CASE STUDIES: THEORY AND PRACTICE IN NATURAL RESOURCE MANAGEMENT

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Abstract

Relevant research solves problems, and solving problems in present day agriculture and natural resource management increasingly involves drawing on knowledge from a range of disciplines. The mix of disciplinary knowledge appropriate to answer questions depends on the nature of the problem at hand. Research resource constraint means that there are trade-offs between the number of relevant cases which can be included in an analysis and the disciplinary breadth and depth brought to bear on each case. Thus there is a continuum of research methods ranging from techniques which deal in a shallow way with large numbers of cases and draw on a narrow range of disciplinary knowledge, focusing on a few features of each case, to the approach commonly called the case study method which typically deals with few cases and draws on a wide range of disciplinary knowledge to analyse complex systems in depth. Attention to theoretical questions concerning design of the analysis can enhance considerably the value of case studies. This paper illustrates the application of case study method to economic aspects of resource and conservation management in agriculture.

Introduction

Australia's extensive grasslands and woodlands have major degradation problems (e.g. Tothill and Gillies 1992, Department of Environment, Sport and Territories 1996) which vary across regions. From a production viewpoint, the major problems involve loss of vegetative cover (especially from perennial grass species), soil organic content and physical structure decline, and other elements contributing to nutrient and water cycling, as well as intrusive problems such as salinity, acidification and erosion (e.g. McIntyre and McIvor 1996). From a conservation viewpoint, relatively few grasslands

and woodlands can still be characterised as natural ecosystems. The few that remain have a conservation significance well beyond their size and are subject to influences (e.g. clearing, weed invasion, over-grazing) which will likely lead to their loss. While precision about the extent and location of the problems varies, there is a general agreement on a need to address them.

In exploring these problems, issues of scale are important from both an ecological and economic viewpoint (e.g. Harrington, Wilson and Young 1984, Brown and MacLeod 1996). Decisions about exploiting or conserving remnant vegetation are typically made at the farm level, while R&D typically focuses on smaller scales (e.g. plots, land classes), thereby, failing to address the appropriate decision context. Extension is typically pitched at the same inappropriate scales exacerbating technology transfer failure problems (MacLeod and Taylor 1995). A key to successfully addressing problems is to get the scale right, implying a detailed understanding of the whole property resource structure, management (technological) systems and the socio-economic context of the managers (e.g. age, dependents, interest, affordability, beliefs).

A research method which explores both underlying processes and context is required (e.g. Pettigrew 1985) and will ideally combine both cross-sectional (what is happening now across a range of cases) and longitudinal (stability over time) elements. Context for conservation on farms is unlikely to be uniform or static over time or space. For example, a farmer may base a given decision on present levels of wealth, current prices, policies or expectation of the government of the day. As these variables can readily change, so does the decision context and, therefore, the likely decisions made and their consequent outcomes.

Case studies can make a valuable contribution to research and policy development in natural resource management. This paper is about the nature of case studies, their strengths in comparison to other techniques, and the way results can be generalised. The design phase is critical to their successful conduct, and is with reference to a case study project currently being developed within the National Remnant Vegetation Program being jointly funded by the Land and Water Resources Research and Development Corporation and the Environment Australia Biodiversity Group. This project is centred on livestock grazing management, and its effects on production and conservation performance in the grasslands and native pastures of southern New South Wales and northern Victoria.

The nature of case studies

What are case studies?

Much of the `bad press' enjoyed by case study methods typically stems from their poor definition as a *research strategy*. Yin (1981a, 1981b, 1983, 1989, 1993) and others (e.g. Eisenhardt 1989, 1991; Ragin & Becker 1992; Feagin, Orum & Sjoberg 1991, and Stake 1995). have sought to define case study methods, and their role and

appropriateness as an empirical strategy for addressing research questions. This paper draws primarily on Yin's work.

Yin (1981a) defines a case study as an empirical inquiry that:

(a) investigates a *contemporary* phenomenon within its real-life *context*; when

(b) the *boundaries* between the phenomenon and context are not clearly evident; and in which

(c) *multiple* sources of evidence are used.

Management of remnant vegetation is a *contemporary* phenomenon within a farming context and is, therefore, subject to many and various influences (e.g. price levels, availability of feed on other parts of the farm, available family labour etc.). The *boundary* between management of a tract of remnant vegetation (phenomenon) and the whole farm (context) is often difficult to distinguish. Landholders may not place much significance on remnant or native vegetation, simply seeing it as part of the total bundle of resources with which to make land use decisions. Farm records are likely to reflect this. Finally, the combination of phenomenon and context are unique on each farm.

