

Accepted for publication in Local Environment in 2006

A systemic approach to scoping of factors influencing more sustainable land-use in Herefordshire

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ABSTRACT. Defining and putting into practice sustainable land use is a complex, systemic problem. Systems models and techniques were used in a study of Herefordshire to clarify the situation and identify the potential for a more locally focused, learning-based approach to land use. Issues included: (i) uncertainty about the boundary of a "system of sustainable Herefordshire land use" (ii) the complexity of economic flows in the county and the absence of some critical data (iii) the importance of the Herefordshire landscape to tourism and the role of agriculture as a determinant of the state of that landscape (iv) weakness of the institutional linkage between tourism and agriculture (v) current lack of inclusion of many relevant stakeholders in concerted action.

Factors favouring a learning approach included a strong local identity, local food-related developments and educational initiatives. Barriers to such an approach included questions of power and landholding, government policies and attitudes and skills within organisations.

These findings are considered in relation to the wider debate over approaches to sustainability.

Introduction

Agreeing an operational definition of sustainable development and how to achieve it, has proved elusive (Bell and Morse, 2001, Pawlowski 2000, Phillis & Andriantiatsaholainaina, 2001). Pearce & Turner (1990) and others have recommended economic, market-based instruments, while Hodge (2001) has argued that neither these nor legal regulation have been successful in the area of agri-environmental policy. Other options include Holling's concept of "adaptive management" (Gunderson *et al* 1995, Holling *et al* 2000) and Senge's learning organisation model (Senge, 1990), both related to Habermas' theories of communicative rationality and consensus building (Habermas, 1984, Bryson & Crosby, 1993).

The central concept of sustainability has both temporal and spatial aspects. Boulding's (1965) metaphor of "spaceship Earth" suggests the entire biosphere is the appropriate system boundary (Open University, 2000). A similar idea is implicit in "hard" sustainability (Turner 1993) such as the system conditions in The Natural Step (Natrass & Altomare, 1999, Martin 2002) and the Ecological Footprint (Wackernagel & Rees, 1996). However, as Lipschutz (1996) and other authors have noted, "Generally, environmental degradation is a product of localised and bounded political economies and histories", so that actions to promote sustainable development may be more appropriate on smaller spatial scales. Local Agenda 21 (LA21) from the Rio Earth Summit (UNDESA, 1992) set guidelines for locally negotiated proposals for environmentally sustainable development. A new discourse has grown around such localism (Buckingham-Hatfield and Percy, 1999), although Marvin and Guy (1997) have questioned its logical basis. Aspinall & Pearson, (2000) and McClean *et al* (1995) have suggested that the clear hydrological and functional boundaries of catchments make these appropriate units for sustainable management. However, physical catchments rarely coincide with areas of administrative control, or other socially defined units such as landscapes (Ball, 2002). For the UK, the USA and Continental Europe, an appropriate unit might be that associated with local government, and much work to implement Local Agenda 21 has occurred within this sector, with varying degrees of success (Webster, 1999). In the UK, the county might form an appropriate unit within which to consider questions of sustainable land use, although a completely autarchic county is unrealistic. Within a spatial unit, the "information deficit" model (Agyeman and Angus, 2003) assumes that local people just need better information on which to base more sustainable actions, with the introduction of formal information systems and targets (Haskins, 2003). However, Agyeman and Angus, (2003) and Ison and Russell (2000) suggest that this is likely to lead to narrowly focused and often top-down concentration on the biophysical to the exclusion of social aspects of sustainability. Chapman (2002) has argued that Government policies should take a more adaptive approach to provision of public services, allowing local experimentation and learning. This could also answer some of Marvin and Guy's (1997) criticisms, but Selman (2004) has argued that local, participatory approaches to landscape conservation cannot be the sole mechanism used.

This paper reports a systemic approach to scoping, designed to identify key issues associated with sustainable land-use in the county of Herefordshire, on the English-Welsh border (Figure 1) It also examines the potential and implications of a local, learning-based approach in identifying and encouraging more sustainable land use.

