SURE Farm

SUSTAINABLE RESILIENT EU FARMING SYSTEMS

SOCIOECONOMIC RESILIENCE OF THE ARABLE FARMING SYSTEM IN THE EAST OF ENGLAND

Findings from the H2020 project SURE-Farm

Table of Contents

AUTHORS:
University of Gloucestershire:
Mauro Vigani, Julie Urquhart, Jasmine E. Black, Rob Berry, Amr Khafagy, Damian Maye, Paul Courtney

Aberystwyth University:
Pip Nicholas-Davis, Sue Fowler, Peter Midmore

How to cite:
Vigani, M., Urquhart, J., Black, J.E., Berry, R., Khafagy, A., Maye, D., Courtney, P., Nicholas-Davis, P., Fowler, S., Midmore, P. (2021). Socioeconomic resilience of the arable farming system in the East of England - Results from the H2020 project SURE-Farm. University of Gloucestershire, Cheltenham, UK.

Introduction

Modern agricultural systems develop in the face of changes at both a global and national level. While arable farming is a highly competitive and strategic sector of UK agriculture, it has to deal with and respond to a range of global challenges such as climate change and the imperative to reduce its carbon footprint, the price volatility of a globalised food system, extreme weather events, labour shortages and more recently the COVID-19 Pandemic.

At a national level, the Agricultural Transition Plan sets ambitious objectives to be achieved by 2028 (DEFRA, 2020). These include: increasing English agricultural productivity while reducing environmental impact, removing Direct Payments and existing agri-environment schemes, and maintaining the current high-level food standards. The government is planning to support a new vision for English agricultural systems, which involves introducing an Environmental Land Management approach to agri-environment schemes, and supporting farmers to improve the environment, animal health and welfare and to reduce carbon emissions. Payments will support sustainable farming practices, nature recovery and landscape-scale change, such as establishing new woodland to better deliver ecosystem services. The government also aims to create an enabling environment to support retiring farmers and to create opportunities for new entrants.

These upcoming changes will constitute a significant challenge for arable farms in the East of England as this farming system is historically highly productive, input-intensive, export-orientated and the recipient of substantial amounts of direct subsidies. This institutional transition will require a significant transformation of the arable farming system at a landscape level, shifting production practices and land use in order to receive support and/or developing new financial and business strategies to improve profitability and cutting costs to remain competitive in a liberalised market. Proposed changes are also likely to impact the demographic structure of farms in the East of England, triggering social and cultural transformation – not least to meet the ecological expectations of transition.

In the last four years, the project SURE-Farm "Towards SUstainable and REsilient EU FARMing systems" funded by the European Commission under the Horizon 2020 research programme, has studied the effects and responses of the arable farming system in the East of England to the full variety of global and national challenges. It has systematically investigated the factors and drivers that influence transformation of the farming system and mitigation of the negative effects of risks. In a UK context the purpose of the study has been to identify and evaluate the resilience of the arable farming system to sudden shocks and gradual changes, observing the capacity of the farming system to react and to generate robust, adaptable or transformable responses (Meuwissen et al., 2019). It has also identified the tools that enhance the viability of the arable farming system, both from an institutional and individual farm's perspective. The project has purposefully taken a multi-disciplinary approach, from quantitative surveys and data analysis to participatory approaches directly involving farmers, policymakers and stakeholders. The objectives and findings of SURE-Farm are central to understanding the various factors at play during this transition period and have direct relevance in strategically informing and supporting policymakers in their pursuit of a vision for a new English agricultural system - for the arable sector, and beyond.

The study area

The case study area is the East of England region (Figure 1), one of the nine official government office regions of England, and former NUTS 1-level statistical region of the European Union. The East of England is the second largest region in England (19,500 km²) and comprises the counties of Bedfordshire, Cambridgeshire, Essex, Hertfordshire, Norfolk, and Suffolk. The region has a total population of around 6,235,000 people (Eurostat, 2019) and includes a number of major towns and cities including Norwich, Cambridge, Peterborough, Ipswich, Colchester and Luton.

The landscape of the East of England is characterised by flat or gently rolling topography, with a low elevation range across the region and around 20% of the land below sea level. It is the driest region in the UK with annual rainfall of only 70% of the national average. Risks to the environment in the region - exacerbated by climate change and an increasing population - include water scarcity, flooding, and sea level rise (ClimateUK, 2012).

Crops	Area (Hectares)	% England Total
Wheat	443,000	27
Barley	185,000	23
Oilseed rape	115,000	21
Sugar beet	71,000	62
Potatoes	37,000	35
Field grown vegetables	24,000	25

