brought up by SI3 :

*“So we need to organise time over time, we need to try to do that as fast as possible but it cannot be done within 2 years. We need to deeply change farming organisation and its ways to produce.”*

#### *In 20 years*

The time scale of this scenario has been brought up by several interviewees. SI3 explain that it is *“more realistic”* even though 20 years would be the middle scale. Whereas for SI1 this scale is uncertain. Indeed they explain that how this future would be:

*“It is complicated to say because in agriculture, we are in a transition phase where conventional practices, organic farming practices, even zero-pesticide practices are co-habiting.”*

Therefore, how the future would look like is complicated to explain, depending on which way we decide to go, even though they gave some descriptions, the uncertainty is very present. The feasibility of this scenario would depends on the alternatives found and the public policy. One of the recurrent problems of this

scenario would be that resistance would continue to happen and therefore a change in practice is needed. SI5 highlighted it by saying:

*“We have the impression that pesticides are less and less effective against the apparition of new resistance. So at some point if we want to continue as today, there is a risk to have more damages and increasing doses. So finally stay as today without change is not viable so, anyway, we need to think differently”*

## 4.2 Farmers results

### 4.2.1 Overall results

The interviewed farmers had quite diverse answers to my questions. Although some common themes were shared. Firstly, it is important to note that most of the interviewed farmers are combining their pesticide use with other alternatives methods. Indeed, it has been highlighted by several farmers that if an alternative method was working well, there is no reason for them to not use it. For example, FI3 uses conventional pesticides as well as the implantation of beneficial insects, that are predatory insects for negative insects, and they also use mating disruption. FI4 also use this method, they also started to apply clay in addition to other more conventional pesticides.

Interestingly when asked if non-organic farmers could transition to organic farming or if something could motivate them to do this transition, the conventional farmers said no. FI5 explained the organic label was to be paid for. Therefore they did not want it, they should not pay for it. FI3 pointed out that “ *There are no alternatives [methods], there are things where there is no alternatives*”. FI2 added that :

*“It is not a question of laziness but it is a question of time schedule. We are doing some things on the side [to farming]. We recognise that there is a certain comfort to use pesticides”.*

The size of the exploitation, the freedom to use pesticide or not were also other arguments advanced by some farmers.

Secondly, the definition of the term pesticide was questioned during the interviews. FI4 stated “*When you are talking about pesticides the word [meaning] is wide. In organic [farming] it is also pesticides. Pesticides can be organic or not organic*”. This statement is supported by other farmers.

Additionally the displeasure of the use of this specific term “pesticide” was brought up by all farmers regardless of their type of farming. When I asked a question about if they preferred the term “pesticide” or the term “phytosanitary product” and why, farmers explained that they preferred the second term. FI5



explained that *“It is a negative connotation: pesticide. Pesticide it is true, it is often employed by people who fight us, because it scares, it is the pest [disease]”*. Another farmer, FI2 explained that: *“You are right, phytosanitary product, it means exactly the same thing that pesticide but it is less connotated danger for the health”*. The negative connotation of the term pesticides is an argument that was used by three farmers and the argument of the “pest” (as the human disease) was used by three farmers.

Another worry of the farmers is the current restriction of active substances in France that is not the same as other countries. For example, FI5 stated that *“We do not want to re-use products which have been forbidden for 18 years, we would like that it is forbidden for them [other countries] too.”* This is perceived by the farmers as causing an *“unfair competition” (FI5)* for French farmers.

