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Triggering Change: Towards a conceptualisation of major change processes in farm decision-making

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Abstract

In this paper, we present a broad conceptualisation of change in farm-level trajectories. We argue that as a result of path dependency, major changes in farming practice primarily occur in response to ‘trigger events’, after which farm managers intensify their consideration of the options open to them, and may set a new course of action. In undertaking new actions, the farm system enters a period of instability, while new practices become established. Over time these new practices, if successfully achieving anticipated aims, lead to a further period of path dependency. Recognising and capitalising upon this pattern of events is important for the development of policies oriented towards incentivising major change in farming practices, and may explain why similar projects and/or policies influence some ‘types’ of farmers differently, and at different times. To illustrate our arguments, examples of this process are described in relation empirical examples of major on-farm change processes, drawn from qualitative interviews with organic and conventional farmers in two English case study areas.

1.0 Introduction

Influencing change at farm level is a major aim of UK and European agricultural policy. Perhaps the clearest example of this is agri-environmental policy: considerable research in recent years has addressed farmers' agri-environmental behaviour, typically emphasising their response to agri-environmental schemes (e.g. Morris and Potter, 1995; Harrison et al., 1998; Burton et al., 2008; Hanley et al., 1999; Falconer, 2000). However, there has been considerable concern raised about how effective these policies have been at encouraging major changes in farm practices. Burton (2004) for example, found that environmental practices were being marginalised to small sections of the farm, rather than being integrated into farming activities across the whole farm; Mittenzwei et al. (2010) found that environmental designation had very little impact on changes made to farm management practices. In line with this are concerns about the extent to which multifunctionality – recognition of the multiple functions of farming such as environmental maintenance, and rural economic development in addition to commodity production – is being expressed at farm level (Burton and Wilson, 2006; Jongeneel et al., 2008; Morgan et al., 2010). In these cases, the tendency is to point out the persistent 'productivism' of farming households, which continue to emphasise the importance of the farm as a place of production. In contrast to this is the evidence of increasing diversification and pluriactivity on UK farms (e.g. Lobley and Potter, 2004; Maye et al., 2009; Lowe and Ward, 2007), suggesting that considerable changes are occurring in how farms are managed.

In this paper, we propose a conceptualisation of management change at farm level: we argue that minor changes happen incrementally, but that major change happens most often in response to 'trigger events'. By minor change, we mean alterations to farming activities which do not change or add a new focus to the farm system. Examples of minor changes include fencing a watercourse, adding a buffer strip to arable fields, and gradual intensification or extensification of production. A major change is characterised by a change in farming trajectory: the addition, removal or reorientation of a set of farming activities (e.g. discontinuing or initiating production of a specific commodity, converting from conventional to organic production, establishing a farm shop). We argue that major change tends to occur in response to trigger events due to the path dependency characteristic of both farming practicalities and farming culture.

Arguably the best-known approach to conceptualising change at farm level is Rogers (1983, 1995) diffusion of innovations approach. Rogers (1983) describes a set of stages by which new (typically technological) innovations are adopted by farmers: knowledge, persuasion, decision, implementation, and confirmation. In the first stage the farmer is exposed to the innovation, but is not motivated to learn more about it; in the second stage the individual becomes interested and actively seeks out information; in the third stage a decision is made to adopt the innovation; in the fourth the innovation is implemented (to varying degrees) and in the fifth stage, the decision is made to fully implement the innovation. While this set of stages may be appropriate to the adoption of a technological innovation, altering path dependency is a much larger project than adopting an agricultural innovation. Padel (2001) in assessing whether organic farm conversion could be considered an adoption of an innovation, argued that the adoption/diffusion model was developed during the Green Revolution of the 1960s and 1970s, when farms were uniformly expected to intensify, thus continuing on a single (arguably 'path dependent') trajectory. As Padel (2001) points out, contemporary farms clearly have a variety of possible options open to them through pluriactivity, diversification, direct and indirect marketing, environmental programmes and the decoupling of agricultural subsidies from commodity production, so their options are

much more complex than simple adoption of a new technique. In Rogers' model, adoption of an innovation often amounts to what we term an 'incremental' change, enabling progression along an existing trajectory, rather than a major change.

Developing farming typologies is a common method for evaluating differential response in farming populations, but again these approaches tend to explain progression along different pathways, rather than major change processes. A review of the literature demonstrates at least a dozen separate typologies of farm and operator types (e.g. Barnes et al., 2009; Bohnet, 2008; Bowler et al., 1996; Darnhofer et al., 2005; Davies and Hodge, 2007; Garforth and Rehman, 2006; Gorton et al., 2008; Marsden et al., 1992; Morris and Potter 1995; Salamon, 1985; Shucksmith and Herrmann, 2002; van der Ploeg, 1994), each implicitly or explicitly identifying pathways which these types are expected to follow. Farming typologies seek to capture the heterogeneity of approaches to farming through distinguishing 'ideal types' or styles on the basis of farming practice, farm characteristics and sometimes also attitudes and aspirations. Path dependency is implicit or explicit in most of these typologies: by distinguishing 'types' of farmers, the response of these subsets of farmers are predicted. For example, Shucksmith and Herrmann (2002) differentiate between 'agribusinessmen', 'contented monoactives', 'struggling monoactives', 'potential diversifiers', 'pluriactive successors' and 'hobby farmers', positing that each will respond differently to policy and market changes. 'Contented monoactives', for example, would intensify production in the face of declining returns, whereas agribusinessmen would invest more in non-farm activities, and hobby farmers would not change at all. Path dependency can also be related to van der Ploeg's (1994) styles of farming, in which he discusses the notion of 'room for manoeuvre' of different farmers in respect of ongoing processes of farm adaptation and development over time. He argues that it may be much easier for a low intensity beef farmer to sign up for a farm stewardship scheme than an intensive dairy farmer, owing to their current activities and capabilities. While this is a useful observation, there is a clear problem with this approach: typologies are static representations of general farm populations where, at any time, a proportion of farmers may fall into one category or another. Farmers studied are expected to follow trajectories based on this static picture. What has been lacking is analysis of how individual farms move between categories – for example, at what point does a 'struggling monoactive' become a 'hobby farmer'?

