Case Study Research in Agricultural and Extension Education: Strengthening the Methodology

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Abstract
This paper approaches the case study design as a strategy for research in agricultural and extension education. Case study is defined, throughout the paper, based on three intrinsic characteristics: specificity, intensity, and multiplicity of sources of evidences. A typology is suggested for case studies considering the study’s purpose, the number of cases and the researcher’s interest. The study analyzes some aspects that allow evaluating the methodological consistence of case studies as related to its transferability, the subjectivity in the data collection and analysis processes, and its dependability and credibility.

Keywords: Case Study, Research Methods, Qualitative Research, Triangulation
Introduction

Qualitative research in general and case study in particular has been labeled by some academic circles as “soft research” as related to its methodological rigor. Etling (1997) recommends that reviewers of the Journal of International Agricultural and Extension Education should not disqualify philosophical and case study articles because the research methodology is weak, recognizing such a label in some circles inside our profession. This imposes a double challenge for agricultural education researchers: case studies must be designed and implemented in a way that inspires: 1) confidence in the scientific community with respect to its conclusion validity and; 2) recognition from the external public (financial agencies, supporters, general public) with respect to its relevance (Ponte, 1994).

Criticisms of case study in the literature have concentrated on three aspects: lack of methodological rigor, difficulty in generalization, and the time spent in the realization of the research. (Bressan, 2000; Gil, 1999; Ponte, 1994; Stake, 1995; Tellis, 1997a; Yin, 2003). With regards to the lack of methodological rigor, the subjective nature of the data collected and the use of mistaken evidence to influence the results are among the primary aspects of concern. The fact that many researchers are tempted to extrapolate the results of the study without being supported from the data collected is an other point of criticism (Goode & Hatt, 1969). Also, it is often alleged that case studies take an overwhelmingly amount of time to conduct and result in thick documents that are sometimes difficult to read (Bressan, 2000; Gil, 1999; Yin, 2003).

However, it is the difficulty in generalizing that has worried some scholars the most. Since case studies do not rely on the probability theory (it works with unitary cases purposefully chosen, as opposed to randomly chosen samples), they do not offer a basis for scientific generalizations in the way they have been traditionally understood by the positivist tradition – issuing ‘general laws’ applied to a specific population and possible to be objectively verified. In fact, it is not the intent of case studies to be generalized or objectively verified, as shown throughout this paper.

Depending on the audience, such criticisms might place the credibility of case study as a research method at a brink. However, they may be minimized by adopting criteria that strengthen the methodological consistency of case studies. Methodological criteria are instrumental and constitute the “necessary condition for scientific competence because few things scream more incompetence than methodological negligence” (Demo, 1995, p. 59).

Merriam (1998) and Yin (2003), pointed out that case studies allow researchers to retain the holistic and meaningful characteristics of real-life events. To Yin (2003), a case study “investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (p. 13). In other words, case study research is appropriate when one deliberately wants to cover contextual conditions, but when the relevant behaviors cannot be manipulated (Yin, 2003). Unlike experimental, survey, or historical research, in case studies any and all methods of gathering data, from testing to interviewing, can be used (Merriam, 1998). Indeed, case studies are expected to combine qualitative with quantitative methods. This grants to case studies a character of interdisciplinary research, since the researcher is required to know a wide variety of methodological procedures from
different knowledge areas and philosophical approaches.

Agricultural education as a discipline has some premises that converge with some of the major building blocks of case study as a research methodology. Barrick (1989) asserts that agricultural education involves application in real settings and serves as the bridge between agricultural science and other disciplines. “Agricultural education blends the applied sciences of agriculture with the applied behavioral sciences of education,” (p. 46) with footings of biological and physical sciences, psychology, and sociology, which gives to it an interdisciplinary and applied science character (Barrick, 1989; McCormick, 1989; Williams, 1991). Williams (1997) assumes that agricultural education researchers are expected to use an interdisciplinary approach. Application in real settings and the interdisciplinary character are two major tenets in which agricultural education and case study research methodology converge.

Research in agricultural and extension education often take place in settings in which relevant behaviors cannot be manipulated. Buriak and Shinn (1993) identified four research problem areas for agricultural education: knowledge base for teaching and learning, curricula and program planning, delivery methodologies, and program relevance and effectiveness. In all these areas, the context is of paramount importance, which is another convergent precept between agricultural education and case study research methodology.

Accordingly, case study is a research method suitable for most agricultural and extension education situations, which takes place in real settings, requires an interdisciplinary approach, and calls for a properly portrayed context in order to allow the readers to make connections between the study and their own (cross-country) experience.

Purpose
The purpose of this paper is to provide tools that contribute to strengthen the methodological consistency of case study as a research method. Specifically, this bibliographic study aims:

1) To characterize, define, and typify case study as a research method, and;
2) To identify quality criteria that allows evaluating the methodological consistence of case studies.

Defining Characteristics of Case Studies
It is critical to know what characterizes an object of study, before constructing a definition. Therefore, before defining case study it is necessary to know its constituent elements.

Specificity
The quintessence of case study is its specificity. Case studies are particularistic, devoted to investigate, deliberately and intensely, a particular, unique situation (Ponte, 1994). Stake (1995), Creswell (1998), Merriam (1998) and McMillan (2002) consider case study as a bounded system, taken as an object, rather than a process. Most authors agree (Creswell, 1998; Lazzarini, 1997; Ponte, 1994; Stake, 1995; Tellis, 1997a; Trochim, 2003; Yin, 2003) that case studies are best applied to situations in which the object cannot be studied out of the context in which it occurs naturally, since in most cases it is not possible to clearly distinguish between the limits of the object and the context.