Farmers feels like they are not heard and sometimes abandoned. FI3 highlighted this by saying: *“We are abandoned and few people care”* and *“We have the impression to not be helped by the research”*. This is supported by FI5 who explained :

*“ At the same time we have difficulties to fight against taken decisions because we see well that we are not specially listened and heard”.*

The economical aspect of pesticide use was also brought up by several interviewees. Indeed, according to FI3 *“every year prices increase”*. FI3 and FI2 agreed on a price of 500 euros per litre for some phytosanitary products, so FI2 explained that *“ I do not know a lot of farmers who when they buy a product at 500 euros/litre, have fun putting too much on”*. FI4 explained that prices of product was according to their novelty:

*“It depends, it [price] depends. What is new is expensive in conventional, in organic or in IPM. When it's new it's expensive, when it's old it is cheap. An organic pesticide which is new will be expensive, a chemical pesticide which is new will be expensive”.*

For some farmers, consumers are part of why pesticides are still heavily used today. FI2 highlighted the dilemma between consumers and production:

*“ A cheap food plate needs an industrial and productive farming, full of pesticides, do not dream. When we can afford it, having fresh [food] it is great but we pay it three times more expensively for this plate but I mean is that it is a choice. And it is the consumers who have this final choice. No one forces people to choose in supermarket so it is them finally, in advance, who will produce this type of landscape and farming.”*

It is supported by FI1 who stated that what farmers are producing what consumers want and consumers eat what is produced. They also stated that producers,

consumers, and policy makers should all work together toward the farming evolution.

#### 4.2.2 Pesticides in futures imaginaries

##### *Scenario 1: Pesticide use is forbidden*

###### *In 2 years*

In this scenario, the future is quite different depending on the interviewee. The overall feeling is quite negative, like the next scenarios. FI3, imagined it as “*a starving*” future, they also used a comparison with French hospitals: “*It is like imagining that we suppress all French hospitals and all doctors and nurses in France.*” The chaotic aspect is also brought up by FI1 but they said that it may be a less chaotic than the scenario where the use of pesticides is compulsory. But for FI4 this would be “*catastrophic*” if all types of pesticides are forbidden. FI2 also brought up the possibility of protests, and they mentioned that with this scenario, the price of food would increase. Indeed they stated:

*“Would people accept to pay a baguette 2,5 euros? Would people accept to pay 20 euros for a chicken?”*

However they also continued with “*It is strictly impossible [this scenario] so personally I do not imagine it*”. While arguing that they are not imagining it they were worried about what the firms who are producing pesticides will do. They supposed, that the firms could send pesticides to other countries.

Economically for FI2, the country would “*collapse*”, yields would “*fall drastically*”. FI4 continued with this idea as for them we will not be able to feed ourselves, however they are doing a distinction between biocontrol pesticides and chemical pesticides, and if only the last are forbidden then only a certain people will be able to feed themselves, because production would be more expensive.

###### *In 20 years*

First it has to be noted that this scenario was not asked in some interviews, due to time constraints but also due to my role as an interviewer that forgot to ask. Therefore, only FI1, FI2 and FI3 shared their imaginary of this time scale for the scenario.

For FI3, this time scale will only “*report the phenomena of 20 years.*” It shows that they imagine the future similarly that within the two years’ scale. FI2 could not imagine this future because of the changes that may happen politically. However, they questioned if farmers would like to go back to their grand-parents farming practices, and how middle size farms will be the most impacted ones. They also highlighted that like in the two years scale, it would impact negatively production

leading to less incomes. For FI1, this *“total ban [interdiction] will not be possible”*, and this will be a complex future whereas evolution is possible.

### *Scenario 2 : Pesticide use is compulsory*

#### *In 2 years*

This future is quite negatively envisioned by the farmers, but these imagined futures are also quite different for each interviewee. Firstly, FI5 said they *“prefer to not imagine”* but they also said that they do not agree with this scenario because *“It will be complicated because if we use pesticides excessively, or insecticides, things like that, I think that we will see a lot of insects disappear which are useful to us, such as bees.”* FI4 also said when asked specifically about chemical pesticide use becoming compulsory that: *“We are not in this situation, I cannot imagine it. The global approach of society is not going in this direction. Neither is research.”* FI2 also said that they do not think this scenario is doable therefore they are not imagining it.