Figure 1. Location and county boundary of Herefordshire.

Framework and methods used for the study

The research (full details are in Morris *et al*, 2001.) was commissioned by the Bulmer Foundation (a not-for-profit organisation set up by the Bulmer family and H.P. Bulmer Ltd) to examine options for sustainable development in Herefordshire. H.P. Bulmer was a major employer in the county, having

strong links to land-based industry, with a public commitment to sustainable development (H.P. Bulmer Holdings PLC, 2002)

The research was framed using a systems approach (Checkland and Scholes, 1990, Open University, 2000), identifying possible systems of interest within the situation and modelling these qualitatively. It was largely desk-based, supported by 20 semi-structured interviews by telephone or in person with key individuals in local government, tourism, agriculture and community work. The interviews were used to fill gaps in the published data, hear the views of a range of stakeholders and provide an initial triangulation of the developing analysis. Interviewees were identified either *a priori* or during the investigation. A full list of the organisations contacted is provided in Morris *et al*, (2001).

The study aimed to identify:-

- major transformation processes involved in a Herefordshire land use system
- key conditions and drivers for change that influence these transformation processes.
- data sources that provide information with which to model possible transformation processes
- sensing and control mechanisms that currently operate
- processes that could enable stakeholders to ‘learn their way’ towards a sustainable system of land use.

Complementary studies of novel accountancy methods and ecological footprints (Wackernagel and Rees, 1996) for the sponsoring organisations and the county were conducted by the New Economics Foundation and Best Foot Forward (2001) respectively.

Herefordshire as a land-use system

Despite the apparent certainties of Figure 1, an appropriate boundary for a *system of (sustainable) land use* in Herefordshire (Figure 2) is not self-evident. Economic data are usually presented for the administrative area of Herefordshire, but the current county boundary does not conform exactly to any clear social, landscape or geomorphological discontinuity or to biophysical units such as watersheds or soil types. However, tourism literature (Anon., 2001), the history of local authority boundary changes (HMSO, 1996, Local Government Association Information Services, 2002) and interviews suggested a strong sense of local identity. This was related to perceptions of community and particularly of a (cultural) landscape, intermediate in nature between the more intensively arable/industrial landscapes to the east and the more exposed uplands to the west.

A *land use system* can be conceptualised as taking a whole range of inputs and transforming them into various outputs by different processes. The nature and rates of these processes are affected by external and internal conditions, some of which may be changed by the processes themselves. For Herefordshire, this general transformation system comprises not just its biophysical area but can also be seen as an *economic system*, and a community or *social system*. Different boundary judgements (Ison *et al*, 2000) are needed when seeing the situation as an economic or social system. Different conceptualisations will lead to differing visions of sustainability, examined in the following sections.

Figure 2. Land use as a generalised transformation system.

Physical aspects of the land use system

Agriculture accounts for 180000 ha of farmland and almost 18000 ha woodland out of a total of almost 216000ha (Centre for Rural Research, 2000). The area under agriculture declined by 0.6% between 1998 and 1999 (Centre for Rural Research, 2000), most likely through conversion to woodland or to industrial/residential use. There were approximately 3500 agricultural holdings, 76 certified as organic, in 2001. The overall trend in total number of holdings had mirrored the national decline since the 1970s, but with some periods of gradual increase in holding numbers, possibly from the formation of part-time or “hobby” holdings (Centre for Rural Research, 2000). There had been a gradual increase in owner occupancy compared to rental holding.

Livestock rearing was still important but grassland and rough grazing only just exceeded 50% of the total agricultural area. There had been a major increase growing potatoes, but the traditional specialities of hops and apples were still important, with 2266 ha of commercial orchards in Herefordshire and a smaller but significant area of non-commercial orchards (MAFF, 2000).