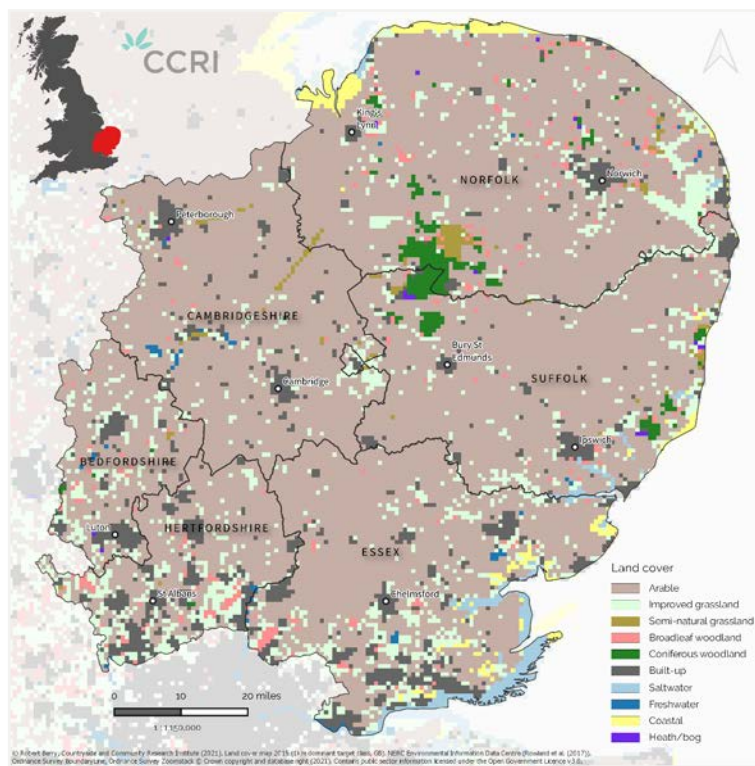Table 1. Area of crop production in the East of England, 2018 (Defra, 2018)

Figure 1. Land cover map of the East of England region

AGRICULTURE AND ARABLE FARMING

The East of England is known as the UK's 'breadbasket' and is responsible for up to one third of the country's cereal production, as the climate and soils are well suited to growing cereals and other combinable crops. The area boasts over 60% of the UK's best (grade 1 and 2) agricultural land, concentrated in areas of reclaimed land around the Fens and Broads and, resulting in high production of arable and horticultural crops (Table 1). Agriculture is therefore a major industry in the region, with more than 40,000 people working in the farming sector. In 2018, the value of output from farming was estimated at around £3.2 billion (Defra, 2018).

Over three-quarters of the total land area in the East of England is used for agriculture, half (50%) of which is used for growing cereal crops for both human and animal consumption and a further 34% is classed as general cropping (Defra, 2018). Wheat and barley are the main cereals cultivated in the region. Other non-cereal crops are grown as well, such as potatoes, mustard, and squash. Sugar beet is grown in rotation with cereals, with the area producing more than two thirds of England's sugar beet crop. Other crops such as carrots, potatoes, oilseed rape, fruit, salad crops and pulses are also grown. Pig and poultry farming are also important to the economy of the region.

As a combined effect of population concentration in cities (and thus a desertion of the countryside) and of the extensive flat agricultural landscape, farm holdings are mainly large-scale family or corporate arable farms - the average size of a farm in the East of England is 118 hectares, larger than the English average of 87 hectares (Defra, 2018). In the last ten years the size of farms has increased considerably as the number of farming businesses has decreased by more than 40%, while the farmland surface area has remained the same. The agricultural landscape in the region is therefore a highly specialised one, dominated by large-scale arable farms and with a low heterogeneity of farm types.

Farmers' perceptions of risk and resilience capacities

In order to understand what challenges, coping strategies and type of resilience are prevalent in the East of England, a large-scale telephone survey was conducted in November-December 2018 involving a sample of 200 arable farms. The sample was stratified to ensure representativeness in terms of the geographical distribution of farms and farm size. Interviews were conducted with the farm owner/manager.

Farmers were asked about their perceptions on the risks and challenges that the arable farming system will most likely face in the next 20 years, on a scale from 1 (not at all challenging) to 7 (very challenging), where a value of 4 indicated neutrality. Figure 2 shows that farmers perceive the main future challenges to be associated with policy change, the market and production/supply chain issues.
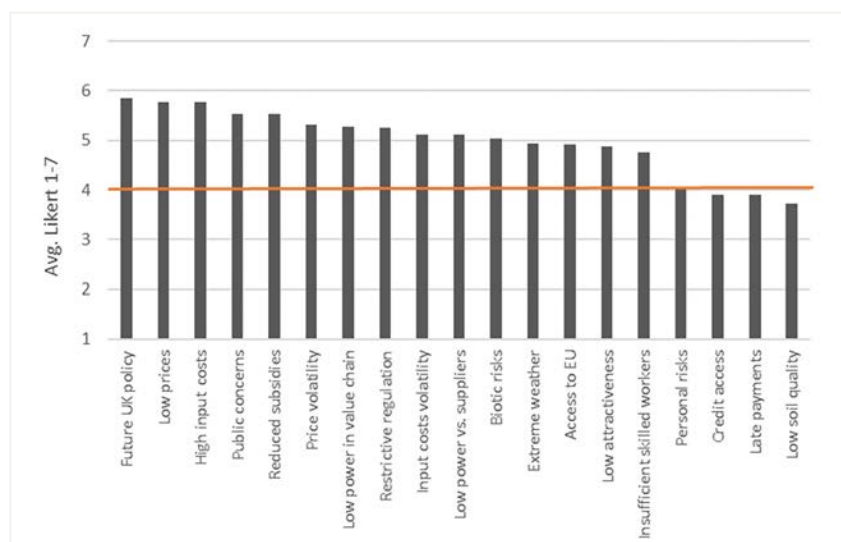

Figure 2. Challenges faced by the East of England arable farming system over the next 20 years perceived by farmers.

