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How Farmers Disentangle from Convention and Develop Ecological and Social Objectives in Lincolnshire

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Abstract

Over the last few decades, many conventional farming practices have been exposed for their damaging environmental and social impacts. Initiatives to regulate and incentivize particular farmers' practices have risen in the policy agenda across Europe. These initiatives can benefit from a clearer understanding for how farmers experience change, and develop social and ecological objectives for themselves. In this study, I interviewed nine Lincolnshire farmers who had began farming with conventional routines. I employ an abductive research design and practice theory to advance a new analytical framework and an enhanced model for examining how these farmers change practices. The framework and model serve to uncover farmers' recursive cycle of disentanglement from old routines, entanglement in new procedures, and engagement with new objectives. Such analysis reveals several significant commercial and agricultural practices that contribute to this change process. On the commercial front, farmers who differentiated their products from basic commodity markets often disentangled from old marketing routines and entangled in new practices. Some of these farmers would engage in new social objectives and immerse their businesses in regional or local food systems. In terms of agricultural practices, farmers who reduced their input use and yields disentangled from old farming routines and entangled in new environmental practices. Those who would further embrace natural ecological processes radically engaged in new environmental objectives for their farm. The dis/entanglement and dis/engagement model visualizes how these shifts in practice reinforce and influence each other. This study responds to gaps in the research by developing new approaches for understanding how farmers disentangle from convention and embrace new environmental and social objectives.

Keywords

Practice theory; agroecology; Lincolnshire farming; regional food systems; natural ecological processes; basic commodity markets; reduced tillage; regenerative farming; organic farming; entanglement; engagement; cognitive transformation; trigger model; subjectivity.

Acknowledgements

During my time in the East Midlands, so many people welcomed me to the British countryside life. These folks made this research not only possible, but exciting, sometimes too exciting. All in all, I am truly grateful for what I could learned and experience over these past months. I would like to thank all those that made this happen. Because some would rather not be mentioned by name, I will refer to everyone here anonymously.

I began my stay in the East Midlands volunteering on a sheep farm for one week. For accommodation and an immersive experience, I signed up to volunteer on organic farms while I gathered data in Lincolnshire. In between burning hedge trimmings, my sheep farming host patiently explained to me his take on the state of British farming and his personal experiences. His dedication to farming was astonishing: having started farming late in life, and continuing hard labor well into old age he invested an unexpected inheritance into a taxing lifestyle, instead of retiring in comfort. I would love to have that kind of courage and spirit one day.

After my stay with this farmer, I moved onto a part-community, part-dairy farm project. There I got to see the joys, tensions, and conflicts involved in living in an alternative agrarian community. I learned the importance first-hand of communicating expectations, resolving conflicts early, and clarifying visions for such a project. I also personally experienced what it is like to commit to caring for farm animals. For five days a week, every morning, I helped milk about a dozen cows. I learned their names, their attitudes, and the procedures for milking. After a few weeks I was able to start and finish the job all on my own. While I do not expect to do this again, I'm grateful for the patience my colleagues had in teaching me how to do it. The family of the dairy herdsman shared their home, food, conversations, and a taste for their lifestyle. The set up worked well with the research I needed to do, as I was able to work in the mornings and conduct interviews in the afternoons.

The farmers and foodie folks I interviewed were both welcoming and generous with their time. Some were willing to follow up with me and chat for a total of several hours. Others invited me to events to meet new farmers, see regional food networks in action, and learn skills like grafting fruit trees. I learned a lot from the folks I met. One former herdsman on the farm was fascinated by my research topic, regularly asking me how it was going and sharing his own insights. He loved carpentry and taught me to carve a killer wooden bowl and spoon. Another couple working on the farm showed me how they train oxen and taught me to ride a pony through a stream, a fun memory.

The folks I met on this project helped make this a tremendously rich experience. I could not have met them without the support and encouragement of my family and my partner. I am also grateful for Erasmus+ for helping sponsor my travels and for my supervisor for patiently wading through the twists and turns of my research topic.

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Table of Contents

List of Figures and Table

Abbreviations

CAP – Central Agriculture Policy
ELMS – Environmental Land Management Scheme

1. Introduction

1.1 Synopsis and Problem Statement

This thesis examines how farmers change their routines in Lincolnshire, a region where industrial farming practices relying on intensive chemical input use are conventional (Business Lincolnshire, 2023). As such practices receive increasing scrutiny for their negative environmental and social impacts, advocates across Europe are addressing ways to shift these routines (Pe'er et al., 2020; Greenpeace Nederland, 2022). These initiatives, however, are notoriously difficult to implement and contentious to debate (Apuzzo and Gebrekidan, 2019; Boztas, 2022; Pronczuk and Moses, 2023). In the Netherlands and the UK, environmental advocacy and policy changes have prompted a backlash from farmers triggered to defend their practices and livelihood (Gayle and Laville, 2022; Dirth and Miller, 2023). A clearer understanding for how farmers undergo behavioral change might inform strategies for approaching this sensitive issue. Examining how farmers develop their own social and ecological objectives might inform interventions that could encourage that process. Unfortunately, current research has yet to develop a working model that can reflect how farmers experience change or develop new objectives (Padel et al., 2020). This study addresses this gap by drawing on findings from established theories and insights from novel interview data with farmers. Using a practice theory framework, I explore how farming behavior changes in its recursive reproduction. I build on frameworks including: practice theory components, other efforts to model changes in practice, and notions of dis/entanglement and dis/engagement. These are harnessed to develop a new model for better understanding how farmer experience change and develop social and ecological objectives.

This study takes an abductive approach to its research design which allows new theories and models of change to emerge alongside established ones. To do this, in what follows, I first present a review of how sociologists have studied farmers' practices over time. I then review practice theory and important concepts like dis/entanglement and dis/engagement used in the analysis. I follow this with details on the research design, data analysis, and methods used in the study. To orient the reader on the development of conventional farming practices in Lincolnshire, I provide a historical background section. This is followed by the findings, analysis, and discussion portion of the thesis. There, I present the dis/entanglement and dis/engagement model as a tool to reflect nine farmers' experiences of change. I conclude with a summary of the study and its results.

1.2 Review: Sociology of farming practices

Rural sociologists have been studying how farmers adopt new practices for over a century (Valente and Rogers, 1995). Several academic fields have developed to address *why* and *how* farmers change their behavior. Recently, researchers have attempted to answer both these questions with multifunctional frameworks and theories. While these address important gaps in the research, few can comprehensively address how farmers develop new objectives.

Several early theoretical frameworks developed out of partnerships among rural sociologists and extension workers. These partnerships often developed on the premise of exploring how farmers adopt innovative practices (Padel, 2001). This understanding was

instrumental for extension workers eager to promote new technologies and techniques. An early theoretical framework to emerge from this research was the adoption/diffusion model (Ryan and Gross, 1943). The adoption/diffusion model that emerged from such collaborations identified different categories of farmers based on their willingness to accept innovation, including: the innovators, the early adopters, the early and late majority, and the laggards. The innovators were willing to experiment, while early adopters were less inventive but recognized for their strong influence in their local community (Padel, 2001). This research helped extension agents identify who to target to diffuse an innovation across farming communities.

The adoption/diffusion model developed from the understanding that farmers change practices through a process of knowledge transfer. In this context knowledge transfer is understood as a linear and hierarchical process in which specialists, such as extensionists or advisors, teach farmers to adopt the superior practices they are offering (Wood et al., 2014; Kroma, 2006). This was a dominant theoretical understanding among researchers until the 1990s, when theories about coproduction of knowledge and social learning took hold (Morgan, 2011; Wood et al., 2014).

These theories developed from research revealing the role farmers play in creating and diffusing innovative practices (Skaalsveen et al., 2020). Some researchers found that when farmers were invited to engage alongside experts in a coproduction of new techniques and technologies, they were more likely to adopt these new practices (Kroma, 2006; Schneider et al., 2009; Dolinska and d'Aquino, 2016). Other researchers found that formal relationships with experts, even if less hierarchical, stifled adoption rates (Wood et al., 2014; Šūmane et al., 2018). These researchers suggest that farmers gain valuable knowledge through informal relationships with their peers, a process described as social learning. Social learning is cited as an important factor in the adoption of sustainable agricultural practices via the diffusion of a sustainable innovation in a farmer's social network (Mills et al., 2019 ; Skaalsveen et al., 2020). Such researchers study the components of social networks to understand how practices diffuse. They study a network's centrality and cohesion, via the number of direct connections an individual has in the network '(Wood et al., 2014; Ramirez et al., 2018; Chaudhuri et al., 2021). They also study the knowledge brokers and intermediaries that increase connections across networks (Schneider et al., 2009; Skaalsveen et al., 2020).

This field of Agricultural Knowledge and Innovation Systems has shifted from a focus on how experts influence farmers' practices to how social networks and interactions with others influence practice adoption. But questions remain as to why farmers may adopt one practice over another, especially if they have access to multiple networks. Why do farmers enter and leave varying social networks? What makes some start new networks? How do farmers transition from following conventional practices to becoming innovators or early adopters?

Researchers attempting to answer these questions often examine personal and psychological motivations behind farmers' choices. In her metanalysis, Padel (2001) observes that motivations for practice adoption have been categorized as farm related, personal, or institutional and social reasoning. She discovered that early studies found agronomic and animal welfare reasons for converting to organic farming. Farm financial concerns for cost saving and access to premium markets were also important. Padel (2001) and Fairweather (1999) find that personal motives, like concerns about health and stewardship represent a different category for conversion. In Blesh's and Wolf's (2014) study on agroecological transitions among American farmers, they identified market opportunities and policy conditions as reasons for converting to

"alternative agriculture" (Allaire and Wolf, 2004; Stuart and Gillon, 2013, cited in Blesh and Wolf, 2014).

While the proliferation of research into categorizing motivations can be helpful to better understand and encourage adoption, it does little to explain how motivations and strategies develop or change (Darnhofer et al., 2005; Palomo-Campesino et al., 2021). Such research encourages the design of analytical frameworks that categorize the differences between farming practices, rather than expose how practices develop and change (Therond et al., 2017).

New frameworks and research agendas are necessary to understand how farmers continue to develop practices beyond standardized regimens like certified organic farming. Padel (2008) began to observe this phenomenon among Dutch farmers who expressed becoming "more organic" as they gained experience working with natural cycles on their farm. Research has begun to focus on these broader trends in the 'ecologizing' of agriculture and food practices (Magrini et al., 2019). This ecologization process incorporates environmental and stewardship practices across a food system that consists of agricultural practices, supply chains, and consumption practices. Some researchers refer to this process as an agroecological transition, especially when it is coupled with "a deliberate political will to change (Duru et al., 2015, cited in Magrini et al., 2019)." How does this political will develop?

Vankeerberghen and Stassart (2016) observed that such a will can emerge from a dual process of "detachment from and continuity with the conventional agricultural regime," in a process they call "insularization." By agricultural regime, the scholars draw on the Multi-Level-Perspective literature to refer to an established system of widely accepted practices (Magrini et al. 2019, Geels, 2011)." In the study, the scholars interviewed farmers who initially reduced their soil tillage practices to accommodate for difficult soils or to decrease their workloads. Something about this practice, however, triggered several to embrace a concern for soil life. These farmers then developed new fertilizer, pesticide, and cover crop practices to improve their soil quality and curb costs. Vankeerberghen and Stassart determined that such a concern developed through a two-step transition process. By reducing soil tillage, farmers destabilitized the regime's convention. Then through experimentation and learning, several farmers experienced a "cognitive transformation" in their understanding of soil. This destabilization and transformation opened up the space for new agricultural practices and motivations to emerge. These researchers found that some farmers developed motivations to transition to organic farming, while others could not imagine cutting conventional pesticide use. This process of insularization reflects both why individual farmers change behavior and how their new practices may still be influenced by convention. This theoretical advancement raises new questions, such as: how and why do some practices trigger cognitive transformations?

Indeed, Padel et al. (2020) find that there is still "little understanding of how farmers change from conventional to agroecological practices." These scholars test how accurately two analytical frameworks reflect the way in which UK farmers develop new sustainable practices. The first model, Efficiency-Substitution-Redesign, theorizes that farmers might transition their farming practices first by increasing the efficiency of artificial fertilizer and chemical input use, then by substituting these inputs with alternatives, and finally by redesigning their farm following new principles. Yet in the case studies, the authors find that these steps are hardly followed in sequence. This model does little to explain why farmers might transition through these steps either. The second, 'trigger events' model follows the logic that farmers maintain their practices until a triggering event occurs that demands them to reevaluate what they are

doing (Sutherland et al., 2012; cited in Padel et al., 2020). This reevaluation process following the trigger includes an active assessment and implementation phase in which new practices are formulated and performed. While this model aligned with the experiences of many of the farmers in their study, the sequence was rarely followed in its theoretical order. The authors conclude with a call for a better framework, model, and theory to improve our understanding of how farmers develop their practices.

Such a model could build on the insights from these fields of research while addressing their lingering questions. The model this thesis advances attempts to reflect the process conventional farmers undergo in becoming innovators or early adopters. It addresses how they initiate and why they participate in varying social networks. This framework avoids categorizing farmers and instead ventures to describe their transitions and becomings. This framework also reflects how farmers become 'more organic' by exposing the dynamic behind 'cognitive transformation.' This study attempts to build on this previous work based on a conceptual framework of practice theory.

2. Research Methods

2.1 Conceptual Framework

Practice theory is a body of social theory that examines human behavior as a focal point to explain why and how people do things. The theoretical lineage I follow in this paper first emerged in the 1970s to explain social behavior as a dynamic relationship between top-down societal structures and individuals' agency to modify them (Bourdieu, 1977). Examining practices can expose this dynamic because "Human social activities . . . are recursive. That is to say, they are not brought into being by social actors" but they are "continually recreated by them (Giddens, 1984)." Everytime a practice is "recreated" it is open to modification. Therefore, like Sahlins (1981) has said before about culture, the reproduction of a practice can lead to its transformation.

This happens when a component of a practice is reproduced with a modification. Schatzki (1996) identified practices as having three components or "major avenues of linkage" that intersect through:

> (1) … understandings, for example, of what to say and do; (2) through explicit rules, principles, precepts and instructions; and (3) through what I will call 'teleoaffective' structures embracing ends, projects, tasks, purposes, beliefs, emotions and moods (Schatzki, 1996, p. 89).

To simplify, following Warde's (2005) example, these three components can be described as understandings, procedures, and objectives. This third component diverges slightly from Warde's example which interpreted the component as 'engagement.' While engagement can be a useful term here, 'objective' well represents Schatzki's 'teleoaffect,' and the term 'engagement' is used elsewhere in the thesis in a slightly different way. Schatzki uses teleoaffect to express the quality inherent in all practices of having a set of ends that participants pursue and respond to emotionally. For example, Loscher (2019, citing Loscher 2016) describes 'efficiency' as a teleoaffective structure for the practice of accounting. The term 'objective' reflects this ends-pursuit component of practices (Welch, 2020).