Westmacott and Worthington (1997) noted that the landscape of Herefordshire showed least change among those they studied. Area of Outstanding Natural Beauty designation applied to 9.2% of the land surface and Area of Great Landscape Value to 51% (Herefordshire Council, 1998). Tourism literature stressed the “unspoilt countryside, market towns of distinctive character and a wealth of varied landscapes..... The richness of the natural environment forms a backdrop to a more leisurely pace of life..... where innovation and inspiration blend in with the historic landscape of a rural past” (Anon., 2001 p 1).

Manufacturing, retailing and distribution occupied a relatively small total area, concentrated in the main towns. Residential property also occupied a very small total area, so agriculture and tourism could be seen as defining the land-use system.

The county as an economic system

Precise data about the economic flows into, within and from Herefordshire appeared to be limited and not widely disseminated. Available data primarily concerned employment and numbers of specific businesses, and these do not necessarily correlate with economic flows. The Gross Value Added per employee in manufacturing in the joint Hereford and Worcester county was estimated to be almost 10% lower than the national average, but slightly above the regional average (Herefordshire Council, 1998). The index of multiple deprivation, one measure of (lack of) economic activity in an area, placed Herefordshire close to the average for the UK (Herefordshire Council, 1998).

There was a general perception that the county had economic problems, especially low wages relative to the national average. Agriculturally-related employment had declined and alternative employment in the rural areas was not being created. Although the county had a slightly higher than average rate of self-employment, this still related mainly to existing agricultural activity.

Interestingly, statistics for agriculture are published separately from and frequently excluded from discussion of, other activities. The total economic output of agriculture in Herefordshire was estimated at just over £200m (Herefordshire Council, 1998). Nationally, farm incomes had declined by 28% between 97-98 and 98-99 and this was exacerbated by the foot and mouth disease outbreak in 2000. Less than half of all agricultural holdings employed any non-family labour (Herefordshire Council, 1998).

Most economic activity in the county was predicated on access by road, with potentially negative implications for sustainability. Rail connections are limited, although some specific initiatives had been taken to make greater use of this mode (H.P.Bulmer Holdings PLC, 2002)

In 1998/9, 4.5 million visitors came to Herefordshire, spending an estimated £192 million, similar to the economic output of agriculture (Heart of England Tourist Board, 2000). Direct employment in hotels and tourism was over 5% of total employment excluding agriculture for the whole county, and over 8% for the rural areas (Herefordshire Council, 1998). Every 100 jobs in tourism are estimated to generate 14 jobs elsewhere in the countryside (Countryside Agency, 2001).

Herefordshire, Worcestershire and Shropshire together had access to funding for economic development and regeneration since 1994/5 under the EU Objective 5b criteria and subsequently Objective 2, the LEADER Programme and Rural Development programme (CSR Partnership, 2000). Approximately £35m had been expended on a wide variety of projects addressing issues such as skills shortages, diversification and personal transport, usually stressing sustainability or sustainable development. Responsibility was spread among several agencies such as the Local Authority, Advantage West Midlands and the (then) Ministry of Agriculture, Fisheries and Food, (MAFF).

Figure 3 represents the suggested major cash flows within the county area and across its borders. Precise quantification of these would be a major exercise, but the open arrows in the diagram indicate issues that may have a major bearing on local sustainability. Locally based and owned businesses bring a net cash flow in to the county, but some of the profits accruing to national businesses must leave the area (New Economics Foundation, 2002). The strength of the economic linkage between tourist revenues and farm income was unclear, as was the magnitude of dividend and other investment income.

Figure 3. Flow diagram of the main cash flows within and through Herefordshire seen as an economic system

Social aspects of the system of interest

There appeared to be significant inward migration of older people and professionals and a net outflow of younger people from the economically active population. The resultant ageing population was seen as ultimately imposing a burden on health and social services. Inward migration may have brought in interest-earning capital and increased local cash-flow, but also raised local house prices causing problems of affordability for local people.

Many employers noted difficulty in recruiting appropriately skilled labour (Herefordshire Council 1998). While some of those migrating into the county had high skill levels, these were mostly in areas more relevant to self-employment. There was little emphasis in the local skills strategy on training, awareness and capacity-building for a sustainable sub-region (Learning and Skills Council 2001). Herefordshire is one of only four English counties without a University. This encouraged the outward migration of young people and there is

“..... a strong positive correlation between the cohesiveness of local communities and participation in higher education” (DfES, 2003).

