Strip cropping in agricultural transition:

How institutional constraints affect development of nature-inclusive agriculture in the Netherlands

Thesis

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Abstract

Strip cropping farming is an emerging innovation in the Netherlands and efforts are underway to expand its adoption in Dutch agriculture. However, this innovation faces bottlenecks before it can be widely adopted. The goal of this thesis is to research the institutional constraints farmers face in their interaction with the Netherlands Enterprise Agency, in Dutch known as "Rijksdienst Voor Ondernemers" (RVO).

In this qualitative case study, I study the case of the relation between strip cropping farmers and institutions, particularly RVO. Data was collected through semi-structured interviews with strip cropping farmers, government employees, and experts. This thesis uses the concepts of institutions by (Geels, 2004; Scott, 1995, 2008), institutional logics by (Frenken et al., 2020; Fuenfschilling & Truffer, 2014; Thornton et al., 2012) and the multi-level perspective by (Geels, 2002).

The key findings of this research are that strip cropping farmers face regulative constraints with the Integrated Administration Control System (IACS) monitored by RVO, and related to this system are the subsidy schemes, agri-environment-climate measures, and the eco scheme. Furthermore, they face constraints related to phosphate sampling, legal complexity, and communication with RVO. Strip cropping farmers also face normative constraints from their community where they receive negative attitude from their neighbours on their farming system. This study has found that the logics of the constraints with the IACS relate to the logic of control, distrust, fraud prevention, monocropping, complete information provision/ sending, and lost knowledge. Furthermore, constraints experienced are related to rural tension. Farmers adopt different navigation strategies to cope with the constraints. These strategies vary from hiring a consultant for the registration, and/ or using a pragmatic way of drawing their strips in the IACS.

In conclusion, strip cropping farmers must operate under the same rules as conventional farmers, while implementing different practices. This leads to an uneven playing field that strip cropping farmers must overcome.

Samenvatting

Strokenlandbouw is een opkomende innovatie in Nederland en er worden inspanningen geleverd om de toepassing ervan in de Nederlandse landbouw uit te breiden. Er zijn echter knelpunten voordat deze innovatie op grote schaal kan worden toegepast. Het doel van deze scriptie is het onderzoeken van de institutionele beperkingen die boeren ondervinden in hun interactie met de Rijksdienst voor Ondernemers (RVO).

In deze kwalitatieve case study bestudeer ik de relatie tussen boeren in de strokenteelt en instituties, in het bijzonder met RVO. De gegevens zijn verzameld door middel van semi gestructureerde interviews met boeren in de strokenteelt, overheidsmedewerkers en deskundigen. Deze scriptie maakt gebruik van de concepten van instituties van (Geels, 2004; Scott, 1995, 2008), institutionele logica's van (Frenken et al., 2020; Fuenfschilling & Truffer, 2014; Thornton et al., 2012) en het multi-level perspectief van (Geels, 2002).

De belangrijkste bevindingen van dit onderzoek zijn dat boeren in de strokenbouw te maken hebben met regulerende beperkingen door de gecombineerde opgave dat wordt beheerd door RVO. Hieraan gerelateerd zijn de subsidieregelingen, Agrarisch Natuur en Landschapsbeheer (ANLb) en de ecoregeling. Verder hebben ze te maken met beperkingen in verband met fosfaatbemonstering, juridische complexiteit en communicatie met RVO. Boeren die in stroken telen hebben ook te maken met normatieve beperkingen vanuit hun gemeenschap, waar ze een negatieve houding van hun buren ten opzichte van hun landbouwsysteem krijgen. Uit dit onderzoek is gebleken dat de logica's van de beperkingen met de gecombineerde opgave verband houden met de logica's van controle, wantrouwen, fraudepreventie, monocultuur, volledige informatievoorziening/verzending en verdwenen kennis. Bovendien worden beperkingen ervaren die verband houden met spanningen op het platteland. Boeren gebruiken verschillende navigatiestrategieën om met de beperkingen om te gaan. Deze strategieën variëren van het inhuren van een consultant voor de registratie en/of het gebruiken van een pragmatische manier om hun stroken in de gecombineerde opgave te tekenen.

De conclusie is dat boeren die in stroken telen volgens dezelfde regels moeten werken als conventionele boeren, terwijl ze andere methoden gebruiken. Dit leidt tot een ongelijk speelveld dat boeren met strokencultuur moeten overwinnen.

Preface

Writing this thesis was a learning experience from the beginning till the end. This thesis concludes my Master Development and Rural Innovation in which the research perspectives and theories came together. Doing your thesis is often described as challenging and a lonely time. I am grateful for several people who helped, supported and guided me through this thesis process.

First, I want to thank my supervisors Cees Leeuwis and Daphne Schoop for their guidance in my learning process in writing this thesis. Your critical questions, comments and advice shaped this research and helped me to delineate the topic of this thesis. The regular meetings helped me to focus on the subject and were helpful.

I would also like to thank the CropMix project and team for the opportunity to do my thesis in this interesting research. I am grateful for Yvonne Florissen who co-coordinates the CropMix project and helped to reach out to potential interviewees. Same goes for Luc van Veghel and PJ Beers for their help and advice for my thesis and who organize the living lab where I get to present my findings to the farmers and RVO.

Special acknowledgement to all the interviewees that freed up time in their busy schedules during the spring sowing season for an interview and answers to my questions. It resulted in many interesting conversations, and I found your drive for nature-inclusive agriculture inspiring. Without your open and honest answers, this thesis would not have been possible.

I want to thank my classmates Emma, Merel, Floris, and Ionna who helped me with their peer reviews. Working together with you has motivated me to keep on going and made the thesis writing process easier. I also want to thank my girlfriend Channah for her endless support and motivation to finish my thesis.

Contents

1 Introduction

The current agricultural system in the Netherlands requires a shift from dependency on external inputs like fertilizers and pesticides to a system that works closer to nature (Wrzaszcz & Prandecki, 2020). To facilitate this, innovations like strip cropping are being introduced to enhance biodiversity, improve soil health, and create a more resilient agri-food system. Strip cropping is seen as a promising new initiative in Dutch agriculture (Ministerie van Landbouw, 2018). This research focuses on how this new innovation integrates into the existing agricultural system and identifies areas for improvement to facilitate the scaling of this innovation.

Agricultural policies over the past century have significantly shaped the current agricultural system. In the early 1900s, agriculture was small-scale, resulting in naturally high biodiversity on farmland. However, the introduction of the Mansholt Plan after World War II and the subsequent implementation of the Common Agricultural Policy (CAP) fundamentally altered agricultural practices (Van der Heide et al., 2011). The European Union aimed to establish food security and reduce reliance on food imports. The adoption of chemical fertilizers led to larger-scale operations and a shift towards specialized monocropping systems. These systems, while more productive, became less resilient to pests and diseases, increasing reliance on pesticides. The Common Agricultural Policy (CAP) has played a central role in this transformation (Pe'er et al., 2020).

The CAP has continued to develop the agricultural sector with a focus on food security. However, the expansion of agricultural operations has led to significant biodiversity loss and a growing disconnection between agriculture and nature. This is evidenced by declining soil organic matter and decreased land productivity (Pereira et al., 2012). For agriculture to remain viable and sustainable, it must adapt to operate within environmental boundaries (Springmann et al., 2018; Vermunt et al., 2022). Transitioning to nature-inclusive or agroecological systems, which integrate agriculture and nature for mutual benefit, is essential (Runhaar, 2017b). However, efforts to implement these changes through new policies have faced resistance from the sector (Vermunt et al., 2022).

A transition in agriculture is necessary to improve nature and sustain healthy food production in the future (Springmann et al., 2018; Union, 2020; Zwartkruis et al., 2020). One promising approach is strip cropping, where crops are grown in multi-row strips with an alternating pattern of at least two strips across a field (Ministerie van Landbouw, 2018). This method improves soil health, resource use efficiency, yield stability, and promotes biodiversity. Strip cropping exemplifies a practical step towards creating a more sustainable and resilient agricultural system. (Ditzler et al., 2021; Lizarazo et al., 2020).

This thesis is conducted as part of the CropMix research project, which investigates crop diversity as a pathway to sustainable agriculture. The project consists of three work packages, with the third focusing on institutional change. This thesis will contribute to the third work package by examining the institutional constraints that farmers face. Netherlands Enterprise Agency, or in Dutch known as Rijksdienst voor Ondernemend Nederland (RVO) is one of the organizations that farmers interact with and plays a role in promoting sustainable development and innovation in the Netherlands. Furthermore, RVO is part of the consortium of CropMix. They recognize that nature-inclusive farmers face institutional constraints, for which RVO aims to help solve these issues (Rijksdienst voor Ondernemend Nederland, 2022). This thesis will gain insight into the institutional constraints strip cropping farmers face with RVO.

To gain a better understanding of the institutional constraints I will use several theories and concepts. Initially, I will use the multi-level perspective (MLP) to define the actors and their position in the socio-technical regime (Geels, 2002). The concept of institutions and the institutional theory will be used to

understand and define institutions. The concept of institutions is divided in regulative, normative and cognitive institutions (Scott, 2008). From the institutional theory, I will apply the concept of institutional logics, which will be useful for determining where the institutional constraints originate. (Frenken et al., 2020; Fuenfschilling & Truffer, 2014; Glover et al., 2014; Scott, 2013; Thornton et al., 2012).

The constraints and logics will be placed in the MLP to gain insight into their context and where they originate in the regime. Prospective nature inclusive farmers (niche innovators) must find their way through the institutions and organizations in the existing socio-technical regime. The pressure from the landscape, the agricultural sector tries to keep the regime in place (Geels, 2002; Vermunt et al., 2022). It is impossible for the socio-technical regime to reinvent itself and to come up with radical solutions to enable nature-inclusive farming which can be defined as transformational system failures (Dijk et al., 2018; Weber & Rohracher, 2012). The Dutch government has the ambition to promote nature-inclusive farming (Ministerie van Landbouw, 2018). Some farmers want to change their practices and become more nature-inclusive, to increase climate resilience and restore nature. However, nature-inclusive farmers face institutional constraints which limit their possibilities for development and growth (Dijk et al., 2018; Duru et al., 2015; Runhaar, 2017a, 2017b).

This research contributes to a better understanding of bottlenecks for strip cropping farmers by studying the institutional constraints strip cropping farmers face with the RVO. It is also unclear what logics underlies the constraints faced by farmers. This thesis will therefore aim to research and gather the constraints and analyse them on their origin. The central research question in this thesis is:

What institutional constraints do farmers who apply strip cropping face in their interaction with RVO?

In this research, I focus on strip cropping farmers which is a group of farmers that operate in a niche in Dutch agriculture. By studying the constraints they face, I will generate knowledge on how this affects the transition of niche innovators in Dutch agriculture. In this case, I will emphasize the role of RVO in this process. I will answer the main research question, by answering the following sub-research questions:

1. What institutional constraints do strip cropping farmers face?
2. What are the underlying logics of the constraints?
3. How do farmers navigate these constraints, and what solutions do they propose?

The answer to the first research question is based on interviews with farmers and will provide an overview of the constraints. I will use the concept of institutions divided into regulative, normative and cognitive by (Scott, 2008) to understand the institutional context. The answer to the second research question will provide insight into the institutional logics of the constraints. How the constraints strip cropping farmers experience are influenced by their institutional context. For this question, I will use institutional theory by (Frenken et al., 2020; Fuenfschilling & Truffer, 2014; Thornton et al., 2012). The third question is answered using the results from the interviews.

Chapter 2 of this thesis will present the theoretical framework, discussing the theories that will guide the answers to the research questions. Chapter 3 will outline the research design and methods. Chapter 4 is a context chapter where context on strip cropping and CAP will be given. Chapter 5 will address the bottlenecks related to European policy, Chapter 6 will focus on bottlenecks related to information and knowledge, and Chapter 7 will address bottlenecks related to community dynamics. In Chapter 8 I will discuss the results and Chapter 9 will conclude this thesis.

2 Theoretical framework

The introduction of this proposal has briefly introduced the concepts of Multi-Level Perspective (MLP), institutions, and institutional logics. In this chapter, these concepts will be further explained and connected to the research. These theories will together construct the theoretical framework to research the institutional constraints nature-inclusive farmers face.

2.1 Multi-Level Perspective

The multi-level perspective (MLP) is a middle-range theory that conceptualizes overall dynamic patterns in socio-technical transitions. The MLP views transitions as non-linear processes that result from the interplay of developments at three analytical levels: Niche, socio-technical regimes, and socio-technical landscapes (Geels, 2002). The MLP is a way of understanding how changes in technology and innovation happen in society. The first level of the MLP is the niche level where new ideas, technologies or innovations emerge. An example of a niche is nature-inclusive agriculture in the Netherlands (Vermunt et al., 2022). The second level is the socio-technical regime which represents the dominant configuration in society. It includes established technologies, rules/ institutions and norms that dominate society. The third level consists of the socio-technical landscape which consists of the external trends/ environment. For example societal pressure, political coalitions, the macro-economy, and geo-political developments (Geels, 2002). An overview of the MLP of the agricultural sector and the three different levels with the actors relevant to this research is presented in Figure 1.

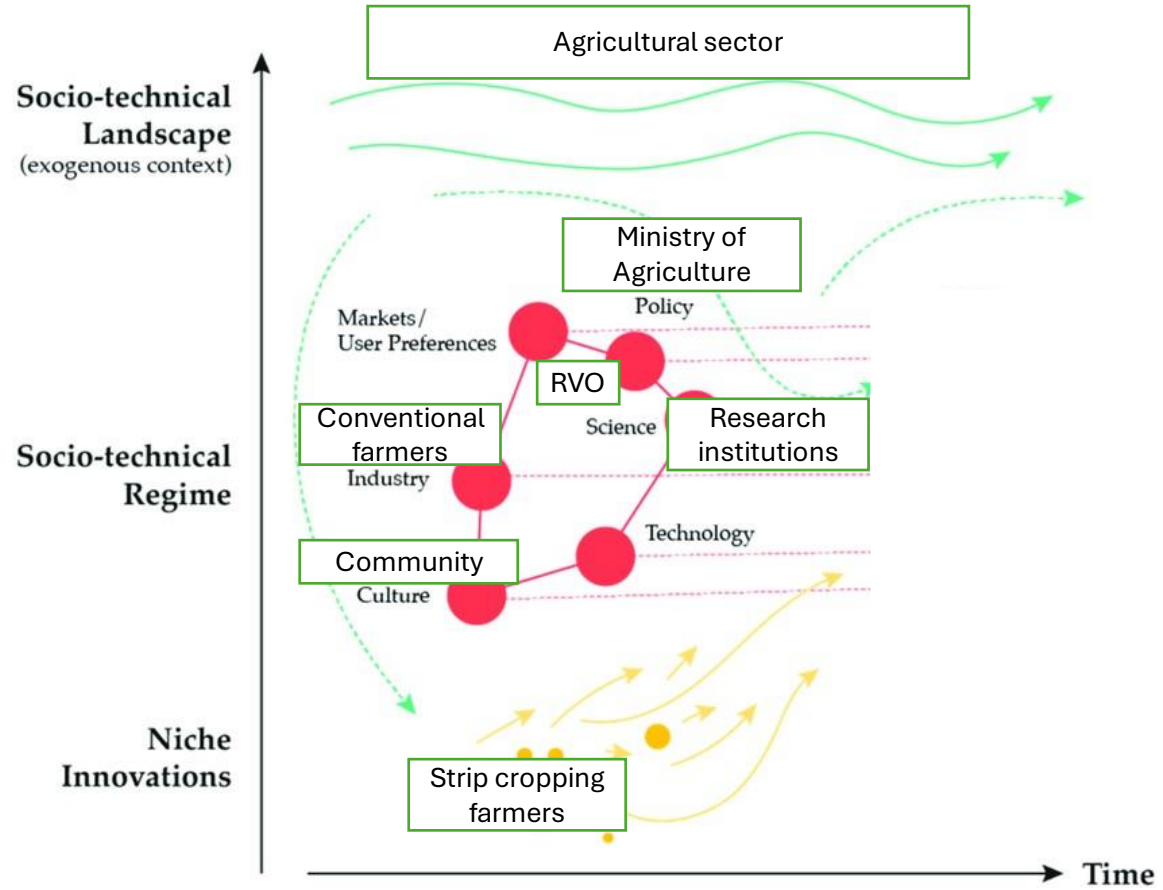

Figure 1 Multi-Level Perspectives with a focus on niche innovations in a small network of actors (Geels, 2002; Geels & Schot, 2007)

In this research, I consider strip cropping farmers as niche innovators that are connected in a small network of actors, for example in CropMix. They aim for their innovation to mature and become mainstream in the socio-technical regime. In this regime, there are several different institutions and organizations that operate and maintain the current system. A specific case for this thesis is the RVO which operates in the socio-technical regime. They are standing in between the pressures from for example the government policies and the farmers in the socio-technical regime and niche innovations. For many years, the agricultural policies have been promoting conventional farmers (Buitenhuis et al., 2020). This means that the processes at the RVO are adapted to the conventional way of farming. Through participating in the CropMix project, they aim to support strip cropping farmers, but they find it difficult to change the system for this niche innovation.

Significant changes according to the MLP happen when there is interaction between the different levels. strip cropping farming niche needs favourable conditions from the landscape level to enter the current regime. The MLP can help to understand how these changes happen over time by looking at the interaction and influences of different levels of society (Geels, 2002).

2.2 Institutions

Institutions are a key component of socio-technical regimes. To find constraints in institutions, it is necessary to define the concept of institutions. Institutions are defined by Hodgson (2006, p. 2) as: "*Institutions are systems of established and embedded social rules that structure social interactions. Language, money, law, systems of weights and measures, table manners, and firms (and other organizations) are thus all institutions.".* They are a social phenomenon and structure social interactions.

Institutions shape how we live, work, and interact with each other (Scott, 2008). Agriculture is also shaped by institutions. A major example of this is the Common Agricultural Policy (CAP) introduced by Sicco Mansholt who after the Second World War became the first European commissioner responsible for agriculture. His ideas of restoring and modernising agriculture became the basis for the CAP. There was a lot of resistance against his plan, the Mansholt Plan. Farmers felt that their livelihoods were threatened and that only large farms would survive (EU pioneers, 2021). This system change was met with protests which could be compared with the current protests happening in Europe considering the new Green Deal and the agricultural change it proposed. Farmers who were encouraged in times of Mansholt, by the institutions to change their business, must change again (Boon & Plicht, 2024).