Choosing between case studies and other techniques

Yin (1989), suggests that a choice between case studies and other empirical methods might be rationally made against three conditions:

(a) the *type* of research question being posed;

(b) the extent of *control* a researcher has over actual *behavioural* events; and

(c) the degree of focus on *contemporary* as opposed to *historical* events.

The first condition boils down to the simple "who, what, where, when, why and how" questions of most research. While any of these questions can be handled by most research approaches, this is accomplished with varying degrees of efficiency. For example, "who", "what" and "where" questions are well addressed through surveys and historical accounts. Case studies well suit the more interesting (from our perspective) "how" and "why" questions, which are explanatory rather than exploratory or descriptive. Because other methods (e.g. formal experiments, historical accounts) are also employed to investigate this type of research question, the second and third conditions provide the necessary discrimination. Historical accounts are best used where there is no scope for control over or insight into contemporary events. Experiments, require an ability to control and manipulate events in a direct, precise and systematic fashion which is rarely accomplished beyond laboratory conditions.

An appropriate niche for case study methods in research situations which deal with contemporary events in which behaviour of the people or systems at the centre of the

research problem cannot be manipulated (Yin 1989, 1993). This role is also supported by two sources of evidence that are of limited use to other methods - direct observation and systematic interviewing, which can be usefully applied to other sources of evidence (e.g. documents, archival materials, surveys etc.) to provide the multiple sources of evidence (i.e. the third technical characteristic of case study methods).

Case study methods using multiple sources of evidence are important in researching farming systems which are typically complex, influenced by many purposive and *ad hoc* management decisions, and occur within a context of ill-defined feed-back loops and uncertainty. Dynamic processes and change are also characteristics which can be explored by the case study method in ways that other techniques either cannot or do so poorly.

Generalising from case studies - *analytical* versus *statistical* generalisation.

Much concern, confusion and criticism of case study methods revolves around their representativeness and the ability to generalise findings beyond the actual case. In this particular context case study methods are often seen as a poor substitute to a well-conducted survey. This reflects a mistaken understanding of the essential difference between generalising to theory (analytical generalisation) - a property shared by case studies and most natural science experiments - and generalising to populations (statistical generalisation) - typical of surveys (Yin 1989, 1993). Individual cases are not sampling units in any statistical sense.

The correct context for generalising beyond immediate case findings is that of theory development and generalisation to theory. Like classic scientific experiments (whose generalisation is rarely queried), case study design is ideally based on a well-grounded theory and set OF testable propositions. Findings are generalised to that theoretical base according to the degree of support the findings provide to the original propositions. If the empirical findings support either the theory, or a rival theory (i.e. sample to theory), theory development progresses. Case study methods do this well in situations where (a) the context is important and (b) events cannot be manipulated as in a classic experiment (Yin 1993).

Confidence about the wider validity of conclusions is increased if findings apply to multiple cases, consistent with the theoretical context from which the first case was drawn (i.e. analytical generalisation). Multiple case studies (like multiple experiments) enhance analytical generalisation through replication, especially when the additional case findings support a given theory and contradict a well justified rival theory. However, the use of multiple cases does not increase `representativeness' of `samples' as in statistical generalisation logic (i.e. sample to population) - already argued to be inappropriate to case study methods.

Eisenhardt (1989, 1991) working in the business management field has also sought to promote the case study method. However, unlike Yin who uses case studies to test *a priori* theory, Eisenhardt uses them more to promote theory building as a primary goal.

For example, Eisenhardt (1989), while acknowledging the role of good research questions and theoretical constructs, argues that propositions can be developed (and tested) during data collection, rather than prior to it. Because the aim is to obtain a rich understanding of the cases in all their complexity, insights gained during data collection can be used to inform the theory. Yin (1989) regards this as explanation-building, which is a more difficult form of theorising. It should be noted that some (e.g. Dyer and Wilkins 1991) argue that any theorising in advance will restrict insights and the researcher should have as few preconceived ideas as possible (but see Eisenhardt 1991)

Walton (1992) supports anchoring case studies in theory development because the practical steps of implementing a case study can force a careful consideration of 'what it might or might not be a case of'. In his view, this explains why case studies have been path-breaking in several theoretical fields. However, relating the case to theory in one discipline may not be sufficient. For example, Wieviorka (1992) in a study of terrorist groups has found that while a sociological approach delineated the processes producing terrorism, it 'could explain neither why nor how this phenomenon occurs in one place but not another, and it was of practically no use for making predictions'. Using case studies to understand both processes (whether social or economic) and the history of events and occurrences may be relevant in natural resource management.