Abuse of alcohol and other substances among younger people was a widely expressed concern. Activities by the Churches, Citizens Advice Bureaux and others to tackle “rural stress” also indicate unsustainable aspects of lifestyle. Although these initiatives arose from difficulties within the farming community, they were also used by non-farming families. The dispersed rural population in the county affects the social welfare of the rural community, restricting peoples' access to local services, employment and social events.

Problems of complexity and coordinated action

A recurring theme was the lack of coordinated action to deal with the complexity of the situation, well exemplified by interactions between landscape, agriculture, tourism and economics. Farming practice critically affects the appearance of the landscape and varies between farmers, depending on their attitudes and those of the people with whom they interact (Beedell and Rehman, 2000, Carr and Tait, 1991, Fish *et al* 2002, Morris *et al* 2002). Diversity of land-use between different farmers may be a major contributor to the positive appeal of the landscape (Frame, 2002). A positive linkage between tourism revenue and farm income exists for some farmers, but its overall importance to the farm population was obscured by the manner in which statistics are presented. Improved transport links could benefit industry and commerce in the county, but might reduce its success as a destination for tourism. The target audience was at the “high quality” end for whom rapid access might be detrimental to the perceived attraction of the area (B. Heavens, Herefordshire Tourism, personal communication). Figure 4 illustrates this situation as a causal loop diagram (Open University 2002). The existence of such coupled positive and negative feedback loops can result in very complex dynamics (May, 1976)

Figure 4. Causal loop diagram of the relationships among landscape, agriculture, tourism and economic sustainability of a Herefordshire land use system.

Institutional links between landscape, tourism and agriculture appeared to be very fragmented, with a range of different agencies involved, having different perspectives, geographic/sectoral interests and with administrative and cultural differences across the English-Welsh border. While Herefordshire Farming and Wildlife Advisory Group (FWAG) felt they had been successful in encouraging farmers to improve prospects for wildlife on farms, the Campaign to Protect Rural England (CPRE) and some activist groups were much more pessimistic in their assessment of the situation,

The coordinating power of the Local Authority was limited. Chapter 22 of the Local Government Act, 2000 gives the Unitary Local Authority a general power (but not a formal duty) “to do anything which they consider is likely to improve the social, economic or environmental well-being” of the area. The power “does not enable a local authority to raise money (whether by precepts, borrowing or otherwise)”. The Herefordshire Unitary Development plan (Herefordshire Council, 1999) includes a range of sustainable development activities, but the implementation of much of this in the wider countryside was outside the powers of the Council. Interviewees generally suggested the local authority had been more active than many in Local Agenda 21, but the overall picture across the UK has been poor (Local Government Management Board 1997, Webster, 1999).

Achieving concerted action requires a shared vision of more sustainable land use among the multitude of stakeholders, agencies and agendas on sustainable land use. This need was clear, but the institutional arrangements to support it were at best, weak. The Herefordshire Partnership had been set up as a multi-agency forum to support the implementation and integration of the Herefordshire Plan and Agenda 21. However, the parallel existence of a less formal “Partnership for sustainable Herefordshire” (E. Brook, personal communication) suggested that the official forum had omitted some relevant stakeholders. The Green Gate initiative, (Partnership for Sustainable Herefordshire 2001) funded by the National Lottery Charities Board, had produced a green consumer guide and had acted as a facilitator, providing web access, communications skills and enabling local “grass roots” groups to pool resources in a cooperative network.

Opportunities for a learning approach for sustainable Herefordshire

Participative, learning-based approaches have been widely recommended (Berkes and Folke, 1998, Ison *et al*, 2000, Jiggins and Röling, 2000) as ways of achieving sustainable development through construction of and concerted action towards, a shared vision. Baker *et al* (2002) have noted that spaces for conversations, such as communities of practice (Wenger, 2000), platforms (Röling, 1994), fora or *dispositifs*, (SLIM, 2001) can catalyze learning, create new visions, and change perceptions, fostering trust and promoting mutual learning. Their successful function requires skilled facilitation, but also depends on appropriate institutional arrangements.