One starting point to respond to this question is Wilson's (2007, 2008) conceptual work on farm-level transition. He similarly identifies 'types' of farms (following development trajectories ranging between productivist and non-productivist), but recognises the importance of 'nodal points' (such as succession) in changing these trajectories. He further notes that:

farm transitional trajectories are often characterised by relatively linear transitional patterns for certain periods of time (i.e. little or no change in farm management decisions), interrupted by sudden, at times dramatic changes in transitional direction (Wilson, 2008, p. 374).

Thus, unlike much of the farming typology literature, Wilson argues that transition at farm household level is non-linear, heterogeneous, complex and inconsistent, and therefore somewhat unpredictable. He also argues for the importance of the different levels of resources and types of priorities held by farmers, and the differing levels of constraint these place on farm households in terms of their ability to set new trajectories. However, beyond the observation that specific events can be pivotal, Wilson does not address the process by

which change occurs, or how to influence change in specific directions, simply positing that this change can conceptually be conceived as reflecting increased productivist versus non-productivist thought and action. He specifically calls for qualitative empirical research to ground and test his concepts.

The purpose of this paper is to present and develop a conceptualisation of change at farm household level that develops and builds on existing ideas about farmer types, path dependency, trigger events and barriers or incentives for change. In particular, the paper illustrates the role of trigger events in change processes associated with farming trajectories. To do so, we present our conceptualisation with the empirical data from which it was derived, and discuss implications and directions for further research. First, we describe our research methods.

2.0 Methods

Our conceptualisation of the ‘triggering change’ cycle arose inductively over the course of several field research studies in the UK, all addressing farm household-level decision-making. As such, this paper builds on earlier ideas developed during an European Commission funded project on agricultural land use decision-making (Sutherland, 2010), a UK Government (DEFRA) project on pro-environmental behaviour (Dwyer et al., 2008; B Burton et al., 2007; Slee et al., 2006), and a Rural Economy and Land Use (RELU) funded project on ‘neighbourhood effects’ in organic farming (Sutherland, 2011). It is this latter data set (collected in 2007-2008) which is drawn on to illustrate the points made in this paper. This data set (48 qualitative interviews with farm managers) was found to be particularly useful, as it includes 17 farmers who had converted from conventional to organic production. Organic conversion represents a major change to the farming system. However, in this data set, major change was not limited to organic farm conversion: most of the farmers in the study had made a major change in farm activities at some point in their farming history. These changes included discontinuing production of specific commodities, diversification into provision of rural housing or business units, adopting care farming, and contracting out their land or farming activities.

2.1 Data collection

Qualitative interviews were undertaken with farm operators in a study site in the English Midlands, and another study site in southern England. The sites were chosen to reflect organic farming ‘hotspots’, where more than 10% of agricultural land within a 10 km² radius was certified as organic and a nearby ‘coldspot’ where there was only one organic farm within the same radius¹ (for further details see Gabriel et al., 2010). Organic farming respondents (21 in total) were identified by two of the major organic certification agencies (the Soil Association Certification Ltd and Organic Farmers & Growers Ltd); most who were currently farming (e.g. had not retired or relocated) agreed to an interview. The 27 conventional farming respondents interviewed were contacted through their listings in the Yellow Pages: every farmer listed in the study sites was contacted by post with an explanation of the study and a request for interview, and then subsequently contacted by telephone. Approximately 25% of those contacted agreed to an interview. Farms in both regions were largely mixed, with arable crops used primarily to feed livestock, either for meat (beef and sheep) or dairy production, although there were also nine cereal farms. Conventional farms ranged in size from 35 to 2000 acres, with the organic farms typically somewhat smaller, ranging from 5 to 1300 acres. Respondents ranged in age from 33 to 83

¹ Identification of organic hotspots and coldspots was a requirement of the interdisciplinary RELU project.

and were predominantly male: four of the interviews were given by women, and three interviews were given by a farming couple. Further detail on respondents and methods can be found in Sutherland (2011).

Interviews were held in respondents' homes or farm offices, and lasted from 45 to 120 minutes. The interviews were recorded, transcribed in full, and analysed using NVIVO qualitative data analysis software. The interviews followed a question guide addressing questions relating to farm history, participation in environmental schemes, and perceptions of organic farming. Particularly useful to this paper was the question on 'farm stories', in which participants were asked to describe the history of their farms. This typically resulted in a description organised into periods, marked by what we have termed 'triggers', such as succession or financial difficulties, after which the farming system was reoriented in a different direction. Respondents also described the processes through which they converted to organic farming or undertook diversification activities.