It seems that each farmers' future imaginaries are quite individual with few common themes among them. Indeed FI3 described this future as *“a starving”*, whereas FI1 highlighted the *“economical disaster for the exploitation [of farming]”* as there is no more choice. They also said that *“I think it would be more like war between those who are for and those who are against”*. Also when asked about how they imagine how the society would react to this scenario, FI2 mentioned protests. For FI2, this future would not be inherently negative, as they explained:

*“I do not think that it would make a great difference for my exploitation as long as I use it [pesticides], it is mainly for those who do not use them [pesticides]”.*

Nevertheless, they stated that this scenario is not great as it takes away choices for those who do not want to use pesticides. This argument is also supported by FI4.

It should also be noted that in general, this future is not very descriptive with images but is more oriented toward possible consequences of the said scenario.

#### *In 20 years*

In this time scale, FI1 said that it will still be like *“a war”* and *“chaos”* between those against pesticides and those for. Whereas for FI4, in a scenario where the chemical use of pesticides in this time scale is, that they still cannot imagine it. FI5 also said *“in 20 years, me, I do not see how we will be able to feed the planet tomorrow, I mean the population, by limiting our production”*. This places pesticides in the centre, maybe as the motor, of food production. Indeed FI5 continued by saying that *“There will be more starving that already exists, in the world”*.

FI2 proposed a possible solution to pesticide use: GMO. They explain that in this scenario it would be *“one of the solutions for the future to avoid pesticides”*. They also brought up that it could be however a scary solution for some, because of its meaning, therefore maybe the name would be changed. Regarding the economy they stated that like within two years, *“I think 90% of farmers use it [pesticides] so it would not change much”*. And they brought up again that if would not be good for those who chose to not use pesticides, it would be *“scandalous”*. FI3 also highlighted the difficulties to produce that could arise with this scenario because it would disrupt the earth equilibrium, and we will have a *“desert”*.

### *Scenario 3: Continuing with today as basis*

#### *In 2 years*

This scenario is imagined in a more positive light than the previous ones. Indeed, FI3 explained that this scenario would probably better than the previous ones. For FI4, changes are happening, and *“it is done bits by bits and it works very nicely”*. However, for FI2 this future is a little blurry, and for FI1 there is a need for an evolution. FI5 said that this future would be quite similar to what is happening today as they stated: *“In two years, seeing the evolution at the rhythm it is going, my opinion is that nothing will have changed”*. Another important aspect for this future is that the evolution happens without any *“technical impasses”* (FI4). FI2 added that norms regarding pesticides are evolving but they are not applicable.

#### *In 20 years*

The time scale of 20 years seems to bring difficulties to imagine the future in this scenario, as for some farmers it is a too short time scale to see changes. Indeed as explained by FI5, *“20 years, certainly [ changes] but it will not change everything, it not likely.”* They added that *“Maybe we needed 100 years for changes to happen [...] I think that even 20 years it is too short to see change.”* FI2 explain that there is not clear direction for how to go about in 20 years, therefore *“People try to manage but what I mean is that we are navigating a little at sight”*. FI5 added that to see changes:

*“ It should retake the place it deserve [human food] , that it is the priority of every one but we are not there yet, we are very far away”.*

However for FI4, firms that are fabricating pesticides are working toward *“more flexible products, less toxic”*, so in 20 years these products would be mainly what can be found. They also talked about how requests and *“imaginaries”* from the consumers will change in 20 years.

### 4.3 Comparison between scientists and farmers results

Scientists really highlighted how pesticides are embedded within the farming practices making it difficult to see farming without them. This could also be seen from some farmers perspective because of how they imagine future scenarios. Even if farmers did not describe pesticides as deeply rooted like scientists, it has been clearly explained that a future without pesticides would be complicated.

The rise in food prices if we stop using pesticides has been brought up by the two groups, regardless of the scenario. In addition, losses in the farmers' incomes are another shared worry by some scientists and farmers. This is most of the times, linked with the reduction in production due to less pesticide use but also of the prices that practices with no pesticides will generate. Consumers and public policies have been brought up in several interviews. Consumers, as explained by some scientists and farmers, play a major role in how both scientists and farmers imagine the future.