These changes define the landscape farmers are currently operating in and the pressure that the landscape puts on the system. Central to this issue are the institutions and institutional constraints. In this chapter, institutions will be further explored using literature from (Geels, 2004; Glover et al., 2014). In his paper, Geels (2004), he defines institutions in terms of rules. He argues that rules are linked to other rules and organised into a rule system. These systems can be collectively shared and regarded as rule regimes. Therefore, a regime can be understood as a semi-coherent set of rules (institutions) which are linked to each other. To avoid confusion with public institutions, he defines three different kinds of rule systems/ institutions: **Regulative, normative, and cognitive institutions**. In his paper, Geels provides a table based on (Scott, 1995), where he indicates the different emphasis between the institutions. I will use this table (Table 1) to classify institutional constraints in my framework.

Table 1 Varying emphasis: Three kinds of rules/ institutions (Geels, 2004, p. 905; Scott, 1995, 2008)

	REGULATIVE	NORMATIVE	COGNITIVE
EXAMPLES	Formal rules, laws, sanctions, incentive structures, reward and cost structures, governance systems, power systems, protocols, standards, procedures	Values, norms, role expectations, authority systems, duty, codes of conduct	Priorities, problem agendas, beliefs, bodies of knowledge (paradigms), models of reality, categories, classifications, jargon/language, search heuristics
BASIS OF COMPLIANCE	Expedience	Social obligation	Taken for granted
MECHANISMS	Coercive (force, punishments)	Normative pressure (social sanctions such as 'shaming')	Mimetic, learning, imitation
LOGIC	Instrumentality (creating stability, 'rules of the game')	Appropriateness, becoming part of the group ('how we do things')	Orthodoxy (shared ideas, concepts)
BASIS OF LEGITIMACY	Legally sanctioned	Morally governed	Culturally supported, conceptually correct

2.3 Institutional logics:

Another lens to study institutions is the concept of institutional logics. Institutional logics is part of the institutional theory and can be used as an approach to understanding the content and coherence of structures in a system. It can be used to trace contradictions between structures (Fuenfschilling & Truffer, 2014). "*The institutional logics approach highlights how actors are influenced by their institutional context. It shows that institutions regularize behavior, but at the same time enable agency and change. The strength of the approach lies in its focus on the content and meaning of institutions.* (Fuenfschilling & Truffer, 2014, p. 775)".

Institutional logics suggest that various institutional sectors compose a society that involves different rationalities. For example, norms, values, different beliefs and practices that shape actors behaviour and cognition (Fuenfschilling & Truffer, 2014). The notion of institutional logics was developed to specify the institutional content of an organization's environment. By acknowledging underlying societal institutions which affect all fields at different levels, instead of referring to some form of technical functionality or organizational power struggles and interests (Frenken et al., 2020; Friedland & Alford, 1991).

The institutional logics brought forward by Thornton et al. (2012) are ideal types. They are simplified theoretical constructions with clear boundaries and categories that sharpen the interpretation of cultural content. This also means that the ideal types do not represent a single unified logic present in society, nor should logic be understood as static (Frenken et al., 2020; Thornton et al., 2012). Institutional logics are categorized by (Thornton et al.) into seven ideal types of sector logics based on Western society: family, religion, state, market, profession, corporation, and community (Frenken et al., 2020; Thornton et al., 2012). These ideal types, including their source of legitimacy & authority and the basis of strategy, are presented in Table 2. In addition to the sector-level logics in Table 2, I will focus on field-level logics. Field logics is developed based on the findings and literature (Fuenfschilling & Truffer, 2014). Field logics will be used as analytical principles which offer specific logics, make rules

of the system, and assign power and status. Furthermore, field logics steer attention to specific constraints and solutions (Fuenfschilling & Truffer, 2014; Thornton et al., 2012).

Table 2 Institutional Logic Ideal Types (Frenken et al., 2020; Thornton et al., 2012)

Logic	Family	Community	Religion	State	Market	Profession	Corporation
Source of legitimacy	Loyalty	Reciprocity	Faith	Democracy	Share price	Expertise	Market power
Source of authority	Parent	Ideology	Charisma	Bureaucracy	Shareholder	Professional association	Board of directors
Basis of strategy	Honor	Status	Symbolism	Community good	Profit	Reputation	Size

Generally, the institutional logics approach assumes that states are interested in the well-being of their citizens (Thornton et al., 2012). The states enforce this through command-and-control frameworks that are based on the implemented laws (Lee & Lounsbury, 2015).

In this thesis, I will combine the works of (Frenken et al., 2020; Fuenfschilling & Truffer, 2014; Thornton et al., 2012) on institutional logics. I will analyse the institutional constraints with the field-level institutional logics. Furthermore, I will use the work of Fuenfschilling and Truffer (2014), where they use institutional logics to highlight how actors are influenced by their institutional context. They introduce insights from the institutional theory into the MLP to provide a more elaborated understanding of structures. They focus in detail on the coherence and content of structures and their degree of institutionalization which is the process by which a practice or organization becomes established and integrated into the formal structures and norms of a society or system. There are several indications on how to assess the degree of institutionalization of an institutional logic. Through the duration of its existence (how long a system is guided by the same regulations), resistance to change, and the scale and scope of diffusion (Fuenfschilling & Truffer, 2014; Runhaar et al., 2020).

I will use this to study the underlying logics of the constraints farmers face in the MLP. This will gain insight into how institutional constraints have developed and how the actors are influenced by their institutional context.

3 Methodology

This chapter describes the methodological approach of this research. In the first section, I will describe the research design and setting. Second, I will give an overview of the data collection methods and how these methods have helped to answer the research questions. The third section will describe the data analysis process. The fourth section of this chapter will give an overview of the interviewees and some background information. The fifth section of this chapter will focus on my positionality. The sixth and final section of this chapter will describe the ethical considerations.

3.1 Research design

In this qualitative research, I study the case of the relation between strip cropping farmers and institutions with a focus on RVO. How institutional constraints affect the practice of strip cropping farming which is a form of nature-inclusive agriculture. A case study seeks to achieve more complex and fuller explanations of a phenomena (Vaus, 2001, p. 221). The goal of a case study is to create an analysis of the process and context which illustrate the theoretical issues being studied (Cassell & Symon, 2004). The phenomenon that is studied is how institutional constraints affect development of nature-inclusive agriculture in the Netherlands.

The research participants in this case study will be selected using a purposive sampling and convenient sampling method. According to Palinkas et al. (2015, p. 1), "*Purposeful sampling is widely used in qualitative research for the identification and selection of information-rich cases related to the phenomenon of interest.*" I used this method to select interviewees who applied strip cropping and were likely to face constraints. In addition to that, I used this method to select policymakers and consultants for expert interviews. Convenience sampling is a type of non-probability sampling where members of the population meet certain practical criteria (Etikan, 2016). In my research, the interviewees were easily accessible through the CropMix network. I also used my network for sampling and reached out to potential interesting interviewees through LinkedIn and email. I used this strategy to select interesting stakeholders. Strip cropping is relatively new in the Netherlands and therefore I could not expect to find potential interviewees through random sampling.

I used the maximum variation strategy to select different types of farmers (i.e. organic, conventional, different crops) across the Netherlands. The objective of the maximum variation strategy is to identify important shared patterns across a variation of cases that have emerged out of heterogeneity (Palinkas et al., 2015). I have used this to identify interesting farmers from the CropMix project where I selected different farm types in different parts of the Netherlands.

3.2 Data collection methods

My main data collection method in this study is via semi-structured interviews with farmers who applied strip cropping techniques. This interview technique gives focus to the interview while giving flexibility to ask follow-up questions (Bradley et al., 2007). Furthermore, semi-structured interviews with government employees are conducted to gain their perspective on the case. Finally, expert interviews are conducted to obtain a more general overview of the constraints. Another data source used is document analysis. This consists mainly of the website of RVO and is used for triangulation of the findings from the interviews.

The interview guide will be added to Appendix 1. The questions in the interviews are based on the theory on institutions (Geels, 2004). The questions were divided into regulative, normative, and

cognitive institutions. This guide was used during the interviews to provide structure and give a logical order to my questions.

3.3 Data analysis

The interviews were recorded using my mobile phone. The recordings were then uploaded to Microsoft Teams using my Wageningen University account. The interview recordings were uploaded to Microsoft Word and transcribed using the built-in transcribe tool. The transcription was manually corrected for mistakes, since the software did not capture all text and included additional timestamps within sentences. The transcription method was verbatim style to capture all relevant spoken and semi-spoken information (Rincon, 2018). For the quotes used in this report, the transcription style of intelligent verbatim was used for better readability (Rincon, 2018), after which the quote was translated into English using Deepl Pro Translate. The intelligent verbatim style is used to make the text more coherent and better translatable. After the translation, the original recording will be relistened to ensure that the original message is kept.

After transcription, the data was coded using Atlas.ti. The coding scheme will be added to Appendix 2. For the coding, I started with deductive coding. I made a list of codes based on the theoretical framework which focused on the division of institutions. When I started coding, I found that the codes were too general, and I started the process of inductive coding. Codes were created based on two interviews and I connected the codes to the deductive generated codes. Inductive coding is good for capturing the complexity and diversity of data (Skjott Linneberg & Korsgaard, 2019).

3.4 Introduction of interviewees

After the interviewees were selected, they were approached via either the CropMix project or directly. This resulted in 10 interviews, whom I will introduce in this section. The interviewees have a different relation with strip cropping. Most of the interviewees are farmers who apply strip cropping, but there are also other interviewees. The short introduction per interviewee will serve as background for the following chapters.

Interviewee 1 works for the government and is a policy advisor on the transition of the Dutch agricultural sector and specialises in agroforestry. She has worked on the IACS to include agroforestry. She knows the registration system and worked on improvements to the system for agroforestry.

Interviewee 2 is a farmer from the North of the Netherlands. The size of the farm is between 30-40 ha of which half is grown conventional and half is grown certified organic in strip cropping at 3 meters width. The farmer started in 2017 with strip cropping. He has a wide variety of crops at his farm. From staple crops like wheat to vegetables to seed cultivation for breeding companies. The main driver for applying strip cropping is to enhance biodiversity in the field with a limited reduction of income.

Interviewee 3 Is also a farmer in the North of the Netherlands. His farm is between 60-70 ha of conventional agriculture. 20 ha of this is cultivated in strip cropping at 27 meters width. He chose 27 meters to accommodate his spraying machine. His main driver for applying strip cropping is to improve the habitat for farmland birds. He is using his regular crop rotation of potatoes, sugar beets, and wheat and includes strips of wildflowers.

Interviewee 4 is a farmer located in the middle of the Netherlands. She has two separate companies, one conventional agriculture and the other organic agriculture. The conventional agriculture company is the primary location and is between 50-60 ha. The organic part is between 30-40 ha and consists of

strips of approximately 30 meters wide. The choice for strip cropping was to improve biodiversity and nature conservation. This decision was made to account for the wishes of the owner of the land.

Interviewee 5 is a farmer located in the South of the Netherlands and has an organic dynamic farm of 20 ha. A small part of the land is cultivated in strip cropping. For the farmer, strip cropping is a method of promoting biodiversity and fits into the organic dynamic system.

Interviewee 6 is a farmer who works for a farm of the cooperation Herenboeren in the South of the Netherlands. The concept of Herenboeren is a cooperative where members are shareholders, customers, and volunteer at the farm. Herenboeren does not want to rely on subsidies and wants to connect people to agriculture. The specific farm I visited applied strip cropping for their vegetables since they have to use small plots to make variations in the vegetable supply to their members. The strip cropping was requested by members to improve biodiversity. The farm is almost 20 ha of which 4.5 ha is vegetable production in strip cropping.

Interviewee 7 is an expert interview with someone who is involved in guiding farmers to develop food forests. He is helping farmers with permits, contact with government, and regulations. For example, with the environmental law in the process of developing a food forest. In his work, he is experiencing similar constraints as strip cropping farmers. Since he has worked on several projects, he has a wider overview of constraints. This interview was an expert interview.

Interviewee 8 is a farmer in the North of the Netherlands with a farm of 70 ha and grows organic flower bulbs on 35 ha. He introduced strip cropping to improve soil quality and biodiversity, along with other measures like mixed cropping, bokashi, and green manure.

Interviewee 9 is a farmer in the East of the Netherlands, who farms more than 200 ha of land, spread over 3 farms in a regenerative, organic way. He includes strip cropping to improve biodiversity, and reduce vulnerability to pests and diseases, and has been doing it for a long time, even starting with it in Ireland where he used to farm.

Interviewee 10 works for the government and is working towards a new role for RVO as an organization. The goal is to make an impact on sustainable transitions in the Netherlands, rather than only executing policies. She has knowledge about RVO as an organization and how it is constraining, but also about the opportunities there are within the organization.

3.5 Positionality

I am not a farmer myself but did follow the education to become a farmer which provided me with a broad knowledge of what a farmer needs to know. However, being an outsider in this sector, I had to be careful with my conclusions in this research. I had to make sure that I let the farmers speak through the interviews and based my conclusion on their input. I used my background to understand the farmer's perspective, but not to speak for them. However, my interpretation and discussion are formed by my positionality. It is therefore important to identify how my positionality influenced my research (Darwin Holmes, 2020).

I am a 27-year-old Dutch male who grew up in a small town in Overijssel the Netherlands. I was not raised on a farm, but my whole life I have been interested in agriculture and nature. I did a bachelor of horticulture and arable farming at Aeres University of Applied Science in Dronten. In my bachelor's I was one of the few students who did not grow up on a farm which gave me an odd position in class. I was less influenced by discourses from family on how good agricultural practices looked like and therefore had more space to learn about new insights. During my studies, I did small research towards agroecological farming which inspired me.

Due to my bachelor's and later work experience, I was able to discover several sides of agriculture. I know the current system and the opportunities and limitations it has. Therefore, I am now more interested in alternative, nature-inclusive farming and how to improve the socio-technical regime for it. I like to stand with my wooden shoes in the clay and use these experiences higher up in the decision-making chains.

3.6 Ethical considerations

Agriculture in the Netherlands has seen a lot of disturbance in recent years. Protests against the reduction of nitrogen application policies started in 2019. The farmers were especially opposing left-wing politicians (van der Ploeg, 2020). This made the situation in agriculture tense, which was also found during the interviews, where farmers commented about the normative pressure they received. Therefore, the anonymity of all interviewees is important and a consent form was used (Hammersley & Atkinson, 2010). Interviewees were asked to participate in the interview beforehand. Before the interview started, they got a consent form which they had to sign. A copy of this form will be added to Appendix 3. In this form, farmers were informed about the information that would be collected, how the information was treated and about anonymity. Also, the consent form included permission for further use of the data for the CropMix project by my supervisors. The interviewees received a blank copy of the consent form.

As a researcher, I will not only extract knowledge from the field, but I will also return knowledge to the field. After completion of this report, it will be sent to the interviewees who participated, and intended to participate, but were not able due to circumstances. I will also present my findings during a dialogue session with RVO and farmers as part of CropMix.

4 Strip cropping in the Netherlands

This chapter provides a better understanding of strip cropping in the Netherlands. This context chapter Will explain two important concepts that will be used in the results section. First, the definition of strip cropping by RVO is defined. This definition is important because it is defined in a specific way, and it is used for the Eco scheme. In the second section of this chapter, I will elaborate more on the Common Agricultural Policy (CAP), the Integrated Administration and Control System (IACS), and two subsidies connected to CAP, the Eco scheme and the Agri-environment-climate Measures (AECM), or in Dutch, de Ecoregeling en Agrarisch Natuur- en Landschapsbeheer (ANLb).

4.1 Strip cropping

Strip cropping has come up as an alternative to the monocropping farming system. Pioneering farmers introduced this method on their farms to increase biodiversity (Juventia et al., 2022). Strip cropping has become one of the greening requirements in the Eco scheme as part of the CAP. To quantify whether something is eligible for the eco activity, there is a set of norms that must be met. Strip cropping in the core is the diversification of crops in the field. At RVO they have defined the following rules for it to count as strip cropping for the Eco scheme additional payments (RVO, 2023b):

- You grow at least 5 crops as your main crop on your agricultural land.
- Of those 5 main crops, at least 2 are productive crops and one resting crop.
- You do this in at least 5 strips from 3 to 27 meters wide
- You apply strip cropping to arable land or permanent crops. You cannot use permanent grassland as a strip. Strips with shrubs and trees or a wooded bank are allowed.

These are the regulations farmers must follow to get points for eco-activities. Apart from the benefits of strip cropping, which have been explained in the introduction, a farmer can also get more subsidy (RVO, 2023b). However, strip cropping is not limited to these rules to be defined as strip cropping. These rules are important if he wants his strips to count for the Eco scheme. More information about the Eco scheme will be given in the second section of this chapter.

4.2 Common Agricultural Policy

The CAP is a major institutional framework that shapes the EU's food system and landscape. From when it was implemented in 1962, till now. The policy is working over a period of 7 years, with the current CAP period running from 2023 to 2027. Due to delayed implementation, the current CAP runs from 2023-2027 instead of 2020-2027. With the CAP, farmers can get extra income through subsidies. This was originally implemented to increase food production and achieve food security in Europe. However, the structure of the CAP has changed since then. Currently, the focus is more on supporting environmental measures/ greening for which farmers will receive extra subsidies (Matthews, 2018; Pe'er et al., 2020).

The system responsible for managing, monitoring and controlling all area and animal-based CAP interventions in the EU is the Integrated Administration and Control System (IACS). This system is used throughout the EU and ensures that comprehensive and comparable data is available (European commission, 2024). In the Netherlands, this is implemented by the "gecombineerde opgave", which is managed by RVO. In the IACS in the Netherlands, you can apply for subsidies, provide data for the agricultural census and the manure legislation (RVO, 2024a). In Figure 2 a schematic diagram of the CAP architecture shows how the interventions in the CAP are divided. I want to highlight two sections, the Eco scheme, and AECM, since these themes come back in the interviews and this report as well.

The Eco scheme is an extra payment supplementing the basic payment where you need to perform extra eco-activities to earn points and value and through that extra subsidy. For the Netherlands it is called “de eco regeling” and it is divided into 5 goals: To improve climate, soil and air, water, environment, and biodiversity. The Eco scheme is divided into three levels, bronze, silver, and gold. Depending on the region, you need to earn a certain number of points per goal. In addition to that, you need to reach a threshold value. This threshold depends on the level (bronze, silver, gold) and the number of hectares you want a subsidy for. You can earn points and value by performing eco-activities. There is a list on the website of RVO where the rewards per activity are shown. If you have an organic certified farm, you will reach the gold status automatically (RVO, 2024b). This means that organic farmers do not need their strip cropping activities to count as a greening measure for this subsidy.