Source: survey. The orange line identifies a value of 4 on the Likert scale, indicating farmers' neutrality with respect the challenge. All challenges above the line are statistically different from 4 (t-test mean > 4) at 1% significance probability level (Pr(T > t) = 0.000).

POLICY CHANGE

Many of the higher-ranking challenges are related to regulations and to the UK's exit from the EU. UK agricultural policy is currently being developed, with a new Environmental Land Management Scheme (ELMS) at its core, based on the principle of 'public money for public goods'. At the time of survey (December 2017), farmers remain uncertain as to what this will mean in practice. Respondents are especially concerned about a reduction in direct payments (i.e. the Basic Farm Payment, BPS), access to EU markets, competition from new markets (such as the USA) and a reduction in skilled farm workers (many of which come from other EU countries). Farmers also share concerns about agricultural regulations, considering some to be overly restrictive and inflexible. In particular, crop protection regulations are perceived as a risk in terms of enabling or constraining what products a farmer can use, and thus what crops are viable to grow. For example, the latest ban on neonicotinoids (now reversed for sugar beet in 2021) was seen by farmers as a barrier to growing oilseed rape and sugar beet, because of dramatically reducing yields.

PRICE CHALLENGES

Some of the market challenges are linked to input and output prices and their volatility. This is not surprising given the intensive nature of the East of England farming system that relies on

inputs, with products such as wheat globally traded. In addition, there are challenges in the supply chain, especially in terms of imbalanced market power and the limited bargaining capacity farmers have with buyers and suppliers - who are often multinational holdings with large global market shares.

PRODUCTION CHALLENGES

Weather was also cited as a major risk by the survey respondents. Although interview respondents felt that the climate is becoming slightly warmer, it is the extremes of cold (severe winters), heat (summer droughts) and severe storms and flooding that are difficult to manage. The East of England is particularly prone to spells of dry weather during the summer months.

HOW FARMS PREPARE FOR RISKS AND CHALLENGES

East of England farmers adopt a variety of strategies to cope with the aforementioned challenges and risks. The most frequently adopted strategy consists of implementing measures to prevent pests or diseases. Arable farmers have to deal mainly with black stem rust (*Puccinia graminis*), black-grass (*Alopecurus myosuroides*), the cabbage stem flea beetle (*Psylliodes chrysocephalus*), small mammals (rabbits) and birds (e.g. pigeons) which eat and damage crops.

Having updated market information is also a central strategy, especially with respect to wheat which is traded on the global market and subject to the volatility of global wheat prices. Therefore, farmers must manage these fluctuations and endeavour to sell their grain when prices are high and exchange rates favourable, keeping a check on global markets and events that may impact on grain prices for the coming season (e.g. droughts in key grain growing areas of the world). Forward

contracts are an important tool to manage global market risks. In the East of England 70% of the grain is sold up to 2 years in advance, which helps with budgeting and cash flow. To avoid achieving low prices, there is also the possibility to store the harvest and sell when prices are highest.

Innovation and technological developments represent important opportunities for reducing climate risks. Having machinery capacity available (even via contractors) can help overcome climate variability to a certain extent. For example, operations such as harvesting that used to take a week can be done in a day or two now, reducing the negative effects of bad weather.

INFORMATION AND TRUST TO COPE WITH RISKS AND CHALLENGES

Within the East of England arable farming system, the various operators do not act in isolation. On the contrary, the farming system is composed of networks enhancing the sharing of resources, knowledge and experience, and leading to mutual learning processes between actors. As a result, the farming system can effectively take advantage of collaborations and knowledge sharing for dealing with challenges and risks in a more efficient way than dealing with such issues individually. An important aspect driving learning is the degree to which farmers trust their sources. This is depicted in Figure 3, showing the average response of farmers to the question *"What sources of information can be trusted?"*. Scientists, the NFU, technology providers and neighbouring farmers tend to be more trusted than politicians, environmental NGOs, and both social and mainstream media.
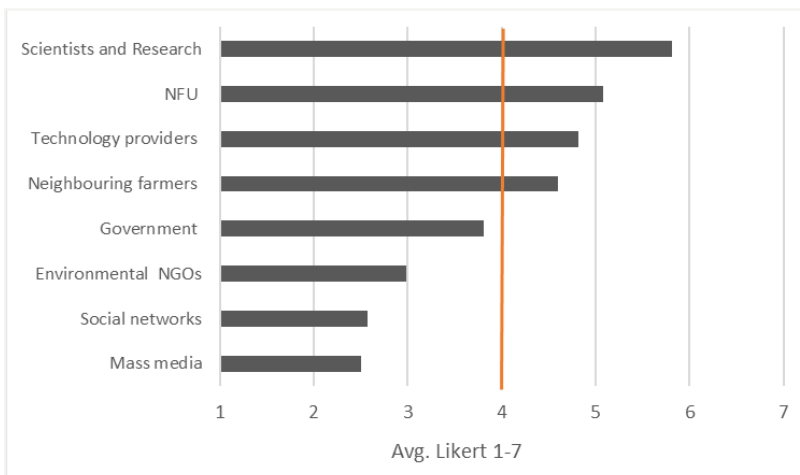
Figure 3. Farmers perception of trust in different sources of information.