The definition of "pesticide" is another important subject that has been brought up by most of the interviewees. Sometimes more promptly than others. Such as FI2, with whom we created two distinct scenarios, one for all types of pesticides and another one for only conventional pesticides. This need of clarification has been highlighted from scientists by questions such as what I mean by pesticides but also explanations that pesticides are not only chemical/conventional and can be used in organic farming.

Lastly, differences in imaginaries can be noted. Most of the future imaginaries from the farmers are negative with even a few interviewees who couldn't imagine it. Words like catastrophe, chaos or war were used by several interviewees. For scientists, even though futures without pesticide could be described, such words were employed way less and all scientists could imagine a future in all scenarios. They also used more images and described these futures in more detail than the farmers.

## 5. Discussion

### **How are pesticides imagined amongst farmers and scientists in French society and is there a difference between them?**

By using Mische (2009) nine dimensions of projectivity we can look at how the two groups project themselves in the three different scenarios, and use it for comparison. Starting with the scientists and with the scenario where pesticide use is forbidden. The interviewees have a more developed imaginary on the short term than on the long term (Reach), they do tend to have a single and precise trajectory (Breach), their imaginaries are quite clear and certain. These futures are quite contracted due to the economical perspective (expendability), they are social and quite connected. Finally we could say that the genre of this scenario is tragic or maybe pragmatic. For the scenario where pesticide use is compulsory, scientists have in general less described imaginaries than the previous scenario. This scenario has similar Reach, Breach but is less clear and certain than the previous one. This scenario does not seem to expand but to be quite contracting, it is still a quite social scenario. The genre for this scenario could also be tragic. For the final scenario, as explained in the results section, the interviewees who thought about this scenario were not all questioned about the two time scales and some interviewees were not proposed this scenario, making it complicated to use Mische (2009) dimensions as a whole.

For the farmers' imaginaries, in the scenario where pesticides are forbidden to use, the short term is generally more developed than the long term imaginary, the trajectory is quite precise, however not so clearly described but they are quite certain, fixed. These imaginaries are mostly very contracting, reaching to an end. However, we could see them as social only to a limited extent, and quite disconnected. The genre of this scenario is definitely tragic. The second scenario, where pesticide use is compulsory, the futures imaginaries are imagined at the same level of description at two years or 20 years, they have a quite clear, certain and contracting. They also have a certain level of sociability and connectivity. I would say that the genre is tragic, maybe dystopian. The last scenario, continuing as today, is less developed than the two others, the trajectory is not precise, not very clear and quite uncertain. On the contrary to others scenarios this one seems expending instead of being contracting, social and disconnected with open possibilities. The genre would be pragmatic. All this analysis was done following my personal understanding of the nine dimensions of projectivity from Mische (2009).

The previous analysis was done by grouping all scientists' imaginaries for a scenario together and grouping all farmers' imaginaries similarly. We can see that there are small disparities between the different scenarios, but also between the groups in general. One notable similarity would be the genre. Indeed, most of the genres I attributed to the scenarios are tragic or at least pessimistic, as we can see

from the results. Even though, as explained in the background section, alternatives exist and are researched, and as supported by results they are not imagined as successful possibilities for the future.

While every scenario offered different imaginaries within the groups and between the groups, Mische (2009, see in Ehgartner and Welch, 2024) highlighted that the way people talked about their futures projections but also their clarity and genre could be influenced by the interviewee “*educational and socio-economic background*” (Ehgartner and Welch, 2024:8). No questions were asked about it to the interviewees, however we could suppose that the diversity of future imaginaries could possibly be due to this.