The research identified several activities within Herefordshire that could offer opportunities for a learning based approach, and examined these in more detail. They included:-

- specific projects to support learning.
- local food products
- use of indicators of sustainable development
- IT developments
- existing networks

The Bulmer Foundation set up Project Carrot (Dawe *et al*, 2004, Project Carrot, 2003) “to develop a suite of ‘leading edge’ sustainability learning programmes” concentrated on the local campus of the Pershore Group of Colleges. The campus is to provide a resource for demonstrating and promoting sustainable development principles, including innovative commercial programmes to catalyse the establishment of similar activities across the region and to contribute to research, advice and information. A major aim is to stimulate debate relating to sustainable land use “bringing people together to discuss how to break down the barriers that stand in the way of sustainable land use.

[through]: conferences and seminars to stimulate stakeholder debate about key topics; position papers and reports, a series of ‘live issue’ working parties to address current land-based issues of regional or national importance; and through our community education programmes” (Project Carrot, 2003).

The strong local identity noted earlier could be crucial to the innovative commercial activities envisaged in Project Carrot. It gives a clear “brand” for locally-produced foodstuffs (DEFRA, 2002) that could be exploited to provide both economic benefits and a community of practice for collective action. Sundkvist *et al* (2001) and Holden *et al* (2002) suggest that the resulting increase in connection between farmers and local consumers engenders learning by both groups.

Macnaghten *et al* (1995) noted that people were generally unfamiliar with the idea of sustainability but identify positively with its values and priorities once they understand what it means. They also stressed that sustainability indicators need to be perceived as being unbiased and meaningful at the local level and developed through continued open consultation. The ecological footprinting study (Best Foot Forward, 2001) and the sustainability indicators published by the Local Authority (Herefordshire Council 1999) offer a focus for debate among stakeholders, although as noted below, these could also act as barriers.

Recent developments in information technology (IT) could assist collaborative action, as suggested by Alexander’s visionary concept of e-Gaia (Alexander, 2002). The Kington Connected Community (2003) had supported social and economic uses of IT within Herefordshire and a range of individuals had moved in to the area to continue IT-supported work, even marine insurance. Increasing opportunities for IT-based activity could encourage local residents to seek enhanced skills helping development of communities. However, the possible high costs of providing broadband access in rural areas (FAO 2005) may not be supportable on a narrow cost-benefit analysis.

Existing networks that could offer platforms for learning included the Chamber of Commerce and Tourist organisations, although agriculture had only limited representation on both of these. Less formal networks included the Partnership for Sustainable Herefordshire, Women’s Institutes and others associated with leisure time. Several interviewees commented on the catalytic role being played by younger, skilled inward migrants, often attracted by the landscape and lifestyle.

Barriers to learning

Despite these potential opportunities, several barriers to learning within the county were also identified. These included:-

- power relations
- the attitudes of official agencies
- Government policy
- lack of access to data
- local capacity

Disparities in power (Hinchliffe and Belshaw, 2003) could hinder collaborative action. Owner-occupation of the majority of farms gave this group substantial power over land use. The Local Authority has some formal power over land use and the Unitary Development plan (Herefordshire Council, 1999) supported activities that should contribute to sustainable development. However, implementing several of these in the wider countryside depends on collaboration with landowners. The Local Authority’s use of “area of land growing potatoes” as a (negative) indicator of sustainability (Herefordshire Council, 1999) could hinder this. The problems of soil loss associated with potato

growing are widely recognised, but public demonisation of this specific land use was unlikely to encourage dialogue.