Phases of case study research - the importance of sound design

All research, including case studies, is conducted in phases that typically, but not always, follow a general sequence of - research design, data collection, data analysis, and reporting.

Research design necessarily links the data to conclusions (Yin 1989). Poor designs leave the quality of the research and general validity of the conclusions open to challenge. Therefore, the critical design phase must be well-conducted and adequately specified (Eisenhardt 1991, Yin 1993). Qualitative researchers undertaking case studies on individuals and small groups place much importance on prior preparation, rather than simply allowing the case to speak for itself (Stake 1995, Harper 1992).

The key to establishing a good research design is to follow a logical process of linking data to objectives, conclusions to data and, thereby, linking objectives to conclusions. Yin (1989) identifies five critical steps (elements) of a case study research design; as follows:

(1) Presenting a clear and adequate specification of the theoretical issues and, from this, the questions that frame the study.

(2) Clearly defining the unit(s) of analysis, including possible sub-units if these are warranted

(3) Deciding on the appropriate number of cases to explore within the study.

(4) Clearly specifying the selection criteria for choosing the case studies.

(5) Choosing an appropriate and effective data collection and analysis strategy.

(6) Developing appropriate tests to ensure the validity and reliability of the approach taken in conducting the case study.

These steps are consistent with Eisenhardt's approach.

These elements are now briefly outlined, followed by an illustration of the approach taken in the example native grassland case study.

Theoretical issues and research questions

Stake (1995) argues that the researcher's greatest contribution is in 'working the research questions until they are just right'. He also emphasises the need for issue questions which conceptually define the case study, and distinguishes these from information and evaluative questions which may be important, but are not critical to the design phase.

Yin (1989, 1993) generally proposes developing formal explanatory propositions (including rival propositions) to be tested via data collection and analysis against criteria relevant to their acceptance or rejection.

Eisenhardt (1989) argues that *a priori* formal propositions can inhibit exploration of the cases and development of novel propositions, and supports the development of tentative theoretical constructs to inform the study, and an iterative process that links data to the emerging theory. Key requirements are using multiple evidence from each case to produce well-defined and measurable theoretical propositions or constructs, and testing each proposition afresh against each case. Confidence in the propositions increases if replication of findings occurs. Eisenhardt (1989) also proposes that the research design include a phase of testing the theoretical propositions that emerge from the study against the literature, both supportive and contrary.

Unit(s) of analysis

A common failing is to clearly define and stick to a unit of analysis that is appropriate to exploring the theoretical issues underpinning the research (Yin 1989). A clear definition of the unit of analysis is necessary to firmly bound the subsequent study, develop relevant and precise propositions, and guide data collection. Poorly defined units of analysis typically lead to results that lack rigour and are more descriptive than explanatory (Yin 1993). Where data are collected for sub-units (e.g. a paddock), there is a risk of the ensuing analysis remaining at that level, rather than being drawn together at the original unit level (e.g. the farm) (Yin 1989).

The unit of analysis need not relate to some specific physical entity (e.g. an individual, group, institution) where unit boundaries are usually clear. Alternatives might include a farming approach (e.g. conservative versus innovative), a specific policy (e.g. price support) or an event (e.g. drought). The key to determining the appropriate unit of analysis remains the research questions defined for the study (Yin 1989).

Number of cases

Unlike statistical sampling methods there is no single rule concerning the minimum number of cases to be selected for a given research project. Selection of the number of cases is necessarily influenced by the study aims, the research questions to be tested and the level of confidence (theoretical versus statistical) that is required in the findings.

Single cases are useful when there is some *critical* case against which to test a well specified proposition, or where an *extreme* or *unique* case is the main focus of interest. *Multiple* case designs are more common and are generally used to replicate findings or support theoretical generalisation.

Each case within a multiple case designs can incrementally increase the ability to generalise. Eisenhardt (1989) suggests limiting the number to the point where the incremental contribution of extra cases is only marginal (e.g. 4-10 cases) and to retain the flexibility of adding additional cases if necessary.