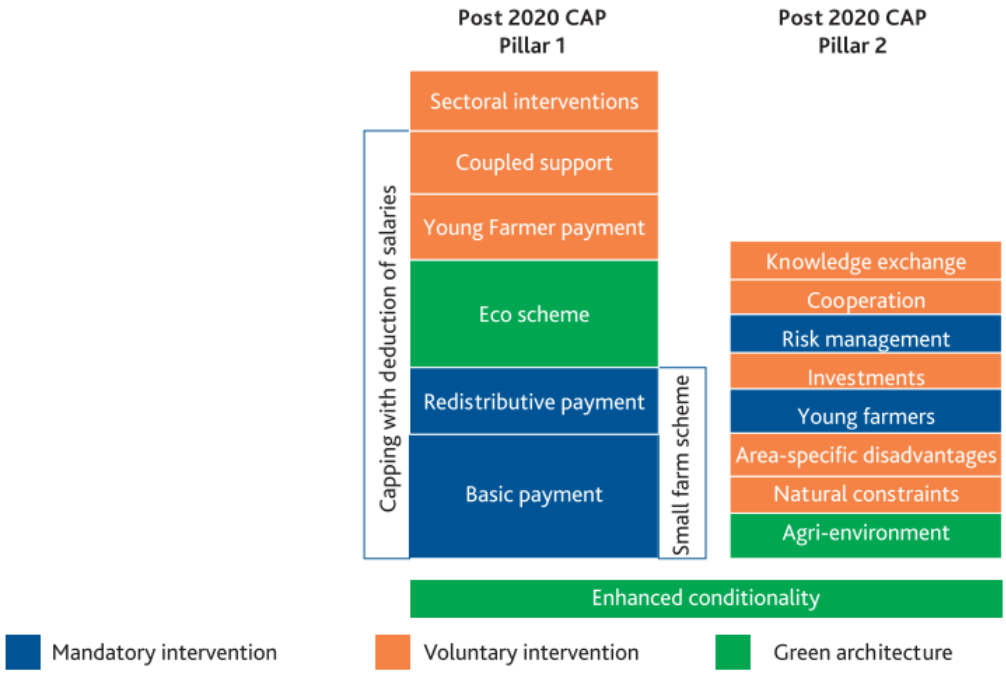

Figure 2 Schematic diagram of CAP architecture (Matthews, 2018)

The AECM is a subsidy for agricultural collectives from the provinces, water boards, and CAP. This subsidy aims to protect and improve the animal environment, work on water quality and contribute to climate goals (RVO, 2023a).

In the AECM, provinces have designated areas where Ecological measures are eligible, based on their expected effectiveness for nature. Within the designated areas, a collective develops management plans and contracts individual farmers to implement the required management practices to create the desired habitats. The farmers in return will receive the subsidy (RVO, 2023a).

5 Strip cropping in Common Agricultural Policy

In this chapter, the constraints with CAP will be elaborated on, based on the experiences of the interviewees. Furthermore, this chapter will focus on how strip cropping farmers navigate the constraints and will elaborate on the institutional logics of the constraints. The CAP in 1962 had a different focus than the current CAP. Over the past decades, the policy has changed to become more nature-inclusive and with less emphasis on increasing yields. Strip cropping is one of the measures that is introduced to increase nature-inclusive agriculture. However, the changes in CAP are facing resistance from current conventional farmers who built their businesses on the old CAP policies (Pol, 2024). Therefore, the CAP seems to suit conventional agriculture most, while trying to accommodate alternative businesses as well. The interviews endorse that the current CAP system is not designed for strip cropping and that it is causing constraints.

During the interviews with strip cropping farmers, several bottlenecks with the CAP are highlighted. These bottlenecks mainly originate in the IACS (Gecombineerde opgave). Other constraints were found in the ANLB and eco scheme subsidies connected to CAP, which were more general constraints. As well as sampling policies for phosphate fertilization. Another bottleneck was the complexity of the systems, which made some farmers get stuck in the application, and others rely on consultants.

5.1 Constraining vs navigating Integrated Administration and Control System

In this section, I will show the constraints farmers face with the IACS that came up during the interviews. Not every farmer experiences constraints with the IACS in the same way. Where for some farmers, the IACS is difficult to work with, there are also farmers who navigate the IACS and find solutions to work with it. These differences will also be elaborated on in this section.

Constraints with IACS: Time consuming, complex and too detailed

The IACS requires farmers to register their plots of land where every crop needs to be registered as a separate field. Most farmers in the Netherlands have large fields with monoculture. Interviewee 4 has an organic farm with strip cropping and a conventional farm with monoculture. She **spent twice as long on registering the strip cropping farm** with 63 separate fields compared to the conventional farm.

> *I think about 5 hours for the organic farm. And for the conventional farm, I do have to draw in a new plot every now and then, but I think I spent about 2.5 hours for that. (Interviewee 4, 2024)*

Even though her conventional farm is bigger than her organic farm, it is more work for her due to the different strips and landscape elements. Particularly for interviewee 4, it is interesting, since she manages both farms and does the IACS for both farms. This gives a good indication of how much extra time it costs to register.

Furthermore, interviewee 4 has issues with the fact that **in December the crop rotation plan for the next year must be registered**, while most of the time, it depends on the weather what the exact crop rotation will look like. Especially since she also must register it in May in the IACS, and in fall again what was planted. She mentions that this gives a lot of extra work. Another issue she has with the IACS is when she is making adjustments in the online system:

> *You then have your plots drawn in and then you continue with your IACS. And if you make any changes, you have to go through the whole list again. And if you change a parcel, for example,*

you get a red cross next to the other parcel, so you have to enter it again first, and so on. (Interviewee 4, 2024)

Interviewee 4 mentions the **complex system and struggles with the interconnectedness**. When one detail changes, there are always connected details which also need to be reviewed again.

Interviewee 2 compares his registration to neighbours and mentions that it is way more work to register strips compared to conventional agriculture. When asked how much longer he spends on his registration, he estimates that it takes about 50-60% more time compared to a similar-sized conventional farm.

So anyway, filling in the plot registration is much more work. That's what I see with other People, they're done in no time. Just a few clicks and on that one field you just have to enter another crop code. So that then goes very quickly. And in our case, the borders sometimes shift. Or you have to draw new borders again. For us, it's just a lot more work. (Interviewee 2, 2024)

Interviewee 2 gives a comparable answer to Interviewee 4, registration takes longer compared to conventional farming. More interviewees mention the extra time it costs to register their fields. Interviewee 3 **spent, together with his wife, three full weeks registering their fields last year**:

Last year I spent 3 full time weeks just filling it in. It was new then and until now we have always done it ourselves, without an adviser. We thought to ourselves, how complicated can it be? We can do it ourselves. But we really couldn't figure it out and then it broke us up. We spent 3 weeks on it and it drives you crazy. (Interviewee 3, 2024)

This interviewee wants to be independent from a consultant and do the registration himself. However, since the system was new in 2023, it took three weeks to properly draw every field and solve error codes. Even though he has a simple crop rotation with only potatoes, sugar beets and wheat. However, since he grows them in strips and implements Eco-activities like green manure, wildflowers and other landscape features as well, it takes a lot of time to complete. Also, this farmer is a conventional farmer, which makes it important to properly register the activities for the Eco scheme.

These three interviewees (2,3, and 4) registered the IACS themselves. Even though, at some point, they must ask for help from their neighbours, or a consultant. Their biggest constraints with the IACS are the additional time it costs and the complexity of the system.

Interviewee 2 mentions that **the registration system is too precise**. He gets an error while registering his strips which are 3 meters wide. When he draws it in the system, the strip width becomes 2.98 meters which gives an error and causes it to not count as a strip. The precision of the system does not match the practice in the field. According to interviewees 2 and 3, **you need GPS for the correct synchronizing of strip cropping in IACS and the field**

But the biggest problem is getting that done in the field. You can't do without GPS to begin with. I didn't start this until I had some experience with GPS as well. Earlier, I didn't see an opportunity for that either, I would never have come up with the idea either. (Interviewee 3, 2024)

Interviewee 2 has the same issue when he plants a field with small plots. The field is too small to do it with GPS, it must be sown manually. Because he does not have GPS coordinates as a reference, he needs to spend extra time on the registration of this field. Also, the satellite images used in the system are from the previous year, which makes it impossible to see where the crops are on the map.

Constraints with the IACS are considered regulative constraints since they involve formal rules, laws, reward and cost structures, governance systems, and procedures based on the varying emphasis of institutions made by (Geels, 2004).

Navigating the constraints of the IACS: Consultants or pragmatic approach

As mentioned earlier, farmers are dealing differently with the IACS and especially with the registration of their land. Interviewees 2,3 and 4 mainly see it as a burden to do the registration but also want to do the registration themselves. Even though they needed to call a consultant several times because they got stuck with their application. However, there are also other ways farmers deal with the IACS. For example, **drawing it as nature, hiring a consultant, or it is embedded in the operation** which makes it easier to fill in.

Interviewee 5 takes a different approach towards the registration. He has limited knowledge of computers and finds it difficult to work with. He does the registration with help from his son and a colleague farmer. However, when he registers his strips in his field, he registers it as nature because He cannot find his way through the system.

This is comparable to what another interviewee (specific interviewee known by the author) does with a field where he mixes wheat and grass at 1.5-meter-wide strips and the strips combined stay within 27 meters. He puts it in as wheat because it is too much work to register it all separately. Even though he is more skilled with computers and IT, for him it is not worth the trouble and extra time. He does most of his registration following the rules and faces constraints by it. These narrow strips are too much effort, for which he decides to use his approach while staying within the regulations of strip cropping. This shows that farmers are applying their approach to the IACS, avoiding constraints.

Interviewee 6 uses a consultant who fills in the IACS. He only needs to provide the data and check for any mistakes. The consultant uses a pragmatic approach to the registration of the fields.

> *I'm not going to draw that in specifically. If I have to be honest. I can't draw in strips. We have 4.5 hectares of vegetable cultivation and that is divided into monoculture and strips. We draw that all in as big blocks as it were. We have a block of animal feed and the other blocks are not divided into individual strips, but more in general terms. Other things are taken into account, but I personally look at that a bit less strictly. (Interviewee 6, 2024)*

In this quote, he explains how he and the consultant work in registering their fields. This interviewee is part of Herenboeren, which is a concept that has multiple locations, that all use this consultant to register for the IACS. Because of this approach, he does not encounter the same constraints as other farmers.

Interviewee 8 started using a consultant to do the IACS when he started to convert from conventional agriculture to organic. At this point it became too complex to comply with all the rules and to prevent making mistakes, he started using a consultant. According to him, if he would fill it in himself and declare the truth of it, but made a mistake, he could face a fine. However, when a consultant does it, he can adjust it in case of a mistake. To prevent getting into trouble he prefers to outsource it. He is still busy preparing the registration to reduce the costs of the consultant.

Based on these interviews, GPS is needed as a reference for registration in the IACS and to synchronize the action in the field. According to interviewee 8, it would be helpful if the GPS coordinates could be uploaded to the IACS. I found on the website of RVO that it should be possible to upload GPS coordinates to the IACS (RVO, 2020).

Interviewee 9 started strip cropping before the software at RVO was ready for drawing his fields. He was helped by a researcher from the WUR who drew his fields on the map. Interviewee 9 now only has to change the crop codes each year and has no issues with the system. He has embedded strip cropping in his operation. He does not need to change the border but only has to change the crop codes. This makes it easy to do the registration.

interviewee 1 who has experience with agroforestry and the IACS on the RVO side proposes to make administrative exemptions for a specific group of farmers to make registration less complex:

> *And the systems are just made for large scale industrial farms. So, you could actually... and that is in the pipeline, I understand. that you could, for example, make administrative exceptions for certain groups of farmers, thus limiting the burden. Because they do exactly what you want them to do and not that because those systems are designed for the masses they actually have more administrative burden. (Interviewee 1, 2024)*

Interviewee 1 mentions making flexible regulations for nature-inclusive, strip cropping or organic farmers. Since they already do what the government wants them to do. Interviewee 7 mentions that for food forests a special crop code was introduced. This helped a lot in the registration of the fields. This is an example of an administrative exemption that could also benefit strip cropping.

Interviewee 2 believes that the 3-meter bottom limit for strip cropping does not make sense. Smaller strips or pixel cropping give even more biodiversity. If the program registers a strip of 2.98 meters, in the field it makes no difference, so the border does not need to be this strict.

Interviewee 3 proposes a tool where you can add your strip width to a specific field, and the number of strips and let it draw your map. Interviewee 8 proposes to use the GPS coordinates from the tractor in the registration system. Every farmer uses GPS, and the system knows exactly the location of each strip, including the crops. This will prevent a farmer from having to draw the field again.

5.2 Constraints in Agri-environment-climate measures and Eco scheme

Subsidy schemes related to the CAP, such as AECM and the Eco scheme, were also discussed during the interviews. Interviewees highlighted several constraints associated with these schemes. While these constraints were not directly linked to strip cropping, they did have a reinforcing effect on one another. In this section, I will elaborate on the experiences of the interviewees with these schemes and how it is constraining strip cropping.

AECM subsidies, uncertainty in the field

Interviewee 2 used to be part of the AECM, but **at some point, the area he was in was no longer eligible for this**. One of the constraints he found in the AECM was that he lost production and income by partaking in this scheme. Initially, he was compensated through the subsidy. However, when this was revoked, he could not proceed with the practices. The issue is that **he has no control over the process of whether he keeps the subsidy but depends on a cooperation**. He must adapt to the scheme to get the subsidy but risks losing the subsidy without any influence. Since he still wanted to support nature and restore the landscape, he had to look for alternatives. Via strip cropping, he found the solution, since he could improve biodiversity and get a more resilient cropping system without losing productivity.

Interviewee 4 is not allowed to participate in the AECM because she is too close to an airport (within 5 km). Since promoting nature could attract birds that can cause issues with planes departing and arriving. Even though she implements more measures than necessary for AECM, she is not getting paid for it. This could be considered a regulative constraint since it involves a formal law to protect airplanes. It is connected to strip cropping because the environmental measures are taken in the strip cropping fields in the form of fallow strips. She perceives this as unfair compared to farms that are outside of this zone that do get the subsidy.

Interviewee 9 already has wildflower strips and is also eligible for AECM. So, he is also getting paid for these measures. Because of the strips, he can implement the measures in his crop rotation.

> *On all farms, we have ANLB. Most of the flower edges we have in ANLB. And some herb-rich fields. And we do that anyway so then it's also nice if you get paid for it for providing ecosystem services. If we didn't get that, I would still be doing the same thing. Because we need it in our farming practices to make sure we suppress pest insects and disease by attracting predators and increasing biodiversity for field birds and insects. For that, we do feel intrinsically motivated. I think it's also okay to be paid for that for providing those ecosystem services. (Interviewee 9, 2024)*

Interviewee 9 is an example of a farmer who implements greening measures based on intrinsic motivation and gets subsidy for it. Just like interviewee 4, he would do these measures anyway, but he does receive subsidy for it, whereas interviewee 4 is not eligible. Implementing flowers and unproductive crops could provide benefits in the field in strip cropping, by attracting beneficial insects, while at the same time, it could count as a measure for AECM. However, there are more conditionalities before you can get this subsidy. And also, if you do get this subsidy, you can lose it due to changing interests, while still losing productivity.

The eco scheme is not worth the additional work

The eco scheme is becoming a big part of the CAP payments In the current CAP period, 25% of the direct payments are to be allocated through the eco schemes (European commission, N.D.), as also mentioned by Interviewee 1. This is also something I noticed during the interviews with the farmers. Almost all interviewed farmers participated in the eco scheme. Only interviewee 6 did not participate in the eco scheme, since his business model does not rely on subsidies. In general, there are not many constraints with the eco scheme concerning strip cropping. However, since strip cropping is considered one of the activities for farmers to earn points for the eco scheme, it requires extra time and registration for farmers. **Especially conventional farmers who apply strip cropping as environment-friendly measures face extra work due to more complex registration**. This causes frustration for farmers, especially when they compare their activities and effort with colleague farmers. An example is interviewee 3 who uses his strip cropping and other activities to earn points for the eco scheme:

> *Nobody is waiting for work. You make it all so difficult. Not even with the eco scheme that allows you to create €150 in value. There is no one who thinks that is worth doing with a plot of strip cropping. They look for the path of least resistance. They say, if I want gold status, I will leave several hectares fallow. I don't understand that it is very easy to just leave a few hectares fallow and then you score gold. If you compare that with the efforts, I make to achieve gold status. If you compare that with the efforts I make to achieve gold status, you see the enormous differences between how my plots look and what I do to get gold status, while someone else does it by leaving a few hectares fallow. (Interviewee 3, 2024)*

So instead of planting your crops in strips which causes a lot more work, you can just leave a part of your land that has low yield anyway, fallow. You will reach the same gold status, but save a lot of work. **Compared to other activities, strip cropping is not worth it when done for the subsidy**. Before the eco scheme, he did not register all his landscape features. However, since he needs to prove his activities to reach gold status, he needs to register everything. According to him, it is not worth trying to reach gold status in the eco scheme by using strip cropping. Something that is also mentioned by interviewee 8. He questions the amount of effort it takes for the IACS and eco scheme to the added value of it. He is growing tulip bulbs which is an expensive crop to grow. He mentioned that just for the seed bulbs, he pays 20.000 euros per hectare. To make a return on investment, he needs 50.000 euro per hectare and if he wants a good profit, he needs 70.000 euro per hectare. If you compare that to the efforts you must put in the IACS and Eco scheme to earn up to 400 euros per hectare in subsidies, it does not add up. He also mentions that colleague farmers do not even bother to apply for it.

One of the easy ways to earn points for the eco scheme, that is mentioned in the interviews is the cultivation of fibre hemp. After lobbying, hemp was added to the list of activities for the Eco scheme. For a farmer, it is easy to implement this crop, as he can outsource all the work and still earn a profit. Especially if he reaches a higher status and gets more subsidy (Interviewee 3, 2024). Based on articles in “Nieuwe oogst”, there seem to be several initiatives in the House of Representatives in the Netherlands to increase the compensation for fibre hemp (Hiddink, 2022, 2023; Smit, 2023).