The understanding, procedure, and objective components can alter every time a practice is reproduced. Therefore, "the sources of changed behaviour lie in the development of practices

themselves (Warde 2005)." Practice theorists have attempted to understand what influences these components to change, since the discipline's beginnings. In classical practice theory, practices are influenced by "material conditions" and cultural dispositions, Bourdieu called "habitus." Habitus is an internalized societal inclination that results from the "generation … of practices (Bourdieu, 1977)." In other words, practices inspire a disposition to continue performing a certain behavior. Bourdieu believed this disposition to be heavily determined by social norms. Other practice theorists find that actors are more aware of their own dispositions and have some agency over how they are expressed (Ortner, 2005; Giddens, 1984). Giddens' structuration theory views individuals as social beings self-aware enough to act with or against the social norms that shape them. Ortner builds on Giddens' work, recognizing that one's psychological and cultural formations shape their consciousness, or subjectivity. This study attempts to explore how understandings, a component of practice proximate to disposition, subjectivity, and Vankeerberghen's and Stassart's cognitive transformation, shapes a practice through modification (Warde, 2005, p. 139).

Such a modification may serve to disentangle one from, and entangle one in, a routine behavior. This dual process of dis/entanglement reflects a process for reducing participation in one set of practices in conjunction with increasing involvement in another. The cultural critic Sarah Nuttal (2009, p. 1) describes an entanglement as a "condition of being twisted together or entwined" in a set of relationships that can perpetuate certain behavior. This terminology is not widely used in the practice theory literature but it serves as a useful descriptor for this study. This is so because dis/entangling does not strongly indicate intentionality. Some farmers entangled in organic practices, for example, not because they necessarily wanted to practice those procedures, but because it granted them access to a premium market. Such a framing reflects how farmers experienced changing practices with a mix of purpose and retrospective recognition. This process contrasts to the more intentional experience of dis/engagement. Some farmers described purposefully engaging their farm businesses in new objectives, such as social or ecological integration. Sometimes this would couple with a disengagement from a previous objective, such as producing large yields. Changes to a farm business' objectives were often more intentional and foundational than the procedures farmers dis/entangled from/in. Changes to a farm's goals and mission could introduce a whole new set of procedures. Some farmers described engaging in new objectives without dis/entangling first. Other farmers changed practices by cycling through dis/entanglement followed by dis/engagement.

Paired with insight on practice components, dis/entanglement and dis/engagement can serve as a framework to analyze how farmers' practices change. This framework can help show how a farmer's understandings and procedures dis/entangle them from/in routines, as well as how understandings and objectives dis/engage them from/in practices. Upon examining a farmer's experience of change with this framing, triggers, understandings, procedures, and objectives may appear. The ways in which these components shape and influence each other can be closely examined with the conceptual framework of dis/entanglement and dis/engagement. These processes can help reveal how farmers stumble upon and purposefully embrace changes in practices.

2.2 Objectives

The goal of this study is to answer the following research question: how do conventional farmers change practices in Lincolnshire? Additionally, the thesis reflects on the question: how do Lincolnshire farmers develop social and ecological objectives? To answer these, I employ an abductive research design that harnesses established theories while advancing insights from interview data to develop an appropriate analytical framework and model for examining farmers' change process. The analytical framework will be used to examine interviews with nine Lincolnshire farmers on the topic of practices and change. The enhanced model will serve to reflect and explain the farmers' change process.

2.3 Research Design

I refined my research question, theoretical framework, and data analysis through a recursive process of deductive and inductive methods, known as abduction (Timmermans and Tavory, 2022). I began with a research question about how farmers in a politically conservative English region change their practices in response to disruptions in food production and provisioning. This question was informed by news and journal articles about disruptions in food supply and Brexit fallout, and how the long-reigning Conservative Party policies impacted these issues. I wanted to interview farmers where the Conservative Party is popular, about how the impact of these policies and disruptions influenced their practices. However, when I interviewed farmers in the field, almost none cited these sources as impacts on their practices. Instead, farmers mentioned responding to the impact of certain market forces, incentives for new business strategies, and environmental effects on their farm.

These observations did not reflect the theories I had encountered in my deductive research of the effects of policy changes and food shortages on farmers. So I began to "defocus" my attention on those effects in both my data analysis and data gathering (Timmermans and Tavory, 2022, p. 55). In my analysis, discussed in more detail later, I paid careful attention to responses that I was not expecting. In my data gathering, I deepening the scope of my interviews (Timmermans and Tavory, 2022, p. 54). I did this by introducing more open ended questions, and developing new ones based on field notes and memos conducted after interviews (Timmermans and Tavory, 2022, p. 57). In these memos I began to categorize the types of practices and motivations for changing them by comparing and contrasting responses from farmers. This technique is known as theoretical sampling in the grounded theory tradition, which is often a source of influence for abductive approaches to data gathering and analysis (Timmermans and Tavory, 2022, p. 140).

Theoretical sampling is a method for observing and classifying data inductively, and recursively, as additional data is gathered (Charmaz, 2014; Glaser and Strauss, 1967). This is performed by refining the research and interview questions as categories of data begin to appear. This process is followed by a decision on what data to collect next and where to find it. Emerging categories are defined through a continuous process of data gathering and analytical memo-writing. This method helped reveal the significance of relationships to markets, business models, and ecology in farmers' choice of practices. Recognizing that farmers were more inclined to identify these broader motivations than the impact of recent disruptions, I expanded my research question to a more general inquiry into how conventional farming practices change in Lincolnshire. In following the theoretical sampling method, I then refined my research focus

to Lincolnshire farmers with experience in conventional practices. I interview these farmers about how their practices may have shifted. This criteria would help focus the research on how changes emerge in a region where certain farming styles have persisted for many generations, as described in the historical background section.

2.4 Data Gathering

I gathered data through semi-structured interviews and participant observations. To conduct semi-structured interviews, I contacted farmers I found through Google searches for Lincolnshire farmers, as well as other relevant actors, such as regional suppliers, food processors, agribusiness supporters, and local food organizers. I conducted interviews with in-person farm visits and conversations, as well as over-the-phone discussions. After each discussion with these actors I asked for the contact information of additional farmers via the snowball sampling technique. In addition to Google searches, I contacted farmers by immersing myself in Lincolnshire farming networks. I did this by volunteering on a Lincolnshire dairy farm from early March 2023 to the end of May 2023. This experience enabled me to make participant observations, as well as connect me with additional farmers to interview.

The semi-structured interview is a preferred method of inquiry for this study for its flexibility and reciprocity. This interview style affords the ability to improvise questions based on the participants' responses (Kallio et al., 2016). The improvisation is coupled with a reference of predefined questions, known as an interview schedule, that served as a guide through the discussion. This interview style helped direct questions about practices and motivations while leaving room for open-ended responses. While the flexibility of semi-structured interviews can encourage unexpected but potentially relevant discussions, it also challenges the uniformity of data collection. Some interviewees were asked questions that others were not, making the data slightly less comparable and harder to analyze. As I interviewed different actors about varying practices, the non-uniformity of responses was expected.

My choice and formulation of interview questions was informed by my participant observation. By living and volunteering with farmers in Lincolnshire, I gained both explicit and tacit observations, that would have otherwise been challenging (DeWalt and DeWalt, 2011). By immersing in a local dairy farm for almost two months, I not only witnessed, but embodied farming practices. I also did not only observe, but felt the motivations behind them. This explicit and tacit data informed my interview schedule. It also granted me extended time for follow up interviews and the ability to explore questions from multiple actors' perspectives. I recorded my observations and discussions through memos and some audio recordings.

A drawback to volunteering on an organic farm for this study, was that I spent a majority of my time immersed on a farm that was quite anomalous for the region. Organic farming accounts for only 2.9% of agricultural land in England (GOV.UK, 2022). In addition, this farm is experimenting with uncommon practices of not slaughtering any cows and raising oxen to, one day, replace tractor power. The farming networks this farm helped me connect with are unorthodox for Lincolnshire, and had the potential for biasing my selection of interviewees toward those with atypical practice preferences. Yet the advantage here was that I had the chance to ask intergenerational farmers who transitioned from tradition about their process.

To counteract this bias I cold called and emailed dozens of farmers via Google Search. Some of these farmers were listed in Google Business Profiles and Yell (formerly the Yellow Pages). Others had websites with contact information. These websites revealed that many of

these farmers employed more conventional techniques. Yet they were less likely to respond to unsolicited requests. I found that farmers with certain 'sustainable' practices were more interested in chatting with me about their farm, than those with perhaps more conventional practices. I was more successful connecting with conventional farmers via intermediaries I had met in-person. These efforts helped me even out a potential bias toward organic farmers by interviewing a balanced selection of farmers with differing practices.

2.5 Ethics

Every interviewee was provided information about my research and gave either verbal or written consent to be interviewed and recorded. Participants were only interviewed and recorded if they gave permission to do so. For this thesis report, interviewees have been given a pseudonym to protect their identities. All attributable names, such as to businesses or farms, have been removed or altered. The interview transcripts and audio recordings were kept on a password protected laptop and mobile phone, and are soon to be stored on a secure Wageningen University drive in accordance with its policies.

2.6 Data Analysis

Upon completing my interviews. I transcribed the audio recordings with a Microsoft Word transcription tool. I then started a coding framework to categorize extracts from the interview data that referred to my research question. Developing codes entailed continuing the process of recursively engaging with deductive and inductive analysis. I began with five high level codes that included categories developed from my memos and notes, such as relation to markets, and embrace of government environmental policies. Other categories included those based on theories in the practice theory tradition including answerability and culture, and finally a category on place. I parsed the transcripts for instances of practices that fit either of those categories. I soon discovered that these categories had a very uneven quantity of associated practices. The categories also could not clearly reflect my research question about how practices *change*. So I decided to take a more inductive approach and select for each farmers' material practices, both agricultural and business related, and the motivations behind them that they had expressed.

For every interviewee, I copied transcript quotes into an Excel spreadsheet that described farming and commercial practices, along with the motivations behind them. I then opened another tab in the same workbook where I summarized the quotes for each interviewee alongside a reference to the full quote's cell location. I could then write a concise biography of each interviewee's practices and motivations using the summaries and direct quotes. After this immersion in the interview data, a new pattern began to emerge. Every farmer expressed following a system of practices that they either transitioned into, or struggled to shift away from. I then pulled together the practices and motivations associated with both these scenarios. This revealed patterns in farmers' narratives of change that could be defined as dis/entanglement or dis/engagement. I then used dis/entanglement and dis/engagement as a framework to analyze the farmers change process. I could classify farmers' experiences of changing practices in either of these categories. To gain further insight into the change process, I coupled this framework with the established theory of practice components. This abductive approach to my research analysis resulted in a new model that could analyze and reflect farmers' experience of changing practices.

2.7 Positionality

I have come to research how conventional farmers alter their practices as a result of studying the advantages of alternative farming practices in my Masters program. This education contributes to a potential bias towards favoring particular ecological and social practices. To perform this research, I needed to reserve my judgements in order to observe how farmers develop their own understandings about their practices.

I did this by widening my focus to how farming practices are changing without preference to a particular style. This allowed me to minimize triggering certain responses in my interviews. Discussions about organic and alternative farming practices can have a political register in this region, which may derail conversations into political talking points or defensiveness of one's routine. My ability to introduce myself with the new name of my Masters program, which changed from Masters of Organic Agriculture to Masters of Resilient Farming and Food Systems, helped me navigate these tensions.

As researcher coming from the Netherlands, most interviewees considered me impartial to the cultural debates around farming norms. Several actors could explain to me the dynamics involved in these debates without feeling the need to defend a position. As this study lays out, however, most farmers I spoke with did not indicate cultural debates as reasons to change. Nevertheless, some actors assumed my preferences for particular types of changes, which shaped our conversations. These assumptions varied, however. One environmentalist felt keen to show me low-tech, public agriculture projects in the region. A farming industry actor who knew of Wageningen University, where I study, was eager to explain Lincolnshire's investments in storage facilities and automation. His perception of Wageningen researchers was likely to have been related to industrial farming, while the environmentalist understood that I was a student of ecological farming practices.

My cosmopolitan background encouraged me to think that conversations with actors from these varying backgrounds in farming would help overcome my biases in data collection. My excitement, ability, and privilege to meet new people across different industries and geographies granted me access to the farmers I would interview. My personality and background and also shaped the discussions I had with actors. I was often privy to the world of those I met, but my experience and history was inaccessible, and sometimes indecipherable, to most. Farm helpers happily and comfortably taught me about Truck Fest, labor competition with Eastern European immigrants, or how to carve wood. These were mostly one directional conversations. Discussions about my background were strained and sometimes distanced rather than fostered connection. My shyness, having moved around growing up, and access to middle class privileges were unrelatable, sometimes incomprehensible, and, perhaps very rarely, a source of suspicion. I tended to gravitate to those who liked to talk about their experiences, influencing my data set. For my quieter colleagues, I would guide our conversation with questions about them.

Among the interviewees, I directed my questions to material practices. My interest in practice theory comes from a presumption that behavior influences one's values and objectives. This led me to doubt farmers' explanations for how the values they may have today influenced their adoption of practices in the past. My impression was that a farmers' present values may obfuscate their recollection of those they have had in the past. My epistemic assumption was that examining previous practices may encourage an interviewee to more accurately represent their motivations at the time. This builds on a materialist presumption that motivations can change,

especially after adopting new practices. I encouraged farmers to explore how their motivations were different before they adopted a practice they follow today. Insight into how motivations change before and after adopting new practices became critical to the study's findings. Yet this required interviewees to try to recall their previous practices and motivations, a challenge that served as one of several limitations in this study.

2.8 Limitations of the Study

Examining why farmers change practices without exploring the role of underlying cultural changes serves as a limitation of this study. In restricting this study to responses given by farmers, I do not examine factors that farmers might be less willing or less able to communicate. This could be the case with the influence of broad cultural changes, like an increase in media attention on certain farming routines. These dynamics take place over a long time period and might be harder to recognize in interviews than acute triggers.

Relying on farmers to recall past motivations for changing is also a possible limitation of the study. Reflections of the past will always be refracted through one's current perspective. Therefore, recalling a past mindset that resulted in a change might not be accurate to the actual process that took place at the time. Certain motivations or other factors that the farmer was aware of at the time, may be forgotten or distorted.

The use of the theoretical sampling technique is also subject to scrutiny. Altering the interview schedule throughout the data collection process will result in different data gathered. This makes it challenging to compare data from different interviewees. Analyzing interview responses while they are still being conducted also runs a risk of skewing the data. Adapting interview questions to preliminary analytical codes may trigger responses to address these categories rather than the other way around.

Nevertheless, careful use of these techniques may result in theoretical frameworks that are better suited for the data set. This is especially true when there is surprising research evidence, as is the case in this study (Timmermans and Tavory, 2022). These frameworks may also develop novel insights. Mixing grounded theory techniques with existing theories in an abduction research design, may help abate the risks and harness the advantages of both, as after all:

> "neither induction nor deduction is particularly creative, because neither leads to new theories. Theory generation requires us to move away from our preconceived notions and to create new narratives about the phenomenon we are trying to explain (Timmermans and Tavory, 2022)."

Before we develop new narratives about the phenomenon, it is important to understand what these practices are, and how they developed.