2.2 Analytical Approach

Qualitative research is typically analysed inductively, which can be defined simply as "an approach to the relationship between theory and research in which the former is generated out of the latter" (Bryman, 2001, p. 504). The advantage of this type of approach is that findings can emerge which are unexpected, or which do not directly address the original research questions, as is the case in the conceptualisation presented here. Inductive analysis can be undertaken in several ways. 'Grounded theory' is perhaps the best known approach, whereby analysis involves developing theory directly from empirical data (Creswell, 1998). In our approach, we derived the conceptual model from the empirical data, but then grounded it in existing theories relating to the terms used, to provide conceptual and empirical support beyond what was available through the study data. Path dependency, for example, has been well developed in the economics literature, whereas responses to 'trigger events' have been more emphasised in psychology literature. In combining these existing concepts with our empirical observations, we derived the overall conceptualisation of change presented here.

In providing a theoretical underpinning for our conceptualisation of change, we draw primarily on social psychology theory, largely for its consistency with our empirical observations. However, it is important to recognise that concepts of 'lock-in' and 'path dependency' have had extensive development in the discipline of economics. Economists use the terms 'lock-in' and 'path dependency' to describe situations where present circumstances are determined or strongly influenced by previous conditions (Arrow, 1963). The term has been used to indicate technological lock-in, where an earlier decision commits later users to a particular technical configuration (Arthur, 1994) due to the increased costs of seeking an alternative technological approach, resulting in the predominance of a particular way of doing things becoming the 'norm' even if it is not the 'best' (i.e. most efficient or effective) process (North, 1990). Thus a seemingly minor decision can constrain the trajectory of change after that time (Kay, 2003). The concepts of lock-in and path dependency have been recently applied to analyse choices regarding the regulation of rural and urban diffuse pollution (Kirk et al., 2004; Reeves et al., 2007), loss of animal genetic diversity (Tisdell, 2003) and continuing use of pesticides (Vanloqueren and Baret, 2008) illustrating their applicability beyond technology. However, the theory of path dependency has been criticised for its failure to explain change (Kay, 2003). We therefore demonstrate the path dependency characteristics of the farms in our study, but draw primarily on social psychological theory to explain change processes.

2.3 Limitations

There are limitations to developing a conceptualisation inductively. The original aim of the research was to evaluate the influence of high and low concentrations of organic farms on local farming culture (i.e. definitions of ‘good farming’), and how this influenced the social acceptability and up-take of organic farming. The dataset therefore over-represents organic farming, and was gathered in two pairs of linked neighbourhoods, in order to evaluate this ‘neighbourhood effect’. Owing to the consistency which we found in the pattern of responses to trigger events for both conventional and organic farmers in the two study sites, as well as with observations from previous research, and integration with existing theoretical concepts, we are confident in presenting this as a common model for mixed livestock farmers.

However, it has not been assessed for some of the extremes of land holding types in the UK, such as crofts or estates, or for intensive arable producers. Moreover, the frequency with which conversion to organic farming is the response to a trigger event identified in this paper is the result of the intentional selection of a disproportionate number of organic farmers, and should not be taken as an indication that this is the most common response. The dataset also does not represent an effort to identify the full range of possible triggers, or resultant path dependencies. Findings presented here are intended to be illustrative, not comprehensive.

3.0 Conceptualising the cycle of farm management decision-making

The basic premise of our conceptualisation is that owing to path dependency, farm managers maintain a steady course of minor incremental changes to the farm operation, until an event or opportunity occurs which leads to a decision to actively consider a major change. It is important to note that although the term ‘path dependency’ has a negative and passive connotation, suggesting that farm managers have little choice but to remain in undesirable pathways, that is not our intention in using this term. As Liebowitz and Margolis (1995) point out in their discussion of different types of path dependency, path dependency does not necessarily imply inefficiency. Remaining on a constant course is efficient in enabling the minimisation and channelling of resources and the accumulation of knowledge; any business will have ‘sunk costs’ which make it more efficient to continue along an established trajectory. Indeed, given the practical realities of agricultural commodity production, weathering the ups and downs of commodity markets and climatic variation by pursuing a specific pathway is a sensible approach to farm business management.

We propose that major changes to farming activities most commonly follow the stages presented in Figure 1.

Figure 1 about here

1. Path Dependency: All components of the new system are working together and the system has demonstrated its resilience. Investment in skills, knowledge and technology is integrated into cultural capital, tying the farm manager² to this particular approach and limiting the incentive for major change. Incremental change may occur along the existing trajectory. The farm system remains in this state for indefinite periods of time.
2. Trigger Event: The farm manager of the existing ‘path dependent’ system encounters or anticipates one or more triggers (e.g. changes in the lifecycle of the farm household or financial status of the farming business) leading to a ‘trigger event’: the realisation that system change is necessary to meet his/her objectives, and/or exploit new opportunities.
3. Active Assessment: Routine scanning for information intensifies, becoming actively focused on available options. This is an iterative process, including practical assessment of options and current farm and farm household resources, which may involve testing of options (e.g. experimentation) and networking/talking to other farmers or advisors. The farm manager explores the economic, managerial and social implications of changing the system.
4. Implementation: A choice is made and implementation of a ‘new system’ begins. This not only commits the farm manager to financial investments in structural change, but also to developing new skills, knowledge and establishing new social and business networks around the ‘new system’.
5. Consolidation: New knowledge, skills and networks (as committed to in implementation) are developed, and the success of the new system in addressing issues resulting from identified triggers, are evaluated. If the new approach is deemed unsuccessful, the farm manager returns to Stage 3. However, the investment undertaken during implementation may weaken the ability of the farm manager to implement further new changes.
6. (return to stage 1)

These stages are described in turn, in relation to the empirical data from which they were derived.