An important distinction is drawn between *literal* and *theoretical* replication which are standard features of classical experimentation (Yin 1989). The former involves the selection of particular cases on the basis that they should predict similar results, while the latter involves the selection of cases that might produce contrary results for reasons consistent with an underlying propositions. Multiple cases which incorporate both literal and theoretical replicates can then be used to advance theory (Yin 1989).

Selection criteria

This is a fundamental consideration for case methods and successfully linking the data and conclusions to the theoretical propositions. Cases may be chosen because they extend emergent theory, fill theoretical categories, provide examples of polar types, or replicate previously selected cases (Eisenhardt 1989). In this regard, the need for appropriate selection criteria is no different to that of any other form of experimentation centred on replication logic (Yin 1989). The choice of case is sometimes obvious (e.g. critical, unique or extreme cases). However, once theoretical requirements are addressed, the selection may be influenced by pragmatic considerations (e.g. access and feasibility).

Data collection and analysis strategy

Major pitfalls lie in poor prior preparation of the various activities required by the study design and commencing data collection before the design and analytical procedures have been carefully worked out and "pilot" tested . The requirements for effective data collection and analysis is provided in detail elsewhere (e.g. Patton 1987, 1990; Eisenhardt 1989,Yin 1989, 1993, Stake 1995) and not pursued further here.

Data analysis should be independently conducted for each case study, both relating back to the objectives and drawing out policy implications. Close familiarity with each case is required to allow the investigator to draw out its unique patterns and the basis for rich cross-case comparison (Eisenhardt 1989). As each additional case is completed, the results are checked to see if they replicate the findings in the previous cases. Once all cases are completed, cross-case conclusions can be drawn (Yin 1989). Several pattern-matching techniques have been proposed (Eisenhardt 1989, Yin 1989) to assist cross-case comparisons, and avoid biases because of factors such as limited data, the vividness of some cases, personal regard for some respondents, and inadvertently overlooking contrary evidence (Eisenhardt 1989).

A range of approaches may be desirable for cases that involve both quantitative and qualitative elements. Where repeat visits to collect quantitative data are involved, observational skills may be enhanced by drawing on ethnographic approaches and it may also be worthwhile developing a system for coding observations (Harper 1992, Stake 1995). Account should also be made for the fact that findings will depend on how the relationship with informants develops, particularly where understanding of influences, motivations and views is concerned (Harper 1992). A related issue is clarifying the balance in the final report between the researcher's viewpoint, and that of informants with the latter potentially allowing readers to better 'see' the case and make their own generalisations (Stake 1995).

Tests of validity and reliability

There are four basic tests of logic that can be applied to assess the quality of a particular research design. Yin (1989, 1993) has proposed the following as appropriate for a case study design:

Construct validity is about appropriate definitions and operational measures for the theoretical propositions being studied. Using several ways to measure the key variables (constructs) in the study is an important way to overcome possible problems of inaccuracy. Multiple sources of evidence are clearly needed when little information is available on some aspects of native pasture or farm management.

Internal validity is about establishing credible causal relationships. The theory must be internally consistent. This requires careful specification of the units of analysis so that the study does not slip from one unit to another, and use of appropriate pattern-matching techniques to ensure theories and data are consistent.

External validity concerns convincingly specifying the domain to which the findings can be generalised. This requires carefully choosing the cases and explaining why each case has been chosen, and its similarities and differences to other cases, in terms of the

research questions guiding the study. External validity is maximised in multiple rather than single case study design.

Reliability refers to the ability to repeat the findings if the same methods etc. are applied. Formal protocols are necessary to ensure that procedures are consistent across case studies. The data upon which the analysis is based will ideally be maintained in a distinct database, independent of any analysis.

Case example - The native grasslands project

Background to the project

The native grassland project has a number of objectives relating to valuation of the contribution of native grasslands to the economic performance of grazing enterprises in north-central Victoria and the southern Riverina region of New South Wales, and to factors influencing managers' decisions on utilisation of these grasslands. It also seeks to explore the utility of various policy instruments that might be implemented to promote social goals for conservation of these grasslands. For the remainder of this paper we use this last objective sections to clarify the case study research design process.