3. Historical Development of Conventional Farming Practices in Lincolnshire

A conventional practice is a "usual or accepted way of behaving, especially in social situations, often following an old way of thinking … (Cambridge Dictionary, 2023)." In this section, I describe the customary practices that many interviewees in this study began farming with. I do so by tracing back the practices' emergence, and suggesting reasons for how they

came to be "usual or accepted." This is a brief exploration into the social construction of conventional practices. This section surveys the "institutional arrangements characteristic of time, space and social context," and the "dominant modes of economic exchange" that influenced the adoption of routine farming behavior in Lincolnshire (Warde, 2005, p. 139). While this condensed history does not illustrate the full story of how practices were developed and contested, it does reveal trends in how farming practices changed over time in Lincolnshire. These trends will be compared to the changes farmers experienced in this study in the Discussion section.

3.1 Introduction of Commercial Farming in the UK

Modern commercial farming in the UK traces its roots to the late fifteenth century when feudal landowners began demanding rent payments. For details on its emergence, I refer to Rowland Prothero's classic take on agricultural development, *English Farming, Past and Present,* originally published in 1912. The feudal system of cultivation where serfs cultivated lands for lords of the manor, gave way to cultivation by "freeholders, leaseholders,… and hired labourers (Prothero, 2013, p. 55)." Capital flow increased during this time as "commerce permeated national life." This was most evident in agriculture with the advent of enclosures. Enclosures increased private ownership of farmland when communally shared land was fenced off for private use. Enclosures also took place on reclaimed land that was drained or deforested. Enclosures began in the sixteenth century but continued in various forms up through the eighteenth century (Prothero, 2013, p. 56; Smith, 2012). While these movements took different forms and differed in parliamentary support, enclosures often violently displaced peasant farmers from their land and ultimately their homes, as they had to migrate to towns and cities in search for new work. Through enclosures, wealthy and/or powerful "Tudor husbandmen" took possession of land to develop pastures for sheep grazing. Sheep were an early agricultural commodity, as its wool was sold primarily for the lucrative textile market. Indeed, "As trade expanded… both landlords and tenants learned to look on the land they respectively owned or cultivated as a commercial asset (Prothero, 2013, p. 58)." Enclosures were therefore an early stage of development for entrepreneurial farming practices.

The advent of commercial farming increased capital flow into agriculture. While rents rose in the eighteenth century, "profits outstripped the rise (Prothero, 2013, p. 208)." These profits helped pay for investments such as improving livestock breeds and mechanization. The late eighteenth century saw new ploughs, drills, and harvesting and threshing machines develop alongside the issuing of numerous patents. These machines increased labor productivity and crop production which granted many farmers "large returns on their expenditure (Prothero, 2013, p. 210)." To the welcome surprise of farmers in the late 18th to early 19th centuries, produce prices did not go down with the increasing supply. This was likely due to the convergence of variable harvests, financial crises of the 1790s, and the Napoleonic wars reducing foreign food supply, and inducing fears of famine. During this time, Great Britain depended largely on its own food production, a state of affairs that would change after the wars, but would unfortunately return a century later. Necessity, as well as business success, encouraged farmers and landlords to continue "increasing the yield and lowering the cost of production" as well as develop further "enclosures (Prothero, 2013, p. 211)." Therefore, "encouraged by high profits, approved by economists, justified by necessity, agriculture advanced rapidly on the new lines of large farms and large capital (Prothero, 2013, p. 214)." Larger farms accommodated England's

industrializing economy, in which a growing labor population necessitated an growing flow of food supply. Large farms transitioned away from input self sufficiency and towards becoming "factories of beef and mutton." Practices involved in large-scale, industrial farming across England and Lincolnshire first emerged in this period.

3.2 The Beginnings of Modern Free Market Policies for Agriculture

Once the Napoleonic Wars were over in 1815, the British economy was able to open up to foreign imports of produce. While the prices of British produce favored agriculturalists, the limited availability was risky for the national food supply. There were very little reserves during the war, so the British were at tremendous risk if a harvest were to fail. However in 1815, the British economy did not open up to foreign imports. Instead, they amended the medieval-era Corn Laws, to restrict imports of cheap foreign grain that would compete with their business. Parliamentary landowners, agriculturalists, and those concerned about foreign dependence, helped pass these laws to maintain profits and domestic grain production (Prothero, 2013, p. 273). In the medieval era, the Corn Laws were intended to guarantee reasonable prices for grain for average consumers, at a time when foreign imports were too expensive anyway. Revenue was "never the first aim of the Corn Laws (Prothero, 2013, p. 257)." Cynically, Rowland Prothero suggests (2013, p. 272), "Our ancestors passed laws to establish just prices; their successors legislated to secure reasonable profits." Almost instantly, these restrictions on foreign grain were met with protest by some Parliament members and associations of merchants, not to mention consumers. After the devastating harvests of 1845, Parliament finally eased restrictions on importations. By 1849, all restrictions on foreign grain were lifted (Prothero, 2013, p. 274). Prothero suggests that the repeal of the Corn Laws may have been an early step toward modern free market food policies.

3.3 High Farming in Lincolnshire

The latter half of the nineteenth century saw the advent of "high farming" across England. High farming describes an approach to farming inspired by a scientific and business-minded attention to efficiency, practice, and use of technology. This approach stood in stark contrast to the idyllic leisurely culture of farming in which a farmer had plenty of free-time to sport and hunt (Prothero, 2013, p. 347). This leisurely stereotype was sometimes expressed as a judgement of indolence by urban and rural elites. Others had a more nuanced point of view about these changes. In 'Northern Farmer: Old Style' and 'Northern Farmer: New Style,' the poet Alfred Lord Tennyson, contrasts an old Lincolnshire farmer devoted to his land and social rank, to a younger farmer obsessed with money, property, and advancement (British Library, 2023; Brown, 2005, p. 29). For a closer look into Lincolnshire farming developments, I turn to agricultural historian, Jonathan Brown's, *Farming in Lincolnshire 1850-1945.* Brown highlights a quote from a commentator in 1915 who suggested that new Lincolnshire farmers "are very modern businessmen… wealthy and sterling men, but 'near' with their money (Brown, 2005, p. 29)." This 'near'-ness may have been influenced by the challenges of farming in the latter half of the nineteenth century. Profits were hard to come by for agriculturalists, especially during the twenty yearlong Great Depression of British Agriculture. After the repeal of the Corn Laws, farmers felt encouraged to invest more money into capital-intensive farming to stay competitive. These investments were hard to recoup before and through the Depression. Farmers therefore

paid closer attention to their costs and returns on capital (Brown, 2005, p. 30). The next generation of producers found new ways to increase revenues from farming, which, by the 1880s, was "widely referred to as an industry (Brown, 2005, p. 31)." These business-minded farmers were more likely to succeed and deliver their farm to the next generation, than the old-style farmers (Brown, 2005, p. 31). High farming became modern farming in Lincolnshire and across the nation.

Nineteenth century high farming practices depended on inputs, high yields, and capital investments. This is likely the beginning of contemporary industrial farming practices. A Lincolnshire farmer wrote this letter in 1872 that describes practices common in the region today:

> "Every good modern farmer manages upon commercial principles. His superior crops are chiefly from purchased artificial aids administered to both his stock and his crops. His farm stock are brought to early maturity by good selection, breeding, care, attention, and nutritious foods in aid of his farm resources. No modern farmer is content with the natural products of his farm. Every crop and every head of farm stock is supplemented by extraneous and the most satisfactory aids which chemical and other discoveries have opened out upon us. His crops have thus been nearly doubled in quantity, weight and volume: his farm stock have been surprisingly improved in proportions and quality, and by artificial foods and careful attention he prepares a far greater number for market and of much greater value than formerly (*Stamford Mercury*, 19 April 1872) (Brown, 2005, p. 86)."

The adoption of 'high farming' practices did not progress uniformly. Expensive developments, like silage, were rejected for many decades in Lincolnshire before they became common place (Brown, 2005, p. 171). The Depression of the late nineteenth century encouraged some farmers to temporarily retreat from purchasing inputs. Other farmers, however, continued to use inputs as they deemed it a "productive expenditure" that was worth the cost. Revenues from the resulting increased yields justified the costs. This was a perspective some Lincolnshire farmers echoed today when justifying expensive nitrogen fertilizer purchases in my interviews. In the late 1800s, farmers could not buy nitrogen fertilizers, but superphosphates like basic slag, guano, and nitrate of soda (Brown, 2005, p. 172). Tough economic times encouraged farmers to save labor costs, however. Farmers invested in labor saving technology like mechanical reapers in the 1880s. The economic depression gave farmers a choice to either transition to extensive and low-cost farming, or to increasingly efficient, intensive, and "high-output farming (Brown, 2005, p. 174)." The latter was the popular choice among most farmers in Lincolnshire.

However some landowners and estates felt they had no choice but to sell some of their land holdings. By the 1890s the Great Depression of British Agriculture caused some farmland rents to plummet (Brown, 2005, p. 6). Landowners sold land to their farm tenants, or to commercial or industrial entrepreneurs (Brown, 2005, p. 206). Several of the intergenerational farmers I interviewed for this study trace the purchase of their family farms to this period.

Farming struggled to recover from the Depression up through World War I. Crop and livestock prices rose very slowly (Brown, 2005, p. 179). Lincolnshire farmers felt the need to organize politically to defend their interests and started the Lincolnshire Farmers' Union in 1909. The effects of the Depression also inspired governments to get involved in the nation's agriculture production. During World War I, the government established guaranteed minimum prices, which coupled with increasing demand, benefited farmers with higher prices (Brown, 2005, p. 185). The reestablishment of free markets at the end of the war, however tanked agricultural commodity prices, causing a post-war depression (Brown, 2005, p. 193). Farmers were ambivalent and ultimately suspicious toward government intervention. Many welcomed

guaranteed prices and loans, but railed against wage boards, inadequate tariffs, and penalties (Brown, 2005, p. 201).

3.4 The Beginnings of Modern Specialization

Farming was challenging in the 1930s, as well. Many returned to high farming principles of productive efficiency and began to specialize. Historian, Jonathan Brown, found that "it was almost a necessity" for farmers to practice specialization in this period (Brown, 2005, p. 207). This practice differed from the mixed farming norm in which farms had both livestock and crops rotations. Farms mixed the two to make use of financial and fertility synergies. Yet in 1919, a Royal Commission for Agriculture found that "in Lincolnshire the old traditions have been so largely shaken that, wherever it is possible and a pioneer has been forthcoming, specialist crops have been introduced (Brown, 2005, p. 207)." Farmers began to increasingly focus their operation on either livestock, single crops, or other markets to succeed. This focus was an effort to increase the efficiency, and therefore the profitability, of a farming business. As this study's interviews suggest, specialization remains a common practice among conventional farmers in Lincolnshire today.

3.5 Modern Mechanization Practices

The adoption of tractors increased during the inter-war period. In 1937 there 3800 tractors in Lincolnshire and by the early 1940s the number had about doubled (Brown, 2005, p. 229). Tractors were encouraged by World War One's ploughing-up campaign and continued to be adopted for their powerful ploughing, cultivating, and drilling capabilities (Brown, 2005, p. 227). During the Great Depression of the late twenties, some farmers had to sell their tractors and go back to horse power. But most would return to tractor power when finances improved. Tractors proved quite important for Lincolnshire's large potato and sugar beet farms and would become an industry standard.

Mechanized farming practices experienced an upsurge during the Second World War. A government policy promoted another ploughing-up campaign targeting more than two million acres of both derelict and permanent pasture land across Britain (Brown, 2005, p. 242). To achieve this and general production goals, Parliament promoted a greater use of tractors through allocation and financial support. Lincolnshire farms saw a 60% rise in tractor use from 1942 to 1946 (Brown, 2005, p. 259). With this increased availability of tractors, proponents of deep ploughing, which included the Ministry of Agriculture, promoted the practice across the country (Brown, 2005, p. 245). Advocates alleged that the practice would increase production and quality of certain types of farmland. While this was true for many, some farmers' fertility suffered from ploughing. Like most producers during the war, these farmers were encouraged to increase their fertilizer use. Nitrogen fertilizer became readily available at this time, and with government subsidies and promotion, its use increased 187% from 1938-9 to 1944-45 across the UK (Brown, 2005, p. 262). Many farmers who previously could not afford fertilizer became converts. Some Lincolnshire farmers increased their fertilizer purchases by two or three times during the course of the war (Brown, 2005, p. 262). Nitrogen fertilizer use would continue to surge after the war. Deep ploughing and heavy cultivation practices also persisted after the war and in many cases continue through to today. Some farmers I interviewed for this study described a very recent process of reevaluating and rejecting heavy cultivation practices. By the end of World War II

many believed, as one farmer put it, that British "agriculture is probably more fully mechanized than that of any other country in the world (Brown, 2005, p. 260)." The adoption of tractors, combines, and other mechanized farm implements would skyrocket after the war.

3.6 Promotion of High Input/Output Farming

For an overview of post-war conventional practices, I turn to Martin's *The Development of Modern Agriculture: British Farming Since 1931.* Promotion for high farming practices continued to escalate in the 1950s and 1960s. Complementary advise for high input/high output systems was given by the private and public sector. The Farm Management Department formed in 1863 to encourage efficiencies and specialization for farmers (Martin, 2000, p. 92). Agri-chemical companies marketed new weed and pest control products. Banks loaned money to support new practices, like the use of improved plant breeds, chemicals, and artificial fertilizers that would increase production. The uptake of these practices may have been spotty in the 1960s (Martin, 2000, p. 130), but by the 1980s, domestic markets for these inputs were saturating (their use even peaking, for pesticides and fertilizers) (Martin, 2000, p. 102-103).

3.7 Development of Modern Conventional Marketing Practices

Following World War II, British agriculture was strongly influenced by government interventions (Martin, 2000, p. 78). There were marketing boards, guaranteed prices, and a deficiency payment system. The marketing boards regulated production by registering farmers and purchasing regular quotas at guaranteed prices (Marsh, 1985; Martin, 2000, p. 78). The boards would engage in marketing campaigns and premium labeling schemes to increase consumption. This meant that farmers could devote less time and resources to marketing themselves. The boards welcomed this incentive for farmers to use their services, as they wanted to engage with as many producers to regulate national production. Marketing boards therefore attempted to prevent producers from selling directly to consumers (Martin, 2000, p. 78). The British Egg Marketing Board did this by routinely purchasing eggs at higher than market prices. The Milk Marketing Board managed to "cover and control" 80% of the UKs milk distribution at its height (Alcock, 1994). It helped that the marketing boards for milk and potatoes had the right to compel farmers to engage with their services (Martin, 2000, p. 78). Not every policy of the era disincentivized marketing for farmers, as the deficiency payment system encouraged many commodity producers to market to buyers. The system guaranteed farmers prices but not customers.