3.1 Path Dependency (Stage 1)

Any business can be expected to demonstrate a degree of path dependency, owing to the capital investment involved. Here we emphasise the particular aspects of path dependency which were characteristic of the farms in our study. These typically relate to features of agricultural commodity production. Farms are operated under a number of constraints. The skills and labour available on-farm were frequently identified by respondents as limitations. Farmers are also tied into markets and contracts, for example they are often have to meet contractual agreements with processors or retailers and will have invested in systems to comply with food assurance schemes. Uncertain ownership following the death of the farmer, for example, can constrain the up-take of any new opportunities. All of these issues reinforce the ‘path dependency’ of farming operations.

² In this paper we refer to the ‘farm manager’ for simplicity, recognising that decisions may be made by multiple individuals (e.g. farm partnerships, farm households).

The concept of 'lock-in' is a step further than path dependency, referring to a situation in which an initial investment not only makes it most efficient to continue to pursue a consistent trajectory, but leads to other, possibly more efficient investments, not being actively considered. The term 'technological lock-in' is commonly described in the economics literature, where an earlier decision commits later users to a particular technical configuration (Arthur 1994). In this present study, technological lock-in was evident in the investment in machinery characteristic of intensive agriculture. Several of the farmers in this study described neighbours who were unlikely to convert to organic farming because of this level of investment – selling their spraying equipment would represent a financial loss not only of the investment in the machinery itself, but also of the revenue generated from contract spraying for neighbours. Ward (1993) conceptualises the 'agricultural treadmill' as a 'logic' of intensification of production embedded in farming culture, resulting from the production-oriented policies and economic structures of the post-WW2 period. Increased production was achieved through increased technological use, leading to increased income for farm households for a period of time. However, increased production led to price declines, so farmers increasingly invested in additional technology to further increase economies of scale. Farmers following this treadmill cannot easily shift their practices towards another approach to production – having invested in machinery and infrastructure, they need to optimise the outcomes of this investment in order to stay. However, in following this path they continue to make incremental changes e.g. investing in new technology but continuing on a straight trajectory.

Technological and financial aspects of path dependence are already well established in the literature (e.g. Tisdell, 2003; Vanloqueren and Baret, 2008). What became evident in this study was that 'knowledge lock-in' is also important. Farming knowledge reflects both the practical experience and formal training. Many of the farmers in the study had formal training in agricultural production, through agricultural colleges. Choice of college, or specific college courses, can have the effect of lock-in in later farm decision making, by influencing the approaches to farming which farm managers are willing to consider. College courses in the 1980s were typically "production-led" (Craig, organic farmer), emphasising high yields, with some going so far as to denigrate organic production:

one of my college lecturers told me that she was involved with a study on imported organic food, and the level of toxins and moulds in organic mulch and grains was generally higher than conventional food so that kind of put me off. (Jonas, conventional farmer)

As one farmer pointed out, this kind of training was taken not only by commercial farmers, but by individuals who would become professional farm managers or advisors. Part of this knowledge lock-in can be related to a dependence on certain sources of information. Padel (2001) and Ingram (2010) have observed reluctance of both farmers and the extension community to engage in new systems of agriculture such as organic farming and minimum tillage, which need new forms of knowledge. As Slee et al. (2006) note, individual farmers will tend to have established patterns of use of information sources and differential engagement with its component parts. The act of using the knowledge systems in a particular way (visiting the mart, meeting an adviser, going to an agricultural training event) and can reinforce existing types of knowledge, supporting an existing trajectory. In this sense being embedded in certain social learning networks can create boundaries and restrict farmers' opportunities for pathway change. Routine of using particular knowledge sources, limited

access to knowledge and the cost of retrieving it can all lead to lock-into certain socio-technical paradigms (Dosi 1982).

Knowledge lock-in in farming is also learned through practical experience. Farmers develop an understanding of what works and does not work on their farm, leading to a ‘know-how’ (Ingram, 2008) associated specifically with their land and its management. They also develop enduring knowledge cultures aligned with this knowledge (Tsouvalis, 2000). Farmers in this study indicated that they have experienced fluctuating commodity prices, and have therefore learned not to respond quickly to new market signals.

we have always farmed in cycles, we have been through the low price, then we had high price, then back to low, and now we are back into high prices. And the general principle was look at your land, decide what more to do, and decide that is probably the right choice whatever the conditions. And you have to take the ups and the downs. (Albert, conventional farmer)

Commodities produced on farm respond to economies of scale to a degree, but particularly for livestock (e.g. sheep, cattle), take considerable investment and time to alter in terms of production. It can take years to increase the size of a quality dairy herd, as this usually relies on retaining additional livestock raised on the farm. Purchasing additional livestock is possible, but demand can be expected to increase with the associated commodity prices. Farmers thus find it difficult to respond quickly to changes in market fluctuations. Indeed, due to the fluctuating nature of farm markets, farmers have learned that it is poor practice to ‘chop and change’ (Andrew, organic farmer). Farmers are thus disposed to endure commodity price fluctuations, with the expectation that prices will return to “normal” level, locking their operations into current trajectories until it becomes obvious that a major change is needed.

3.2 Trigger Event (Stage 2), Active Assessment of Options (Stage 3) and Implementation (Stage 4)

Owing to the path dependency and lock-in of contemporary farms, we argue that a trigger event is usually required in order to instigate a change process. We define a trigger event as: the accumulation of experiences which results in the recognition by the farm manager that a major change in farming activities needs to occur. These experiences we define as ‘triggers’. This is consistent with social psychology literature, where it is well established that ‘trigger events’ in the life course lead to major changes in activities (e.g. De Jong and Graefe, 2008). In distinguishing between triggers and trigger events, we recognise that it may take a period of time or series of events (triggers) for this recognition to occur. We also recognise that triggers leading to a trigger event can be either positive or negative: respondents reported ‘opportunities’ which led to change in farming trajectory, such as access to land, new government grant programmes, and offers to use redundant farm buildings; as well as triggers which could be considered ‘imperatives’, such as new regulations, market fluctuations and financial duress. The recognition that a change is needed is therefore not necessarily a response to an individual, short term or unanticipated event, although this may be the case (e.g. unexpected death of the farmer).