Scientists and farmers had different ideas of how the future will look according to the different scenarios. Future imaginaries are quite individual, but some common themes can be found among the interviewees. Society and its functionality could be understood as the central worries among all interviewees. The worry of non-beneficial changes in society if we stopped using pesticides could be understood as how the interviewees “*imagine their social existence*” (Taylor, 2004:23). Pesticides are imagined as primordial for farming to produce which is essential for survival. Pesticides are expected to still be present in the future, as future without are quite negative or not imaginable. However, they are generally imagined as different as today. An evolution regarding pesticides is expected to happen as we are today in a transition period. It seems that as pesticides are deeply rooted in the farming practices it is expected that they will be in the future but it is also expected that they may not be under the same form. However consumers’ “*expected expectations*” (Bazzani, 2023) according to farmers and scientists would be to stop pesticide use.

### **How and why are these imaginaries constructed the way they are?**

Firstly, the understanding of the word “pesticide” seems to be a possible important reason for how the different imaginaries are constructed. Some scientists and most farmers needed the clarification about what I meant when I was saying “pesticides”, and several interviewees highlighted that organic farming were also using pesticides. I didn’t define “pesticide” or asked the interviewees to define it, and I never said that organic farming were not using pesticides. It stresses that within society, pesticides can be understood differently depending on the person. The meaning of pesticides can therefore be understood as personal and developed over time through interactions which could be related to symbolic interactionism. As Blumer (1969) explained we, as human, give meaning to things which are coming from social interactions, but meanings are also shaped and reshaped through every interaction we may encounter. The meaning each interviewee has of “pesticide” have been shaped through out their life which may influence the way they are imagining pesticide use. Taylor (2004:25) explained that “*If the understanding*

*makes the practices possible it is also true that it is the practice that largely carries the understanding*". Therefore, personal understanding and imaginaries of pesticides could be affected by the interviewees' own practices with pesticides but it can also be the other way around. Practices can influence interviewees imaginaries.

As explained previously pesticides are understood as embedded within society which induce difficulties to imagine a future without them. One of the reasons given for the need to continue pesticide use, but also for discontinuing its use, was that consumers want cheap products but also non-pesticide treated food. Therefore, both farmers and scientists often saw a change in consumers' imaginaries as necessary. This imaginary seems to be recurrent, as according to Fischer et al. (2025) and Fischer et al. (2024) consumers are often portrayed as central agents when scientists imagine how to change agriculture. Fischer et al. (2025) explained that this focus on consumers but not other actors ignores the influence that for example agrochemical corporations or supermarkets have in how food is produced, and how it is marketed to consumers. In this study consumers are portrayed as the one influencing what is produced, therefore they are the ones for whom pesticides are used, in order to satisfy their demands. We can however question if consumers are the only actors who are playing a part in this problem. Indeed it was brought up that a lack in alternatives to pesticides are also partly why pesticides are still used. The food production is also another reason which motivates the use of pesticides, while acknowledging the impact of pesticides on the environment. These three arguments highlight the interviewees perceptions that we need to still produce food on the same amount but in a more sustainable way. This seems to fit into the "sustainable intensification" imaginary which place sustainable food production as a central point for the future. (Bernard & Lux, 2017, Fischer et al, 2024).

### **How might these imaginaries influence pesticide use and policies governing usage?**

Pesticide use may be influenced by people's imaginaries of them. As seen previously future pesticides imaginaries are personal and may differ according to different factors. Farmers are the primary pesticides users, and in Europe they have been protesting, among other reasons, against new environmental policies for few years now (Matthews, 2024). I have not found scientific research papers studying specifically farmers roles or influence in policy making. From my personal understanding they have not taken, as individuals, an active part in policy making regarding pesticides. Even though they may not take part in the process of policy making, they do have a certain power through protests. For example, in 2024, the Ecophyto plan was paused for some months after intense farmers' protests in France (Barbu et al., 2024). However, the plan started again in may 2024 with a change in indicators (Ministère de l'agriculture et de la souveraineté alimentaire, 2024),



which is contested among scientists (Barbu et al., 2024). Farmers are also still unhappy with the plan, and as we could see in the results, interviewed farmers feel quite abandoned and not listened to. We could understand this, as farmers not being part of the policy making process, and therefore also their imaginaries, at least not directly. Bjørnåvold et al (2022:24) supported that *“to bridge the gap between farmers’ perspectives and policy”* policymakers could visit fields, more dialogue and collaboration between them and farmers, or a more active implication of farmers could be supported.