The deficiency payment system ended by the 1970s as a preparation for England's entrance into the European Community, the Central Agriculture Policy, and its market. Marketing boards began their demise in the early 1990s after neoliberal policy reform (Alcock, 1994). With the decline of marketing boards as a customer, commercial farmers joined their farming neighbors in selling to either supermarkets, manufacturers, wholesalers, cooperatives, or merchants. While the choices for buyers and contracts were more complex than before, farmers marketing practices did not radically change. Many farmers continued receiving guaranteed prices or set quotas with certain contracts. When the milk industry deregulated in 1994, Nestlé and Northern Foods enticed farmers with familiar arrangements for partnerships and prices (Alcock, 1994). Most commercial farmers did not need to build out an extensive marketing

operation. Even the farmers who sold to merchants routinely received offers from buyers without solicitation. Farmers I interviewed doing this, referred to themselves as 'price takers,' as the price of their produce was determined by global markets and deals they were offered. This gave buyers increased leverage over prices, shrinking farm gate revenues (Ilbery and Maye, 2005). This would spur several farmers in the study to start marketing directly to consumers.

Most farmers sell their produce on basic commodity markets. These markets offer comparably lower prices than other markets because of their intense global competition. Financial traders govern the prices for these basic goods based on a number of factors including global supply. Because these goods are usually tradable raw materials, they are exchangeable for any product like it produced anywhere in the world (Fernando, 2023). This global supply lowers the price of the good, subjecting farmers to intense competition to remain viable. Farmers are generally encouraged to respond to this competition by increasing their scale of production. The more product they can sell, the more revenue they can make. A benefit for selling on these established markets is that it allows farmers not to worry about organizing extensive marketing operations. Several farmers in this study explained that it is not unusual for farmers to receive unsolicited calls from suppliers and traders with offers for their produce. Many farmers also negotiate contracts with supermarkets to establish a stable customer for a set period of time. Farmers following these conventional practices can therefore focus on their production.

3.8 Farmland Expansion Practices

Small farms struggled to stay competitive with larger farms for decades, but had been supported by government policies through the first half of the twentieth century. Policies started to shift when small farms were increasingly seen as inhibitors to national plans for agricultural expansion. The 1967 Agriculture Act brought farm structure grants and provisions for farm amalgamations and retirement (Martin, 2000, p. 90). Many small and medium sized farm owners felt compelled to 'get big or get out.'

3.9 Brexit, CAP, and ELMS

Brexit was a controversial but successful campaign for the UK to leave the European Union. With the leave came an end to Britain's participation in the Central Agriculture Policy (CAP) which influenced several generations of farmers. In the mid 1970s, Britain joined the European Community and with it the CAP. Over the coming decades, through direct payments and other financial schemes, the CAP would influence farming practices ranging from diversifying farm enterprises, to adopting environmental standards. One controversial policy encouraged smaller farmers to sell their land to larger farm businesses (Pe'er et al., 2020). This coupled with the recent 1967 Agriculture Act spelled the beginning of the end for many small farmers. On top of this, the CAP policy was criticized for subsidizing already wealthy farmers with large landholdings. In the 2010s the critique was weaponized to strengthen farmer support in voting for Britain to leave the European Union and the CAP, despite its cushy subsidy programs (George Monbiot, 2018). Indeed, in 2016, after a vicious campaign largely built on nationalism, a majority of British voters elected to leave the European Union with Brexit (Wellings, 2021). This caused shocks throughout the British economy, as well as its food system. For farmers reliant on CAP direct payment, the UK Parliament proposed the Environmental Land Management Scheme (ELMS) as a replacement. This scheme is meant to incentivize

environmental stewardship instead of production or farm size. The ruling Conservative Party in Britain deploys the motto "public money for public goods," arguing that farmers should receive public funds for their environmental practices that benefit the public (DEFRA, 2022). The extent to which the incentivized practices truly meet the government's sustainability goals, like increasing biodiversity or reducing carbon emissions, is debatable (Nick Harvey, 2023).

3.10 Beginnings of Organic Agriculture

Nearly since the beginning of high input and chemically intensive agriculture, there was demand for food produced more naturally. Yet this demand was marginal until the 1980s when criticisms of residual chemicals in food and soil abounded causing pesticide and fertilizer to decline (Martin, 2000, pp. 102-103, 184). While most farmers started to reduce their input use, a select few began to consider transforming their system to organic production. This production style emphasized biological processes for fertilization and pest control as opposed to chemical ones that left residues. In 1987 the UK Register of Organic Food Standards established an certification and inspection scheme for organic production. This required a two year conversion period, where farmers had to eliminate artificial chemical use. This was a hard bargain this would cause most yield declines. Farmers who managed to do this would receive access to higher value organic markets that might compensate lower yields with higher prices. In 1994, a CAP agri-environmental policy, called the UK Organic Aid Scheme, provided grants for conversion. This was about the time one farmer in the study converted to organic. Yet organic was slow to take root in the 1990s as the number of growers increased from 620 to 820 between 1990 and 1996 (Martin, 2000, p. 185). The organic market remains quite small in the UK today. Converting was seen as a risky endeavor for many farmers. But some felt it would save their business.

4. Results Obtained

4.1 Farmers' Biographies

The nine farmers interviewed for this study began their careers in the context of recent developments mentioned above. Many farmers started their careers following the conventional practices described. Others witnessed their parents practicing them, and chose to act differently themselves. In this section, I provide a snapshot of these producers' farms, followed by a description of a change in practice they embraced or rejected. This is presented in the form of concise biographies.

4.1.1 Elena

Elena is a co-owner of a multigenerational farm her grandfather began farming several decades ago. Her immediate family owns 250 acres and rents 250 acres. The farm is unique as it lies in the center of a village, which was once less densely populated and is now surrounded by neighborhoods. The farm is not organic, but follows the Red Tractor guidelines for certain

sustainable practices. It is a mixed farm with 40 beef suckler cows, 250 sheep, and arable crops like wheat, barley, oil seed rape, and pees. Ownership and management is split among the family members which including Elena's sister, father, and her cousins who farm a separate part of farm.

Elena is increasing the number of direct sales of her farm's products like its beef. There are several reasons for this including that as a successor to the farm, she wants to run the business differently, and possibly less tediously than her predecessors, "It's a lot of work, so actually the next generation are wanting to do something different." She finds that younger generations are doing this with their savvy marketing and social media skills, "So they might only sell 10 bullocks a year. But they do it all through a box and double the value... I suppose they're working it harder, aren't they? They're not just saying the market will solve it. They're saying we need to make the market do the job." This involves finding and encouraging more customers to buy more of their products, a shift towards "market development." This is something that conventional commodity producers do not have to worry about, "When you're selling commodity wheat or barley or beef, someone else has developed the market for you and you just sell it into a market like into an abattoir or a livestock market or a grain seller. When you're producing it and want to sell it direct to someone, you're taking on quite a lot of that responsibility and some people don't…can't do it…don't like it." To engage with the local market requires additional responsibilities for farmers, like marketing to and interacting with consumers. Elena thinks that this work could benefit farmers by increasing the value of their work, allowing them to reduce their output and workload. Elena therefore encourages farmers to increase local engagement, through sales and other activities. This is challenging for many farmers who want to continue focusing only on increasing efficiencies in production.

Elena is also a consultant who advises farmers on how to think beyond the day-to-day operation and map out a longer term vision. She believes that defining a vision is a necessary skill to anticipate market changes, stay viable, and ultimately reduce redundant and inefficient workload. Vision mapping is a common-place exercise for modern business owners that Elena thinks more farmers need to adopt. She encourages farmers to consider engaging with local markets and environmental practices to increase the value of their work and anticipate the market of the future. She has engaged with various networks of local farmers to discuss these new strategies.

4.1.2 Wilson

Wilson farmed with intensive input use for decades before starting conservation agriculture in 2016. He farms on 700 acres, which he considers comparatively small, and grows broad acre crops like oil seed rape, linseed, and wheat. With conservation agriculture he employs minimal to no tillage, wide rotations, and cover crops to optimize soil carbon for soil biology. He grows seven wheat varieties, as well as YQ population wheat. YQ, officially YQ ORC Wakelyns Population Wheat, is a genetically diverse wheat population consisting of 100 crossed varieties developed in the East Midlands. This biodiverse wheat population is meant to be resilient and adaptable to local soils and changing weather patterns. In addition to biodiverse arable crops, Wilson reintroduced animals, particularly sheep, to his farm. The farm is non-organic as he terminates cover crops with synthetic chemicals, a common practice among minimal and no till farmers in the UK.

The shift to conservation agriculture began with a 2015 trip to Brazil where he met an English regenerative farmer. This farmer was not tilling his soil and told Wilson that it was possible to do the same in the UK. Wilson was aware of the damage soil tillage imbues on soil microbiota and structure, but he was not convinced it was possible to farm differently on his soils. The farmer insisted he "think outside of the box," which eventually spurred a "eureka moment" for Wilson: "The concept was born there. And I've come back and read a lot." When he returned to Lincolnshire he tried direct drilling, a practice of preparing a seed bed directly on the stubble left on the field. Upon its success, he then adopted an 8 year rotation, cover crops, no plowing techniques, and introduced of sheep for nutrient cycling.

The reason this was successful for him was "because it became a passion for me. Something that really interests me and having studied science as a student, I could see the relevance of science and the understanding of what's actually going on." This science revealed to Wilson the efficiency of natural nutrient cycling, "…with heritage varieties, there was a lot more biology, they [traditional farmers] hadn't used a lot of chemicals. They hadn't used a lot of fertilizer. Yeah, so things were in balance... Nature for three-and-a-half billion years farmed the soils without any fertilizer or without any pests because the plants were healthy." His research of natural systems led him to discover that when plants are not fed fertilizers, their root systems expand farther to locate nutrients. Encouraging this behavior, he believes, will establish a healthier and more resilient system.

He believes this approach to farming is a step beyond what some farmers refer to as regenerative farming: "And most people just think regenerative agriculture [is] direct drilling and cover crops, and you've done it. There's far more to it than that 'cause basically, you're trying to reconnect nature to the soil and the plant." While this adherence to natural ecosystem processes may lower Wilson' yields, his net margins are higher, keeping his farm viable. He manages to do this without selling his arable produce to a premium market. He sells his produce for animal feed on the global commodity market. When asked whether he wanted to market his crop beyond the commodity market, he replied "Well, maybe yes, possibly. That we have to develop when we get everything else sorted." His priority is to increase natural efficiencies, rather than the marketing of his products.

4.1.3 Hank

Hank is a third generation farmer who had no intention of farming until 2011, when he returned to his family farm after a career in a corporate office. He farms arable combinable crops like oilseed rape and wheat. He farms with rotations and does not cultivate, or till the soil. He has an agreement with a shepherd to keep sheep on small areas of grass he owns.

Hank did not think he would become a farmer like his father, but he discovered that he liked being his own boss: "The autonomy is the biggest attraction of it, you know not having a boss and blaming the weather instead of other people." Later he pointed out that a bigger challenge for farmers than the weather is "selling and dealing with people and businesses." To avoid this challenge, farmers like him are "price takers" in a market "structured" for customers to reach out to him, offering him prices, rather than the other way around. Not needing to put any effort into marketing is a relief to certain farmers who get to focus instead on "pure efficiency … and cost effective production." An arable farmer's "job is basically to harvest sunlight as efficiently as possible." Yet, "you do sometimes think what proportion of the final product goes to the farm gate." He concedes that negotiating deals with customers is "where most of the value

is.” But he argues that price takers like him do not sell “finished products,” but commodities destined for trade. While a lot of farmers would love to sell more directly or locally, there are “hidden costs” and not every farmer can “afford to be principled.” “I think because farming is becoming higher risk. I think it's an unfortunate side effect that principles can be sacrificed.”

Some principles he can afford to follow. No tillage practices save him money. It also improves the soil, which when that is the “key driver, often the financial benefits become incidental.” Soil improvement increases the resilience of his system. Resilience includes, reducing “reliance on huge amounts of energy and certainly fertilizing chemicals, without affecting the turnover of the business too much.” Hank cannot adapt his farming practices to the ups and downs of financial markets for inputs like fertilizers. Financial markets are volatile on the short term and farming is a long term endeavor, “so being willy nilly doesn't really work.” Fertilizer prices shot up last year but went down this year. Instead of responding to short-term changes, Hank’s strategy for resilience is to look after the soil and grow different crops that “weather all scenarios.” He does not just try to “push production” if its “costing the same and not adding to the margin.” “Rotating through different crops and using composts … helps spread the workload and manages the weather risks and pests and diseases.”

While adding vegetables, perennial plants, and grass lays, would further add to his farm’s resilience, there are structural barriers preventing him from doing so. He does not have specialized harvesting equipment, nor the time to market vegetables to multiple suppliers, nor would he make enough turnover for laying grass down in a “predominantly arable area.” Some farmers, like him, are motivated to increase biodiversity on their farms but not at the “expense of economics.” He finds that “a lot of farmers are tied to the treadmill... of having to produce and having to pay the bills.”

4.1.4 Sam

Sam is an organic farmer, advocate, and founder of an organic vegetable box business that delivers across the country. Roughly a sixth of the produce delivered by this business is grown on the company’s farms. One 500 acre farm is located in Lincolnshire. The company’s headquarters is in the Southwest of the country where Sam was born and raised on a dairy farm. After selling his company to his employees several years ago, he started a cooperative farm in Devon where several farming enterprises are now based.

Before starting the vegetable box company, Sam was a management consultant where he advised companies to differentiate their products from a basic commodity, to achieve a “proprietary position in the marketplace.” After several years, he quit the corporate job and returned to his family farm. There, he noticed his dad was selling milk as a commodity on the global market. He saw this as not only a poor business choice, but a brutal one, as there is always “someone somewhere else in the world who can do it cheaper.” He wanted to farm differently, to be “in control of [his] own...destiny, of [his] own sort of route to the market. And that's what led to this sort of veg box scheme.”

In 1993, Sam had delivered his first vegetable box directly to a customer and realized there was a gap in this market. “Supermarkets told us that everyone wanted absolutely perfect, unblemished vegetables … available fifty-two weeks of the year and…that they didn't really care about the people that were growing them, and that is all a lie.” “When I delivered the first veg box … I had found something where actually the market was not efficient…that was an example

of market failure." His company's route to success was spotting that that there was an unmet consumer demand for produce grown organically.

However, to be able to reject the "scale and specialization model" of commodity production while staying commercially viable, "the only way a farmer can do that is to sell direct and be able to tell their story." Even though there will be additional costs associated with small scale production and distribution, the farmer's story adds to what consumers are willing to pay. Also direct sales recover value that retailers would otherwise take from the sale. "So getting a larger slice, maybe even all, maybe even more than all, because you're adding value by telling the story and so on…could end up more than the conventional retail price." I higher price grants farmers the "liberty to farm" how they want. Sam admits that a big factor of his success is his ability to tell such stories, "I'm reluctant to call it marketing because I loathe most marketing, but I guess it is marketing."

Sam's strategy to liberate farmers to farm the way they want is reflected in his philosophy that the "customer is not always right." In fact the customer is "confused and open to persuasion." Farmers "know a hell of a lot more about vegetables and … what's good to eat and what can be produced sustainably … and I think it's our job to sort of guide people a bit to edit their choices." Customer choices can often lead to unsustainable farming and distribution practices. Sustainably-minded producers, on the other hand, might make better choices for how they treat their land or environment.