In this section, we discuss the characteristics of trigger events in relation to the two most common triggers identified by farmers in the study: financial imperatives and intergenerational succession. These represent two emergent categories of triggers: those relating to the lifecourse of the farm household (e.g. succession, retirement, fluctuations in

labour availability); and those relating to the farm business (e.g. land availability, commodity prices, regulations, subsidy schemes). As Bell et al. (2004) point out, shock events, like a disease outbreak, can also lead to active reconsideration of the farm trajectory. This was the case for a few of the farmers in this study (e.g. BSE outbreak in 1996), suggesting a third type of trigger, related to ethical beliefs about the purpose and practice of farming, but as this was the minority experience, we focus here on the two most common triggers identified in the study.

Financial triggers

In this study, financial issues were described as by respondents as leading to trigger events: specific points in time at which they realised they needed to make a change.

in the early 90s we weren't making any money. And when you work all year for a sum of minus £350 or something it begins to crystallise the mind a bit. And actually I remember listening to John Humphreys on the Today [BBC] programme banging on about the merits of organic farming and getting really cross about it. And [my wife] said why are you fighting this, if that's what people want why can't we do it? So we started looking into it. (Harold, organic farmer)

What Harold describes is a specific point in time at which he realised a change needed to occur (Stage 2), following a lengthy experience of financial losses on the farm. The radio program itself could not be considered the sole ‘trigger’ – it was the culmination of events that led to the realisation that a change needed to be made. The immediate outcome of this recognition that change was necessary was the consideration of possible options (Stage 3).

Similarly, “John” describes the process which he underwent. Like Harold, he experienced financial duress before considering making a change:

and so we have had ten hard years and its ... gradually within three years we decided well it's a bit pointless putting extra capital into the business, two-thirds of it we rented, two-thirds of the land we rented and only a third we owned. So we started prioritising on the third that we owned, in trying to make the most of it, and switching resources into that and looking at an alternative form of income. And being close to an industrial centre like [local city] and being so close to the motorway junction, we are only half a mile from the [local] junction put us in a wonderful position, halfway between [city] and London, and right by the centre of [local city]. So we started to convert...we initially got planning permission for one conversion of the building for office use (John, conventional farmer)

Although for John, the trigger event was not located at a specific date and time, there was a clear period of time during which the farm managers decided to change their priorities, focusing on the land they owned (Stage 2). Similar to Harold, this was followed by an active assessment of opportunities (Stage 3). It was not new information to John that he lived close to an industrial centre, or that he had unused farm buildings, but it was not until he recognised that his farming system needed to change that he actively considered these assets, and changed his farming trajectory. John’s description also includes his implementation process (Stage 4), whereby he started with one building conversion.

In terms expressed in social psychology theory, assessment of new information following a trigger event represents a shift in the form of knowledge acquisition which the farm manager

undertakes. In the elaboration likelihood model (Petty and Cacioppo, 1986), assessment processes are conceptualised as lying on a continuum from ‘central route processing’ to ‘peripheral route processing’. If information receivers are able and motivated, they will systematically analyse persuasive messages through ‘central route processing’. On this basis, reason prevails, leading to a response that reflects active assessment of past, present and potential future situations. Because this response is actively reasoned, it is durable and likely to lead to behaviour which continues for an extended period of time. We argue that this occurs in Stage 3. Peripheral route processing occurs when the decision-maker is not motivated to actively assess a message or situation, and therefore is more superficial in terms of assessment, leading to incremental, less permanent changes. Examples of peripheral route processing include following common peer practice: basing the assessment on the responses or recommendations of others, rather than actively assessing the full range of issues. This process is not without thought, just with consideration of fewer issues and in less depth than for central route processing. We argue that peripheral route processing is the approach taken during periods when the farm system is path dependent (Stage 1), leading to incremental changes in farming practice. As such, central and peripheral route processing reflect different balances of structure and agency (Giddens, 1990): in situations where an individual is motivated to actively consider a wide range of options and information, agency dominates. But where an individual has less motivation, less processing occurs, and structural factors dominate. These processes are illustrated further in relation to succession triggers.

Succession Triggers

Similar to financial duress, succession is a trigger, which can – but does not always - lead to a trigger event. Joseph (organic farmer) describes the ‘classic case’ of a neighbour, who “when his father retired, he was the classic case he took over and converted, he got rid of the dairy cows and converted to an organic farm”. However, there were cases in which little change occurred in farming practices: the successor may continue the existing farming trajectory, particularly if there has been a conscious apprenticeship of the successor in the farming styles of the person relinquishing control, and where the existing farming style is compatible with the new owner’s business and wider social aspirations. Gasson and Errington (1994) describe the passage from family worker to principal in a farming business comprises, likening it to a slow advance up a ladder (Hastings, 1984) which comprises an incremental transfer of practices, decision-making, financial control and ownership to the succeeding generation.. Dumas et al. (1995) classify family succession into four stages: “incubation”, “the choice of successor”, “joint management”, and “the predecessor’s departure”. In the ‘incubation stage’ farmers’ children are socialised into the values, norms and behaviours of the farm, family and business, and as such might be expected to carry on with the existing trajectory. However others have pointed out that the joint management phase in intergenerational succession can be turbulent due to the differing goals and expectations of the parties involved (Keating and Munro, 1989; Potter and Loble, 1996). Succession can therefore lead to a trigger event on one farm but not on another.