The attitudes and methods of regulatory agencies also affect dialogue. The Environment Agency and Health and Safety Executive have power to police legislative standards to prevent land degradation, but less to encourage positive action. Where such organisations are perceived by the farming community to be unduly restrictive, or uninformed about farming practice (Blowers and Elliott, 2003) this discourages collaborative action. Work on a learning approach to integrated catchment management (SLIM 2004) has highlighted a lack of capacity for facilitation of learning among these agencies, further complicated by the EU Water Framework Directive's requirement (2000/60/EC) for management of water resources across river basin districts, spanning several counties and the English-Welsh border. Conservation bodies such as FWAG and CPRE are mainly restricted to working by persuasion or by highlighting breaches of legislation or failures in implementation, which may restrict their credibility with the agricultural community. However, their advocacy skills were credited with being influential in changing the climate of farming opinion within the community (Oreszczyn and Lane, 2000, Morris *et al* 2002).

Among the general public, "green" issues fluctuate in their relative importance (Brown, 1992) and raising their prominence may be an essential prerequisite to action (Morris and Morris, 2005), with Central Government setting the fiscal and legislative context. Where stakeholders see Government proposing unsustainable policies, such as aviation expansion (Sustainable Development Commission, 2002), this will discourage local action.

The difficulty of obtaining detailed and coherent economic data represented both a problem and an opportunity for a learning approach. The apparent absence of any overall economic model of the county made it difficult to predict the economic effects of change. Debate over these issues may then be poorly informed and of doubtful value, but developing a shared model of the county's economy could provide a valuable learning experience, raising issues of boundaries, systems of interest and equity.

Conclusion

Despite the criticisms of "localism" stressed by Marvin and Guy (1999) and the reservations of Selman (2004), this study suggests there are opportunities for local action based on learning and the development of a common vision for a more sustainable locality. A key aspect was the existence of a sense of local identity. Seeing "Herefordshire" as a cultural landscape (Selman, 2004) appeared to engender a sense of belonging that both encouraged and validated actions to develop it in a sustainable manner. This may not be the case elsewhere, and the actions needed to address issues within a locality are difficult to specify in any top-down manner, but proposals that arise from within relevant groups of actors can engender commitment to their success (Connick and Innes, 2003, Morris and Morris, 2005). Locally oriented agriculture and food supply were particularly relevant to sustainable development for Herefordshire. Shorter food chains should benefit both physical and economic sustainability (Sundkvist *et al*, 2001, Pretty, 2001 NEF 2002), although Cowell and Parkinson (2003) suggest that the reductions in energy use through realistic levels of substitution of locally produced for imported foods may be limited.

Despite the criticisms of the information deficit model (Agyeman and Angus, 2003), the lack of information and failure to make connections between agriculture and its implications for Herefordshire landscape, and hence for both tourism revenues and inward migration were particularly striking. Participative processes for gaining and interpreting such information could be very valuable. Scoping is integral to many approaches to sustainable development (Open University 1998, Nillson and Dalkman, 2001) including environmental impact assessment (EIA). Reviews of EIAs within Europe (European Community Press Room, 2003) suggest that practice is poor and that their contributions to sustainability are questionable. The systems-based methodology adopted here represents another way to approach scoping, through an appreciation of key transformation and feedback processes (Figures 2 and 3). This has the potential to facilitate dialogue and learning for coordinated action amongst key stakeholders.

The study has highlighted the complexity of developing sustainable land use, in particular issues of boundaries and how these are perceived by different interest groups. However, it also suggests that there may be location-specific opportunities for a more discursive, inclusionary, learning-based approach. This could, if appropriately facilitated, allow exploration of different boundary judgements (Blackmore & Ison 1998) by stakeholders concerned about 'sustainable localities', leading to more concerted action to promote sustainability. There are still significant barriers to such an approach, including issues of power, the nature and perceptions of government policy and the capacity of local actors to participate in concerted action. These barriers will require attention to realise the full benefits

of this approach and this will certainly need some financial and other support. The continued support offered to the Bulmer Foundation by the new owners of H.P. Bulmer (Scottish & Newcastle plc, 2006) suggests that the work envisaged in Project Carrot could provide an important opportunity for a longitudinal study of a learning approach to more sustainable land use within the county,

Acknowledgements

The authors are grateful to the Bulmer Foundation for funding to carry out this study and to the interviewees who gave so freely of their time and knowledge.