The same goes for protein-rich crops like beans where a few hectares also give you a gold status. One of the interviewees mentioned that colleague farmers decided to grow beans just to reach gold status. Even if the crop failed, or it could not be sold, they would earn more money due to the subsidies (Interviewee 4, 2024). Concerning the strip cropping farmers, it seems not fair that for easier activities, the same results can be achieved.

According to interviewee 3, the eco scheme has not changed anything in his field so far. The only thing it did until now is register what is already there. It only becomes an incentive for farmers to find ways to earn points most conveniently. This interviewee even saw a strip of nature, which he planted together with volunteers, being culled because it was not beneficial for another farmer:

> *There is a colleague farmer here with an unused roadside. We set it up as a hedge area with a volunteer club. Then the eco scheme came along and the farmer said: "I don't like it, take it away. He said if it has to be done, I'd rather have it on the other side of the field. Then I told him, but it's already there, why do you have to remove it now? Everyone talks about it being so valuable. It didn't pay in the eco scheme for him to keep it there. (Interviewee 3, 2024)*

Of the farmers I interviewed, there was one that did not apply for the Eco scheme or AECM. Interviewee 6 worked for “Herenboeren” which is a concept that does not rely on subsidies. Still, he must fill in the IACS following the regulations, but he does not apply for subsidies, even though he would have enough activities to comply. This could also be an explanation for why this interviewee does not register his field too precisely since it is not necessary for the eco activities.

Considering the workload and benefits, strip cropping is not deemed an efficient activity under the AECM and Eco scheme. There are simpler methods to obtain these subsidies. Although, in theory, these subsidies should encourage strip cropping, they impose constraints due to additional registration requirements. Consequently, strip cropping appears to be insufficiently promoted. The constraints with subsidy schemes can be seen as regulative constraints because it involves incentive structures.

Navigating constraints with AECM and Eco scheme

Organic farmers automatically reach gold status in the Eco scheme. Because of this exemption, it is easy for organic farmers to navigate the constraints of the Eco scheme, since they do not need to prove their greening measures to apply for the subsidy. However, it should be noted that they do need to provide proof to SKAL that they are organic and pay for the certification.

Another method farmers use to navigate constraints with AECM and Eco scheme, which is the same as the constraints with AICS, is by **hiring a consultant**. This results in an easier process since the consultant brings experience from other farms and can advise the best strategy. However, it does cost more money to hire a consultant.

Interviewee 8 proposes an interest discount for greening activities on existing loans instead of new loans.

> *That green financing, comes from the government and Rabobank hands it out. And then I say If you are now a bulb grower and you want to convert to organic and you have a high mortgage that says, I can't convert with such a high mortgage I have to grow more bulbs. But if you just have to pay one percent less interest, then the fixed costs get lower. Then you can say, from that money I'm going to change my business. Because you already don't have to recoup those lower costs.* (Interviewee 8, 2024)

When a farmer has reduced fixed costs, he gets room to adopt more nature-inclusive farming practices. Even when these practices reduce the income, it is already covered by the reduced cost.

5.3 Constraining Phosphate sampling policies, sampling each field separately

The IACS is also used for manure legislation. Specifically for phosphate and nitrogen application. Interviewed farmers discussed the constraints they experienced with phosphate sampling which must be done every four years for the differentiation. The maximum amount of manure you can apply depends on your crops and the current concentrations in the soil. It is therefore important to have an accurate registration of your crops. This was mentioned by interviewee 1, she mentions that the **introduction of diverse cropping systems like strip cropping, or agroforestry makes the registration of manure applications even more complex**:

> *Because again, it's related to manure legislation. You can only use certain fertilizer for grassland, for example. For this and for that so those restrictions are very tight. Nowadays you have buffer strips next to your crop. It has become very complex. so, something has to be registered almost on the square meter. (…)*
>
> *All the chemical fertilizer all has to do with What Crops Do You Have on Your Parcel. so basically, they want the CAP to have the parcel registration as realistic as possible. then I also say but what about agroforestry, there are so many crops in a row and now we say, you can use 1 crop code, for example, fruit cultivation or nut cultivation, then we also do not see what exactly is there, so That is also not realistic, so the whole system is actually built on monoculture, so one crop per field. (Interviewee 1, 2024)*

What is central in this quote, is the fact that the system is designed for monoculture. Something which is also experienced by interviewee 4, who has poor soil quality, with low nutrients. To get more room for phosphate application, she needs to take samples of the soil. However, since she is

growing in 63 separate strips, she needs **to sample almost every strip separately**. Her estimated costs are 65 euros per sample, which makes it expensive to implement this. She mentions that even with the exemption by RVO, she still must take almost 63 samples:

> *But we do encounter difficulties with the organic farm is from RVO you have to declare your plot for phosphate every 4 years. I have to take soil samples almost every strip there and have them analysed for phosphate. The phosphate level in that soil is very low, so I do want to sample to be eligible for the phosphate differentiation, only because the plots are not adjacent, I am almost forced to take a soil sample from each plot. A sample costs about 65 euros. and I have 63 strips then. If I don't do that, I don't qualify for the phosphate differentiation and can't apply enough manure on my land, resulting in too low a yield. Because the phosphate level is so low, hardly anything grows. It costs a lot of money to submit those samples. You do have exemptions for strip cropping and then if they are adjoining plots up to 5 hectares, you are allowed to combine the plots. But even then it is still a high cost. (Interviewee 4, 2024)*

The system, which expects a sample from a large monocrop field, presents constraints when the same field is divided into strips that need to be sampled separately. Although there are exemptions allowing for the combination of strips to reduce the number of samples, this still results in additional work.

Interviewee 5 is experiencing the same issues. He also needs to take samples every 4 years but finds it too expensive. He is currently behind on sampling because he has different priorities. Opposite to the phosphate concentration of interviewee 4, interviewee 5 experienced an increase in phosphate concentrations in his soil. He considers growing more phosphate-demanding crops like wheat. Even though he has fewer issues with phosphate concentrations, the mandatory sampling for additional manure application is problematic.

Another farmer experiencing issues with manure is interviewee 6. He has poor sandy soil with low organic matter. He sees his crops lacking nutrients and is looking for ways to get more room for applying manure. However, having a diverse cropping system makes it difficult to request differentiation for applying more manure. This interviewee also mentioned the high cost of measuring samples. He has decided to not sample each strip but to make a grid and take samples randomly. His main reason for sampling is to get an indication of the nutrient availability in the soil and whether it is decreasing or increasing.

This constraint can be seen as a regulative constraint since it involves formal rules, governance systems, and protocols.

Navigating constraints with phosphate sampling

Like interviewee 6 has found a way to **sample his soil in a grid** to navigate the constraints, there are more methods to navigate. Interviewee 9 manages the phosphate by **investing in his soil quality**. Because he has good soil life and organic matter, he can grow his crops without high input of manure. He fits well within the regulations and therefore, does not need to take extra samples. The same applies to interviewee 2, who mentions as an example that for his red cabbage, the recommended nitrogen is 300 kg per hectare, but he can grow good quality crops with only 170-180 kg per hectare. He expects that this is due to his soil quality.

5.4 Constraints with complex bureaucratic registration system

Can a farm still be run by farmers intuition? In Dutch, there is a saying, “Met boerenverstand voed je het land” Translated: with farmers intuition, you can feed the land/ country. With the complexity of the regulations like CAP, it becomes increasingly difficult for the practice of a farmer. Considering the IACS and technological innovations, a farmer must be an IT specialist as well. In this section, I want to connect how different farmers view registration and regulations. How does the type of farmer relate to how they follow regulations, and view governance and laws? Furthermore, I want to focus on the role of consultants for farmers.

Farmers intuition insufficient to reach independence

The approach towards the IACS differs between farmers. Some farmers want to be independent and do the IACS themselves, whereas others hire a consultant who does it for them. In Table 3 I will give an overview of whether farmers do the IACS themselves or use a consultant.

Table 3 Approach to IACS per farmer

	Does IACS self	*Consultant*	*Remark*
Interviewee 2	Yes	No	Too complex for a consultant to understand, too expensive
Interviewee 3	Yes	Sometimes	They had to ask a consultant because they had too many errors and could not solve it with their knowledge
Interviewee 4	Yes	No	She does ask colleague and crop advisor
Interviewee 5	Yes	No	Has issues with computer programs, gets help from colleague farmer and son
Interviewee 6	No	Yes	The cooperative hires a consultant who does it at all farms. He only has to provide input and check it.
Interviewee 8	No	Yes	Used to do it himself when he grew conventional. But since the transition to organic, he has hired a consultant. He still has to provide sufficient data
Interviewee 9	Yes	No	He got help from a researcher and now he can easily change the crop codes.

As shown in Table 3, farmers take a different approach. The **farmers who try to do the IACS independently seem to face the most constraints**. The system is structured in a way that makes it almost impossible to do without help, and farmers are expected to hire a consultant. It seems like the system has evolved to a point where farmers cannot be independent.

If you consider interviewee 3, his wife spent 3 full weeks doing the IACS registration last year. **Only after calling a consultant and getting some tips she was able to finalize it**. They always did the registration themselves and they wish to keep it that way. Interviewee 3 is a conventional farmer. He needs to register his greening activities to earn points for the Eco scheme. The greening activities were not new, he started doing greening activities for AECM in 2009 and started with strip cropping in 2019. It was not necessary to document all his activities in the IACS until last year. But now he wants the activities to fit in the eco scheme system which is time-consuming. He already performed the activities for several years, and he knows they work, only the registration of the activities is problematic. In this case, you could argue that his farmers intuition of applying nature-inclusive activities in his field is substantial, but the IACS does not fit his solutions.

Another interviewee who has trouble with the IACS but has a great farmer intuition is interviewee 5. When I called him to schedule an interview, he immediately mentioned that he could not work with

the IACS and computers in general. When I visited his farm for the interview I could see his farmers sense, he has an organic-dynamic farm and promotes and improves his soil quality. In doing so, he works together with nature. Since his farm is organic certified, his eco scheme has automatically reached gold status. Compared to Interviewee 3, he does not have to register every detail to be eligible for the subsidy. Still, he found the system too complex. He decided to register the part of strip cropping as nature because it was too difficult to draw each strip. He relies on a colleague and his son for the IACS, while farming itself comes naturally.

Interviewee 6's approach to the IACS is interesting. He is part of a cooperative that **hires a consultant** and does the registration on many farms. The consultant uses a pragmatic way of drawing the fields, she draws a couple of big blocks with the main crops in them and does not make a distinction between the strips. This is different from other interviewees who draw the fields themselves and do it precisely. So far, this interviewee did not face any trouble with RVO and gets away with it. The cooperative aims at not relying on subsidies and does not apply for the Eco scheme or AECM. It therefore seems like if you do not need the strip cropping activity for the Eco scheme, it is not necessary to draw your field too precisely.

Interviewee 8 also uses a consultant who does the IACS for him. He has been farming flower bulbs for over 40 years and transitioned his farm to organic starting in 2014. He now grows his flower bulbs without pesticides and the organic matter in his soil is increasing, something which seems to be the opposite of most conventional flower bulb farmers in the Netherlands. This could imply that he has good farmer intuition and knows what he is doing. He also used to do the IACS himself but decided to hire a consultant when he transitioned to organic farming. His main reason for this was the system being too complex and he was afraid to make mistakes, risking penalties. Now he can just provide the consultant with the right information and the consultant spends 4 hours on it and it is done.

Interviewee 2 has an opposite approach compared to interviewee 8. He finds the strip cropping too complex to trust a consultant to register it. He is afraid that it will be too expensive to let someone else do it, especially since a lot of the work is new and he still needs to put effort into answering questions from the consultant. In addition to that, he also likes the challenge of doing the registration himself.

Based on the interviews, it seems like the role of consultants in the IACS is crucial. They have an overview of how multiple farmers do their registration which they can use at other farms as well. Since they fill in the IACS more frequently, they know their way through the system. However, for several farmers, it is difficult to give the process out of hand. Finally, farmers who use the experience of a consultant can avoid most of the constraints, but they would have higher costs since they need to pay the consultant.

Cooperate with colleague farmers to navigate the complexity

One method for farmers to stay more independent and work with the legal complexity is by cooperating with colleague farmers. Farmers can learn from each other in a network which helps them to navigate through the complexity. Examples of farmers who do this are interviewees 4, 5, and 9. However, this will not help in easing the regulations, for which the farmers should work together with the ministry or RVO.

Interviewee 3 proposes to make IACS less complex. It does not need to be this complex. He also believes it is better if the processing industry of field beans is encouraged/ subsidized to increase the market and stimulate sales for farmers.

5.5 Underlying logics of strip cropping in Common Agricultural Policy

In this section, I will continue with the institutional logics to understand how actors are influenced by their context. Each of the constraints from this chapter will be identified as institutional logics on two levels. Logics at the sector level are based on ideal types in Table 2 in the theoretical framework. At the field level logics which are more specific and steer attention to specific constraints and solutions. This will be substantiated by data from the interviews and documents.

Integrated Administration and Control System a logic of control and distrust

IACS is a system to monitor EU CAP policy. This logic can be referred to as the ideal type of "The **state**". The registration system can be seen as a form of bureaucracy which is the source of authority. The field logic that refers to the IACS is the **logic of control and distrust**.

According to the interviewees, the general issue with the IACS is that it requires too much detailed registration. For example, the registration of strips must be precise to the centimetre, where a strip of 2.98 centimetre does not count. In the field, it is impossible to maintain this precision (interviewee 2). There seems to be a gap between what is possible in the system and how it is translated in the field. This is an example of the source of authority, the bureaucracy which exerts its control over the farmers. This can be seen as an example of the logic of control through the IACS.

Interviewees 3 and 8 mention that they feel like the IACS system is based on the logic of distrust. They need to prove every greening measure they implement, especially when it deviates from conventional agriculture. This feeling was shared with interviewee 10 who works for RVO on the policies and clarified this:

> *That is an interesting question. Yes, it is the case that particularly the European regulations for which IACS is also doing the collection are largely based on a kind of distrust. And that's because that's how the European regulations have been until now. And they demand that you demonstrate 100% instead of saying at some point, well with sample checks we have sufficient certainty, for example. So that experience is also true and that was compulsory and the Netherlands was judged on that, that we did it that way. During the current CAP period, this has been adjusted somewhat and we will try to apply the principle of responsible trust, which also applies to national subsidies, to the CAP as well, provided that the European Union allows for it. And then you see that because there have been some changes in the way of working between the applicant, the farmer and RVO and the way of assessing. (Interviewee 10, 2024)*

The IACS which is based on the logic of distrust, originates from the anti-fraud measures from the EU. This makes it difficult for especially farmers that want to adopt better practices to prove this. They must work in a system where colleague farmers try to push the boundaries of the regulations. This relates to the basis of the logic of the state, to increase the community good. The system is designed to ensure a fair playing field and reduce the risk of fraud.

Logic of preventing fraud in subsidy schemes

The constraints with AECM and Eco scheme can be identified by the sector logic of the **State** and the field logic of **preventing fraud**. They originate in the CAP and IACS because they cause an increase in the need for registration and add additional regulations to the CAP.

EU CAP wants to promote sustainable agriculture for which it uses specific subsidies. As seen in the underlying logics of the IACS, the EU wants to prevent any fraud with the subsidies (European Union, 2022). To apply for the subsidies, farmers need to provide proof of their sustainable practices. In the

current IACS system, it is easier to prove your field is fallow, which is less sensitive to fraud due to easy application and control, than to prove you are growing your crops in strips which has several requirements mentioned in chapter 4.1.

Phosphate sampling, limited by the logic of monocropping

Phosphate sampling can be identified as state logic since it also involves bureaucracy to comply with regulations. The exemption position for phosphate-poor soils, allowing for higher phosphate application (known as fosfaatdifferentiatie), depends on the phosphate concentration in the soil and whether the land is arable or grassland. Soil sampling is required every four years. Fields smaller than 2.5 hectares can be combined up to a total of 5 hectares, provided they are adjacent (RVO, 2019). Because in strip cropping, you grow different crops, with sometimes strips of nature or other disruptions, you need to take separate samples. This contrasts with monocropping fields, which are typically larger and require fewer samples.

This constraint originates from the field logic of **monocropping**. The policy is designed for farms with a monocropping system. The policy fails to facilitate small-scale farming like strip cropping.

Underlying logics of complex bureaucratic registration system

The ideal type of the constraint with legal complexity can be related to the logic of Profession. The field-level logic relates to the logic of **farmer independence**. Farming is an old profession which requires a lot of expertise and knowledge. Due to the increased use of technology and the complexity of regulations, farmers dependency on external expertise increases. Not only in strip cropping but for farmers in general. Maschewski and Nosthoff (2022) talk about “smartification of agriculture” with increased use of technology like drones, robots and AI at farms. Where a farmer used to grow his crops using his expertise, he now relies on big data and technology to grow his crops. Farming has become more than growing crops. Regulations have also become more complex, and the governance increased. Measurements have become more precise, which also makes monitoring more precise. Also, environmental monitoring is relying more on data (Forney et al., 2018). There are indications that bureaucratic rationales are increasing due to the digitization of governance instruments (Forney & Epiney, 2022). Farming is no longer farming. With the diffusion of technology, a farmer must also be acquainted with IT, something which is the biggest bottleneck for some farmers, for example, interviewee 5.

The government expects a different field logic of the sector logic profession. The government expects the logic of a “smart farmer” who uses a lot of technology. This results in the governance systems becoming more complex, and farmers fail to operate their farms independently. In that case, they are forced to hire a consultant to be able to keep up with all regulations and updates. Consultants earn their money by helping farmers get through the complexity. This can be seen as a self-sustaining system, where governance can become more complex since the solution is found in a consultant who will know how to navigate. For a farmer, it becomes increasingly difficult to stay independent in his profession. This different interpretation of the logic leads to conflicting ideas on how governance should happen.

5.5 Conclusion

An overview of the constraints, navigation and logics, presented in this chapter is shown in Table 4. IACS for strip cropping farmers takes more time than for conventional farmers. The system is complex and if you add a diverse farming system to it, it becomes even more difficult. This results in a potential bottleneck for current and future farmers to apply strip cropping. The connected subsidy

schemes AECM and Eco scheme provide additional constraints for strip cropping. Given the workload and benefits, strip cropping is not considered efficient under the AECM and Eco schemes. Strip cropping is one of the activities that can be performed to get the subsidy. However, there are easier methods to earn points for the subsidies. While these subsidies are theoretically intended to encourage strip cropping, in practice, they impose constraints due to extra registration requirements. As a result, strip cropping is inadequately promoted. Phosphate sampling is also perceived as a constraint by several strip cropping farmers. Due to their field being split into different plots, they must take more samples than conventional, monocropping farmers.