Scientists on the other hand, seem to have more influence in policy making. Firstly, France does have several governmental public research institutions such as INRAE (Institut national de la recherche pour l’agriculture, l’alimentation et l’environnement, National institute of research for the agriculture, food and environment) or CNRS (Centre National de la Recherche Scientifique, National Center of Scientific Research). I would argue that scientists do have a certain influence on policy making. More generally, scientists can be asked to be advisors on environmental subjects, even though this role is not fully outlined (Spruijt et al., 2014). Scientific uncertainties are one of the reasons why policymakers may not take into account scientific results, knowledge and worries (Spruijt et al., 2014). Spruijt et al. (2014) explained that how scientists affect the process of policy making depends on the person knowledge, values, beliefs and context. The influence of scientist depends on personal and subjective conditions. Therefore a scientist may have an influence on policy making whereas another one may not. Relationships between policy and research have been explained by Boswell and Smith (2017) in four models: research can shape policy, policy can shape research, policy and research are co-produced and finally policy and research are distincts entities. Within the models were policy and research are dependent of each others, we can wonder about which research and which policy are priorities and how it is decided. Boswell and Smith (2017) highlighted that within the model where research shape policy, the research is pre-selected by policymakers. Research is not independently shaping policy. A last interesting aspect on how imaginaries can influence policy and pesticide use would be the role of media, Likens (2010) explained that media can be important actors in making an environmental problems gain attention which could possibly leads to actions. However, media coverage does not automatically induce reactions and actions, and if it does it can take quite some time (Likens, 2010). Therefore scientists’, but I would argue also farmers’, imaginaries can both possibly influence policy making through media, depending on which imaginaries could catch media attention.

#### *Limitations of this study and possible future researchs*

This study explored the imaginaries of two groups that were determined by myself and which could arguably have been different depending on the focus of the study. I chose to focus on scientists and farmers as a whole, but it would be interesting to sub-group these groups. Indeed focus studies on different types of scientists such as toxicologists, ecologists, agroecologists, ecotoxicologists, economists, social scientists etc... could be interesting to research. Similarly for farmers, distinctions could be made between conventional farmers, organic farmers, in-transition farmers, farmers who use organic and non-organic methods etc... Investigating more precised groups could possibly also show different imaginaries and maybe more “grouped” imaginaries. Another angle for possible studies could be gender-based studies or age-based studies.

Exploring other groups imaginaries such as politicians or consumers and comparing them to scientists and farmers imagiaries could also be interesting as interviewees brought up the need for more collaboration and communication between the different actors of the pesticides debate.

Lastly in this study I interviewed 12 persons, it could be interesting, as the results are diverse, to interview more people. To obtain a great understanding of such variable and personal subject like imaginaries, there is a need to interview as many persons as possible. But I would argue that it is a valid argument for most of social sciences research if they wish to have a great and lasting impact on society.

## 6. Conclusion

Imaginaries are mostly dependent on individuality even though societal norms can help constructing them. Scientists' imaginaries displayed differences while also displaying similarities, and it is the same for farmers. These results and discussions highlighted the versatility in imaginaries between the same group and therefore between the two groups. These results cannot be applied to all farmers and scientists in France but may have helped to grasp the different future imaginaries of these groups. We saw how imaginaries may differ depending on the person and therefore on their personal experience, background and worries. Yet there are recurrent subjects such as consumers role, production intensification or the lack of effective alternatives that can be found across interviewees, which emphasise a certain common ground between the interviewees. Future imaginaries are not a fixed, linear phenomena, and are quite complex. Imaginaries may also have an influence on policies governing usage and pesticides depending on who is influencing. Indeed scientists seems to be more listened to than farmers for policies making. This study only focused on two groups, scientists and farmers, and in order to fully understand the impact of imaginaries on society other groups like consumers or politicians should be considered.