When asked about how he developed his organic and sustainable practices, Sam first responded that his business decisions were value-driven. These values came from his parents, a book he read early on, and early work experiences. In the main, he wanted his business to be of service to the environment and to others. While this is true today, when pressed on how he first developed these values, he admitted "I was 26 when I started. I was an insecure young man who needed to prove himself to his father. Looking back on the things I did and the way I did them, I can see that … I just needed to grow more and more of this stuff. I don't know why. Somehow that sort of validated me as a person. You know, over the last 30 or 40 years that has evolved into something I think is much more … subtle and less egotistical and more thoughtful. Some people… to their dying day just want to accumulate more wealth and more power… so I can only assume that they are as insecure at 70 as I was at 26, because that's what drives that sort of behavior. Some people grow up and adopt something a bit more nuanced and interesting."

He revealed that what led him to become more considerate had been contact with nature. "Being out there and actually doing stuff and particularly with your hands not necessarily sitting on a huge 400 horsepower tractor, but actually getting out there and observing… It's quite a humbling experience… and organically, I think things tend to go wrong more, you accept quite early that you're not in control. I think that is quite a big learning experience… As a conventional farmer, you always think you're in control. You can just reach for that chemical or that fertilizer … and you probably are more in control, but only ever temporarily. You're just maintaining an unstable system, whereas in organic you're not in control. You have to really understand what's going on in your in your environment, the ecology of your fields and so on, and try and work with that, which is … just a different way of thinking." Practicing organic farming had had an effect beyond its original purpose of "achieving a proprietary position in the marketplace." It inspired new values that developed into new practices.

Some "people you know, go organic for commercial reasons... the majority become…pretty involved and almost obsessed by it to the extent where you get to actually see a field die, having been sprayed with glyphosate, which you know, conventional farmers love

glyphosate, ... It's like watching someone being tortured. You know that to me, that's what it feels like. I mean, it's agony and so it becomes quite a sort of visceral... The closer you get to nature, you just don't want to do that… It just has been a sort of evolution and I think part of that is the way I'm farming. Part of that is a societal shift and part of it is, it's getting older actually."

The evolution he experienced consisted of selling all the shares of his hundred-million pound company to his employees. Sam wanted to improve the environment in his business, as well as on the farm, as he came to realize that "social and environmental sustainability are very, very closely linked." Through employee ownership, employees would benefit from better working conditions, job stability, and autonomy over business decisions that impact them, leading to a healthier work environment. After leaving the company he transitioned to a small-scale farm collective that cooperates with other farm businesses that purposefully do not seek relentless growth. While he affirms that there are benefits to scale, he also sees environmental, social, and health advantages to short supply-chain food systems. "the closer you are, the more time you spend cooking, that would be better for your health. It would be better, societally, hopefully you'll enjoy sharing that with your friends and loved ones. So I think it's important from that point of view. I mean, clearly there are environmental benefits to short supply chains." His farming collective serves to promote the environmental, social, and health benefits of short-supply chains.

4.1.5 Jack

Jack is a fourth generation farmer working with a bit under 2000 acres in South Lincolnshire. The farm's main crop is potatoes that are grown in rotation. His family has been farming with minimal and no till practices in a regenerative style for 15 years.

Jack's farm has been growing potatoes with tillage and heavy cultivation for multiple generations. But in the early 2000s, the farm was in a crisis, "Because we knew that our soil health was going in the wrong direction and also, really, our profits [were] going in the wrong direction. The commodity prices were very, very low." This coincided with the farm's machinery reaching the end of its' lifetime. Jack's grandfather, the second generation farmer, had recently been to Argentina where he saw non-tilling, direct drills used on regenerative farms. When he came home he "tried it on one field and it worked pretty well," so they decided to invest in new direct drills and reduce cultivation. This was mainly a financial decision as "at that time nobody talked about any of the environmental benefits … it was the financial thing that pushed us into it most." It was cheaper not to pay for heavy soil cultivation, or ploughing, and to terminate certain crops and weeds instead with glyphosate. In response to whether they considered converting to organic production, Jack replied with three concerns: they do not want to cultivate the soil (a common organic practice), they doubt its profitability, and they want to "maintain conventional type yields." This last point was echoed by other farmers as a major difference between organic farming and those who follow more "regenerative" practices.

Jack's family's transition to no tillage practice successfully turned the farm's finances around. Over the last ten years, Jack and his family were able to implement more natural practices for improving soil quality. They added more organic matter and cover crops, and reduced fungicides and artificial fertilizer. They eliminated insecticides all together. While a "conventional farmer relies" on these products, Jack relies on "Mother Nature to provide all of the nutrients the crop needs instead, and obviously, the nature generally works for free. So I want to use that resource instead."

While Jack has worked on cost reduction, he realized his family farm was "delivering environmental goods," as well. The lack of an established regenerative market, encouraged Jack to start a brand, as "I should be able to sell my produce for a premium as well... So hopefully I can reduce my costs and I can get premium price. So that will be further increasing my profit margin."

The purpose of the brand is to differentiate it from other commodities, "because at the minute, I sell on the commodity markets and, when I tip my ton of wheat, that is carbon negative, into a 1000 ton grain store, it gets lost with everybody else's. So I need to keep it separate and sell it with that premium." He also wants to "gain more control of the supply chain." Jack wants to sell his carbon neutral, value-added wheat directly to a food manufacturer as opposed to grain traders who will sell in undifferentiated global commodity markets. He is in talks with "big food brands," as opposed to local customers or processors, as his produce needs to be processed "at scale." Scale is important as he points out that for "15,000 tons of wheat, that is gonna be millions of loads of bread. Is there enough people like, you know, rich people that can afford to pay £5 for a loaf of bread? Probably not." So he must sell to an industrial manufacturer that can reduce the consumer price through efficiencies of scale.

He does believe that a premium market for regenerative wheat exists but is just difficult to reach. While the local retailers and restaurants are interested in regenerative and are more willing to negotiate for it, the middle tier processors are "more difficult to crack." The small mills are more flexible to negotiate, but "cost a lot of money per ton to do their job" than bigger scale mills.

4.1.6 Geoffrey

Geoffrey is a third generation arable farmer on a 330 acre farm. When he and his brother took over the farm in the mid 1990s, they converted the 100 cow mixed dairy farm to organic standards. This conversion was quickly followed by a transition to beef suckler, which was increasingly sold directly to customers. A decade and a half later, the farm transitioned to a predominantly arable operation that cooperates with an organic slaughter less dairy that shares their land. Geoffrey now farms heritage and population wheat, peas, and oats that increasingly cater to a local economy of millers, bakers, and customers. He bottles and sells his own organic oat milk, which when combined with the cow milk produced by the slaughter less dairy, yields more milk than his intensive dairy operation ever did.

Before the farm converted to organic, Geoffrey's farming family was "feeling squeezed, the herd size was having to get bigger and bigger, the margins were getting smaller and smaller and really we felt we were pushing the farm as hard as we could. We weren't making any money." They weren't happy about the pressure on the cows either. So when Geoffrey and his brother took ownership, they evaluated the entire business and decided to convert to organic, "because that gave us access to a premium market and one that we felt reflected the values of what we were doing here." The established organic market and availability of contracts made the conversion possible. They could now reduce the herd size and shift to an extensive forage-based diet. They stopped using sprays and artificial fertilizers, which helped with "the economics." This encouraged them to start "learning farming again" as they began to "understand…all the benefits of clovers [such as natural fertilization]." However the supermarket underpinning organic milk nationwide soon placed a market levy to decrease the saturating market, lowering the price of milk below the Geoffrey's production costs. As the farm was already decoupled from

many of its prior costs and inputs there was little they could do, forcing Geoffrey to realize that "the product was the problem." So they sold the dairy herd and transitioned to suckler beef production that foraged on the farm's organic grass lays. The beef supplier surprised Geoffrey when he rated their cattle adequate for the high-value, finished animal market, of which most assume requires feeding cattle protein concentrates. So Geoffrey started selling to this premium market. To differentiate his forage-fed beef from the concentrate-fed beef on the market, he helped start an association and brand. The association connected him with like-minded farmers who, together, gave him "the confidence to think a lot more about direct marketing, taking ownership of the brands and the values rather than just expecting someone to do all that work for us and reward us." This was inspired by the Geoffrey's experience with supermarkets, where they realized "the people who put the work in on the marketing are usually the people who benefit, you know they're the ones who reap the rewards." experience with supermarkets. The association encouraged Geoffrey to integrate with his product's value chain which was "another step forwards" in his farm's transition process. Previously, "when an animal left, or the milk or a beef animal left the farm, that was the end of the conversation." Now he heard back from his customers, validating him and his work.

More than a decade later, what started with an organic transition has "ended up with this move to what we think is a vegetarian friendly or vegan friendly farm." This move was a result of three major reasons. One of which was that among Geoffrey's four kids, "two are vegan one's vegetarian... So as beef farmers…there was this sort of always ongoing conversation we're having about reconciling the values of vegan and vegetarianism with what we were doing as a farm." The second reason was that this ongoing conversation encouraged Geoffrey to "think about where the farming needs to be in 20, 30, 40 years time. We felt we had got an opportunity just to explore that…" Transitioning away from suckler beef was not only a response to ethical questions but a way to prepare his farm for the future market that may demand less meat. Thirdly, Geoffrey and his brother were seeking a "lifestyle change" as they prepared to reduce their daily commitments to prepare for retirement. This meant limiting their responsibilities for animal care. Yet, they still wanted animals on their farm for "rejuvenation of the soils" and "building fertility." Before they were organic, they were thinking of "volumes" of NPK to fertilize the soil. Now they have "developed" their thinking to "nurture[ing] the fungal activity within the soil" with small quanitites of manure to mobilize nutrients. So when they learned that a local slaughter free dairy was looking for land for their cows, they were happy to discuss collaboration. The dairy now manages more than 40 cows on Geoffrey's farm which allows Geoffrey to benefit from having livestock on the farm, without compromising his values for animal welfare or himself. H14.

Now Geoffrey focuses on farming grains for "human consumption rather than animal feed." He grows heritage and population wheats for the baking industry, peas for the British produced protein crop market, and oats for oat milk. He grows YQ population wheat which includes more than 100 lines of wheat. This genetic diversity helps the crop to adapt to its local environment, increasing its resilience to insects, pests, and climate changes. The diversity also attempts to circumvent crop failure, as at least some wheat might survive undesirable conditions. While it is not a "knockout performer in terms of yield," there "won't be a bad year for it." Geoffrey's priority shifted from yield to adaptability and resilience.

Even still, Geoffrey would argue that he has not sacrificed yields. Now his farm produces more milk (oat and dairy together), than it did at the height of its intensive dairy production while maintaining animal welfare. As his oat milk production converts energy more efficiently

than his previous dairy operation, and with less inputs, he finds that “sometimes stepping back and dialing back the intensity…can actually end up with a more productive system.”

Increasing amounts of Geoffrey’s produce is sold locally to stores or processors. His oat milk, while slightly more expensive than other alternative milks, is continually sold to local convenience stores and shops in wealthy nearby areas. His specialty wheat is sold to a grain miller who negotiates prices with Geoffrey based on bakeries’ demands and Geoffrey’s resulting yields. They do this to support the needs of everyone in the value chain, “And we come up with something that I know is going to look after us. It's going to look after the miller and it's going to look after the baker and the customer.” This is because he “realizes everybody's got to be nurtured for it, for it to work as a whole… rather than this exploitive extractive model, where everybody's trying to get as much as they can out of it.” In this extractive model the farmer is “unfortunately the person in the weakest negotiating position.” Negotiating with the players in the value chain, which is possible for him on a local scale, ensures his business needs are met. Yet these negotiations are challenging to make because they attempt to predict emerging consumer demands years in advance. Nonetheless, these negotiations within the local value chain sometimes succeed in establishing stability and resilience. Geoffrey and the miller have managed to keep the price of wheat the same as it has been over the past five years. This is a testament to cooperation as well as resilience to global supply chains, which have inflated commodity prices multifold for most staple foods since COVID and the war in Ukraine.

4.1.7 The Franks

The Franks are a second and third generation farming duo collaborating on a primarily arable farm. James and his father own 2000 and contract on an additional 1000 acres. They grow a variety of combinable crops, including wheat, oil seed rape, spring barley, winter barley. They also grow sugar beets. They rent land out for potatoes and vining, peas. They contract on other farmers’ land. They also manage storage for other farmers to contract with. Additionally they diversified into the haulage business 25 years ago. They recently brought 200 sheep on permanent pasture that is mandated to be grassland by law.

While the farmers use some non-artificial fertilizer like sewage sludge, and implement crop rotations, they do not think about soil health “as much as some people do.” They believe “we know what our soil can do at the moment. Let's look after it while we can, but still in the way that we want to farm.” This way of farming is high yielding. A primary concern they have about others doing regenerative is that “Their yields aren't as high as they would be.” They believe “It wouldn't be beneficial to the business to try and do those things from the start.”

Yield is important to them because, “your food production from that area isn't as high as it would be in a conventional way” which is not ideal for “global food production.” But also its not great for their profit margins as, “Wherever you go, prices are going up. And of course everybody will put their prices up if they can to maintain a profit level. Farmers can't. Our prices are governed by market forces generally, world market forces.” Yet they acknowledge they will likely follow more regenerative practices in the future with the old CAP “payments going down and the and the new schemes coming in.”

Yet now there is no premium market to encourage regenerative farming as regenerative farmers are “selling their produce to the same people we're selling it to, and for no premium.” And even if they are using less expensive inputs, their profit margins are probably similar which, “If the gross margins are the same, then great. But food production level is lower.”

These farmers are skeptical of regenerative farming as they were with organic farming two decades ago. They believe that, “The organic revolution hasn't really materialized. To the extent that the pundits said it would. And so will this newer trend follow the same path?” The fact of the matter is high yielding agriculture is important as “Every town and village you see building, building, building more and more people, they've got to be fed from somewhere. You know, throughout the world If vast tracts of land are planted with trees, you can't eat trees.”

Their farming practice is governed by efficiency, as they look “at ways of making everything as efficient as possible.” But they are still challenged as the markets makes farming “just a big gamble.” They can try to “play that market and get it right.” While “there is a bit of skill in it a lot of it is pure blind luck.”

4.1.8 Dave

Dave is a fourth generation farmer whose great grandfather started the farm in 1895. Until the early 2000s the farm size was slightly less than 2000 acres but recently the farm business increased to a size of 7,500 acres of land that is either owned, rented, or contracted. Over the last 20 years, the farm increased crops in its rotation, reduced inputs, started generating energy, and began recycling water its uses in processing the crop. The main crop of the farm is potatoes, as it has been historically.

In the 2000s, Dave and his family decided to expand their century old farm business. An opportunity presented itself to do so and they had a “direct route to market.” They were selling potatoes directly to supermarkets which incentivized them to “get more supply under [their] own control.” So they added 5,500 acres with long term tenancy agreements and contracts.

Dave’s strategy is to manage the potato crop’s full rotation to “ensure that the land is in good condition.” With a better soil condition his yields may increase. Dave is driven by strategies to improve efficiencies like this as, “..what we do is commodity. And so because of that, we are price takers. We need to … make sure that we're doing it more efficiently than other people.”