Another constraint that the farmers face is that it gets more difficult to be an independent farmer. The IACS is a complex system that farmers struggle with. They value their autonomy and their own beliefs. For example, some farmers take pride in doing the IACS themselves whereas other farmers outsource it to consultants. Outsourcing to consultants is not preferred by farmers, but is more a necessity.

Farmers have different approaches to working with the constraints. Several methods were mentioned during the interviews. For example, drawing it as nature, hiring a consultant, or it is embedded in their operation which makes it easy to fill in. All farmers had a slightly different approach to navigating the constraints.

Organic farmers tend to have fewer constraints with the Eco scheme, compared to conventional farmers since they reach the gold status automatically. Also, by hiring a consultant, farmers can apply for the subsidies more easily.

The underlying institutional logics of the constraints give an understanding of how the constraints of the interviewees are influenced by their context. For the constraints related to CAP, the institutional sector-level logic of “the state” and “profession” are defined. For the constraints with IACS, AECM & Eco scheme and phosphate sampling it refers to the state with the source of authority bureaucracy.

The field logics of the constraints with IACS is the logic of control and distrust. The IACS is designed to control agriculture in Europe. Several interviewees mention that they feel like the IACS is based on the logic of distrust. This logic of distrust is related to the subsidy schemes in the CAP for which the field logic is defined as preventing fraud. In the constraint with phosphate sampling policy, the logic of monocropping is noticeable. The constraint relating to farmers independence can be identified by the logic of farmers independence, where the farmer is seen as an independent and self-sufficient farmer.

Table 4 overview of constraints and logics chapter 5

CONSTRAINT	NAVIGATION	SECTOR LOGICS	FIELD LOGICS
IACS IS TIME-CONSUMING, COMPLEX AND TOO DETAILED	Drawing it as nature, hiring a consultant, or it is embedded in the operation	State	Control and distrust
AECM, UNCERTAINTY OF FUTURE ELIGIBILITY OF SUBSIDY	Consultant	State	Preventing fraud
ECO SCHEME, MORE COMPLEX REGISTRATION	Organic certified	State	Preventing fraud
PHOSPHATE SAMPLING OF EACH STRIP	Sampling in a grid, or improving soil quality	State	Monocropping
FARMERS INTUITION INSUFFICIENT TO REACH INDEPENDENCE	Cooperate with colleague farmers to navigate the complexity	Profession	Farmers independence

6 Constraints with information, communication and knowledge

In addition to constraints with the IACS, farmers also face constraints with information availability, the communication between farmers and RVO and the limited availability of knowledge. This chapter will start with a section about the constraints farmers mention with information availability. The second section will focus on the constraining communication with RVO, which is linked to information availability. The third section will be about knowledge. The fourth section will focus on the institutional logics of the constraints. The fifth section will elaborate on how farmers navigate the constraints. The final section will be the conclusion.

6.1 Constraints with excessive, fragmented, and poorly targeted information on RVO website

If you take a brief look at the website of RVO, you will immediately see a lot of information. Plenty of information for farmers one would say. However, during the interviews, it became clear that farmers struggle with finding the information they need. The information was **excessive, fragmented, and poorly targeted**. There are different ways RVO sends information to the farmers, through their website, newsletters, and social media. In this section, I will present the results of the experiences of the interviewees.

When interviewees were asked about information availability, interviewees 2,3, and 4 mentioned the excessive information on the website of RVO. Because of this, it is difficult to navigate the website and find what you are looking for. When the interviewees search for rules that apply to them, they need to navigate through rules, exceptions, and conditions. The website is described as complex for which interviewee 2 asks himself why the whole governance system must be this complex.

Furthermore, Interviewees 3 and 7 mention the fragmentation of information on the website. There are a lot of links on the website, all leading to different pages. Interviewee 3 also encounters outdated information, where he uses an old page, only to find out later that there was a new page. Interviewee 3 also has issues with the used language:

> *They should really put a good copywriter on there, someone who can think from the user's point of view of which information is needed and how to structure it? Because it's just a lot of information. (...) Because they are used to official language and they don't take into account enough that citizens are not used to official language. (...) and also use ambiguous language. (Interviewee 3, 2024)*

Interviewee 7 describes the RVO website as horrible, inaccessible, and difficult. When you have a lot of diversity on your farm, you need to navigate to a lot of places on the website, which takes a lot of time. When you have a large, specialized farm, it becomes easier to navigate, because you only need a small section of it. This highlights the fact that the system is built for large companies and not for diverse companies like strip cropping farmers.

Interviewee 4 mentions she is good with computers and manages to find her way through the website. Even though she mainly uses Google search to find the right page, instead of navigating through the website. She mentions that her father who sometimes helps at the farm, would fail to find information on the website and could not have done it on his own.

Interviewee 10 acknowledges the comment that it is difficult to find information on the RVO website. She mentions that this is due to the complex regulations that must be applied in various situations and understood by different target groups. The information is read and used with different interests and interpretations. For example, one farmer wants to learn something about a new regulation, whereas another just wants to know a date or deadline. The transmission of the message should suit both cases.

Interviewee 1 mentions that the website of RVO is divided into several subcategories. There are many different links on a webpage which navigate you to other pages. RVO is working with numerous different laws and regulations for companies in the Netherlands. They need to manage everything, and the website is a major communication channel for providing information. Information is targeted at specific target groups and cannot deviate from these groups. She mentions an example of agroforestry where animals, trees and arable farming are combined. The website of RVO did not facilitate in this case which falls in between sectors. Special cases and new innovations are difficult to classify on the RVO website. This could be considered a limitation for the website to facilitate future innovations. The constraints with information abundance can be considered regulative and normative since it involves Governance systems, where all information needs to be communicated correctly, and authority systems.

6.2 Difficult Communication through helpdesk and newsletter

The interaction between farmers and RVO happens mainly in times of registration for the IACS when farmers get stuck in the application and farmers need to call RVO helpdesk to ask their questions. They usually call for specific cases like what crop code do I have to use for this crop, or I get this error I never heard of, what can I do? During the interviews, several experiences are mentioned which I will elaborate on in this section. Furthermore, I will focus on another communication channel, the newsletter of RVO and some experiences of farmers with this newsletter.

Interviewee 2 mentions that when you call someone at RVO for support with IACS, for example, if you need a specific crop code, they do not know the answer, because in his case it is a new situation they have not heard of before. Interviewee 2 needs to call RVO 3 to 4 times during his IACS registration. He mentioned long waiting times before getting through. The long waiting times were also mentioned by interviewees 3,4 and 5.

Interviewee 3 also mentions he had to call the help desk a couple of times. Especially last year when his wife helped with the IACS, she had to call the help desk for help several times. She mentioned that the people working at the help desk sounded young and that they did a good job in general. However, they could not help her with the right information. She mentioned the following example:

> *A simple example, you are in doubt between two crop codes. you know that the choice has consequences on, for instance, points and values for the eco regulation which are therefore important for you, but you don't know exactly how. So choosing the right code has consequences, but you don't oversee that very well. But with something like that, they can't help you either. (Interviewee 3, 2024)*

They cannot advise on what will be the best option, but can only provide information. The advice she usually gets is to stay as close to reality as possible. She tried that in a case which led to a big mistake, which was later corrected. Interviewee 4 mentions that it seems like they cannot give answers upfront and you just have to try something and afterwards, you will find out whether you were right or not. This is frustrating for farmers who want to do it right the first time and do not want to wait until they get corrected for making a mistake. Especially since it involves regulatory compliance and they potentially could face a fine.

Interviewee 3 had difficulties finding information on the RVO website and asked the helpdesk where to find it. They advised her to use Google Search to navigate to the right RVO page instead of navigating through the RVO website. She does not understand why the system operates in the current way:

> *It's just systems based on mistrust and The need for control. and I understand that and that's how the whole society is set up. I've seen the same thing very strongly In healthcare as well. But yes, it doesn't work. in my view it is counterproductive.* (Interviewee 3, 2024)

Interviewee 3 mentions that the systems are based on distrust. She has to prove everything she does and this also constrains the communication, since the people at the helpdesk cannot and will not take responsibility for the farmer. This basis of distrust is also mentioned by interviewee 8. He mentions that especially his organic operation is checked based on distrust. He operates in a conventional culture, where he is one of the only farmers who grows organic. Interviewee 10 mentions that the basis of distrust originates from European regulations. The European regulations ask for 100% proof since they do not trust samples. Even though this basis of distrust happens in the whole system, strip cropping farmers also face constraints because they need to provide even more evidence and details.

Interviewee 5 mentions that he has no constraints in information from RVO helpdesk. The questions he has asked were always answered and he compliments the communication. Interviewee 8 has an opposing view of the helpdesk and does not even bother to contact RVO. In his experience, nothing will change when you contact them, and in his opinion, calling RVO is pointless.

As a solution to the problems with the helpdesk, interviewee 2 proposed a fixed contact person for specific cases. For example, for strip cropping. A fixed contact person who has more in-depth knowledge of the situation could provide more detailed information.

Another way of communication from RVO is through their newsletter. Interviewees 4 and 9 mention that they are subscribed to the newsletter. Interviewee 4 says she receives it every month (according to the website of RVO this newsletter is weekly), but often finds herself too busy to open it. This is something interviewee 10 also mentions. They monitor how many people open the newsletter and see that a lot of people do not open it. Interviewee 9 however, opens the newsletter every week scrolls to the news about agriculture and reads what is relevant for him.

Interviewee 9 mentions that RVO is lacking in communication around the payment of CAP this year. In November last year, he got a message that he would get paid part of it and the other part before April this year. Up until the interview half June, he heard nothing. He is especially concerned for colleague farmers who rely on this payment because they have a lot of debts. His wife has called RVO to inquire about it.

RVO also seeks dialogue with farmers. RVO and LNV visit farmers to explore what they are doing and understand their way of working. RVO visited interviewee 3 with a group 5 years ago. The interviewee made a presentation about his farm and there was a conversation where the group asked for which improvements could be made by RVO. Interviewee 3 mentioned the constraints they had with IACS, with all the details and extra work. RVO found this interesting and wanted to continue the dialogue at a later moment, but to the disappointment of interviewee 3, that never happened. Interviewee 9 also mentions that he gets visits from RVO and LNV to learn about his farm. And to get inspiration on different approaches to agriculture.

6.3 Lost knowledge, where did the farmer go to?

Knowledge of strip cropping farming and nature-inclusive farming in general is low. For decades the focus and development of agriculture was towards specialized monocropping systems since they could produce most yield facilitated by artificial inputs like fertilizers and pesticides. However, this caused the knowledge of farming together with nature to disappear. This knowledge is returning to the sector by introducing strip cropping and regenerative agriculture. This is also mentioned during the interviews. Therefore, you can consider the lack of knowledge on strip cropping a constraint.

For interviewee 7 who is more interested in food forests, knowledge about food forests is limited. With his expertise, he helps farmers who want to apply a food forest into their farming system. The farmers do not have the knowledge or skills about trees and forests. This is also experienced by interviewee 9, who welcomes colleague farmers and helps them:

> *We have study groups here almost every week, groups of farmers, school classes, RVO, government. They come to see what we do here and find it very interesting and inspiring. At the same time, I tell them that this is not a blueprint of how things should be done, but there are a lot of elements that you can also apply in your own operations. Even if you are a conventional farmer and intensive, if you can grow with less fertiliser by, for example, sowing herb-rich grassland, feeding differently or cultivating your own feed, you can reduce your cost price and therefore have a higher margin. Only all farmers, or at least 95% directly admit that they lack the knowledge to apply this. (Interviewee 9, 2024)*

Knowledge and examples for strip cropping must be available for current & future farmers and RVO. Interviewee 9 helps in this by welcoming study groups and shares his knowledge. He also supports three neighbouring farmers who just started with strip cropping. There is also a course on strip cropping at ERF BV that farmers can follow (BioAcademy, 2024). According to interviewee 10, RVO also supports farmers in acquiring knowledge by giving knowledge vouchers which they can use to hire a consultant and get advice on sustainable agriculture.

6.4 Logics of information provision, sending, and lost knowledge

The logics of information availability and communication are related to the **State** and the source of authority is bureaucracy. The excessive information is caused by the fact that many regulations apply to different stakeholders and different contexts. The data needs to be interpreted in different ways depending on the user. The government and in this case, RVO needs to ensure that it is understandable by all readers (Interviewee 10, 2024). The basis of this strategy can be defined as serving the community good because the government is obliged to share laws and regulations according to the open government law (Rijksoverheid, N.D.). This relates to the field logic of **complete information provision**. This is part of the strategy of the government to avoid liability.

Interviewee 1 mentions that RVO is a large organization with a lot of different people. Therefore, one person cannot know everything within RVO, which also applies to the helpdesk. She also mentions that the systems are based on large, specialized companies and not for small diverse farmers. This means that the people at the helpdesk generally also are better instructed for large companies, instead of small and diverse companies. This makes it difficult for the communication of RVO to facilitate everyone. The helpdesk wants to facilitate everyone. However, the government cannot be held responsible and therefore cannot advise farmers, they can only give information. The field logic for this can be identified as **information sending**.

The constraint with the lack of knowledge can be identified by the logic of **Profession** and the field logic as **lost knowledge**. The disappearing knowledge and expertise is caused by the fact that farming with nature got replaced by farming with increased technology such as machines, fertilizers, and pesticides (Van der Heide et al., 2011). This caused the knowledge on nature-inclusive farming to disappear. There was an easy solution to increase production, by specializing production and using artificial inputs. However, the negative sides were neglected for a long time (Van der Heide et al., 2011; Vermunt et al., 2022). This knowledge needs to be regained and research is needed to improve it (Vermunt et al., 2022).

6.5 Navigating the constraints with RVO website, communication, and knowledge

The excessive information at RVO is seen as constraining because interviewees are not able to navigate through the website to the right pages. When they call the helpdesk of RVO they face long waiting times to find out that the help desk also does not know how to navigate to the right information on the website. Interviewees mentioned a tip they got to **search their topic on Google, which would refer them to the right web page of RVO**. This is a method to navigate the constraint of information availability.

Interviewees 1 and 10 have more knowledge of communication from RVO side. They mention that the employees of the help desk are eager to help but cannot know everything. They have instructions to write down questions they cannot answer, after which these questions will move up into the organization to find the right answers. RVO also researches how to improve their services to navigate the constraints with communication:

> *We try to do that as good as possible and there are very sensible people there who do good research to find out what is needed. We also regularly ask anyone who has called to get in touch with us about his or her experience, and we use that information to try to process the client's signals about how things could be done better. And more in-depth research is also carried out, sometimes using questionnaires, sometimes by telephone, sometimes in panels. (Interviewee 10, 2024)*

This means that **RVO is actively trying to improve their services for better communication**. However, the farmers I spoke to never mentioned the RVO requesting feedback after contact with the helpdesk. Interviewee 2 proposes a fixed contact person at the helpdesk of RVO to answer specific questions about new cultivation methods to improve communication.

The constraints with knowledge are navigated through a **course on strip cropping** by Wageningen University and other partners. In addition to that, **research** is done to increase knowledge of the benefits and practices of strip cropping.

6.6 Conclusion

An overview of the constraints, navigation and logics, presented in this chapter is shown in Table 5. This chapter focused on constraints with information, communication and knowledge. When farmers face issues with the IACS or other regulations, they will start looking for help at the website of RVO. However, they find that information is difficult to find on the website and communication with RVO also fails to help them. Furthermore, knowledge of strip cropping, and nature-inclusive agriculture is limited which makes it difficult for prospective farmers to start with strip cropping.

The institutional logics of the constraints with information and communication relate to the ideal type of the state. The previously mentioned complexity of the rules system also makes it difficult for RVO to effectively communicate the information on regulations to every single farmer. Especially concerning all the differences between the farmers that the regulations apply to. Furthermore, the field logic of the constraints with information is the complete information provision, the fact that the government is obliged to share all information. Related to the difficult communication, the field logic refers to information sending. The government is mainly sending information and cannot advise because it cannot take responsibility for the farmer. The logic of the constraint with knowledge can be seen as the ideal type of profession and the field logic to lost knowledge. The expertise for nature-inclusive, and strip cropping farming that has disappeared due to the reliance on artificial inputs causes the current constraints in knowledge.

Table 5 Overview of constraints and logics of chapter 6

CONSTRAINT	NAVIGATION	SECTOR LOGICS	FIELD LOGICS
EXCESSIVE, FRAGMENTED, AND POORLY TARGETED INFORMATION ON RVO WEBSITE	Find the right page through Google search instead of navigating through RVO website	State	Complete information provision
DIFFICULT COMMUNICATION THROUGH THE HELPDESK AND NEWSLETTER	Internal improvement of services	State	Information sending
LACK OF KNOWLEDGE ON NATURE-INCLUSIVE FARMING	course on strip cropping and research	Profession	Lost knowledge

7 Community constraints: Rural tensions

Based on the interviews, it seems like most farmers experience getting some negative comments about their way of farming. In this chapter, I want to focus on the normative constraints farmers face with their strip cropping. The focus will be on the reactions strip cropping farmers get from their neighbours. Next to negative comments, farmers also experience support from their community. Furthermore, I will focus on the institutional logics of the constraints. Finally, I want to finish this result section with farmers perception of strip cropping, how they navigate the constraints with the community and what solutions they propose to enable or promote strip cropping for current and prospective farmers.

7.1 Negative attitude from community

Through the interviews, it has become clear that the interviewees face constraints from their environment. They implement measures on their farm that deviate from conventional practices. Strip cropping is often one of the measures which is visible in the fields. This section will focus on how interviewees experience constraints from their colleague farmers and the environment. Some interviewees also experienced enabling opinions, which will be covered in the next section.