Source: survey. The orange line identifies a value of 4 on the Likert scale, indicating farmers' neutrality with respect trust. All sources are statistically different from 4 (t-test mean > 4) at 1% (Pr(|T| > |t|) = 0.000) or 10% significance probability level (Pr(|T| > |t|) = 0.093) with the exception of "I am wary of new ideas and technologies in farming" which is not significant.

Farm demographics and structural change in East of England arable farming

The dynamics in farms and the population of farmers are shaped by the economic, financial, social, institutional and environmental landscape in which they are situated. These factors can trigger short- and long-term demographic changes, concerning the number, size and specialization of farms as well as the decisions of young people to take on and continue the farming business. What is at stake, ultimately, is the capacity of arable farming to deliver the goods demanded by consumers and society at large, such as sufficient quality healthy food and ecosystem services. In addition to the survey, a study of farm demographics and structural change was undertaken in May – August 2018. Findings are based on semi-structured interviews carried out with 23 farmers.

STRUCTURAL CHANGE

Over recent decades, an important change in the East of England has been the increase in farm size and the adoption of technologies to make farms more efficient and productive, as larger farms ensure the best utilization of costly farm machinery (through economies of scale). In response to market pressures, policy, regulation and environmental factors, arable farms may change the crops grown, the nature of farm specialisation (for instance, moving away from or investing in livestock, conversion to organic or adopting no-till or conservation farming techniques) or engaging in non-agricultural diversification (such as agri-tourism, biofuel or renewable energy production, and reusing farm buildings for other purposes such as horse stabling or office lets).

ECONOMIC AND FINANCIAL FACTORS

Decisions about what crops to grow and the nature of farm specialisation are also influenced by fluctuating exchange rates and market prices. High levels of debt can constrain how farmers farm, as the focus necessitates affordability of debt repayment. Farms with low (or no) debt are able to plan and farm for the longer term, rather than focusing on short term gains. Low debt also allows farms to more readily increase in size by buying additional land.

INSTITUTIONAL DRIVERS

The Brexit process started in 2016, generating a period of uncertainty which to an extent continues as the Agricultural Transition Plan 2021–2024 is implemented. During this period of uncertainty, farmers have either chosen to invest in large machinery upgrades while they still have the Basic

Farm Payment, or to hold off from investing until the outcomes of post Brexit agricultural policy are known more clearly. The loss of the Basic Farm Payment and a move towards public money for public goods is likely to result in more conservation farming, or a shift from food production to the provision of environmental services. Thus, there is the potential for structural change to occur over the next decade as farmers adjust to a new policy regime. While new policies are likely to benefit farmers already involved in conservation, for others it could mean either adapting their production processes to the new policy, diversifying into non-agricultural environmental services, or exiting farming. Access to markets is also a key issue, with new trade deals likely to influence the type of crops grown and/or the nature of farm specialisation. Uncertainties around regulation may also make farming unattractive to new entrants, or deter or delay management decisions. For instance, the earlier ban on neonicotinoids resulted in less oilseed rape production.

LABOUR AND TECHNOLOGY

On many farms, access to skilled labour is an increasing issue. The reasons for this are two-fold. Firstly, farm labouring is not perceived as an attractive job due to the low pay and long hours, with young people increasingly seeking better paid and easier employment elsewhere. Thus, there is an ageing workforce on family farms, with existing farm workers reaching retirement age. Technological improvements in farm machinery have also meant that the labour requirements are perhaps reduced, while the staff operating such complex machinery needs to be highly skilled and trained. Such workers inevitably demand higher salaries. Furthermore, much of the skilled and unskilled (often seasonal) workers are from outside the UK, but farmers report a decrease in the availability of such labour and there are concerns that this situation will worsen with Brexit. There is, therefore, the potential for a significant labour shortage in the future, both in terms of skilled and unskilled farm labour.

ENVIRONMENTAL DRIVERS

These include climate change, pests and diseases, and extreme weather events. Environmental drivers may lead to changes in farm specialisation or crops grown, which in turn has implications in terms of farm demographics (employment/labour requirements etc.). Farmers' environmental attitudes and preferences will also influence farm specialisation and the approach to farming. For example, environmentally-focussed farmers are more likely to adopt conservation farming or engage in environmental stewardship schemes.

FAMILY RELATIONSHIPS AND SUCCESSION PLANNING

Strong family relationships are crucial for a smooth hand over from the incumbent farmer to the successor, allowing the succeeding farmer to both learn from the incumbent farmer, and to gradually take over some of the decision-making and responsibility. It is increasingly common for

potential successors to work outside of the family farm before taking over the farm business. This is more frequent in smaller farms as they are unlikely to be able to support more than one main farmer, and so successors must work elsewhere before taking over the farm from their parent(s). While this provides them with a broad range of transferable skills, it means they have not had the day-to-day hands-on experience of the farm that they would had they worked on the farm straight from school. Thus, training of and handover of responsibility to the incoming farmer is likely to take a number of years. The cost of inheritance, with respect to inheritance tax and dividing the value of the farm assets and the farm business between a number of successors, can further influence both demographic and structural change.