Succession is not typically a sudden occurrence, although there were farmers who described the premature death of their fathers, to which an immediate response was required. Even so, they typically considered their options for a period of time prior to making a change.

my father and my brother both died suddenly in 1986, which left my husband and *myself doing the day to day running of the farm...for about two years we farmed it pretty much as my parents had done which was, well it's a small farm for a start, at the time it was just over 100 acres..., people were saying to us 100 acres of clay land*

won't be enough to make a living on and this two or three years we were really *proving them right!* So we decided it had to change in some way.... [My husband] belonged to the Soil Association, so I think we thought that being organic might be an answer for us as we were sort of halfway there already and the premium for organic produce being quite high at that time. So it was partly that it fitted our personalities and the farm's personality, and it was also an economic decision. (Betty, organic farmer)

Similar to John and Harold (above), Betty describes the process of major change to farm practices change (Stage 4) which occurred a few years after formal succession. She and her husband actively assessed their current farming practices, available markets and their own interests (Stage 3) prior to making a major change. This time for assessment will likely have also occurred in the case described by Joseph, above – as succession is usually anticipated several years in advance, the successor could be expected to have had time to investigate organic farming as well as other options prior to his father's retirement. In the case described by Joseph, anticipated succession, not succession itself, most likely led to the trigger event and active consideration of options for change.

Although farmers go through a process of active assessment of options and resources following a trigger event, the approach this it takes varies considerably. Frances's approach involved experimentation:

When [husband]'s dad packed up we decided to see whether we could grow grass without fertiliser and sort of cut back on things... And by doing that we realised that we could farm organically without changing you know much else. (Frances, organic farmer)

Farmer Edward suggested that his process was less directed:

Then we were really in an arable situation, we were wondering what to do with the grass, so we eventually stumbled into DIY livery. (Edward, organic farmer)

Still others sought professional advice, attended industry events, and discussed options with other farmers. What is clear here is that the length of time and type of analysis undertaken by farm managers varies, but the overall process is broadly consistent: trigger event (Stage 2), leading to active assessment of options (Stage 3), followed by a major change to farm operations (Stage 4).

3.3 Consolidation (Stage 5) and Return to Path Dependency (Stage 1)

The decision to implement a change in farming trajectory is followed by a period of 'consolidation', while the new farm system becomes established. During this period, the utility of the new approach is evaluated, new skills developed, the value of the new system becomes embedded into farming practices:

(Interviewer): Did you think about going back to conventional?

Frances (organic farmer): My husband did because of the weed, because of all the docks but I kept telling him no because we had had a grant...you know the grant for five years and that grant hadn't run out so if we had have gone back conventional we would have had to pay the money back to the DEFRA

In Frances' case, it was the conversion subsidy they received which kept them on the conversion trajectory, eventually consolidating into a permanent farming trajectory, demonstrating the importance of this type of support. Other converts were less successful. Gary describes the difficulty he had convincing his father to market their organic livestock through organic marketing chains:

I couldn't get it through to my dad, he just could not believe it. He could not believe that people were buying organic, he is a post-war person you know, hard work, endeavour, toil, fertiliser, spray, cut the ground, build it up, lah-de-dah, and so he couldn't quite get it. And it used to frustrate the hell out of me because we were *getting ready for sale and then rather than going through the right hoops to get it ...* down the organic line, he would say oh we will send them to Chippenham market and we will sell them conventionally. And we would literally lose £250 a beast.

In Gary's case, the issue of knowledge lock-in embedded in his father proved insurmountable, and he eventually left farming to pursue a different career³. Others found the learning curve added interest to their farming experience:

I find it fascinating because its like learning all over again because I was brought up on sprays and fertilisers and conventional [farming] (George, organic farmer)

During the consolidation phase (Stage 5), the lack of success with the initial taken can lead to further alterations or refinements to the farm system. Farmer Brian (conventional farmer) describes his venture into conversion of farm buildings into business enterprises:

we started with craft studios and we found them to be too...we had too many not able to pay the rent when the recession came along. However good the product, people just don't buy them. So we then moved from craft studios into offices.

The transition to office rental was successful, and Brian has continued to expand this element of the farm business, while retaining his livestock production largely for personal interest. As such, Brian demonstrates the return to Stage 3 (Active Assessment), followed by a successful implementation (Stage 4), consolidation (Stage 5), and return to path dependency (Stage 1). Learning is key in this stage. As well as on-farm learning by the individual, social learning allows sharing, reflection and validation which assists and enables consolidation (Morgan, 2011). It is also arguably a vital process for building farm resilience.

3.4 Summary and Caveats

A degree of path dependence is characteristic of any business, particularly one based on land, commodity production and steeped in history. In this paper, we have argued that farm managers tend to maintain steady trajectories, reflecting path dependency lodged in the business realities of commercial farming operations, as well as technological and 'knowledge lock-in' based in both formal training and work experience. We have demonstrated that major changes to farming trajectories occur following 'trigger events', points in time where

³ Gary was listed as a registered organic farmer by one of the certification organisations, and was recruited on that basis. It was only after the interview began that his 'former farmer' status became clear. All of the other respondents were active farmers at the time of the study.

the farm manager recognises that a major change to the farm's trajectory is required. This leads to active consideration of options over a period of time, and setting of a new farming trajectory. Investment in this direction, if successful, then leads to a further period of path dependency, where change is once again incremental.