Interviewee 2 faces negative comments on his farming practices, his colleagues call his farm “Little gardens, or fiddling”. In his area, most farms are big fields growing wheat. His approach with more variation and diversity stands out, which makes it easy to comment on. He also grows a lot of different crops that most of his neighbours do not even think about growing. This makes it difficult for his neighbours to imagine the benefits of his system. The interviewee further mentions the masculine feeling of expanding the farm and especially the farm equipment. If you move the opposite way and decrease the size of your equipment, like in strip cropping, you move away from the feeling that dominates farming. Interviewee 2 deviates completely from the original crop rotation, one that is reasonably profitable in the area. He indicates that he gets the following comments from his family:

> *If we had continued in the old way, it would have been better. That's the reaction I do get from other people as well. Is it wise what you are all doing, or wouldn't it also be better to just do things the regular old way? (Interviewee 2, 2024)*

Interviewee 8 also faces opposition from the environment he operates. He mentions:

> *You live in an area, with only conventional growers with a conventional sales And a conventional certification body and a conventional government. and then you start growing organically there. I do everything differently. That means they can worry about us all day and I worry about them. And at the end of the day, you haven't made a bit of progress. (Interviewee 8, 2024)*

Interviewees 2 and 8 both face a constraining environment. Interviewee 8 mentions that because he grows organic, he experiences stronger regulations and monitoring. Furthermore, he does not even talk about strip cropping to his colleagues, because it just gives too much negativity. Another issue he mentions is the banks that do not want to finance a farm that decreases its production.

Interviewee 3 finds that his neighbours are not interested in applying strip cropping as he does. He mentions that his neighbours consider it too much trouble and do not see the benefits of it. The extra work it requires is the biggest bottleneck because the registration in IACS and application is so complex. When compared to the added value in the eco scheme, it is not worth it. He mentions that there is a taboo on promoting nature at your farm. Interviewee 6 receives the same comments from colleagues who just consider it fiddling in small plots.

Interviewee 4 mentions that neighbours who see her strip cropping fields comment on the large number of weeds in the crops. She agrees with them but also explains the bigger goals of nature-inclusiveness with this part of the farm. She also would not apply the strip cropping to her conventional farm as well.

When interviewee 5 was asked about the opinion of his neighbours, he mentioned that most neighbours do not even know what he is doing. He explains the following about it:

> *I don't begin talking to them about strip cropping. I do tell them things, but not so specifically that I talk about strip cropping. Look, for me, strip cropping is not that special. In all the years I've been working organically, crop rotation is just the basis of it all. And I also grow multiple crops here and not just 2 or 3. and I give rest to my soil and I just do things more the organic way. I don't feel the need to discuss this with them all the time. (Interviewee 5, 2024)*

Most farmers embed strip cropping in their farms alongside other measures. This also applies to interviewee 5, who mentions that crop rotation is part of his organic farming and strip cropping fits this perfectly.

Interviewee 9 regularly has groups of farmers or students who visit his farm. He experiences that although most students are open to strip cropping, some students do not believe in it because they only know the current system, which is often taught at home. The students consider strip cropping as difficult and mainly look at the extra work it takes. They compare it to their home farm, reflecting on how farming traditions have been passed down through generations.

7.2 Support from the community

Interviewees not only encounter constraining opinions but also supporting opinions. For example, interviewee 2, who gets negative comments from neighbours, also notices that recreational airplanes will depart from an airport nearby and fly towards his farm and return. They circle his farm because his strips look different and appealing from the sky. People like the view of the different strips. This encourages him to proceed in his work.

Interviewee 6 operates in a cooperative where his customers are simultaneously his bosses and employees. Strip cropping was requested and initiated by several members who wanted to create more biodiversity on the land. The interviewee receives support from the members in maintaining strip cropping since they believe in a system of biodiversity to grow their food. He also gets many positive comments on the diversity on the farm.

Interviewee 9 mentions that through the different study groups that visit his farm, he inspires people to think about biodiversity and improve their soil. He gets compliments on his business case and his agricultural practices. He is farming the land of a country estate and needs to maintain it nature-inclusive, they support his farming practices and value the strip cropping.

7.3 Logic of rural tensions

Community constraints are normative and cognitive constraints. They can be understood as originating from the sector logic of the **community**. The field logic of the community constraints can be identified as **rural tensions.** Farming happens in the countryside where the community feeling is generally stronger and people have more concern for their reputation (Danielson et al., 2023). It is therefore more likely that farmers who adopt a different cropping method which is visible in the fields, will stand out. People are afraid of change because they fear the unknown or prefer the familiar over the unfamiliar (Hubbart, 2023). This makes the position of strip cropping farmers in a community difficult

since they induce change. The alternative approach that supports goals to make agriculture more nature-inclusive can lead to conventional farmers feeling threatened in their practices. The basis of the strategy for the sector logic of community is Status, which farmers try to maintain. For example, interviewee 8 does not even bother talking with his neighbours about the strip cropping to prevent additional negative comments from his neighbours. Another example of interviewee 9 who seeks active dialogue with his community to explain what he is doing to build support.

7.4 Navigating community constraints

Interviewees try to navigate the constraints of their community. The different strategies are presented in this section.

Interviewee 2 tries to **ignore** the negative comments he gets from his neighbours. He used to farm the way they farm and understands their thoughts. However, he knows that what he is doing is an **investment for the long term and necessary to sustain farming in the future**. He mentions the cultivation of onions in his area which has increased over the past years. This is possible because there is still enough fresh water available, but this source is depleting, which makes this crop not viable. He is eager to ensure his farm becomes future-proof and knows that at some point his colleagues must follow.

Interviewee 3 does a lot of **community work.** He is collaborating with volunteers to restore nature in public spaces. He experiences that his neighbours are not interested in the strip cropping and its benefits, but he is strongly driven by de added value for the birds and nature.

Interviewees 4 and 6 did not experience too many constraints from their community. Whereas interviewee 5 avoids getting negative comments on his strip cropping, by **not mentioning** it to his neighbours.

Interviewee 8 farms in an area where the ideology is opposite of his and because of this he faces negative comments from his neighbours. However, he is determined to farm in his own way since it has proven to work. He mentions that he can hardly meet the demand for his organic flower bulbs, with increasing demand from municipalities and flower gardens. This is supported by the public debate on banning pesticides in floriculture. To avoid negative comments from his neighbours about the strip cropping, he does not even mention it to them.

Interviewee 9 does not report constraints from his community. He actively seeks dialogue with colleague farmers to make them understand why he farms in his way which creates mutual understanding.

7.4 Conclusion

An overview of the constraints, navigation and logics, presented in this chapter is shown in Table 6. Strip cropping farmers are adopting relatively new practices on their farms. This results in their farm standing out in the community which leads to normative and cognitive constraints from their communities. Farmers face negative comments or sometimes exclusion from their neighbours and family. Farmers who applied strip cropping did not solely apply strip cropping but did it on top of other nature-inclusive farming practices that make their farms unique. For example, growing organic tulip bulbs where everyone grows them conventional, active bird population restoration, and organic dynamic farming. Being unique in a regime that has been in place for a long time gives a constraining environment. The sector logics relate to the logic of community. The field logic to rural tension. Farmers try to maintain their status in the community by not mentioning all their practices or actively

seeking dialogue. Farmers navigate the constraints of their community by focusing on their own beliefs and proof of their system. They have a long-term goal in mind of creating healthy soil and biodiversity to maintain their farm.

Table 6 Overview of constraints and logics in Chapter 7

CONSTRAINT	NAVIGATION	SECTOR LOGICS	FIELD LOGICS
NEGATIVE ATTITUDE FROM THE COMMUNITY	Ignore, not mentioning the practice, believing in their system, working with your community	Community	Rural tension

8 Analysis and discussion

With this thesis, my goal was to research how institutional constraints affect development of nature-inclusive agriculture in the Netherlands. I researched the institutional constraints farmers faced when implementing strip cropping which focused on constraints with RVO. I researched this using the following research questions:

What institutional constraints do farmers who apply strip cropping face in their interaction with RVO?

1. What institutional constraints do strip cropping farmers face?
2. What are the underlying logics of the constraints?
3. How do farmers navigate these constraints, and what solutions do they propose?

In this chapter, I will start with an analysis of the main results, Where I will answer the research questions linking the findings to the literature on institutions and institutional logics. In the second section, I will discuss the main findings and place them in the literature of MLP and broader literature. This is followed by the third section which will reflect on the limitations of this research. In the fourth section, I will provide suggestions for future research. Finally, in the fifth section, I will provide recommendations specific to RVO based on this research.

8.1 Analysis

In this section, I will highlight the main findings of this thesis. An overview of the topics of this section is presented in Table 7. I will start with an overview of the constraints found during the interviews and classify them per type of institution as regulative, normative and cognitive. This will be further analysed with the literature on institutions (Geels, 2004; Scott, 1995, 2008). In the second section, I will give an overview of the institutional sector and field logics and place it in the literature of (Frenken et al., 2020; Fuenfschilling & Truffer, 2014; Thornton et al., 2012). The final section will be about how farmers navigate the constraints and propose solutions.

Table 7 Overview of Constraints, institutions, sector & field logics and farmers navigation

Constraint	Institution	Sector logics	Field logics	Navigation
IACS is time-consuming, complex and too detailed	Regulative	state	Control and distrust	drawing it as nature, hiring a consultant, or it is embedded in the operation
AECM, uncertainty of future eligibility of subsidy	Regulative	state	Preventing fraud	Consultant
Eco scheme, more complex registration	Regulative	state	Preventing fraud	Organic certified
Phosphate sampling of each strip	Regulative	state	Monocropping	Sampling in a grid, or improving soil quality
Farmers intuition insufficient to reach independence	Regulative	Profession	Farmers independence	Cooperate with colleague farmers to navigate the complexity
excessive, fragmented, and poorly targeted information on RVO website	Regulative/ normative	State	Complete information provision	Find the right page through Google search instead of navigating through RVO website
Difficult communication through the helpdesk and newsletter	Regulative	State	Information sending	Internal improvement of services at RVO

Lack of knowledge on nature-inclusive farming	Cognitive	Profession	Lost knowledge	course on strip cropping and research
Negative attitude from the community	Normative	Community	Rural tension	Ignore, not mentioning the practice, believing in their system, working with your community

What institutional constraints do strip cropping farmers face?

The focus of this thesis is on institutional constraints. An overview of the constraints including a classification of the type of institutions by (Geels, 2004; Scott, 1995, 2008) is presented in Table 7. The most relevant constraints will be further discussed in this section.

The biggest constraint strip cropping farmers face is with the IACS because they apply different farming practices which result in additional registrations. This requires more time for the administration, they face that the registration is too detailed, and the registration becomes more complex. This relates to a regulative institutional constraint. The IACS can be seen as a governance system to monitor and control formal rules and laws in agriculture. In this case, the system monitors for the CAP which relates to AECM and eco scheme, and phosphate differentiation.

Connected to the IACS are the subsidies like AECM and eco scheme. The subsidies are a form of incentive structures which by definition of (Geels, 2004) can be characterized as an example of regulative institutions. While supporting greening measures, strip cropping farmers experience the schemes as a constraint due to the additional registration needs. This is the opposite of what it tries to achieve because incentive structures are seen as an example of regulations that should enable actors and action (Geels, 2004; Scott, 2008).

Farmers intuition which is insufficient to reach independence can also be considered a regulative constraint. The formal rules and laws that are governed by the IACS become more complex. Apart from the increased complexity of laws and formal rules, the IACS also becomes more complex because the precision of the measurements increases and thus the precision of registration. The basis of legitimacy of this regulative institution is legally sanctioned. Farmers are fined for not filling the IACS correctly. Farmers must adhere to the system and fill it in truthfully, which is also checked by the “Nederlandse Voedsel en Waren Autoriteit (NVWA).

In addition to constraints with the IACS registration, the results show that farmers also face constraints around excessive information on the RVO website which they need to work through. This information often relates to the IACS regulations or other regulations like subsidies and laws. This information system can be seen as a governance system and therefore a regulative institution. The government uses the website to communicate laws and regulations. Furthermore, it can be considered a normative institution because the website involves codes of conduct for farmers (Geels, 2004).

Farmers also report issues with communication with RVO which is considered a regulative institutional constraint. This constraint is an example of governance systems and protocols. RVO is a large organization which covers a wide variety of specializations. The helpdesk that forms the communication partner with farmers has general knowledge and often cannot help with specific questions. They follow a set protocol to provide information and knowledge to farmers but do not focus on consulting (Rijksdienst voor Ondernemend Nederland, 2022).

Lack of knowledge of nature-inclusive farming practices is also a constraint farmers report. Especially for prospective strip cropping farmers, it is difficult to implement the new cropping system on their farms. Diverse farming requires diverse knowledge and skills (Aare et al., 2020). This constraint relates

to cognitive institutions as it is an example of beliefs and bodies of knowledge. It relates to the farmers belief in the system and their knowledge. Runhaar (2017a) mentions the need for alternative forms of knowledge production for nature-inclusive agriculture. In a study by (Vermunt et al., 2022), obstacles to knowledge transfer are seen as one of the blocking mechanisms to nature-inclusive farming. In his report, he mentions that knowledge is scattered and barely existent on various topics. Also, for strip cropping farmers, it is difficult to find the right knowledge. For example, knowledge about which crop combinations or strip width is not clear to farmers.

Lastly, farmers report constraints in their community. Farmers face negative attitudes from their neighbours, family and the sector. Because the farmers operate differently, they face normative constraints. This is exemplified by the strip cropping farmers not meeting the role expectations from the sector in their practices. Strip cropping farmers have to deal with negative comments on their cropping system and sometimes even face exclusion. In the study by Vermunt et al. (2022) it is also shown that the dominant agricultural sector is blocking the transition to nature-inclusive farming. The strip cropping farmers work with alternative practices but are judged on existing norms like tidy landscapes without any weeds (Westerink et al., 2021).

What are the underlying logics of the constraints?

In this section, I will answer the second research question by analysing the institutional logics. The institutional logics approach highlights how actors are influenced by their institutional context (Fuenfschilling & Truffer, 2014). an overview of the sector & field logics is presented in Table 7. The institutional sector logics will be classified into ideal types as defined by (Frenken et al., 2020; Fuenfschilling & Truffer, 2014; Thornton et al., 2012). The institutional field logics are more specific logics and will be identified based on the findings and the literature (Fuenfschilling & Truffer, 2014; Thornton et al., 2012). The most relevant logics will be discussed in the following part of this section.

Of the seven ideal types of the institutional sector logics, the logic of the state is most represented in this thesis. This applies to the IACS, AECM and Eco scheme, Phosphate sampling, information, and communication. The IACS is the authority system of the CAP which can be identified as bureaucracy in this institutional logic. The system is designed to cover the full agricultural sector. The strip cropping farmers reported constraints in applying this system to their farms.

I will use the field logics to zoom in on the constraints to increase the level of detail in the logics. The more specific field logics will be used for this. The logics of control, distrust, and preventing fraud can be identified for the constraints with IACS which is too complex and the constraints with the connected subsidy schemes. The IACS system is in place to monitor and control agriculture. This monitoring happens at the EU level which requires detailed registration of activities. This is based on distrust and fear of fraud. To reduce the risk of fraud, the EU wants to monitor and control every action. This makes it difficult for strip cropping farmers who deviate from the standard to do their registration. The standard for the registration is based on the logic of monocropping. The findings have shown that the IACS expects farmers to apply monocropping in their fields. This is the underlying logic which also makes phosphate sampling constraining.

We find that two constraints have the underlying sector logic of profession. First, the constraint where farmers intuition is insufficient to reach independence. This bottleneck can be identified by the institutional field logic of farmer independence. Farmers did not only report that the laws and regulations become more complex, but also the technology and registration systems become more difficult to work with. The profession of a farmer with specialized expertise is no longer sufficient to run a farm. There is an increase in IT use in agriculture and governance. Regulations and machines are

becoming more complex. Maschewski and Nosthoff (2022) mention big tech and smartification of agriculture in their paper. They highlight the potential dangers of dependency on big data and tech companies. They also mention the surveillance through data by the government which could become constraining. The governance through data is also mentioned in the paper by Forney and Epiney (2022) where they researched agri-environmental governance through data in Switzerland. They found that digitization did not lighten the administrative constraints but reinforced the bureaucratic approach to governance. Something which is also seen in this thesis where strip cropping farmers complained about the additional administrative burden of nature-inclusive agriculture and the subsidies.

Second, the constraints with disappeared knowledge are also connected to the institutional sector logic of profession. The field logic is identified as lost knowledge. The specialized monocropping in agriculture has caused the knowledge and expertise on ecology to disappear. However, diverse farming requires diverse knowledge and skills (Aare et al., 2020), something which is not needed in the specialized agricultural system. This change in the perception of a good farmer has impacted the way farmers work with nature. The policies promoting nature-inclusive agriculture work towards a new definition of a good farmer, one that collaborates with nature. However, knowledge has disappeared over the years and needs to be regained (Westerink et al., 2021).

Finally, the negative attitude from the community can be identified as the sector logic of community. The field logic for this normative and cognitive constraint is rural tension. The source of legitimacy for this logic is mutual dependence. Farmers have a strong connection with their community in which they help and support each other. They work towards a collective goal, producing food and maintaining their land. Because of the strong community feeling, the status is important. However, farmers who apply different practices, like strip cropping work towards a different ideology (Westerink et al., 2021). This causes the position of farmers in their community to be difficult. They induce change and support goals to make agriculture more nature-inclusive. Something some conventional farmers try to resist, which makes these farmers feel threatened in their practices (Vermunt et al., 2022). This causes tensions in the rural area.

How do farmers navigate these constraints, and what solutions do they propose?

To answer the third research question, in this section, I will focus on the first part of the research question and analyse how farmers navigate the constraints. The proposed solutions will be answered in section 8.5 in the recommendations for RVO.

An overview of how farmers navigate constraints is presented in Table 7. Farmers have different approaches to working with the constraints. Several methods were mentioned during the interviews. For example, drawing their strips as nature, hiring a consultant, or it is embedded in their operation which makes it easy to fill in. By drawing their strips as nature or in a pragmatic way, farmers spend less time on the registration. They register the goal of strip cropping, the improved biodiversity and try to follow the rules less strictly. Also, by hiring a consultant, constraints with IACS, subsidy schemes, accessing information and communication can be eased.

Organic farmers tend to have fewer constraints with the Eco scheme, compared to conventional farmers since they reach the gold status automatically. Also, by hiring a consultant, farmers can navigate the application of subsidies more easily. This is also researched by (Umar et al., 2019), where they suggest that consultants are crucial and relevant to delivering technologies to the farmers.

The constraints with complexity for which farmers intuition is insufficient to farm independently can be alleviated by cooperating with colleague farmers. By doing this, farmers can work through the complex system together, while staying independent and avoiding hiring a consultant. This is also

mentioned by Van der Ploeg about peasantries. Peasant farmers should work together to protect their farms and remain viable (van der Ploeg, 2018).