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# Popular science summary

Pesticides are a popular subject in natural sciences research, but they are less studied as a social sciences subject. Yet pesticides can be vastly discussed within society. In France, you can find a great deal of articles on various medias, and these past years it also became a recurrent topic between legislators, scientists, farmers, consumers, economists and others. Investigating pesticide within social sciences is then needed if we want to understand their place and role within society, especially in the future. How we deal with pesticides questions today can have a great influence on future practices and research.

In this study, I decided to investigate the future imaginaries of two groups of people who are important actors in France when we talk about pesticides. These two groups imaginaries, farmers and scientists, have been researched through interviews. During the interviews I asked about their worries, hopes for pesticides in the future and their practices with pesticides. I did this through three hypothetical scenarios. The first scenario was about imagining a future where pesticide use would have been forbidden, the second scenario was about imagining a future where pesticide use would have been compulsory and the third scenario was using today as a basis to imagine how the future would look like. These three scenarios helped to study how interviewees imagined the future regarding pesticides.

I analysed through the interviewees answers that how the future is imagined is highly depend of the individual. Indeed some common themes are shared between the groups such as the impossibility to go without pesticide, the consumers role and the need to keep up with the actual food production level. However if we are looking at the interviewees answers in more details, we would see the uniqueness of imaginaries. The results also show that the imagined futures can be constructed according the interviewee own understanding of pesticides subjects or socio-economic background. I also wondered if these imaginaries could have an influence on practices and policy making processes. I concluded it depended on the group, maybe even on the individual but influence of these imaginaries are definitely possible.

This study contributes in re-placing pesticides as a societal subject and encourages at considering it as such if we aim at changing pesticides practices in a durable and sustainable way. There is a need to get further understanding of actual pesticides practices difficulties to shift in order to actually produce changes, which are needed knowing pesticides effects on the environment and human health.

# Acknowledgment

I would like to thank all the interviewees who accepted to answer my questions. This study would not have been possible without you. I am really grateful for your kindness, time and insights during the interviews. I hope this thesis will be up to your expectations.

I am also very thankful to my supervisors for their help during the whole thesis process. Thank you Klara for your support which have been crucial especially during the interview process. Thank for your guidance and for all your answers to my anxious questions. I am also very grateful for your insights and comments while writing this thesis. Thank you Riccardo for your enthousiam about my subject, your ecological knowledge and your help with at the beginning of the interview process.

Thank you to all other students of the supervision group for your feedback, kindness and encouragement.

Finally, I am very grateful to all my friends but also my family who supported and cheered me up along the thesis. Without your support this experience would have been way more complicated.

# Appendix 1

## Interviewee guide for Scientists

Disclaimer – As explained previously the interviews were semi-structured, therefore others questions may have been asked and some questions can have been dropped or rephrased for some interviews. This guide was used loosely.

### I – Introduction

Presentation of myself and the project. Explanation of consent (withdrawing at any time of the project , why consent, how data will be used, how data will be stored, pseudo..) and recording methods. Asking again for the recording (on record, oral consent), if the interviewee has any questions about the interview, consent form, project or anything else before starting the interview.

### II- Interview part 1 – The interviewee

- Quick presentation of the interviewee

#### Personnal relations with pesticides

- Do you work directly or indirectly with pesticides?
- Could you explain your work with pesticides.
- Since when do you work with pesticides?
- Does working with pesticides is voluntary? What led to this choice?
- What do you think about pesticides?

#### Differents practices with pesticides

- What type of pesticide do you study? Do you study special types of pesticides?
- Are you aware of the health and environmental problems linked with pesticides? Could you tell me which one are important for you?
- Would you say you are more conscious of problems that could be caused by pesticides since you started working with them?
- How do you get knowledge about pesticide?
- How would you react if pesticide use was forbidden?
- How would you react if pesticide use became compulsory?