It is important to note that the triggering change conceptualisation represents an idealised process. Triggers are often unpredictable, and thus may occur at any stage in the change process, or may indeed be removed. This can result in deviations from the process as outlined. For example, several of the conventional dairy farmers in this study described actively considering conversion to organic farming owing to long-term financial duress, but a return to higher milk prices enabled them to return to the status quo. The length of time spent in each stage also varies, with some processes occurring over months, others years. There is a degree of overlap between the stages, with active consideration of options sometimes occurring in tandem with implementation of new activities on a small-scale basis.

5.0 Discussion

The implications of the 'triggering change' conceptualisation developed in this paper are both theoretical and practical, advancing the conceptualisation of transition in agriculture and leading to clear policy implications. These will be explored here in turn.

5.1 Advancing the conceptualisation of farm-level transition

Research findings have advanced some of the concepts proposed by Wilson (2007, 2008), providing empirical support to his arguments that farming trajectories are bounded and path-dependent, and that change occurs at key points in these trajectories. This research goes beyond his work by conceptualising change processes. We agree with Wilson that there are pivotal points in farming trajectories at which change occurs, and that there are limitations on the pathways which individual farming systems can follow. However, it is clear from our analysis that these change processes often occur over a period of years, and involve a shift from relatively passive to active appraisal of options and resources. The image of straight lines and points on a graph as presented by Wilson (2008) is thus misleading – a more accurate conceptualisation would be curved lines, where investment in the current trajectory slows during the consideration of options, and new changes take time to become embedded, possibly leading to further changes before a lengthy period of path dependency is established.

Our conceptualisation of change can also usefully inform further development of farming typologies. Consistent with the typologies literature, the farm managers in the study did not respond in a uniform manner to identified triggers; neither were they uniformly influenced by opportunities and constraints inherent in their current systems. We see value in the typology approach, in that it can be useful in identifying path dependencies for different types of farm structure, and patterns in attitudes towards issues, such as the agro-environment. Typologies are also useful for demonstrating differences in farming systems: policy makers are becoming increasingly interested in farmer segmentation with a view to devising strategies to influence farmers' behaviour (Pike 2008). However, beyond recognition that it would be more difficult on some types of farms than others to make major changes in specific directions, the typology literature is not typically useful for understanding how major changes occur or could be facilitated. The static nature of typologies does not allow for the possibility of farmers moving between categories as a response to triggers. Undertaking typological research could be useful for understanding major change, however, if undertaken longitudinally, in order to observe change processes across a wide range of farms, providing additional empirical development to the arguments presented here. For example, use of a

typology approach to address processes farm succession (a predictable and typically anticipated farm event), could usefully advance this literature.

The ‘triggering change’ process described here has some similarities to the ‘diffusion of innovations’ approach developed by Rogers (1983, 1995): the recognition of the need for active information seeking, formal decision-making and confirmation of the new activity. Where our approach differs is in the identification of ‘triggers’ and ‘trigger events’, the iterative and multiple nature of change, and the scale at which change is enacted. Changing the trajectory of a farming operation is not as simple as the exposure to, assessment, adoption and integration of a new technology, but requires one or more events to trigger an active assessment process of multiple options, thus leading to multiple possible outcomes and configurations of the new farming system. For example, changes from conventional to alternative agricultural systems like organic farming require different forms of knowledge, acquired through experimentation and social interaction, as distinct from the one-off innovations on which Rogers based his model (Hassanein and Kloppenburg, 1995). In dealing with multiple possible ‘innovation’ options, the triggering change conceptualisation presented here addresses a magnitude and complexity of change far beyond the adoption diffusion approach.

The issue of ‘opportunity’ in relation to farm decision-making is raised by Farmar-Bowers and Land (2008). They argue that farmers actively work to create opportunities for themselves, whereas what we have demonstrated in this present paper could be construed as a broadly reactive response on the part of farmers to triggers and trigger events. We agree with Farmar-Bowers and Land (2008) that farmers can be active in their pursuit of achieving their aims, but argue that this is typically limited to pursuing an existing trajectory (and therefore involves incremental changes characteristic of path dependency) or in response to a real or anticipated trigger (e.g. farm succession). Integrating a successor into the farm business could be an opportunity which is idealised and actively pursued by the farm manager, as per the Farmar-Bowers and Land construction, but our conceptualisation demonstrates that it is likely to be a passive consideration prior to the formal identification of a successor, at which point active consideration of opportunities is undertaken. The distinction is thus between central and peripheral route processing of information. In the case of financial duress, response may indeed be entirely reactive to this unwanted trigger, and therefore contrary to the Farmar-Bowers and Land conceptualisation. However, where Farmar-Bowers and Land (2008)’s conceptualisation is particularly useful is their more detailed assessment of the hierarchical decision system, whereby they argue that some types of decisions are made by the farm family, whereas others are made by the farm manager. From their assessment, it is possible to argue that decisions regarding ‘major’ changes are undertaken at family level, whereas incremental changes are undertaken at farm business level. Following this conceptualisation, different individuals, and therefore attitudes and values influence these different scales of decision-making, suggesting a potential area for further research.