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Figure Captions

Figure 1. Location and county boundary of Herefordshire.

Figure 2. Land use as a generalised transformation system.

Figure 3. Flow diagram of the main cash flows within and through Herefordshire seen as an economic system

Figure 4. Causal loop diagram of the relationships among landscape, agriculture, tourism and economic sustainability of a Herefordshire land use system.

Figure 1. Location and county boundary of Herefordshire



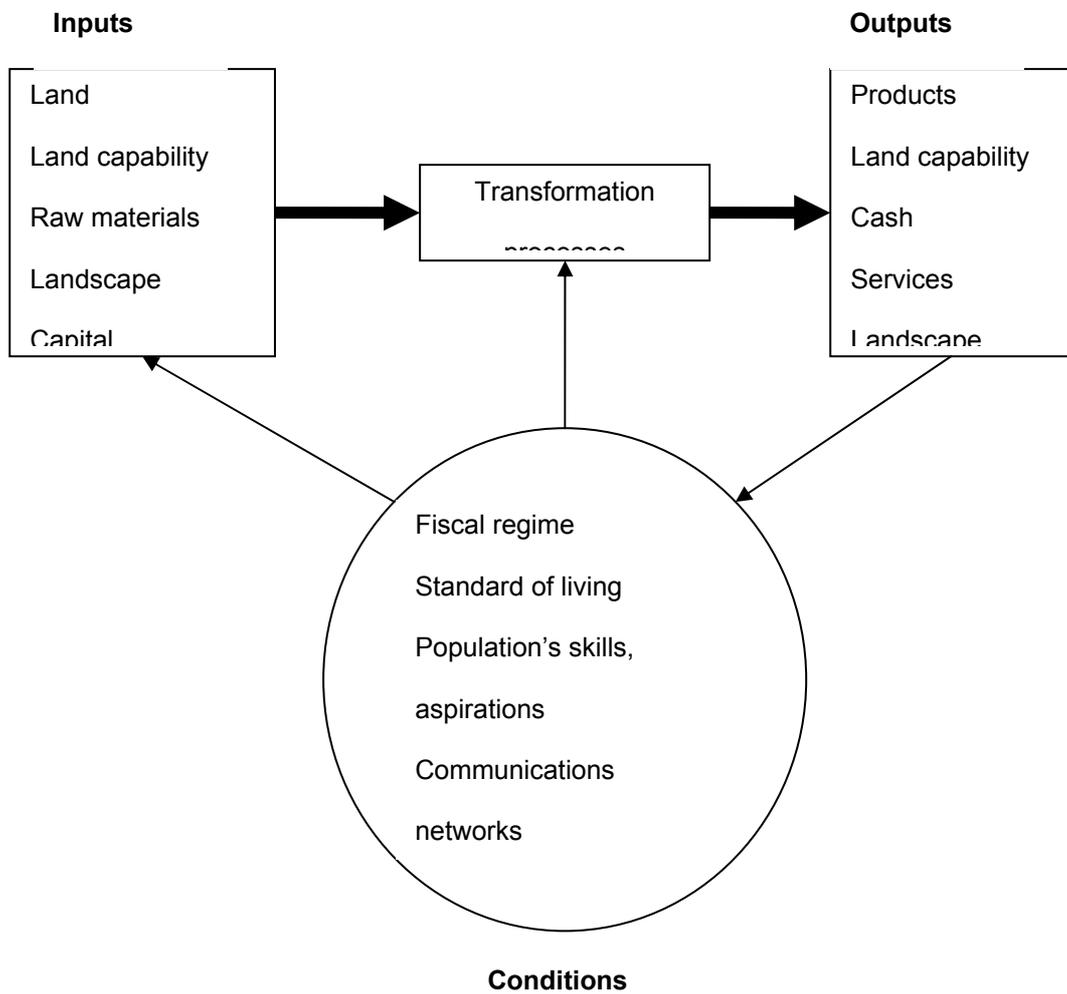
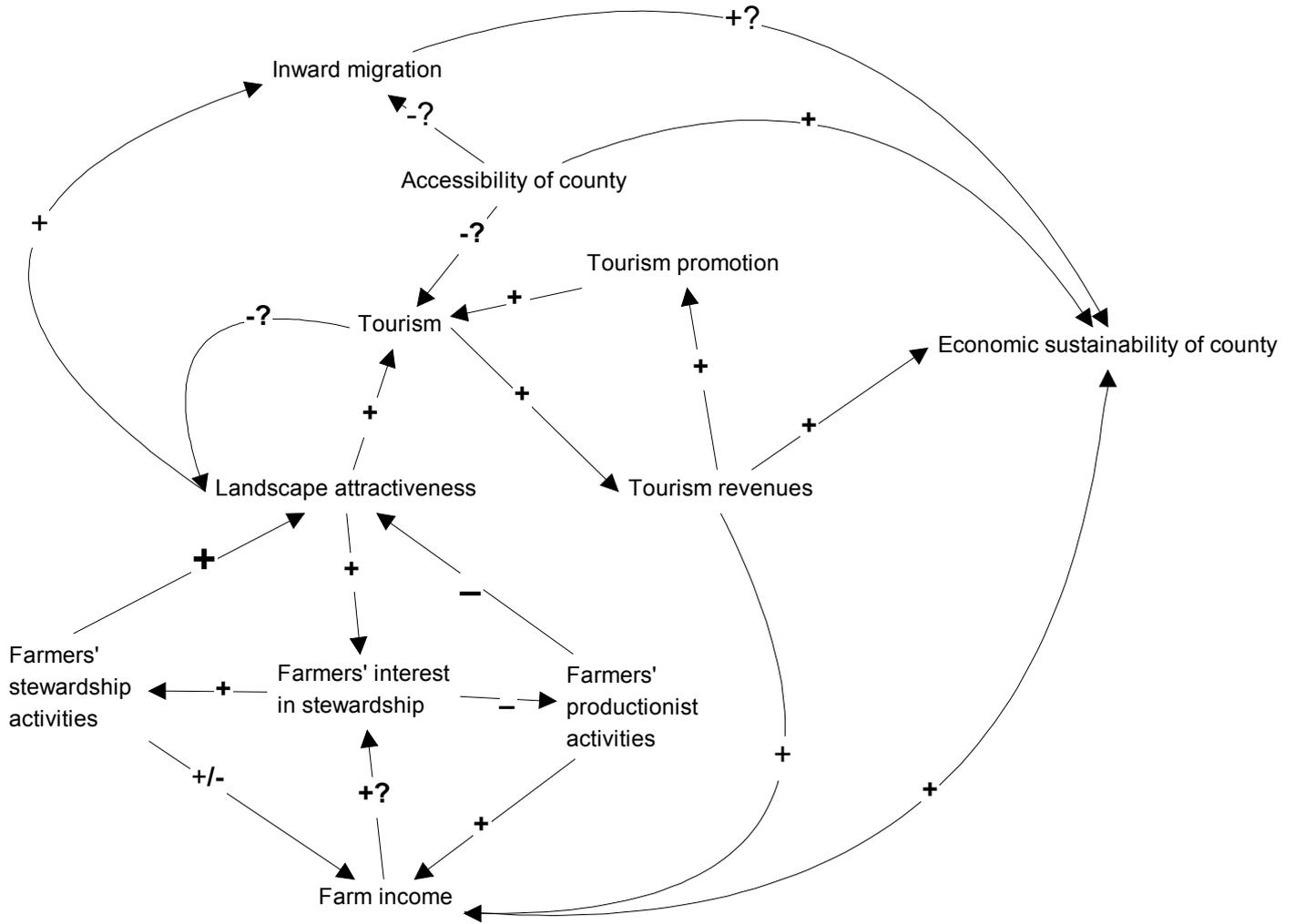


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Figure 3