HEALTH, WELLBEING AND LIFESTYLE CHOICES

Some farmers perceive little choice in their career options. This happens more frequently when there is a strong pressure from the family to work on the farm as soon as they leave school (or even before); or when a change in family circumstances, such as death or illness, results in sudden and unplanned succession. In these cases, new entrants may feel pressure to take on the farm in order for it to continue, while simultaneously they may feel unprepared and reluctant. To avoid these situations, some parents may encourage high achieving sons or daughters to pursue a career off the farm before deciding whether to enter farming or not, which

can perpetuate a view that farming is not for the highly academic. However, given the complexity of modern farm businesses and the need to deal with a wide range of risks and challenges - and increasingly entrepreneurial diversification activities - farmers need a wide-ranging and adaptable skill set in order to run a successful farm business. For some, returning to work on the family farm is a lifestyle choice. It offers the opportunity to live and work in a rural environment and may be seen as a desirable place to bring up their own family. However, farming can be a difficult and solitary job, and farmers are increasingly suffering from mental health problems such as depression and anxiety. Health issues can lead to a change in farm specialisation in order to make it easier to manage, or can result in early retirement of the farmer and/or a succession which is not adequately planned for.

FARM TENURE

Farm size can be increased by contract farming for other landowners, enabling investment in machinery to be more cost effective and increasing total farm income. Owned farms (or a combination of owned and rented) have a more secure tenure and allow farmers to plan for the longer term. In such cases, successors tend to be more attached to the family farm, which has often been in the family for three or more generations. For farms with short tenancies, the focus is naturally on the short term and there are no guarantees for continuity to the next generation and so successors may need to consider alternative employment, or farm elsewhere.

Exploring the resilience of family farm businesses through story telling

Resilience in farming and food systems varies through time and space, and arises from multiple interactions operating at various scales, thus making assessments of resilience in these systems inherently difficult. In SURE-Farm, a novel approach - learning from the experiences of farmers, has been taken to understanding the resilience of family farms.

The exploration of farmers' management of critical decision points was based on narratives collected in the East of England during the first half of 2018. The narrative approach (Jovchelovitch and Bauer, 2000) and a single question: "Tell us the story of your farming life" were used to give the participant as much freedom as possible to tell their story without interference from the researcher. Therefore, the stories farmers told encompassed the events and descriptions personal to them, allowing a unique glimpse into their mind-set that is often missed during the process of social science research. Rather than informants, participants in story telling are therefore referred to as narrators – as they are in essence narrators of their own story.

The narratives were analysed to identify points in the stories where the farm systems changed, or where uncertainty and risk produced responses. The ways in which these change points were described and how they fitted into the overall story helped to improve understanding of what types of stress and shocks produced robust, adaptive or transformative responses (Meuwissen et al., 2019) in the family farming businesses.

THE HEADLINE FINDING

From the set of nine narratives, a total of 32 critical change points in the farming histories were identified – 12 of these arising from sudden, unexpected shocks. The remaining 20 came from cyclical processes or trends (Maxwell, 1986) that farmers were more aware of and could choose how and when to respond to. Seven critical change points produced responses characterised as robust, while 24 produced responses of adaptation, and 4 of transformation. Multiple classifications were used in some instances where the response did not fall exclusively into a single category (Meuwissen et al., 2019). The most prevalent shock mentioned was the sudden death of a family member or key worker, followed by human health issues. Other critical decision points principally related to handovers from one farming generation to the next (a cyclical driver of change), followed by the need to cover two family livelihoods from one income and falling profitability – trends which have commonly driven change.

Generally, drivers internal to the family business seem to be much more likely to provoke change than external influences such as regulation, market fluctuations and opportunities, weather or disease problems. However, much change to farming systems appears to happen gradually. Incremental responses arise from what are mostly considered by narrators to be 'normal' variations. Individually, none amount to a response to a critical decision point, yet over time they result in a substantial change. This gradual process of change has two main implications:

- Resilience attributes are not clear-cut, and there is a spectrum of successively stronger responses to drivers of change from robustness to transformation.

- Frequent small-scale changes cumulate into a much broader and significant overall change. This is described by the authors as 'creeping change' and it appears to make a significant contribution to the resilience of farm systems.

The more significant responses to change discussed in the East of England arable farm stories can be divided into two main strategic attitudes. These either involve:

- Expansion of the area managed (although not necessarily owned or rented); or

- Efforts to streamline activity and release resources for other types of activity - agricultural or otherwise.

These strategies were expressed in different ways, depending on the degree to which there was an emotional relationship with specific pieces of land and/or family heritage. Some narrators (four out of the nine) characterised themselves more as

business people, combining farming with other commercial interests, which perhaps indicated a gradual reduction in attachment to and emotional involvement with agriculture.

POLICY IMPLICATIONS

Drawing out largely unprompted farming life histories and analysing their content is valuable because it can challenge preconceived ideas about agricultural businesses and what is important to them. One of the most obvious outcomes of this element of the study is that, from the narrators' viewpoints, internal shocks, such as farmer health, or cycles such as retirement and succession pose high risks that sometimes are more detrimental than external shocks. Overall, there was little interest in insurable risk. Another insight is that frequent incremental adjustments, barely noticeable in the short term, add up over time to significant adaptation. These may be equally, if not more, effective in generating resilience than more wide-reaching and abrupt adaptations or transformations, and are therefore worthy of further nuanced exploration to inform future policy support.