This efficiency includes caring for “birds and the bees” by increasing wildlife on farm and increasing crops in rotations. Looking after the environment “is a route to profitable farming in [his] view.” So Dave added crops like wheat and grass ley in a longer, 8 year rotation. He does not consider converting to organic farming because he does not feel any urgency to radically change the terms of his supermarket contract. Also, “there's a higher risk in growing [an organic] crop and the revenue that you get for that crop isn't high enough to take into account that risk, in my humble opinion.” Instead he is focused on increasing efficiencies which includes reducing labor need from “15 people working on the farm on 2000 acres” to “10 on 7,500 acres.” He achieves with “bigger bits of equipment which can do more acreage and can travel in more inclement conditions.”

4.1.9 Kevin

Kevin’s farm started on rented land in 1972, which was shortly mortgaged in 1979. Originally it was 365 acres but shrank to 200 acres in the 1980s. The farm began as a dairy farm, but was not commercially viable even after rapid expansion. So Kevin rented an additional 500 acres 8 miles away in 1989. Though he continued to have livestock on the farm, he transitioned to a primarily arable production with wheat, barley, and oil seed rape. For decades Kevin felt like

he was “running faster to stand still," as he was trapped in a cycle of financing loans to pay for expansion to pay for rents. This encouraged him to farm in a way that he would “make as much money from it as [he] possibly [could].” Prospects improved for him when his produce prices rose between 2008-2012. Soon after that he was offered to sell his tenancy to an estate. He took the offer and moved back 'home' to the original 200 acres he and his family now fully own. With no more borrowings, Kevin semi-retired. He now farms less intensively with his children. They keep a rotation that fits with the UK’s environmental stewardship scheme. There is a forest on the property as well as an on-farm bakery,

Kevin and his family follow the environmental stewardship scheme to “start to put something back into the land” after intensive farming. The scheme provides payments for the use of clover for fertilizer and produce silage for their few remaining cattle. They keep two year fallows and direct drill their cereals, as well. They never intended to convert to organic “but wanted to use minimal inputs.” They discovered which inputs they could manage avoiding. This did not include artificial fertilizer, as they tried forgoing it when prices were high in 2022. They “couldn't produce a decent crop from it.” So they “sort of stepped back to minimal inputs” with “no cultivation involved,” as “it's direct drilled.”

Several reasons for this change in approach to farming included the fact that they now owned the land and that they did not need to pay high rents. Another factor is that Kevin is now in a different “stage of life,” where he is more concerned with leaving the land in a better condition than he had started with. He had also been diagnosed with a life threatening illness that he associated with work related stress. So he wants to farm in a way that is the “least stressful” with the “least amount of money to be invested.” But he still wants “a reasonable return we could make a living from.” As he has income from several sources, such as his pension, he does not need to push his farm to make as much money as he did before.

The farm also has plans to diversify its revenue generation through Kevin’s children’s farm related businesses. His son is producing kiln dry logs that heat the farmhouse and are sold on the farm. His daughter started a bakery that sources its wheat from the farm. She has sold her bread to the local community and collaborated with farmers and millers across the value chain to improve bread recipes and select more profitable wheat varieties for the burgeoning local market Kevin observes that “quite a nice circular economy” is beginning to emerge without the use of loans that defined his intensive farming career. By avoiding loans, he succeeded to create “less stressful work.” He is still out on the farm everyday as, “Although I said that I’m semi-retired, I seem to spend as many hours working, but I'm certainly not as productive and not as stressed.”

4.2 Dis/entangling and Dis/engaging Analysis

Almost all of these farmers described a process of dis/entangling or dis/engaging from a set of routine practices. Dis/entanglement and dis/engagement are categories of key trends that emerged from my analysis. Coding for practices and motivations in the interview data revealed dual processes farmers experienced of stepping away from an old routine and embracing a new one. This analysis revealed that experiences of change diverged based on a practice’s intention and alignment with old or new objectives. Along with understandings and procedures, objectives are one of the basic components of a practice (Schatzki, 1996; Warde, 2005). When one or more of these components are modified, they can result in a change of behavior. For many farmers, a modification in one component encouraged a change in another. This recursive sequence of shifts appears to follow a common pattern among the interviewees. Many farmers disentangled

from routine habits entangled in new practices, and engaged in new objectives for their farm businesses. Dis/entanglement and dis/engagement therefore serves as a framework to analyze the farmers' change experience. This framework is visualized in a model that helps to expose its dynamics (Figure 1). The dis/entanglement and dis/engagement model consists of several pathways in which farmers move away from a routine behavior and toward a new set of practices. For many this process begins with a trigger to reevaluate an understanding of a particular behavior, depicted by the first blue arrow on the left. A farmer might then begin to shift away from this routine by adjusting a procedure, the middle blue arrow from the top. Performing this new procedure has the capacity to reveal a new understanding about what the farmer is doing, the bottom left arrow. This new perspective encouraged several farmers to advance new goals, or objectives, the top arrow. These farmers then deepened their behavioral transformation by engaging in a new set of practices to reach their new objectives, the bottom right arrow. This process of stepping away from previous routines and embracing a new set of practices can be seen as a dual process of dis/entanglement and dis/engagement.

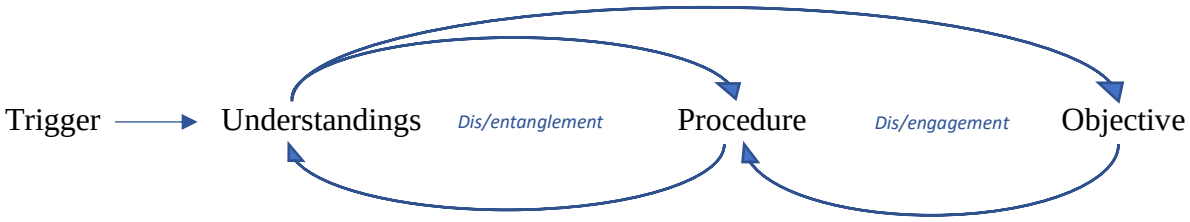

Figure 1: Dis/entanglement and dis/engagement model

Note. This model outlines a recursive dynamic that many farmers experienced when changing practices. The model builds on elements from the 'trigger effect' model of change and the components of practice from practice theory. The model visualizes how farmers initiate change in response to a trigger. This can influence a shift in a farmer's understandings about a routine behavior. Some farmers follow this shift with a cycle of dis/entanglement via a change in procedure that may result in a secondary change in understandings. Other farmers directly embrace new objectives for their farm with their new understandings. Several farmers who first undergo dis/entanglement embrace new objectives following a secondary shift in understandings.

Responding to a trigger often initiated this process for changing practices. Kevin, Sam, and Geoffrey cited getting older and wanting to reduce workloads as a reason to detach from their previous intense routines. Liz, Jack, and Wilson refered to seeing other farmers' routines as a catalyst to reevaluating their own. Geoffrey and Elena both expressed the preferences of a farmer's family members, such as a spouse or child, as an initiator. Dave and Kevin found that new opportunities, such as an offer for a favorable contract or for a sale of farmland, served as a trigger. These triggers spurred these farmers to reevaluate their understanding about their approach to farming. Sam, Geoffrey, and Elena expressed that younger generations of farmers may recognize their predecessors' practices as tedious, unnecessarily challenging, or no longer effective. These younger farmers might have a different outlook on the farm's business or agricultural practices. When this next generation takes over their family farms they may initiate new strategies.

These personal and intergenerational changes to understandings often encouraged a change in procedure. The farmers concerned with financial struggles and tedium adopted new

approaches to the farm's business and agricultural operation. These new procedures disentangled farmers from their previous routines as they lessened their involvement in previous practices. Meanwhile many of these farmers entangled in new procedures and understandings. A few producers went on to entangle in such radically different understandings, that they began to engage in new objectives for their farm business.

4.2.1 Dis/entangling and Dis/engaging

Two farmers in the study expressed undergoing dis/entanglement followed by dis/engagement, the two key categories of change that emerged from the analysis. These processes began with a trigger that encouraged new understandings and, in turn, new procedures. These procedures disentangled the farmers from both their business and agriculture routines as they entangled in new marketing and environmental practices. The farmers' experience with these practices then encouraged a deep rooted appreciation for regional value chains and their farm's ecology. These understandings initiated a process of dis/engagement as farmers disengaged from prioritizing profits and embraced new ecological and social objectives for their farms.

Geoffrey and Sam were triggered by issues of financial viability. They inherited farms that struggled to profit from sales to basic commodity markets. These markets offered comparably lower prices than other, more premium markets due to intense global competition. The nature of these markets are elaborated in the Development of Modern Conventional Marketing Practices segment of the Historical Development of Conventional Practices section.

Instead of following their parents practices and expanding production to increase revenues from these markets, Geoffrey and Sam actually decreased the amount of produce they sold to them. These farmers preferred to brand or certify their products to access higher value, premium markets. Therefore this practice removed, or disentangled, these farmers from global commodity markets and the "scale and specialization model," Sam and several farmers alluded to.

When Sam started to farm, he felt an urge to reject his father's strategy to increase production (Figure 1.1). He began to disentangle and "liberate" himself from the brutal competition of the global commodity market, where there is always "someone, somewhere else in the world who can do it cheaper." Instead of competing for efficiency or scale, he focuses on farming higher value organic produce, and "tell[ing] [his] story." This story, a part of his new marketing procedure, differentiated his organic produce from conventional supermarket produce. Expressing the environmental, social, and health benefits of his differentiated product adds value that could end up increasing his prices to higher than those offered on the commodity market. He also began selling directly to consumers rather than to wholesalers or supermarkets to retain as much value as possible. This approach to differentiating his product was inspired by the lessons he learned as a management consultant, to achieve a "proprietary position in the marketplace."

To differentiate his product, Sam entangled in new organic procedures to qualify for a premium market. This simultaneously disentangled him from his father's agricultural practice of chemical input use as organic standards did not allow for them. Following this procedure had a profound effect on Sam. These new practices catalyzed a professional and personal transformation, initiating another phase of disentanglement, a new shift in his understandings.

"Being out there and actually doing stuff and particularly with your hands not necessarily sitting on a huge 400 horsepower tractor… It's quite a humbling experience and organically, I think things tend to go wrong more, you

accept quite early that you're not in control. I think that is quite a big learning experience. As a conventional farmer, you always think you're in control. You can just reach for that chemical or that fertilizer … You're just maintaining an unstable system, whereas in organic you're not in control. You have to really understand what's going on in your in your environment, the ecology of your fields and so on, and try and work with that, which is… just a different way of thinking."

Reducing input use disentangled Sam from the agricultural control farmers like his father had over their farm. This had a major influence on shifting his farming objectives away from "grow[ing] more and more of this stuff," which once "validated [him] as a person."

Sam went on to purposefully engage in natural ecosystem processes when he developed new "social and environmental sustainability" objectives for his company (Figure 1.1). While he may have entangled into organic farming practices for financial reasons, he would come to develop new environmental objectives for practicing organic. For most commercial farmers, maintaining viability and increasing profits serves as their major objective. But some farmers like Sam would develop new objectives. As he says, many "people go organic for commercial reasons" yet,

"the majority become pretty involved and almost obsessed by it to the extent where you get to actually see a field die, having been sprayed with glyphosate … Its like watching someone being tortured … I mean, it's agony and so it becomes quite a sort of visceral... the closer you get to nature, you just don't want to do that… It just has been a sort of evolution, and I think part of that is the way I'm farming, part of that is a societal shift and part of it is, it's getting older actually."

Sam gained a deeper understanding and care for the ecosystem of his farms as a result of following organic procedures, along with psychological and social changes. This understanding would feed into new *ecological* objectives for his company to preserve a biodiverse environment with a reduced carbon impact. This fueled new procedures for regional sourcing, avoiding air freight, introducing agroforestry on farms, and reducing plastic packaging. It also became apparent to Sam that "social and environmental sustainability are very, very closely linked." The welfare of his employees was just as important as that of his farms' ecology. He engaged in new procedures for employee welfare and employee ownership of the company. This coupled with a disengagement from conventional corporate models for power sharing.

Sam would engage more in regional and local food systems after he left his business. With the understandings developed over his career, he organized a small-scale farm collective with the objective of promoting environmental, social, and health benefits of short-supply chains. This encouraged new, non-growth oriented but viable practices catering to local and regional food systems.

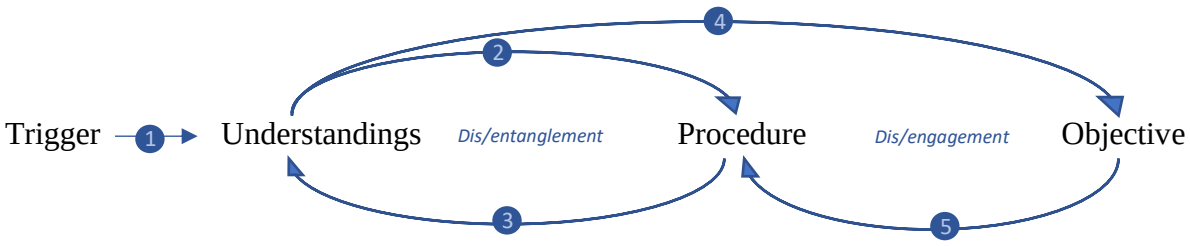

Figure 1.1: Sam's dis/entanglement and dis/engagement model

Note. In step 1, Sam recognized overwhelming competition in his father's "scale and specialization model" of farming, triggering him to consider other commercial approaches he learned as a management consultant. This exploration shifted his understanding about how to market his produce. In step 2, he disentangled from basic commodity markets and entangled in the organic market. This coincided with an entanglement in organic practices. In step 3, Sam followed a change in these procedures with a shift in his understanding about the value of ecology and links between environmental and social sustainability. In step 4, Sam engaged in new objectives to benefit the environment and his coworkers. In step 5, Sam embraced new procedures such as supporting biodiversity and soil health, as well as giving his employees ownership and democratic control over the company's operations and decisions

Geoffrey also disentangled from commodity markets by converting to organic production (Figure 1.2). Before he and his brother inherited the farm, the farm business strategy was to expand, but "the herd size was having to get bigger and bigger, the margins were getting smaller and smaller and really we felt we were pushing the farm as hard as we could. We weren't making any money." This triggered Geoffrey to reevaluate the business approach and consider disentangling from commodity markets. Producing organic food could mean increasing revenues without expanding production. So they began to disentangle from agronomic practices of chemical input use in line with organic standards. Entangling in these new procedures shaped new understandings, as Geoffrey had to "[learn] farming again" to "understand…all the benefits of clovers." Disentangling from a reliance on "volumes" of NPK, this understanding inspired a newfound concern for ecosystem services, like natural fertilization.