The conceptualisation of ‘triggering change processes’ arose inductively, grounded in social psychology and farm household adjustment literatures. However, it is worth noting that related concepts are being addressed in other literatures. The concept of change as subject to inertia which can and does get overcome by extreme events, leading to a new stable (or inert) system is being developed in the literature on socio-ecological systems (Gunderson and Holling, 2002). However, socio-ecological systems theory can be criticised for its focus on making sense of systemic change at the expense of really understanding how and why social structures and human agency interact to respond to this change (Gotts, 2009). Transition

management theory (Geels, 2004, 2005; Kemp et al., 2007a, 2007b; Rotmans and Loorbach, 2009) is another attempt to explain sudden, often unpredicted, change in a social-technological system: "A cluster of elements, including technology, regulations, user practices and markets, cultural meanings, infrastructure, maintenance networks and supply networks" (Geels et al., 2004 p. 3). Transition management thinking posits that transitions are the result of long-term processes of fundamental change that incorporate processes of societal, ecological, economic, cultural and technological co-evolution at multiple levels (Loorbach and Frantzeskaki, 2009). To date, applications of transition management concepts to agriculture have been limited, typically assessing change at system level, rather than farm-level (e.g. Belz, 2004)⁴. The interconnectedness of lock-in and multiple pathways following trigger events suggests that further development of this literature in relation to agriculture may be a fruitful area of future research.

5.2 Policy Implications

Through the identification of path dependency, trigger events and the processes which follow, key areas for intervention can be identified. Recognition of this pattern suggests that there are distinct periods of time in which farm managers can be influenced to change in specific directions. This has important implications for extension services and programmes – advice for changing farm trajectory can be very influential immediately after trigger events but may be dismissed if a farm system is path dependent and the farm manager has no motivation to change the existing system. During the periods where farms are path dependent, farm managers are unlikely to seek or respond to this type of advice, but would benefit from knowing where it can be obtained. Increasing resources available to provide guidance to farms which are likely to experience triggers (e.g. succession, market fluctuations) could be expected to be particularly influential. In line with this, periods following major disease outbreaks, or the announcement of major policy reforms (e.g. to the CAP) could be key periods to increase the advice and incentives available to farm managers to make changes. Arguably at this stage farm managers are more motivated, so they will systematically analyse persuasive messages through ‘central route processing’, leading to more durable change.

This distinction between central and peripheral route processing is grounded in empirical assessment, but assessed in relation to the elaboration likelihood model (Petty and Cacioppo, 1986). The value of this model is not only that it provides a justification for the distinction we observed between major and incremental change processes, but that it suggests that active consideration of options leads to more durable changes. The question raised by Lowe et al. (1999) of why agri-environmental schemes have not led to changes in farmer attitudes can be addressed from this perspective. Current subsidy structures encourage both major and incremental changes: subsidies supporting conversion to organic farming, for example, facilitate major changes to farming operations, inspiring active consideration on the part of the adopters. However, many agri-environmental scheme actions, such as fencing a watercourse or leaving hedges untrimmed, are clearly incremental changes, thus involving limited active engagement of farm managers. The idea that voluntary, incremental change can lead to permanent attitude and behavioural change may therefore be fundamentally flawed. Incentivising change may require the creation of ‘imperatives’ e.g. through environmental regulations (Kara et al., 2008), or voluntary incentives of sufficient magnitude or orientation to justify major changes to the farming system, and therefore active engagement of the farm manager.

⁴ Although Wilson (2007) makes mention of this literature, he does not develop it in any detail.

Our analysis also demonstrates the importance of resource availability to the establishment of new farming trajectories. Capital investment in farming leads to path dependency; financial duress as a process leading to a trigger event, is by definition indicative of limited financial resources. This highly limits the options available to farm managers. To make desired pathways possible, sufficient resources must be made available to farm managers if they are to make this transition. Farms experiencing multiple triggers are also highly vulnerable, particularly if an unanticipated trigger (e.g. death or injury of the farm manager, disease outbreak) occurs during the period of consolidation following a trajectory shift. Making additional information and/or financial resources available to farm managers experiencing multiple triggers represents an opportunity both to reduce the stress inherent in these experiences and to facilitate trajectory change in a desired direction.

Needed resources to support change processes are not limited to financial capital and technology, but also knowledge. Some triggers, such as succession, can lead to an influx of capital (human, economic and cultural) through the successor, particularly if this successor has worked off the farm for a period of time. For these individuals, knowledge is particularly important, as these farm managers may be disconnected from traditional farming knowledge systems. Kara et al. (2008), in a US study, found that graduating from agricultural college had no relationship to whether the farmer employed the conservation practices examined in their study. Indeed the only relationship Kara et al. found was that college educated farmers were more likely to use yield indicators. This is consistent with statements made by farmers in this present study about the ‘conventional’ orientation of available college courses, serving to reinforce existing intensive farming trajectories. There is also increasing recognition that much of current agricultural research and extension services do not reflect the needs of farmers ‘on the ground’ (van der Ploeg, 2003). Key to change in farming systems, then, may be knowledge made available to existing farmers and potential successors through formal education and extension.

Our description of the triggering change process also suggests there is value in designing policies which facilitate the embedding of new farming trajectories. In this study, conversion subsidies were identified as important not only for maintaining farm income during the conversion period, but as a means of encouraging the continuation of organic farming while ideals and new knowledge were being developed. New approaches take time to embed into farming systems. Where major changes to farming approaches are the aim of policy, incentivising transition over a period of years, or requiring repayment of conversion subsidies, would appear to be an effective support. In the same way, facilitation of knowledge sharing can be effective in supporting farmers through periods of transition. Previous research has shown the importance of farmer networks to share their experiences and validate their knowledge about new farming systems (Padel, 2001; Ingram, 2010).

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