The shape of farm transfer is changing across the generations, as farmers live and work longer, successors start later, and family gender roles and focus on work-life balance are gradually revised. In turn these processes impact on management styles, the attractiveness of farming as an occupation, and internal pressures, such as the need to provide incomes for two family generations - all affecting the resilience of the farm and farming system in distinct but related ways.

Learning to be resilient in East of England arable farming

As our analysis shows, arable farmers in the East of England need the ability to weather a wide variety of different risks and shocks, such as the UK's exit from the EU, volatility in grain prices, extreme weather events, pests and diseases, and the availability of labour. Farmers, therefore, need to be able to adapt, or even transform, their farm business in response to these challenges. Learning is recognised as an important component of risk management and resilience, enabling farmers to respond to and manage the wide range of risks and challenges.

As the UK transitions into a new post-Brexit agricultural policy, farmers will need to adapt and adjust their businesses in response to shifting priorities and demands on agriculture, with an increasing focus on environmental conservation. This will require learning across a range of

dimensions, involving fundamental shifts in farmers attitudes, social norms and farmer identities.

The SURE-Farm project, therefore, investigated the learning strategies of arable farmers in the East of England to better understand their capacity to remain resilient during this period of significant agricultural restructuring (Urquhart et al. 2019). Eighteen farmers were interviewed in 2018 and were asked how they gather information to inform their decision-making and who from, as well as how they go about enacting change on their farm. Participants also undertook a mapping activity to identify and rank individuals or organisations that they perceive as important in influencing their decision-making, with those placed in the centre of the grid deemed to be the most important and those on the outside the least important.

WHAT LEARNING STRATEGIES DO FARMERS ADOPT FOR MANAGING RISK AND ADAPTING TO CHANGE?

Cognitive learning was the most fundamental form of learning identified in our study, with participants describing a range of strategies they adopt for seeking out new knowledge, or refining their existing knowledge. This included searching online information, the farming press, social media and attending training or other events. Experimentation was also an important learning strategy, with farmers trying out new things on their farm and seeing how they worked. This was often done a little at a time, in combination with learning about new approaches, seeking out information and talking to other farmers. Experimentation may occur both in terms of agricultural production and for diversification activities.

Key - Farmer influencer categories

1. Farming advisors
2. People on the farm
3. Other farmers
4. Consumers
5. Financial influencers
6. Research institutions
7. Government influencers
8. NGO's / environmental / conservation organisations
9. Direct customers
10. Suppliers
11. Buying groups
12. Cooperatives
13. Farmer associations
14. Processors
15. Local influencers
16. Media (general)
17. Social media
18. Internet
19. Farming press

Foreground (A), mid-ground (B) and background (C) levels of influence; most influence at the centre
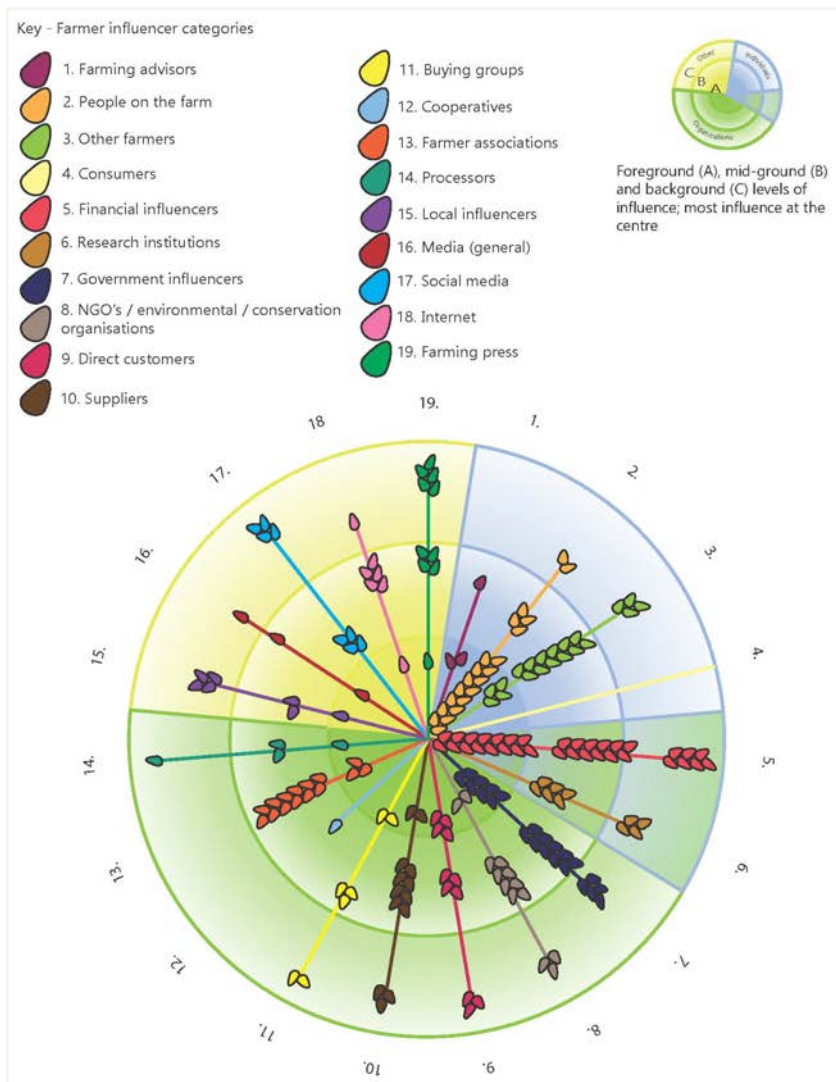
Figure 4 – Influence map. Each grain represents a farmer, showing how their individual ratings vary within each category. Some farmers may be represented more than once, due to sub-categories which have been grouped to simplify the data representation. The stronger influence radiates from the centre outwards.