Considering the negative attitude from the community, farmers try to ignore the negative comments. They also believe in their system, which makes it easier to navigate through the community constraints.

There is a lot of variety between the farmers. Above mentioned navigation strategies do not apply to all farmers. Some farmers experience fewer constraints than others. For example, organic farmers who operate well within the boundaries of the regulations experience fewer constraints with Eco scheme, phosphate sampling, and communication. Another difference between farmers is farmers who strive for autonomy in the registration of IACS and farmers who hire a consultant. Fewer constraints are experienced by farmers who hire a consultant compared to farmers who do the registration themselves.

8.2 Discussion

In this section, I will discuss the findings by linking the results to the theory. The discussion will start with an overview of the constraining logics and its relation to strip cropping. This will be followed by discussing the institutionalization of the logics relating to the stability of the regime. This will be followed by mapping the logics in the MLP to place them in the context of the regime. This section will end by discussing the farmers independence.

Institutional logics in the multi-level perspective

To summarize the institutional logics and the related constraints, an overview is made in Figure 3. In addition to the logics mentioned in Table 7, Figure 3 also shows the connections in logics of strip cropping, and agriculture in the EU and CAP. These logics are necessary to create a more comprehensive view of the constraints. Figure 3 shows the relation between the different logics and provides an overview of where the constraints originate.

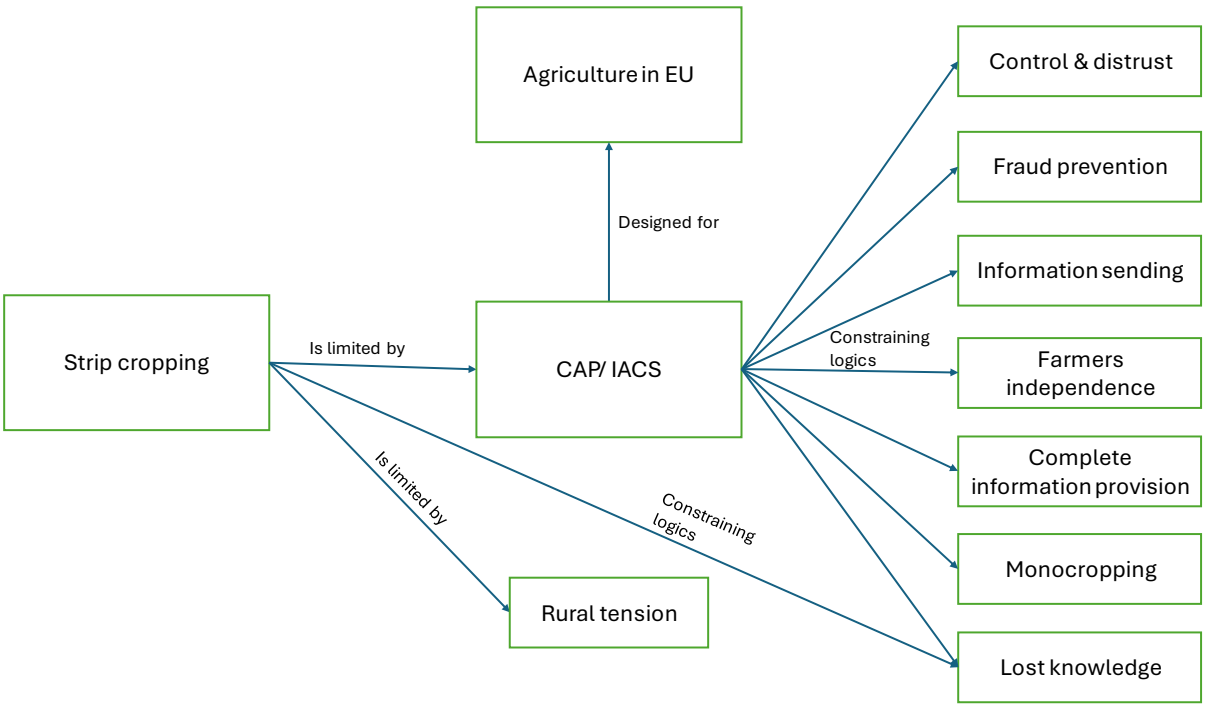

Figure 3 Overview of constraining institutional field logics in strip cropping

Fuenfschilling and Truffer (2014) discuss in their paper about a high structurization, or the institutionalization of logics. They describe that if a field is dominated by one established field logic, the regime is likely to be systematic and stable. This results in a strong power of the socio-technical regime over actors and can determine the course of development of the regime. In the case of strip cropping farmers, there is a highly established logic of conventional agriculture. This regime was shaped by policies over time and is highly institutionalized (Vermunt et al., 2022). An example of this is the CAP which is another highly institutionalized logic due to the long existence, on which agriculture is based. It tries to exert power on agriculture by implementing changes but faces forces from the agricultural sectors such as protests and lobbying against the changes (Zia Weise, 2024). The dominant forces in the sector, the conventional farmers and industry, exert their power to create a stable regime. This marks the system strip cropping farmers try to create windows of opportunity to break through. Figure 3 furthermore shows that the constraining logics are related to CAP/ IACS which is limiting strip cropping. This summarizes the relation between strip cropping and the constraints, which are mostly connected through the IACS and CAP which are executed by RVO in the Netherlands. An exception to this is the constraints related to the logic of rural tension. These constraints are disconnected from the CAP/ IACS and affect the strip cropping farmers directly.

Strip cropping is challenged by the high legitimacy of CAP policies and community logics. Both logics are highly institutionalized. CAP and agriculture in the EU are mutually dependent, they are designed around each other. Agriculture aims to achieve legitimacy from CAP and the development of CAP is influenced by forces from the agricultural sector such as lobbying and protests. An example of this is the protests that happened in Brussels in 2024 against the policies promoting nature-inclusive agriculture in the Green deal (Henley, 2024). Strip cropping is a form of nature-inclusive agriculture. The approach the dominant forces in the sector have against policies on nature-inclusive agriculture could also be seen in the approach the community has towards strip cropping farmers.

In Figure 4 an overview is given of the institutional logics in the MLP framework to demonstrate the relation between the logics in the context of the regime. The CAP/ IACS can be seen as the policy system which exerts regulative rules and constraints. Strip cropping farmers are the niche in the MLP. This new configuration is trying to break through to the dominant configuration. The MLP discusses external influences that influence niches via expectations and networks from the socio-technical landscape and regime. (Geels, 2004). These influences are also noticed by strip cropping farmers from the community in the regime, which constrains their practices from scaling and being implemented by colleague farmers.

Strip cropping farmers use a new cultivation method that suits the new government vision. However, as a niche, they need to operate in the socio-technical regime, following the same regulations as conventional agriculture. The strip cropping farmers find that systems like the IACS are not suitable for their operation, which causes more administrative work compared to conventional farmers. In a study by Smink et al. (2015), they studied how mismatching institutional logics hinder niche-regime interaction. They studied the interactions between the bio-methane niche and gas regime. They found that differences in pursued goals, decision-making styles and the scale of operations hindered productive cooperation. Strip cropping farmers also face different goals and conflicting logics. This leads to the niche-regime interaction being hindered.

The highly institutionalized dominant agricultural system consolidates stable patterns of interaction (Runhaar et al., 2020). Furthermore, if the institutionalization becomes bigger, the impact will be larger and it becomes more difficult to deviate from it (Runhaar et al., 2020; Tolbert & Zucker, 1999). This could be considered a reason why it is difficult for strip cropping farmers to fit in the socio-technical regime since it is difficult to deviate from the established rules while they farm under different rules.

The field logics are placed in the MLP in Figure 4. The CAP/ IACS is placed at the policy level of the regime. Connected to that, the logics of control & distrust, fraud prevention, information sending, and complete information provision are placed under the CAP/ IACS because they are directly related to this concept. The constraints originate and happen in the regime. Also, rural tension originates from the regime, more particularly in the culture system of the regime. Logics like farmers independence and lost knowledge can be considered standing in the path of the niche innovations to become the dominant configuration. Lost knowledge is a constraint that must be overcome to properly scale the innovation. The farmer's independence is also a constraint that is in the path of the niche to maturation. When farmers cannot work their way through the system on their own, they will have a difficult time becoming mainstream.

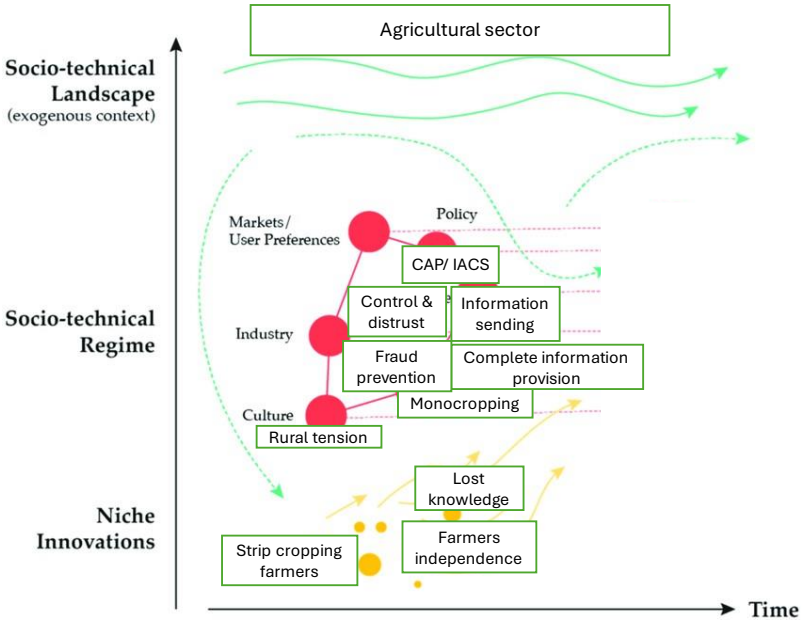

Figure 4 MLP with institutional logics related to strip cropping -adapted from (López Reyes et al., 2020) original (Geels, 2004)

This regime power is also seen in a study on the transition towards nature-inclusive agriculture in Dutch dairy farming. Some of the key findings from this report are that the current agricultural sector is seen as a recurring blocking mechanism which requires institutional change, and the change needs to come from policies aimed at regime transformation by the current government officials (Vermunt et al., 2022). In a study by Verburg et al. (2022), they advocate for more consistent and fundamental governmental support to facilitate conversion to organic dairy farming. They mention the need for a regime shift rather than supporting newcomers who enter the sector. Even though the current regime is highly institutionalized and difficult to deviate from, it must change to facilitate the transition towards nature-inclusive agriculture. The current changes that were implemented in the IACS to facilitate strip cropping are not sufficient because they are merely an addition to the current system. The transition of the system requires a fundamental societal change from one relatively stable regime to another (Loorbach, 2007). The highly institutionalized institutions in the agricultural sector are difficult to change. It is impossible for the socio-technical regime to reinvent itself and to come up with radical solutions to enable nature-inclusive farming which can be defined as transformational system failures (Dijk et al., 2018; Weber & Rohracher, 2012). This is also why it is difficult for strip cropping farmers to operate in the regime.

Strip cropping and farmers independence

Farmers struggle to find their independence in the highly institutionalized system. The IACS is embedded in agriculture, and it is difficult for this institution to change. This digital governance system is used to monitor agriculture in the EU. However, this digitization of governance has a serious impact on farmers autonomy: "*Despite some discourses that present digitization as a tool to lighten administrative constraints and a way to aid in the independent management of agricultural activity, our analysis reveals a more qualified picture: at the present time, digitization reinforces the bureaucratic approach to governance, and the contribution of digital technologies to the interests of the farmers themselves remains minimal.*" (Forney & Epiney, 2022, p. 173) In this study, they researched the effect of digitization and the effect on farmers autonomy in agri-environmental governance. The digital governance system (IACS) mainly has benefits for the bureaucratic approach to governance, where the benefits of the digital system are minimal for farmers. This relates to the strip cropping farmers who lose independence and need to use digital tools, without many benefits for themselves.

For strip cropping farmers the digitization of the IACS is also seen as a constraint. An example of this is the detailed registration of their activities. The system has become too complex for several farmers to complete independently. Therefore, the constraints with the IACS relate to the farmers independence. Earlier I discussed that the logic of the profession of farmer has changed over time and now includes more technological and IT aspects instead of cultivating plants. Farmers depend on consultants to do the registration properly. This relates to the work on the search for autonomy of peasantries by (van der Ploeg, 2018)

8.3 Reflection on limitations

This research was conducted in the spring of 2024. The primary source data were the interviews with farmers. However, due to the bad weather in spring, farmers were late planting their crops. This resulted in them having limited time to have interviews. Due to the limited time frame of this thesis, I was not able to plan the interviews at a later, more convenient date. Also, the summer period was about to start, which meant that other possible interviewees would go on holiday. This already happened with a consultant and policy worker from the Ministry of Agriculture. Possible interviewees were deleted from the list before reaching out due to them indicating that they wished not to be approached. In the end, springtime is not an ideal moment to interview farmers since they are busy getting their crops in.

Also, there were 2 farmers with whom I initially made an appointment, but one had to cancel the day before because he was too busy, and the other interview had to be cancelled on the day itself since I could not get to the location in time.

I sampled farmers through the CropMix project network. I selected possible interviewees based on their farm type and location to get a diverse group. However, in the end, this group was relatively small and the differences between them were bigger than expected. They all had different approaches to constraints in strip cropping. This diversity was bigger than expected, which led to interesting differences but gave problems with saturation of data. Concerning the constraints, the data is saturated. The interviewees gave comparable answers related to the constraints. However, considering the question of navigating the constraints per farmer, the data is not saturated. My questions could have been more exact on this subject.

In addition to the CropMix network, I also used LinkedIn where I shared a message calling for potential interviewees. However, I got limited reaction to this. I reached out to many consultants and

policymakers, but I either got no response at all, they were on holiday during my data gathering, or they were not available for an interview. This led to my list of interviewees mainly consisting of farmers. While my research focuses on the interaction between farmers and RVO, it was also connected to consultants and policy. It would have been better for the data to include the perspective of consultants and policymakers. For example, advisors from RVO who work specifically on IACS and CAP.

Another method of data gathering could be included. For example, observations when farmers are registering their IACS. This should be done before the 15th of May since the IACS should be submitted before that date. For my research, this date was too early to be included. You should consider that a farmer does the IACS at a time that suits him, which could change depending on the weather and be late at night. Living labs are organized as part of CropMix. It would have been interesting to gather data during these living labs. However, due to the spring season, these sessions could not be organised within the planning of my thesis.

During my proposal phase, I mainly worked on understanding the concept of institutions. This resulted in my focus on the theoretical framework and interviews on the division of institutions into regulative, normative and cognitive institutions (Geels, 2004). It was helpful to learn about institutions and their position in the regime. Institutions are a major part of this thesis, however, while this distinction clarifies institutions, it was not useful for understanding the constraints. This clear distinction between institutions helps in understanding how institutions work. However, in practice the institutions are interlinked and cannot be seen separately. This made it difficult to identify the institutional constraints in the analysis.

I also included institutional logics which better helped in understanding the constraints by putting it in perspective of the context. However, my initial focus went mainly to institutions in regulative, normative and cognitive which resulted in my interview questions to also focus on this division. If I had included a focus on for example field logics, I could have gone more in-depth on the constraints and focused more on the underlying concepts of the constraints. Institutional logics can also be used to study the niche-regime interactions. Just like the study of (Smink et al., 2015) where they drew on institutional logics to understand the niche-regime interaction in biomethane production in the gas sector. Since my interview questions did not focus on the institutional logics, it was difficult to draw the full picture of institutional logics in the MLP.

During the proposal and execution of the research, it was difficult to navigate through the CropMix goals and expectations and develop my research plan. This made it difficult to give my focus on the subject. I tried to include the system failure framework, but this framework was too broad to cover the focus on institutional constraints. This framework can help where system failures happen. If I were to start this research again, I would focus more on institutional logics and transition management. I would then include questions related to constraints with RVO in addition to my research to suit the goals of CropMix. This would lead more towards developing my research.

I did not get sufficient data for navigating constraints with knowledge, information and communication. My interview questions failed to fully cover these concepts. I did get some data from the interviewees who worked for the government, but from the farmers, I did not get sufficient data. Furthermore, this research cannot exclude whether constraints only affect strip cropping farmers, as other farmers, such as conventional farmers were not included in the scope of the research.

8.4 Recommendations for future research

My research has mainly focused on institutional constraints strip cropping farmers face in their interaction with RVO. While this focus was enough to cover in a Master's thesis, the focus should

become broader to create a more comprehensible view of the constraints. This study focused on strip cropping farmers who also were the main data source. A more diverse sample of interviewees is needed to include the perspective of consultants, conventional farmers, researchers, and policy makers. This will create insight into how the constraints are perceived by conventional farmers. By doing so, it can be concluded whether the constraints from this study only affect strip cropping farmers, or if the constraints are more common. The role of consultants is also discussed in this thesis. However, I was unable to include consultants in my data collection. Future research should also include consultants since they play a pivotal role in the sector and farmers independence.

Policymakers should be included more in future research to study the possibilities for strip cropping farmers. This study focused on the constraints and how farmers navigated, but when policymakers are included, more information on possibilities at the policy level can be found.

8.5 Recommendations for RVO

As RVO you are positioned between the enterprises and the government. The position of RVO in the MLP is between the policy and industry regime. Based on my research I have the following recommendations:

The IACS is a system to document all activities in agriculture. This system is highly institutionalized and covers conventional agriculture. For farmers who implement new or unique practices, this system is not working. Farmers struggle to find their way through the system, they do not know whether they meet the criteria for exemptions and need to find their way through the website or newsletter to find the proper information. My recommendation would be to explore whether a farmer can get a one- or two-year exemption from registering his strips in the IACS until the strip cropping is embedded in his farm. Prospective strip cropping farmers already have to find their way into the field and implement it in their GPS system. This will prevent initial mistakes in the registration process which could lead to future errors of the system due to changing strip locations on the map. For the years farmers get exemption they can register their fields like interviewee 6 did, in a pragmatic way where they give an overview of their situation in less detail. Or use a special crop code for strip cropping.

This way farmers will get experimental space to implement strip cropping in their farms without already worrying about additional administrative burden. It will also give farmers time to contact RVO to get more information on how to apply their strips in the IACS (if needed).