An additional trigger soon induced another cycle of changing understandings and procedures for Geoffrey. When the supermarket underpinning the organic milk industry lowered its price, Geoffrey was forced to consider that "the product was the problem." Instead of milk, he shifted production to forage-fed beef. As the market for this product was just emerging, Geoffrey was forced to disentangle from his prior marketing practices of selling to supermarkets and wholesalers. He began new procedures for branding and organizing marketing with like-minded farmers. This experience led to further understandings about direct-to-consumer marketing and regional food systems: "the people who put the work in on the marketing are usually the people who benefit, you know they're the ones who reap the rewards." He began to "think a lot more about direct marketing, taking ownership of the brands and the values, rather than just expecting someone to do all that work for us and reward us." These understandings would shape his embrace of new objectives and a new set of practices.

Like Sam, Geoffrey too engaged in natural ecosystem processes and regional food systems after dis/entangling (Figure 1.2). After "learning farming again" by developing his understanding of ecology, he engaged in new objectives for his farm. One of these objectives was resilience. This encouraged him to adopt new procedures such as growing crops like YQ population wheat. YQ is not a "knockout performer in terms of yield," but there "won't be a bad

year for it." The crop has natural adaptability and resilience to insects, pests, and climate change. Unlike Hank, Geoffrey demonstrated his willingness and capability to adopt resilience as a farm-business objective. Hank would not do this because his objective for conventional type yields was a priority.

Geoffrey engaged in regional food systems after adopting procedures for direct-to-consumer marketing, branding, and associating with like-minded farmers. These experiences grounded him in collaborations with regional producers, processors, and customers. He found himself in conversations with millers and bakers, negotiating prices and agreements across the wheat value chain. He realized that when everybody in this chain is "nurtured," their collective business and production needs can be met. This is an alternative to the "exploitive extractive model, where everybody's trying to get as much as they can out of it," and the farmer is "unfortunately the person in the weakest negotiating position." Regional partnerships can be good for business and the local economy, but only if the participants are "looked after." This understanding encouraged Geoffrey to engage in a new objective for catering to regional partners by prioritizing, and even limiting himself, to selling within a certain mile radius. This disengaged him from the "exploitative extractive model" of competitive, commodity farming. Following procedures in line with these objectives has been challenging but also rewarding, as Geoffrey and his milling partner managed to keep wheat prices stable through COVID and the following inflationary period, a feat and testament to the model's resilience.

Geoffrey's children would trigger another new objective for the farm. Geoffrey found it harder to account for the slaughter involved in his beef suckler operation once his kids became vegan and vegetarian. This trigger encouraged a shift in his understanding about how to prepare the farm for changing and emerging economies. His children choosing to reject meat served as a sign to consider that the general demand for meat products might shrink in the future. So Geoffrey developed a new objective to prepare his farm for future markets by forgoing animal slaughter and catering to emerging markets. He began new procedures for collaborating with a slaughter-free dairy farm and producing and bottling his own oat milk. When asked about the amount of milk he produces, he mentions that with dairy and oat milk together, his farm is producing more milk than it did at the height of its conventional, intensive operation.

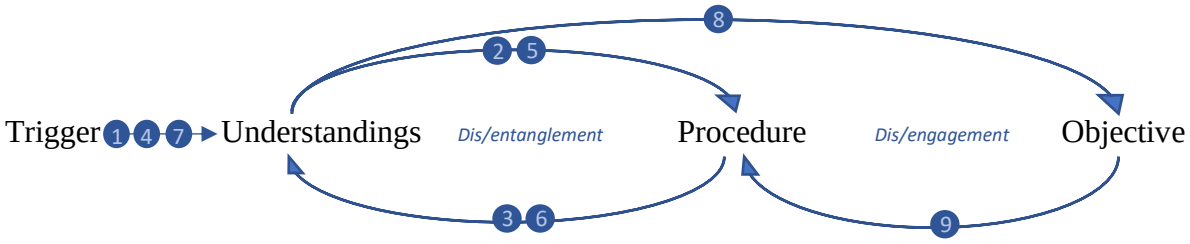

Figure 1.2: Geoffrey's dis/entanglement and dis/entanglement model

Note. In step 1, Geoffrey felt triggered to reevaluate the dairy farm business after he inherited it in a difficult condition. Step 2, he decided to disentangle from commodity markets and sell on the premium organic market. This led him to entangle in organic agriculture procedures. These procedures encouraged new understandings about the ecology of his farm in step 3. In step 4, Geoffrey experienced another trigger from his main organic customer that causes him to reconsider dairy as a viable product. Geoffrey converted to forage-fed suckler beef production in step 5. Catering to the emerging regional market for this product entangled him in regional value chains. This encouraged him to develop new commercial understandings about direct marketing and branding in step 6. In step 7, Geoffrey experienced another trigger to reconsider his product after his children stop eating meat and raise questions about the farm's treatment of animals. This influenced Geoffrey to engage in new objectives not to slaughter on his farm in step 8. In addition, after fostering relationships with regional processors and customers, Geoffrey

engaged in objectives to dedicate his farming to the regional food system. A third new objective Geoffrey embraced after entangling in ecological farming was to prioritize his farm's resilience, in addition to yield. These objectives inspired new procedures in step 9 to cooperate with a slaughter-free dairy, operate within a certain mile radius, and grow YQ population wheat, a species not celebrated for its yields but for its resilience.

4.2.2 Dis/engaging

Some farmers did not express undergoing dis/entanglement, but solely dis/engagement, in their process of change. This process often began with farmers having felt triggered to shift their understandings about a conventional practice. A new understanding then encouraged an engagement with new environmental and/or social objectives and procedures for their farm.

Liz, for example, described disengaging from her father's generation's focus on scale and efficiency, "the next generation are wanting to do something different." Elena described this understanding as inspiring a new objective for engaging the local community in the farm through education and the local food economy (Figure 1.3). Elena has started to organize workshops for school children to visit the farm and learn about the processes involved in producing the food they eat. She has increasingly used new marketing procedures to differentiate her produce as higher quality and more ecological. While using less inputs may produce fewer yields, she can sell her produce at a higher value in the local market or through a box delivery scheme.

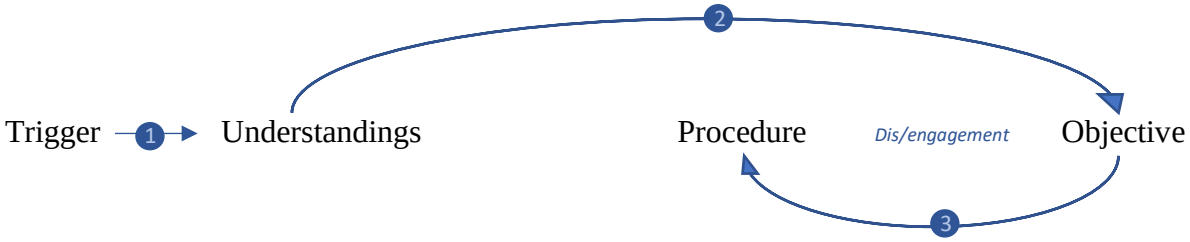

Figure 1.3: Elena's dis/engagement model

Note. In step 1, Elena is triggered to explore new ways of farming and marketing after witnessing her father's trying approaches to both. In step 2, she engaged in new objectives for the farm to cater to local residents and not just the basic commodity market. In step 3 she developed new procedures of direct marketing and educational programming on the farm.

Wilson also described his process of changing practices as a direct embrace of new objectives (Figure 1.4). The process began when a farmer in Brazil triggered him to reevaluate his understanding about the possibility for adopting conservation agriculture on his farm in Lincolnshire. This shifted understanding encouraged a new objective to fully engage with natural ecological processes, even if it were to reduce his yields. As long as he could remain financially viable, he would prioritize natural fertilization and resilience processes over expanding yields. Like Geoffrey, Wilson adopted new procedures for cultivating resilience-oriented crops like YQ population wheat. However, unlike Geoffrey, he did not engage in a regional food system. Wilson was content with selling his produce on commodity markets as his profit margins remained positive and stable. Yet, he might consider engaging in these new markets in the future.

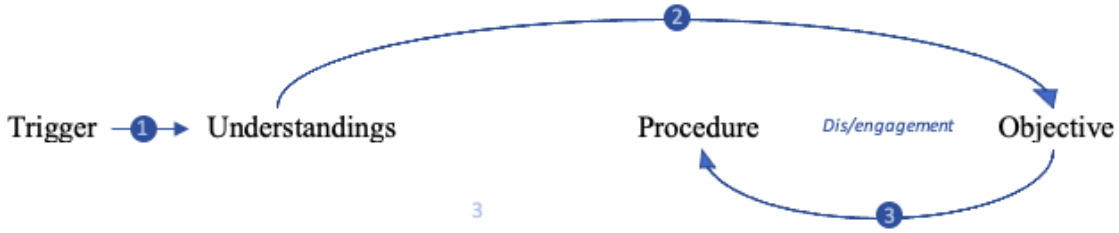

Figure 1.4: Wilson' dis/engagement model

Note. In step 1, after a chance encounter in Brazil, Wilson was triggered to develop new understandings about practicing conservation agriculture on his farm. In step 2, he entangled in a new objective to prioritize natural ecological processes over yields. In step 3, Wilson started a new procedure to cultivate YQ population wheat in accordance with ecological resilience.

Kevin was encouraged to adopt new objectives after a shift in his perspective, as well (Figure 1.5). First, several triggers shifted his understanding. Kevin was nearing retirement age when he received a life altering diagnosis for an illness he associated with being over worked. So when he was approached with an offer to buy out the rest of his mortgage on his extended farm, he took it, and transitioned to his original 200 acre farm. His age, health, and experience encouraged a shift in his understanding and preference for intensive conventional farming. He wanted to disengage from its stressful practices. This inspired a new objective to farm on a smaller scale and with less inputs. He would do this by engaging in natural ecological processes. He began new procedures to follow the UK government's Environmental Stewardship scheme which offered payments for ecological farming practices. Meanwhile his children returned to the farm and engaged with new farm businesses in the local economy. Kevin's son started producing kiln dried logs for firewood sold on the farm, and his daughter began farming and baking bread with the farm's wheat crop. She has engaged with regional farmers and millers across the wheat value chain to improve her bread and local sales.

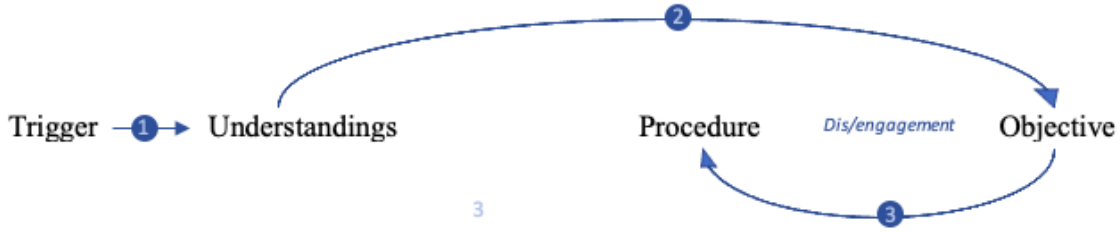

Figure 1.5: Kevin's dis/engagement model

Note. In step 1, age, health, and financial circumstances triggered inspired Kevin to reevaluate his adherence to conventional agriculture practices. In step 2, he embraced less stressful, smaller scale farming. In step 3, he reduced input use and adopted new environmental procedures in line with the UK's Environmental Stewardship scheme. His children also returned to the farm and engaged it in the local food and timber markets.

4.2.3 Dis/entangling

Other farmers experienced dis/entangling rather than dis/engagement in their change process. These farmers felt triggered to shift their understandings about a conventional practice. They then entangled in new procedures that reflected their change in perspective. Unlike the other farmers, they would not go on to embrace new objectives. These farmers did not experience shifts in perspective following their experience with new practices. These farmers felt barriers to engaging in new objectives that might oppose established ones for increasing yields and profits.

Like the other farmers, Jack and his family were also triggered to disentangle from their conventional routine. After his grandfather returned from visiting no-tilling, 'regenerative' farms in Argentina the family decided to experiment with the technique (Figure 1.6). The practice involves direct seeding a crop onto the stubble of the previous crop, rather than cultivating the soil from scratch. Generally, this practice should be cheaper than cultivation because it requires less equipment and less workload. Jack's farm was struggling financially at the time as commodity prices were low, and their "profits [were] going in the wrong direction." These triggers encouraged the farmers to reevaluate their understandings about cultivation and ultimately implement a new procedure. No longer tilling the soil disentangled the farmers from their agricultural and business routine and turned their finances around. Yet, unlike the organic farmers, they did not fully disentangle from chemical input use, a potentially key catalyst for deep transformation. While Jack and his family radically reduced certain artificial inputs, they continue to use herbicide to terminate their crops before direct seeding the next crop. The procedure they changed was replacing their ploughing attachment with a direct drill attachment for their tractor. This was a far less significant change in procedure and understandings than the organic farmers underwent.

For Sam, it was the practice of getting off his tractor that would result in a deeper shift in his understandings. The humbling experience of losing a sense of control over his crop growth encouraged him to learn about, and value the ecology of his fields. Geoffrey went through a similar experience of "[learning] farming again" when he forewent with chemicals. He had to "understand…all the benefits of clovers," like natural fertilization.

Jack, on the other hand, did not want to convert to organic because he did not want to lose "conventional type yields." In his understanding, yields were important for profitability, which was something he did not want to risk. Just like Sam and Geoffrey, he turned to new procedures to improve his finances, but unlike these two, his understandings did not undergo a resulting change. His motivation continues to be to use "Mother Nature to provide all of the nutrients the crop needs… and obviously, the nature generally works for free. So I want to use that resource instead." In continuation with this understanding, when regard for the environmental benefits of no tillage emerged, he initiated new marketing procedures to attain added value for his crop. He began to disentangle from conventional marketing practice and entangle in new branding practices to differentiate his produce from basic commodities. At a scale of 2000 acres, he feels he can only market to large manufacturers. These are "more difficult to crack" and negotiate alternative prices for alternatives markets, than middle tier processors. Jack did not entangle in regional markets, like Geoffrey. With Jack's understandings and motivations remaining similar, he did not engage in new ecological or social objectives for his farm.

Figure 1.6: Jack's dis/entanglement model

Note. In step 1, Jack is triggered to change his understandings about input use after his grandfather returns from visiting regenerative farms in Argentina. In step 2, He disentangled from high input use procedures primarily for financial reasons. He also disentangled from basic commodity markets. However, unlike some of the other farmers, his understandings did not fundamentally shift in recognition of the ecological or social impacts of these practices. He did not develop new objectives for the farm, but continues the same cost reduction, high yielding approach.

Hank also disentangled from conventional agriculture practices like Jack (Figure 1.7). Hank developed a new understanding about the financial and ecological benefits of reducing tillage. Yet perhaps unlike Jack, Hank developed more of an awareness of the value of resilience on his farm. He understood resilience as a way to "weather all scenarios" by reducing "reliance on huge amounts of energy and certainly fertilizing chemicals, without affecting the turnover of the business too much." While this understanding has inspired new procedures like "rotating through different crops and using composts," he has struggled to make resilience an outright objective due to perceived barriers. Not every farmer can "afford to be principled" as "a lot of farmers are tied to the treadmill... of having to produce and having to pay the bills." Unlike Geoffrey, Liz, Kevin, and Wilson, he maintained his understanding about the importance of producing large yields. Sacrificing yields presented an unacceptable financial risk and resulted in "an unfortunate side effect that principles can be sacrificed." Yields and viability were linked, preventing him from engaging in new objectives like resilience. At his scale, he did not think he could accommodate for lower yields by shifting to alternative, more premium markets. While Hank is dis/entangling from/in new agricultural procedures he felt unable to embrace new objectives and systems of practices.