In most cases, the farms in our sample were family farms with several family members having a role in management of the farm, so decision-making is shared. Agronomists were also very influential with many farmers engaging with them frequently and indicating that an agronomists' role has evolved from input on plant protection products to having a much broader knowledge of the agri-environment scheme landscape. An important aspect is the degree to which farmers trust their influencers. In essence, those in their inner circle such as family, friends, employees and trusted independent advisors tend to be more trusted than politicians, the media and external input suppliers - who are often perceived as promoting their own product.

FOSTERING LEARNING TO BETTER ENABLE AGRICULTURAL TRANSITION

The strategies identified by the farmers in this case study concur with Kolb's (1984) theory that learning is both about content (ideas, information, views) and process (experimentation, interactions, relationships), with learning involving the thinking and doing of farmers. This calls for a particular mind-set that allows farmers to learn: they need to be open to new ideas, be flexible and have a reflexive approach to their business in order to persist and adapt (or transform) when needed. They also need to be willing to learn from others, share their own experiences and

Much of the learning expressed by respondents was relational, involving learning from others, either through one-to-one engagement with other farmers or advisors, or collectively through social learning among farmer networks. This is particularly useful when farmers want to try out something new and engage in trials. The influence mapping activity is visualized in Figure 4, which suggests that the most pertinent individual influencers for farmers are family members.

practice behaviours that enable learning, such as experimenting and trying out new ideas, engaging in networks with other farmers and seeking out new information. Further, these learning activities occur at both the individual level and the group/social level. Thus, while farmers learn through their own experience and trying out different things, they also learn from observing and talking to others.

While learning can be constrained by the individual not having a mind-set open to learning, it is also impeded by external factors that limit the degree to which farmers can learn and adapt. As our research indicates, farmers already have a wide range of cognitive and relational learning skills that are crucial for adapting or transitioning to a new food and agricultural system. However, enabling a shift in farmers' social norms requires

changes in how farmers perceive themselves, which challenges existing notions about what constitutes a 'good farmer'. With its focus on public money for public goods, and the requirement for environmental enhancement as an underpinning principle of post Brexit agricultural policy, the 'good farmer' identity is likely to shift from a producer of affordable food, to an agro-ecological steward producing both nourishing food and conserving the environment. However, as respondents in our research indicated, achieving this requires not only normative shifts in farmers, but cultural shifts in consumer demand, public perceptions of farmers and an enabling policy environment. Many farmers in our study indicated that they would like to farm more sustainably, but were constrained by the existing policy context, and consumer demands for cheap food.

Navigating through the transition

SURE-Farm has demonstrated that the farming community in the East of England is well aware of the challenges ahead. The study has reaffirmed the resilience of the arable farming system to shocks and gradual changes, demonstrating robustness, the ability to adapt, and in some cases even transformation in the face of significant risks and challenges. However, the transition from being an EU member to being outside the Common Agricultural Policy (CAP) and the EU single market is a profound and fundamental change, both in terms of a loss of subsidy and changes to trade and market competition (DEFRA 2020), that requires a wide range of actions, planning and support. This can only be meaningfully achieved through an enabling institutional environment that coordinates gradual transformation at economic, environmental, social and cultural levels.

WHAT POLICY RECOMMENDATIONS WOULD SUPPORT RESILIENCE?

SURE-Farm findings suggest that farm support does not necessarily need to increase financially, but it does require a change in design. A move from the Basic Payment Scheme to environmental payments has the potential to gain the support of farmers if delivered well and overcomes the limitations of previous and existing agri-environmental schemes, such as inflexibility, high levels of bureaucracy and delays in payments. This could be achieved by co-designing new policies with farmers and supply chain stakeholders to ensure they are fit for purpose, and also drawing on institutional memory in Defra to incorporate learning from previous schemes in the development of new policies. For instance, our participants have indicated that lessons can be learnt from how agri-environmental schemes

were delivered in the 1990s, when the Countryside Stewardship Scheme (CSS) was flexible, personal and had good advisors with accessible, easy to read and understand information, and booklets with illustrations for farmers. Effective advisory services and learning networks will be crucial to support farmers through the 2021-24 transition period, delivered by independent and trusted advisors. Such support will be needed to encourage and enable farmers to engage in new entrepreneurial activities that reflect the central aim of post Brexit agricultural policy that is based on public money for public goods. This could include non-agricultural land-based activities such as woodland creation or rewilding, alongside sustainable agricultural practices which will require new knowledge and a shift in social norms about what it is to be a 'good farmer'. In this respect, peer-to-peer learning will be important to allow farmers to share best practice and learn from others.