Case Objective: to recommend appropriate policy instruments (focusing on incentives) for achieving conservation goals;

Theoretical issues and research questions

To determine appropriate mechanisms for achieving public policy goals for native grasslands on farms, we need to understand *why* farmers manage native grassland in the way they do. For example, does the current or anticipated level of net cash flow influence conservation outcomes? Is the need for cash flow important in influencing management of the grassland areas? Does this need vary with the proportion of cash flow derived from these areas, or the availability of potential income sources on or off-farm?

The *why* question has non-economic components. For example, are farmers significantly influenced by factors other than profitability or net cash flow in management of native grassland areas? How important are factors such as management style, attitude to risk, and family situation?

These *why* questions are a basis for understanding *how* different policy mechanisms might influence management and conservation outcomes. What type of policy mechanisms are necessary, if any? Is it necessary to have a mix of policy mechanisms? How will farmers' attitudes to government involvement influence acceptability of different mechanisms?

Given the economic character of the project, there are some particular questions of interest relating to policy mechanisms.

(a) How effective are incentives based on 'economic' principles of compensation for foregone opportunities, reimbursement of costs and internalisation of externalities? This question is necessary because most discussion of incentives presumes that farmers are profit maximisers, and hence that incentives must be based on these principles. Even where the profit maximising assumption is found not to hold, an incentives system based on such principles might prevent damage to conservation values arising from neglect or future price or technology change that might not be prevented by payments based on other principles.

(b) How does the 'fit' of native grasslands into the whole farm system influence the effectiveness of different policy mechanisms? The way in which these areas 'fit' within the whole farm system will vary greatly from farm to farm and is likely to have an important effect on the effectiveness of different policy mechanisms.

(c) How effective will *circuit-breaking* incentives be? Such incentives would aim to indirectly improve management of native grasslands by bringing about appropriate strategic shifts at the farm business level (e.g. in the mix of on-farm and off-farm activities in which capital and effort are invested).

(d) In summary, should incentive systems be based on a broader economic approach which accounts for the non-pecuniary objectives of the farm-family, the 'fit' of native grassland into the whole farm system, and opportunities to influence strategic decision-making. In other words, important opportunities to influence farmer behaviour may be lost and inefficiencies will occur in expenditure if incentives are based primarily on 'economic' principles.

The approach (Eisenhardt 1989) of outlining some preliminary theoretical constructs in advance, while developing testable propositions during analysis of results rather than a priori has been adopted. An initial attempt was made to specify propositions in advance following Yin's approach (see Crosthwaite, MacLeod & Malcolm 1997). It has since been decided that these propositions were unnecessarily restrictive and revealed to lack realism once field visits commenced and the propositions were discussed with farmers and other researchers. The now preferred approach will allow for the richness of the cases to inform the theory, while retaining a systematic approach.

Units of analysis

The main unit of analysis is the farm business, which is broad enough to encompass decision choices about investment and off-farm work. A critical task is to explain the effects of policy mechanisms at the farm business level, and their flow-on effects to the conservation management approach. Sub-units of analysis which are physically identifiable are the farm and the native grassland. Other sub-units which are more conceptual in nature are the farm-family, and the conservation management approach.

Number of cases

Eight case studies are planned. The project has been designed to test the management of native grasslands in two land types in south-eastern Australia - (a) riverine plains and (b) slopes, hills and tablelands. While it will be possible to draw lessons by comparisons across these land types, the farming situation is very different. Topography, soil type and rainfall are largely independent of human action and affect carrying capacity and management options. Cases will also be selected in order to capture the range of enterprises utilising native grasslands (e.g. mixed farming, extensive grazing, dairying). In addition, there is more than one research question being addressed. These factors may require a relatively large number of case studies if similar results (literal replication of theoretical propositions) are to be found for more than one case study. Likewise, explaining differences (theoretical replication) will need to be convincing over several cases if the results are to be attributed to the theoretical propositions rather than to other factors.

Selection criteria

A number of criteria have been developed for selection of the case farms, including: physical characteristics of the property; enterprises, income and profitability; availability of information; landholder interest; and linkages to other research projects or initiatives (e.g. Landcare).

Several ways of identifying farms that met these criteria were considered. Using a mail or phone survey to identify potential cases (Harper 1992) was not possible within time constraints. Extension officers of state agriculture and conservation agencies in each study region compiled a list of 10-12 farms thought likely to meet these criteria. Cases were then chosen after discussion with the extension officers.