The IACS is also used as a registration system for official statistics about agriculture. Maybe farmers who apply strip cropping can register a crop code for strip cropping for the field and include the width of the strips. They can then support this by including sowing data from the GPS from the tractor, which will give the area per crop that is sown. Furthermore, a fixed contact person at the RVO helpdesk related to strip cropping could help in communication and feedback.

Farmers struggle to find information on the RVO website. Maybe you can introduce a chatbot function on your website which helps to navigate to the right web page to find the information he is searching for. Farmers shared in the interviews that they had to call RVO helpdesk because they could not find the right information. By introducing this chatbot, farmers do not need to call for this issue anymore.

I have interviewed farmers who mentioned that RVO visited their farm several years ago. They felt heard and seen through the visit and conversations. However, they mentioned that they were promised a follow-up to further discuss the constraints they were facing. They report that the follow-up did not happen. This could lead to farmers losing trust.

A possible solution that came up during the interviews relates to giving farmers incentives to apply nature-inclusive measures. To stimulate farmers, exceptions can be made in the administration. An example of this is for organic certified farmers, who have an exception for the Eco scheme. Another solution is to make it financing easier for farmers who want to adopt nature-inclusive farming practices but feel limited due to their loans. He proposed an interest discount for nature-inclusive measures. When a farmer wants to transition, he can get an interest discount on his existing loan to compensate for production losses. This would give farmers financial space to implement less profitable activities. This is something that Rabobank also considers (Baas, 2024)

Another proposed solution is the 3-meter bottom limit that should change. When you have smaller strips, you will get even more biodiversity. The precision of the details in IACS cannot be made in the field, why does the system have to be this precise?

9 Conclusion

The goal of this thesis was to research the institutional constraints strip cropping farmers face in their interaction with the Netherlands enterprise agency, or Rijksdienst Voor Ondernemers (RVO). I conducted a qualitative case study to find answers to this question. I identified different types of constraints. The regulative constraints that farmers face relate to the registration system, Integrated Administration and Control System (IACS) which is executed by RVO. Strip cropping farmers find that their diversified farming system requires more detailed registration, leading to more errors in this online system. Since their registration requires specific details for strip cropping farmers, it becomes more complex because they need to discover the correct details themselves. For a correct registration, farmers are almost compelled to hire a consultant which leads to the farmers losing independence in their profession. In addition to that, the information on the website of RVO is excessive, which makes it difficult to find the right information. When contacting the helpdesk of RVO, farmers are faced with long waiting times and the helpdesk is not able to answer the specific questions. Farmers also operate in a restraining community which gives normative constraints. Because their system works differently and requires more work in the field and the IACS, strip cropping farmers lack understanding of their practices by conventional farmers, and experience negativity and sometimes exclusion.

Concerning institutional logics, most constraints can be related to the ideal type of the state. The logic of the state is built on the strategy to serve the community good. This study has found that the logics of the constraints with the IACS relate to the logic of control, distrust, fraud prevention, monocropping, complete information provision/ sending, and lost knowledge. Furthermore, constraints experienced are related to rural tension.

Conflicts arise in the institutional logics where conflicting expectations of logics are present. For example, in the logic of profession/ farmers independence. The government expects farmers to use different technologies and regulations on their farms for monitoring and control. This digitization leads to farmers becoming more dependent on the government and consultants. Whereas a farmer wants to be independent and manage his business himself. Studies have shown that digitization of monitoring and control of greening activities did not contribute to more greening measures implemented on the farm. The farmer does not benefit from the technology and must bear the additional costs.

The IACS is a system to monitor agriculture in the EU and is the basis for subsidies. To serve the community good, the system is designed to reduce the risk of fraud. This makes it necessary for farmers to prove every action which causes the most constraints in strip cropping with RVO.

Strip cropping farmers have different approaches to make working with the IACS and RVO possible. They use different strategies to navigate the constraints. One of the most frequently used strategies is to hire a consultant to either do the full IACS for the farmer or help them with specific questions. The interviewees also proposed solutions like making a specific crop code for strip cropping to prevent drawing each strip separately.

In conclusion, strip cropping farmers can be considered a niche innovation in the socio-technical regime. They must operate their farm following the rules and systems of the dominant regime, the conventional agriculture and Common Agricultural Policy (CAP). This causes the most constraints because they are expected to be in the same regime as conventional agriculture but apply different farming practices. Institutional changes are inevitable to achieve the goal of supporting sustainable agricultural practices.

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Appendix 1 Interview guide

Voor mijn Master Development and Rural innovation aan de WUR doe ik op dit moment mijn master thesis. In het kader van het CropMix project onderzoek ik welke belemmeringen boeren met een innovatieve manier van landbouw (in de vorm van strokenteelt *of agroforestry* tegenkomen). Ik kijk in mijn onderzoek vooral naar belemmeringen van regels en normen. Mijn doel is om een overzicht te maken van de verschillende belemmeringen en deze verder te analyseren. Mijn bevindingen zal ik presenteren aan RVO welke bezig zijn met het verbeteren van de organisatorische processen rondom strokenlandbouw *en agroforestry*. Voor dit onderzoek ga ik interviews afnemen bij oa boeren, specialisten, onderzoekers en medewerkers van RVO. De data uit de interviews zullen anoniem verwerkt worden. Verder informatie over verwerking van data kunt u vinden in het informed consent formulier. Als u akkoord bent en het formulier wilt tekenen kunnen we beginnen met het interview.

1. Kan je mij meer vertellen over het bedrijf?
    a. Hoe groot, welke gewassen, biologisch – niet biologisch
    b. Welke teeltmethodes
    c. Geschiedenis bedrijf,
2. Hoe zou je dit bedrijf vergelijken met reguliere akkerbouw bedrijf?
    a. Verschillen/ overeenkomsten?
3. **Formele regels:**
4. Met welke wetten heb je te maken?
    a. Zijn er specifieke:
        i. Wetten
        ii. Regels
        iii. Procedures
        iv. Die het gebruik van het teeltsysteem (strokenteelt of agroforestry) moeilijker maken?
5. Heb je plannen om veranderingen door te voeren in de bedrijfsvoering richting natuur inclusieve landbouw, die niet mogelijk zijn door wet- en regelgeving?
    a. Bijvoorbeeld op het gebied van agrarisch, arbeid, of afnemers eisen?
6. Een aantal vragen over RVO
    a. In welke situaties heb je te maken met RVO?
        i. Met wie? Waarvoor? Welke situatie? Wat is de uitkomst?
    b. Hoe helpt/ bevordert RVO jouw bedrijfssituatie?
    c. Hoe belemmert RVO jouw bedrijfssituatie?
        i. Bureaucratie, tegenstrijdige regelgeving, gebrek aan informatie
    d. Kan je voorbeelden geven van situaties waarin je geholpen of tegengewerkt werd door RVO?
7. Hoe zorg je ervoor dat je aan alle wet en regelgeving te voldoen?
    a. Wie is hierbij betrokken?
    b. Welke uitdagingen zijn hier
8. **Normen**
9. Met strokenlandbouw of agroforestry werk je anders dan reguliere landbouw. Ik ben benieuwd naar de effecten hiervan in de vorm van verwachtingen/ normen:
10. Wat merk je vanuit de sector hoe er gekeken wordt naar strokenteelt of agroforestry?
    a. Staan collega boeren open voor jouw manier van telen, of merk je weerstand?
    b. Krijg je ondersteuning vanuit loonwerkers, afnemers, toeleveranciers of klanten?

11. Merk je belemmeringen vanuit de sector of de markt omdat je met een ander teeltsysteem werkt? Zo ja, welke?
12. **Vertrouwen/ ervaring**
13. Heb je persoonlijk belemmeringen ervaren bij het toepassen van strokenteelt *of agroforestry?*
    a. Hoe heb je de keuze gemaakt tot omschakelen?
    b. Merkte je dat je los moest komen vanuit de reguliere gedachte rondom akkerbouw?
    c. Hoe reageerde je omgeving op strokenteelt *of agroforestry*?
14. Was het voor jezelf lastig
15. Hoe reageerde je omgeving?

Interviewvragen bij interview RVO:

1. Wat is je rol bij RVO?
    a. Hoe hou je je bezig met strokenteelt/ agroforestry?
2. Hoe is het contact tussen RVO en boeren met strokenteelt en agroforestry?
    a. Hoeveel contact is er?
    b. Is er meer of minder contact in vergelijking met gangbare akkerbouwers?
3. Heeft het RVO doorgaans meer contact met boeren of met adviseurs/ tussenpersonen? Hoe werkt dit?
4. Kan je uitleggen hoe RVO werkt met de gecombineerde opgave, ANLB, mestwetgeving, eco regeling en basis premie.
    a. Zijn er nog meer regels/ procedures waar boeren zich aan moeten houden en waar RVO bij betrokken is?
5. Er zijn veel veranderingen in de wet en regelgeving binnen de landbouw. Hoe gaat RVO hier mee om? (Bijvoorbeeld 4% braak liggen)
    a. Hoe zorgen jullie dat het op tijd bij de boeren terecht komt
6. Aan het einde van de gecombineerde opgave wordt gevraagd hoeveel tijd er besteed is aan het invullen. Zijn er verschillen te zien tussen gangbare akkerbouw en strokenteelt of agroforestry?
7. Ontvangen jullie klachten over belemmeringen van strokentelers/ agroforestry over processen waar RVO bij betrokken is?
    a. Zo ja, wat voor belemmeringen zijn dit?
    b. Kan je meer vertellen over waar de belemmeringen vandaan komen?
        i. Bijvoorbeeld, EU wet, LNV of implementatie binnen RVO?
8. Krijgen jullie signalen van gangbare akkerbouwers die van plan zijn om te schakelen naar strokenteelt of agroforestry, maar die dit niet doen vanwege belemmeringen?
9. Is de huidige wet en regelgeving klaar voor de transitie van landbouw naar een natuur inclusieve (specifiek strokenteelt)?
    a. Wat zijn de grootste belemmeringen/ kansen?
10. Zijn er procedures die jij moet volgen?
11. Hoe heb jij contact met boeren? Wat is jouw ervaring daarmee?
12. Wat denk jij over strokenteelt?
13. Kunnen jullie veranderingen doorvoeren?

When interviewing a researcher or consultant, the interview will start with asking what their role is and how they are connected to nature-inclusive farming. I will then follow up on their knowledge on normative, regulative and cognitive rules and how they affect nature-inclusive farming. <u>Expert interviews</u>

1. Wat is jouw rol?

    a. Wat is jouw relatie met strokenteelt en agroforestry?

2. Formele regels:

3. Zijn er specifieke wetten, regels of procedures die het gebruik van het teeltsysteem (strokenteelt of agroforestry) moeilijker maken voor boeren?
    a. Met welke wetten hebben boeren te maken?
4. Wat zijn de grootste belemmeringen die strokentelers/ agroforestry boeren tegenkomen?
5. Waar hebben boeren de meeste hulp bij nodig/ met welke vragen komen ze vaak?
6. Wat weet jij van de relatie tussen boeren en RVO?
7. **Normen**
8. Wat merk je vanuit de sector hoe er gekeken wordt naar strokenteelt of agroforestry?
    a. Staan collega boeren open voor deze manier van telen, of is er weerstand?
    b. Krijgen boeren ondersteuning vanuit loonwerkers, afnemers, toeleveranciers of klanten? Of worden ze juist tegen gewerkt?
9. Zijn er belemmeringen vanuit de sector of markt omdat er een ander systeem gebruikt wordt?
10. **Vertrouwen/ ervaring**
11. Merk je bij boeren dat ze belemmeringen hebben op het gebied van verwachtingen/ vertrouwen in hun omgeving?

Appendix 2 Coding scheme

DEDUCTIVE	REGULATIVE	NORMATIVE	COGNITIVE	RVO
INDUCTIVE	ANLB	Communication/ information	constraint	ANLB
	constraint	constraint	knowledge	constraint
	Consultant	farm type	Personal drive	Eco-regeling
	Eco-regeling	Place/ space	Place/ space	GLB/ gecombineerde opgave
	farm type	Solution	Solution	LNV
	GLB/ gecombineerde opgave			manure
	governance			Solution
	LNV			
	manure			
	Solution			
	Subsidy			

Appendix 3 Consent form

Toestemmingsverklaring deelname onderzoek CropMix

Studie:	**Designing mixed cropping systems and transition paths towards sustainable ecology based agriculture (CropMix)**
Dossiernummer:	NWA.1389.20.160
Contactpersoon:	Prof. Dr. Ir. Cees Leeuwis, projectleider, begeleider, Knowledge Technology & Innovation, Wageningen University & Research (cees.leeuwis@wur.nl / cropmix@wur.nl) Daphne Schoop, PhD kandidaat, begeleider, Knowledge Technology & Innovation, Wageningen University & Research (daphne.schoop@wur.nl / cropmix@wur.nl) Rico van Assen, master student Development and Rural Innovation, Wageningen University & Research (rico.vanassen@wur.nl / cropmix@wur.nl)

Introductie
Wij vragen u deel te nemen aan wetenschappelijk onderzoek uitgevoerd in het kader van onderzoeksprogramma CropMix, gefinancierd door de Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO), looptijd 1 januari 2023 t/m 31 december 2027. CropMix onderzoekt de rol van gemengde teelten (o.a. strokenteelt) in transities richting duurzame landbouw. Voor meer informatie over CropMix kunt u de website www.cropmix.nl raadplegen, of terecht bij cropmix@wur.nl.

Het doel van dit toestemmingsformulier is om u van informatie te voorzien over de dataverzameling en om uw toestemming voor verzameling en gebruik van de gegevens te verkrijgen.

Om welke gegevens gaat het?
Wij vragen u deel te nemen aan een interview van ongeveer xx minuten op xx-xx-xxxx met masterstudent Rico van Assen. Rico van Assen wordt in zijn afstudeerproject binnen CropMix begeleid door Cees Leeuwis en Daphne Schoop. Naast de audio-opname worden vooraf, tijdens en na het interview handgeschreven notities gemaakt van bijgaande gesprekken en observaties. Wij verzamelen algemene (persoonlijke) informatie over u, uw rol en organisatie. Daarnaast betreft het interview specifieke vragen over uw ervaringen in of met bepaalde organisaties die relevant zijn voor of binnen de landbouwsector. Wij nemen interviews op met als doel de audio te transcriberen (om te zetten in tekst) en zo te kunnen analyseren. Ook de handgeschreven notities worden gedigitaliseerd en daarna geanalyseerd.

Wie gebruikt de gegevens?
Alleen onderzoekers aangesloten bij CropMix hebben toegang tot de data, waar nodig. Het CropMix onderzoeksteam bestaat uit ongeveer 70 wetenschappers van diverse instellingen (Wageningen University & Research, TU Eindhoven, Avans Hogeschool, HAS Green Academy, Rijksuniversiteit Groningen). Gespreksverslagen worden geanonimiseerd bewaard en uitgewisseld, door middel van nummering. De persoonlijke gegevens die bij het nummer horen zijn enkel bij de directe onderzoekers bekend. Wij delen uw persoonlijke gegevens niet zonder uw toestemming met personen buiten CropMix. Tijdens de studie wordt de data opgeslagen in de systemen van de onderzoeksinstituten waaraan de onderzoekers gelieerd zijn. Na afloop van het project wordt data 10 jaar opgeslagen in de databases van de betreffende onderzoeksinstituten. In dit geval is dat de database van Wageningen University & Research.

Waarvoor gebruiken wij de gegevens?
De bevindingen van de studie gebruiken we voor (academische) publicaties en op conferenties. We behandelen uw persoonlijke informatie vertrouwelijk. Persoonlijke of gevoelige informatie gebruiken wij in publicaties alleen geanonimiseerd en zal verder niet openbaar worden gemaakt. Citaten zullen we altijd anoniem maken, maar in sommige gevallen kunnen ze terug te leiden zijn naar u of uw organisatie.

Vrijwillige deelname
Deelname aan deze studie is vrijwillig. Zonder enkele consequenties kunt u altijd uw deelname aan de studie terugtrekken. Als u ervoor kiest zich terug te trekken uit de studie, zal alle informatie die tot aan dat moment is verzameld worden vernietigd, en we zullen geen nieuwe informatie van u verzamelen. U kunt contact opnemen via cropmix@wur.nl om dit te regelen.

Welke risico's zijn er?
Er zijn geen bekende risico's verbonden aan deelname aan dit onderzoek. U zou zich oncomfortabel of ongemakkelijk kunnen voelen bij het bespreken van gevoelige onderwerpen. U kunt altijd uw deelname aan de studie terugtrekken en toestemming voor bepaalde onderdelen intrekken.

Vertrouwelijkheid
Alle persoonlijke informatie die we tijdens deze studie verzamelen, behandelen we vertrouwelijk en is alleen toegankelijk voor het onderzoeksteam. De opnames van interviews gebruiken we om de gesproken tekst uit te schrijven. We slaan de data op een beveiligde locatie op.

Toestemming deelname onderzoek
Door dit formulier te ondertekenen, erken ik dat ik de bovenstaande informatie heb gelezen en begrepen. Ik stem er mee in om deel te nemen aan de studie CropMix en dat mijn gegevens worden gebruikt voor onderzoeksdoeleinden. Ik begrijp dat mijn deelname volledig vrijwillig is, en dat ik me op elk moment kan terugtrekken uit de studie. Ik begrijp dat het onderzoeksteam mijn informatie vertrouwelijk behandelt.

Naam: _____

Organisatie: _____

Datum: [datum]

Handtekening: _____

Toestemming publiceren van geanonimiseerde quotes
Door dit formulier te ondertekenen, bevestig ik dat ik de bovenstaande informatie heb gelezen en begrepen. Ik stem er mee in dat quotes geanonimiseerd gebruikt kunnen worden in publicaties.
Ik begrijp dat dit op vrijwillige basis is En dat het onderzoeksteam mijn informatie vertrouwelijk behandelt.

Ik geef toestemming voor het gebruik van geanonimiseerde quotes in publicaties.

Naam: _____

Organisatie: _____

Datum: [datum]

Handtekening: _____

Voor vragen of voor het intrekken van toestemming kunt u mailen naar cropmix@wur.nl. Mocht u vragen hebben over het onderzoek kunt u contact op nemen met Cees Leeuwis (cees.leeuwis@wur.nl) of Daphne Schoop (daphne.schoop@wur.nl). Voor ethische vragen of bezaren over dit onderzoek, kunt u ook contact opnemen met Jacoline van der Zijden (rec@wur.nl) of met Professor Moore, voorzitter van de Ethische Onderzoeks Commissie van de Wageningen Universiteit (rec@wur.nl)