Smarter regulations for plant protection products (PPP) are important, with the UK implementing longer timescales to phase out obsolete or unsafe products whilst creating new solutions to the pests and diseases that they control. This could be achieved, first, by looking at what alternative options exist and, second, by supporting funding to develop such alternatives. A move away from the current hazard-based assessment of PPPs, which often leads to bans on products, to the previous risk-based approaches whereby risks are managed through technology, would allow more flexibility and alternative solutions for farmers.

The actors involved in the arable farming system - starting with farmers and land owners - could benefit from a gradual learning process, based on experience, reflexivity, flexibility and an openness to new ideas. Future policies will need

to ensure that advice, support and opportunities are provided for farmers to experiment and try out new ideas and approaches. This may involve developing new social networks, trialling new innovations or technologies (e.g. agroforestry, smart agriculture, precision farming), and putting in place incentives and policies to support a transition that recognises the learning needs of farmers.

Generational renewal is also important. Over the longer them the continuation of arable farming is inevitably dependent on intergenerational transfer. However, to date policies to facilitate the transfer of farms to young farmers while pensioning off others late on in their careers has had a limited effect. The intergenerational transfer is a period of high risk for family businesses and the attractiveness of the farming sector is a key factor for young people in deciding whether or not to enter the sector. Factors such as taxation, welfare and the development of

infrastructure and living conditions in rural areas all need to be considered. A more holistic form of policy support targeted at intergenerational transfer needs to be considered to ensure the future resilience of arable farm businesses and the valuable contributions they make to rural communities.

In conclusion, the SURE-Farm experience has indicated that agricultural and rural policies need to be more holistic, encompassing economic, social, cultural and environmental goals in order to facilitate farmers and land managers to deliver a wider variety of goods, including public goods. The process of policy formation would benefit from an improved participation of farmers, in order to foster and cultivate farmers' ownership of these policies, which would enhance their effectiveness and, in turn, empower farmers to narrate positive stories of resilience across the fields of East of England, and beyond.

References

Baird, J., et al. (2014). "Learning effects of interactive decision-making processes for climate change adaptation." Global Environmental Change 27(Supplement C): 51-63.

ClimateUK (2012). A Summary of Climate Change Risks for the East of England. Climate UK. **http://www.greensuffolk. org/assets/Greenest-County/Adaptation/General/Summary-of-climate-change-risks-to-East-of-England.pdf**. Accessed 09/03/2021.

Defra (2018). Defra Statistics: Agricultural facts - commercial holdings at June 2018: East of England. **https://assets. publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/866814/regionalstatistics_ east_20feb20.pdf**. Accessed 09/03/2021.

Defra (2020). The Path to Sustainable Farming: An Agricultural Transition Plan 2021 to 2024. November 2020. **https:// assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/954283/agricultural-transition-plan.pdf**. Accessed 12/04/2021

Eurostat (2019). Population statistics for NUTS1 level regions of the European Union. Eurostat, accessed 09/03/2021, **https://ec.europa.eu/eurostat/cache/RCI/#?vis=nuts1.population&lang=en**.

http://www.greensuffolk.org/assets/Greenest-County/Adaptation/General/Summary-of-climate-change-risks-to-East-of-England.pdf

Jovchelovitch, S. and Bauer, M.W. (2000). Narrative interviewing, in Bauer M.W. and Gaskell G. (eds) Qualitative Researching with Text, Image and Sound: A Practical Handbook (Sage: London, UK), pp. 57–74.

Kolb, D. A. (1984). Experiental learning: experience as the source of learning and development. Upper Saddle River, New Jersey, USA, Prentice-Hall.

Maxwell, S. (1986). Farming systems research: Hitting a moving target. World Development, 14: 65–77.

Meuwissen, M.P.M., Feindt, P.H., Spiegel, A. et al. (2019). A framework to assess the resilience of farming systems. Agricultural Systems, 176: 102656.

Nicholas-Davies, P., Fowler, S., & Midmore, P. (2020). Telling Stories–Farmers Offer New Insights into Farming Resilience. EuroChoices, 19(2), p12-17.

Rowland, C., Morton, R., Carrasco, L., McShane, G., O'Neil, A., and Wood, C. (2017). Land cover map 2015 (1km dominant target class, GB). NERC Environmental Information Data Centre: **https://doi.org/10.5285/c4035f3d-d93e-4d63-a8f3-b00096f597f5**

Urquhart, J. et al. (2019) D2.3. Report on farmers' learning capacity and networks of influence in 11 European case studies, Horizon 2020 SURE-Farm project report, Countryside & Community Research Institute, University of Gloucestershire, UK.

Vigani, M. and Dwyer, J. (2019). Profitability and efficiency of high natural value marginal farming in England. Journal of Agricultural Economics. First published: 17 July 2019 **https://doi.org/10.1111/1477-9552.12351**

Vigani, M., Urquhart, U., Black, J.E., Berry, R., Dwyer, J. and Rose, D.C. (2020). Post-Brexit policies for a resilient arable farming sector in England. EuroChoices, Early View.

Vroege, W., Dalhaus, T. and Finger, R. (2019). Index insurances for grasslands – A review for Europe and North-America. Agricultural Systems. Volume168, 101-111.

Zagata, L. and Sutherland, L.A. (2015). Deconstructing the 'young farmer problem in Europe': Towards a research agenda. Journal of Rural Studies, 38: 39–51.

SURE
Farm
SUSTAINABLE
RESILIENT
EU FARMING
SYSTEMS