Figure 1.7: Hank's dis/entanglement model

Note. In step 1, Hank developed new understandings about the ecological benefits of reducing tillage on his farm. In step 2, this resulted in disentangling from tillage routines and entangling in new procedures like limiting cultivation and adding biodiversity. In step 3, Hank described developing an understanding for the ecological resilience on his farm. Yet, unlike some other farmers, he did not feel capable to fully engage in new objectives for resilience due to the financial risks of lower yields.

Dave also dis/entangled from/in procedures without engaging in new objectives or systems (Figure 1.8). Dave was triggered to reevaluate the scale of his production when he encountered an offer from a supermarket for a "direct route to market." This reevaluation led him to triple the size of his potato farming operation, resulting in new procedures. Some of these

procedures were inspired by new understandings about the role the "birds and the bees" play in increasing production. Like Jack and Hank, he disentangled from conventional agricultural practice by recognizing ecology as "a route to profitable farming..." Dave added new crops in his rotation and reserved areas for wildlife to improve natural soil fertility and pollination. Just like these other two farmers, Dave did not want to reduce his yields. Therefore he did not want to completely eliminate chemical input use and go organic. He did not undergo a resulting change in understandings. Instead, he wanted to continue increasing his margins by using bigger tractors and "equipment which can do more acreage and can travel in more inclement conditions." The continuation of his understandings did not support his engagement with new objectives or systems of practice.

Figure 1.8: Dave's dis/entanglement model

Note. In step 1, Dave felt triggered to change the scale of his production with an opportunity for a "direct route to the market." He also began recognizing the benefits of biodiversity for production. In step 2, he entangled into new procedures for increasing wildlife and soil fertility on his farm. Yet he did not describe a further development of understandings or embrace of new objectives.

The only farmers not to experience a significant change in practices were the Franks. This father and son farming duo did not express any trigger to shift their understandings. Nor did they express any process of dis/entangling or dis/engaging. They were still experiencing struggles to remain viable, but they did not reevaluate their perspective on how to finance their business: "Our prices are governed by market forces generally, world market forces." Instead they continued their farming practices as is. They did not experience an entanglement in new marketing practices like Sam, Geoffrey, or Jack. They did not attempt to reach premium markets like organic, either. They also did not disentangle from input use to save on costs as their yields might not be "as high as they would be."

5. Discussion

This process of dis/entangling from procedures and understandings, and engaging in new objectives and procedures, reflects the experience of behavioral change for these farmers. The dis/entangling and dis/engaging model contributes to the field of practice theory by visualizing the way shifting practice components interact and result in practice transformation. It also addresses gaps in current models. The trigger events model frames change as a process initiated by a trigger, and followed by period of assessment, and then implementation. An issue raised by scholars who evaluated this model against case studies was that this sequence of actions were

hardly ever followed in its theoretical order. The dis/entanglement and dis/engagement model used in this study resolves this issue by representing farmers' multiple and recursive pathways to change. This model starts with a trigger as the first stage of change but instead of following it with assessment and implementation, it employs understandings, procedures, and objectives from the practice theory tradition. While assessment can map to the concept of understandings, this model replaces implementation with procedures and objectives. This replacement opens up the possibility for several pathways. Farmers were observed to follow a shift in understanding with either a change in a procedure or a change in objective. Indeed, five of the farmers who changed practices adjusted procedures following new understandings, while three adjusted their objectives following a shift in understandings.

This model also reflects farmers' processes of recursive change, in which a shift in a component influenced a shift in another component. This helps reveal the process in which the motivations for adopting a practice change over time. Several farmers dis/entangled from/in one set of practices for financial reasons, but would later develop ecological or social motivations to continue practicing them. These motivations grew as a result of a shift in procedure inspiring a change in understanding. For many farmers, new environmental and social understandings encouraged engagement in new objectives for their farm businesses. These producers then adjusted their farming practices to no longer only meet financial goals, goal for resilience and participation in regional food systems. Not every farmer developed these objectives. Some expressed roadblocks preventing them from doing so. The dis/entanglement and dis/engagement model accounts for this and helps explain why some farmers undergo more radical changes in their practices and perspectives than others. It does so by exposing a mechanism for how "cognitive transformations" develop and function in the practice change process.

The insularization theory advanced the idea that change in perspective, particularly on soil life, can play a role in how deeply farmers are willing to change their practices (Vankeerberghen and Stassart, 2016). The authors of the theory do not explain how these "cognitive transformations" emerge, but recognize their presence in the process. This thesis works to show how changing understandings function in the process of behavioral change. Triggers, and shifts in procedures, appear to influence changes in understandings. This is apparent when Geoffrey and Sam start to value their farms' ecology after practicing new organic procedures.

Geoffrey and Sam first entangled in organic practices as a strategy to keep their farms profitable. The alignment of these agricultural practices with their business objectives supported their organic transformation in one key way. A shift away from basic commodity markets to premium markets allowed them to reduce their yields but still stay viable. Their disentanglement from basic commodity markets reinforced an entanglement in low input, low yielding agriculture practices even beyond organic. Geoffrey and Sam were encouraged to cede conventional control over their farm and engage in the ecological processes of farming. This developed their awareness about their environmental impact and encouraged them to engage in new objectives for environmental resilience. Simultaneously, moving away from basic commodity markets encouraged these farmers to entangle in alternative, regional markets. Geoffrey and Sam then engaged in a new goal to limit their commercial prospects to their nearby communities in order to support regional food systems. These intertwining agricultural and commercial practices encouraged these farmers to disentangle from convention and embrace social and ecological

objectives. The key dynamic involved was a shift in understandings, a "cognitive transformation," that resulted from triggers and new procedures.

Elena and Kevin also engaged in new social and ecological objectives via a change in understandings. However, their engagement in these objectives was less advanced than that of Geoffrey and Sam. Sales to alternative, local and regional markets represented a smaller share of Elena's and Kevin's total sales. Their commitments to farming with ecological processes also waivered in some cases. Kevin described experimenting with abstaining from using artificial fertilizer use for one season, when prices for the input were high. Yields suffered more than he was willing to accept, lending him to reject ever trying that again. Ultimately, the input was necessary, if not in excessive amounts. While both these farmers may have had less opportunity to engage in these objectives than Sam and Geoffrey did, the fact that they did not dis/entangle first may have contributed to a slower start for them. For Geoffrey and Sam, dis/entangling developed an understanding that engaging in ecological processes and regional markets was not only important, but necessary. Converting to organic farming urged them to rely on healthy soils and resilient crops for success. This was also the case for Geoffrey's engagement in the regional food system. His turn to organic beef production entangled him in a regional value chain which developed his understanding that to succeed depended on the success of his regional collaborators. Elena and Kevin may have felt less of an urgency to adopt these practices because they did not entangle in these dependencies and understandings the same way.

Wilson did not experience such entanglements either. He was also the only farmer to adopt new ecological objectives without new social objectives. Elena and Kevin wanted to embrace their local communities and economies, but Wilson did not have the same ambition. He found that he could remain profitable with lower yields simply by reducing costs of input use. He felt no incentive to entangle in premium markets. He therefore did not entangle in regional food systems, either.

While Jack and Hank adopted similar, low input agriculture procedures, they did not embrace new objectives. This may have been because the two maintained their prior understandings. Ultimately, these farmers could not imagine remaining profitable with lower yields. They were unwilling or unable to disentangle from basic commodity markets and entangle in premium alternatives. So while they adopted several ecological practices, they did not adjust their conventional objectives. Neither did Dave fully entangle in lower input/output systems. These farmers' scale may have been limiting factors. The farmers who embraced new objectives operated farms with sizes ranging from 300-700 acres. Those who did not embrace new objectives had farms ten times that size, between 2000-7500 acres. Jack, Hank, Dave and the Franks felt they could only sell to large processors or buyers. Jack and Hank explained that middle tier processors and customers could not accept their quantities of produce. Jack suggested that these smaller processors can more easily accommodate alternative, premium, and regional markets than those they do business with. These are the kinds of processors that those who embraced new objectives worked with.

Four particular practices appeared to influence these farmers development of new objectives (Table 1). Moving away from commodity markets disentangled farmers from conventional commercial practices, while reducing chemical input use disentangled them from routine agricultural practices. Then embracing regional food systems engaged farmers in new commercial practices, while collaborating with natural ecosystem processes engaged them in new farming practices. Farmers explained how these particular practices encouraged (or if they

could not be adopted subsequently prevented) them from engaging in new objectives and a deeper level of practice transformation.

For Geoffrey, Sam, Liz, and Kevin, disentangling or disengaging their products from basic commodities encouraged them to engage in alternative, regional markets. These farmers developed objectives to embrace regional value chains and food systems. While Jack did attempt to disentangle his products from basic commodity markets, he did not develop new commercial objectives for his farm. Unlike the others, he did not engage in regional markets and food systems, perhaps a contributing factor. Hank, Dave, and Wilson did not disentangle or disengage from basic commodity markets and subsequently did not develop new commercial objectives.

For Geoffrey, Sam, Liz, Kevin, and Wilson, disentangling or disengaging from high input and high output practices resulted in new objectives to enhance natural ecosystem processes. The other farmers may have reduced input use but not high yielding practices. Hank, Jack, Dave, and the Franks expressed that they could not engage in new agricultural objectives for their farm if they competed with their conventional yield objectives.

Several farmers described how these practices reinforced each other. For Geoffrey and Sam, disentangling from basic commodity markets by entangling in organic markets meant disentangling from high input/output agricultural practices. Kevin experienced the same with his entanglement in the Environmental Stewardship Scheme. For Geoffrey, the organic market for his beef was regional, entangling him in its smaller scale value chains. These reinforcing dynamics are at play in the transformative effect that procedural changes have on changing understandings.

Table 1: Four significant dis/entangling and engaging practices

	Commercial practices	*Agricultural practices*
Disentangling/ Disengaging	Withdrawing Products from Basic Commodity Markets	Withdrawing from high input and high output practices
Entangling/ Engaging	Embracing Regional Food Systems	Embracing Natural Ecosystem Processes

Note. This table highlights two commercial practices and two agricultural practices that played significant roles in farmers disentangling or disengaging from routine and embracing new habits.

While disentanglement or disengagement from commodity markets and agricultural practices is unconventional, it does not represent a radical rupture in the historical development of farming in Lincolnshire. It does, however, open up new possibilities. Entangling in alternative, premium markets is a contemporary strategy for a traditional objective: to stay viable and make a profit. The practice does not reject, but fulfills an imperative as old as commercial farming itself. Where a divergence may begin to appear is in regard to the tradition of 'high farming.' High farming described a 19th century agricultural trend for practices relying on input use, specialization, and capital investments. These procedures were perhaps a response to new financial understandings developed during the difficult years of the Great Depression of British Agriculture and the free market competition after the repeal of the Corn Laws. The farmers who could succeed during this time were entrepreneurial, devising new ways to make profits. Similarly today, the farmers that changed their practices also followed entrepreneurial drives to

develop profits. Yet a key difference is that this study's entrepreneurial farmers developed an understanding that the "scale and specialization model" will contribute to continuous financial hardship. After all, there is always "someone somewhere else in the world who can do it cheaper." So these farmers diverted their attention away from improving agricultural production and towards improving their marketing and commercial approaches. Unlike high farming, this new approach to profitmaking introduced farmers to lower yielding, lower inputting, with less capital investment, agriculture. These practices either shifted, or were results of shifts, in farmers' understandings about the financial, ecological, and social impact of conventional farming. Ultimately, these new perspectives encouraged several farmers to develop social and environmental objectives for their farm businesses. Recognizing how this process works can help us better understand how longstanding conventions can transform.

Practice theorists have long attempted to explain change by registering varying degrees of significance to the impact of social structure and individual agency on behavior. This is the case for Bourdieu's habitus, Giddens' structuration, and Ortner's subjectivity. This research contributes to the question of how changes in practice emerge by describing how established objectives can transform into new objectives. This happens through cycles of disentanglement and disengagement from social convention, alongside entanglement and engagement in new personal and interpersonal understandings. These processes reveal how practices and motivations emerge, shift, and influence each other. By examining transitions as opposed to categorizations, the framework responds to gaps in the research. These include questions as to how conventional farmers might become innovators or early adopters, how farmers develop and shift their social networks and perspectives, and how farmers become 'more than organic'. Building on the theory of practice components, this framework can model the recursive process in which practices transform through reproduction. This responds to the study's research questions about how conventional farmers change practices in Lincolnshire, and how these farmers develop social and ecological objectives.

6. Conclusion

This thesis studied how farming practices change in Lincolnshire, a county famous for its farmers' adherence to convention. The study used an abductive approach in its research design to develop a new framework and an enhanced model for understanding how farmers' develop new objectives. Data was gathered from nine semi-structured interviews with various Lincolnshire farmers. Practices and their motivations were coded for. The patterns in the adoption (or rejection) of practices were examined following the theoretical framework of practice theory, dis/entanglement, and dis/engagement. Observations of these patterns informed the development of a model that reflects how previous practices change and how new practices are adopted. This model revealed how farmers developed objectives through a change in understandings, triggered by circumstance or by following a new procedure. Such procedures include entangling in alternatives to basic commodity markets. This encouraged several farmers to engage their farms in regional food systems. Low input and low yielding agricultural practices appeared to encourage several farmers to engage in ecological objectives for their farm. The model contributes to practice theory and may be useful in examining behavioral change beyond farming, as well.

Insights from this research can inform discussions about how to encourage change in conventional agriculture practice. The study reveals that several producers ultimately developed strong commitments to social and ecological objectives after entangling in dependencies with their farm's ecology and regional food systems. Farmers first entangled in regional value chains and environmental practices when they saw them as strategies for achieving financial objectives, rather than increasing production. Therefore policymakers and advocates may encourage this process by developing organic and regional markets that reward farmers for considering commercial strategies to achieving viability, instead of relying on increasing production with damaging chemical inputs. The study revealed that these transitioing farmers then entangled in new perspectives when they 'got off the tractor,' learned the use of clovers again, and developed marketing strategies with regional value chains. This study's model shows that these perspectives were crucial to the development of social and ecological objectives. Therefore, attention can be paid to support the adoption of these particular procedures, and the markets that encourage them. Several farmers recognized that while procedures labeled as regenerative might encourage disentangling from high input use, they do not necessarily encourage a full engagement with natural ecological processes or with regional economies. Aspirations for 'conventional type yields' often prevented farmers from fully engaging in new objectives. Support for regional and direct-to-consumer markets that offer more value to farmers, may subvert these aspirations. Additional hurdles to entangling in new practices included the size of one's farm. Mid-sized farms were recognized as more flexible and capable of working with the mid-tier processors catering to emerging alternative and regional markets. Support for these particular farms, their value chains, and infrastructure might inform strategies for incentivizing farmers to disentangle from routine and engage in new objectives.

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