### III – Interview part 2 - Future scenarios

#### Scenario 1 – Pesticide use is forbidden

- Imagine if pesticide use become forbidden in the next two years, what would happen? Could you describe this future? (possibility to ask about economy, environment, society)
- Imagine if pesticide use become forbidden in the next twenty years, what would happen? Could you describe this future? (possibility to ask about economy, environment, society). Would it be different from the two years scale scenario?

#### Scenario 2 – Pesticide use is compulsory

- Imagine if pesticide use become compulsory in the next two years, what would happen? Could you describe this future? (possibility to ask about economy, environment, society)
- Imagine if pesticide use become compulsory in the next twenty years, what would happen? Could you describe this future? (possibility to ask about economy, environment, society) Would it be different from the two years scale scenario?

Scenario 3 – Today's pesticide use is the basis

- Imagine if we continue to use pesticide as we are doing today in the next two years, what would happen? Could you describe this future? (possibility to ask about economy, environment, society)
- Imagine if we continue to use pesticide as we are doing today in the next twenty years, what would happen? Could you describe this future? (possibility to ask about economy, environment, society) Would it be different from the two years scale scenario?
- Between these three scenarios which one do you prefer and why?

Finally I'll ask again if they have any question, if I can use anything that they said during the interview, and if I can make citations.

# Appendix 2

## Interview guide for Farmers

Disclaimer – As explained previously the interviews were semi-structured, therefore others questions may have been asked and some questions can have been dropped or rephrased for some interviews. This guide was used loosely.

### I – Introduction

Presentation of myself and of the project. Explanation of consent (withdrawing at any time of the project), how data will be used, how data will be stored, pseudo, ..) and recording. Asking again for the recording (on record, oral consent), if the interviewee has any question about the interview, consent form, project or anything else.

### II- Interview part 1 – The interviewee

- Quick presentation of the interviewee

#### Personnal relations with pesticides

- Do you work with pesticides? If yes what types of pesticides?
- Do you use different types of pesticides?
- If no use of pesticides, why? What other methods do you use?
- How does pesticide help you?
- What do you think of the term pesticide versus phytosanitary product?  
Could you explain?
- Do you use alternative methods, if yes which one?
- Do you think these alternatives work as well as pesticides? How so?
- Does something could motivate you into changing your practices?
- According to you, what are the environmental impacts of your farm?  
Could you list them for me?
- How would you do if you had to reduce the environmental impacts of your farm?
- How do you get knowledge about pesticides?
- How would you react if pesticide use was forbidden?
- How would you react if pesticide use became compulsory?

### III – Interview part 2 - future scenarios

#### Scenario 1 – Pesticide use is forbidden

- Imagine if pesticide use become forbidden in the next two years, what would happen? Could you describe this future? (possibility to ask about economy, environment, society)
- Imagine if pesticide use become forbidden in the next twenty years, what would happen? Could you describe this future? (possibility to ask about economy, environment, society) Would it be different from the two years scale scenario?

Scenario 2 – Pesticide use is compulsory

- Imagine if pesticide use become compulsory in the next two years, what would happen? Could you describe this future? (possibility to ask about economy, environment, society)
- Imagine if pesticide use become compulsory in the next twenty years, what would happen? Could you describe this future? (possibility to ask about economy, environment, society) Would it be different from the two years scale scenario?

Scenario 3 – Today pesticide use is the basis

- Imagine if we continue to use pesticide as we are doing today in the next two years, what would happen? Could you describe this future? (possibility to ask about economy, environment, society)
- Imagine if we continue to use pesticide as we are doing today in the next twenty years, what would happen? Could you describe this future? (possibility to ask about economy, environment, society) Would it be different from the two years scale scenario?
- Between these three scenarios which one do you prefer and why?

Finally I'll ask again if they have any question, if I can use anything that they said during the interview, and if I can make citations.

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