Data collection strategy

The project involves detailed semi-structured interviews with landholders and other family members. Initial interviews have concentrated on obtaining information about enterprises and pasture types on the farm, which paddocks fit each pasture type, and stock movements between paddocks that have been recorded or are reliably remembered. Subsequent stock movement information will be obtained periodically during the project.

Later interviews will seek financial data. Management options will be solicited from the landholder, as well as from an agronomist who will inspect the native grassland areas. Where available, research data from similar grassland areas will be utilised.

Information about business structure, management practices, farm history, family situation, current and expected cash flow requirements, and farm-family goals will be sought during the interviews. The type of qualitative data that will be required will be, to the extent possible, specified in advance, and a suitable recording format devised. It

is expected that useful qualitative information will be generated which does not easily fit into pre-determined categories.

Analysis strategy

The following steps summarise the approach for each case:

(a) Determine level of stocking on each pasture type;

(b) Specify management alternatives to achieve production and conservation goals;

(c) Determine the farm-family profitability targets or net cash flow requirement;

(d) Prepare an overview of other factors which might influence management of native grasslands;

(e) Determine the reliance on the native grassland areas for meeting financial needs;

(f) Examine the potential effectiveness of different policy mechanisms given factors such as the 'fit' of native grassland management into the whole farm system and the availability of alternative investment strategies.

As each case analysis is completed, comparisons will be drawn with previous cases. Finally, pattern-matching techniques are to be used to draw cross-case conclusions.

The questions about *why* farmers manage native grassland in a particular way will be addressed by comparing the economic performance of present management strategies and alternative strategies to assess the extent to which profit or net cash flow requirements influence management. Where economic factors are found to be the primary influence on farmers' decisions, the *why* questions will produce sufficient information to address *how* different policy mechanisms are likely to influence management.

Analysis of qualitative information obtained through the semi-structured interviews and observation over repeat visits will give some insight into other factors which influence their management (e.g. farming style, family circumstances, attitude, knowledge). However, as the project is of limited duration, it is likely that the use of formal qualitative research analysis tools will be limited. Hence, the research design may not allow 'strong' theory to be generated if non-economic factors are found to be as important as economic.

Nevertheless, the likely effect of each policy mechanism can be tested by assuming in turn the varying importance of each economic and non-economic factor. If the effect of each policy mechanism changes significantly, with different assumptions, then this in itself will be a significant finding. Analysis will be assisted by referring the wider body of social research in agriculture.

Testing the design for validity and reliability

The research design is being constructed in advance with validity and reliability in mind.

Regarding construct validity, the project is being designed to maximise use of multiple sources of evidence (farmer opinion, farm records, regional production and economic data, botanist opinion, agronomist opinion, and available research data). Case farm owners, and relevant others, will be asked to comment on the accuracy and interpretation contained in interview documents, spreadsheets and case reports. Careful specification of the units of analysis will increase internal validity. External validity will be increased through careful attention to the research questions and criteria for selecting cases. Plans for documenting key aspects of the study and by maintaining a data base (interview reports, farm data) for each case study, independent of the case report, will increase reliability and consistency.

Discussion/conclusion

The paper originated in the need to find a suitable method for analysing on-farm land management issues. The whole-farm level at which farmers manage, the complexity of the issues, and the time dimension mean research techniques which emphasize process and context are required. Case study methods do this, and can moreover readily integrate multiple sources of evidence. Case studies also require researchers to take a holistic approach to the problem or unit under study.

It has been shown that the perceived weaknesses of case studies and errors that are commonly made in their application are not substantive. These problems can be largely overcome through a good research design, which includes a stage of theory development and application. There are now sufficient guidelines, from the different perspectives of Yin, Eisenhardt, Stake and others, for getting the design right. The design steps were illustrated in this paper by application to the natural resources problem that lead to consideration of the case study approach in the first place.

Theory-building about natural resource management is one of the areas in which case studies may make a major contribution. Case studies are not representative in a statistical sense, but can be used to generalise to theory. The steps required in case study research force attention to what the case is about and to unearthing its key processes. The real issue is not whether this farm is similar to other farms, but whether we are starting to understand processes that also operate on other farms in spite of the different context that may occur there.

When the multiple dimensions of the on-farm situation are considered - pasture and livestock management, business viability, farm-family livelihood, land protection, biodiversity conservation - it is clear that case studies have a potentially strong role to play in social science research directed to agriculture and natural resource

management. Arguably, case studies should be used much more frequently than they are.

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