The specificity of case studies can be analyzed through the object and the time dimensions. The object represents the situation, event, program, phenomenon, community or individual of interest to the researcher. It should be bounded for place and context. The place represents the geographical environment in which the case takes place. The context refers to the social,
economic, historical, cultural, and environmental conditions prevailing during the study’s period. Contextual conditions should deserve careful consideration by the researcher, since they are essential to the comprehension of the object of study as well as to make the study’s results transferable to similar situations.

From the time dimension perspective, contemporaneity is the defining characteristic of case studies. By studying contemporary events or phenomena, case studies permit the use of two types of evidence which are not always possible in other types of studies: direct observation and interviews with people directly involved in the phenomenon or event. Contemporaneity is, therefore, the primary characteristic that distinguishes case studies from historical studies (Merriam, 1998; Yin, 2003). In addition, we need to establish a “when” – with a beginning and an end – for data collection. Establishing the “when” means to define the finite character of the study. If the “when” cannot be clearly defined, then the event or phenomenon is not bounded enough to qualify as a “case” (Merriam, 1998).

Intensity

The role of intensity as a characteristic of case studies is to allow a rich, deep, vigorous and complete description, that clearly illustrates the complexity of the case under study (Merriam, 1998). The researcher is expected to go deep in the design of the theoretical-contextual basis of the study as well as in the data collection and analysis processes. Together, such stages (theoretical-contextual base, data collection and analysis), should produce a holistic view of the case (Creswell, 1998). Intensity can be approached from the theoretical-contextual, the data collection, and the data analysis perspectives.

The theoretical-contextual basis is considerably more important in case studies due to the fact that they deal with situations where the object cannot be studied out of the context in which it naturally occurs (Yin, 2003). This requires, on the one hand, a detailed description of the social, economic, historical, cultural, and environmental context and, on the other hand, a well-founded theoretical framework.

The theoretical-contextual basis is especially relevant given the fact that case studies do not attempt to provide us with statistical generalizations (generalizing for populations). For Yin (2003), “A fatal flaw in doing case studies is to conceive of statistical generalization as the method of generalizing the results.... This is because your cases are not ‘sampling units’ and should not be chosen for this reason” (p. 32). For him, “a previously developed theory is used as a template with which to compare the empirical results of the case study” (Yin, 2003, p. 32-33). He also argues that the researcher should always attempt to search for analytical generalizations (generalizing for theories) when conducting a case study. Nevertheless, case studies findings do not call for broad claims but to make the results transferable to other contexts, through a reader-driven process named transferability. As a result, the researcher should provide elements for the readers to make informed judgment about whether they can transfer the findings to their own situation. A detailed account of the environment surrounding the research must be provided through a thick theoretical-contextual framework in order to allow transferability to occur.

The data collection process is greatly facilitated if the theoretical-contextual basis is consistently formulated. Key aspects that have emerged from the theoretical-contextual basis should necessarily be included in the instruments of data
collection. What is important to keep in mind is that the data collection process should be designed and conducted in a way that the nature of the data collected allows multi-perspective analyses. Triangulation of data and methods is a keystone strategy for multi-perspective analyses.

Stake (1995) emphasizes the need to construct a data collection plan, or protocol (Yin, 2003). A data collection protocol has the potential to increase the level of confidence on the collected data and in turn contribute to increase the trustworthiness of the study. A data collection protocol should necessarily include: 1) objectives, questions and/or study propositions; b) definition of the study object; c) the most relevant aspects of the theory or theories that guide the study; d) the field procedures to be adopted, and; e) primary or main questions that will be dealt with during the process of data collection.

The third perspective to be taken into consideration is the process of data analyses. For Yin (2003) data analysis is the most difficult aspect when conducting case studies because it depends on three factors that are not always present at the same time: a) the capacity of the researcher to think with rigor; b) the quantity, type and quality of the data available for analysis, and; c) the capacity to consider alternative interpretations for the same data.

Data analysis is a process of giving meaning to impressions. The search for meaning, according to Stake (1995), corresponds to the search for patterns, for consistency within certain conditions, which he calls pattern-matching. For him, these patterns will be known in advance drawn from the research questions or will emerge unexpectedly during the analysis. We add to Stake’s (1995) point that such patterns may emerge from a well elaborated theoretical-contextual framework, which reinforce its importance for methodological consistence of case studies.

Analyzing data is, by itself, an intense process. In case studies, the level of intensity (and complexity) is usually higher than in other studies because it has to comprise multiple perspectives. During the analysis, the researcher has to consider not only the perspective of the actors who are directly involved in the phenomenon/situation being studied, but also the perspectives of social, cultural, and economic groups that are part of the context, besides the interactions between these perspectives (Tellis, 1997). Moreover, two peculiarities of case studies affect the data analysis process, making it even more intense: 1) the large amount – and variety – of data, and 2) the existence of information that may seem contradictory and incompatible with each other (Merriam, 1998).

Multiplicity of Sources of Evidences
Case studies require the use of multiple sources of evidences. In human and social science research, each and every situation is multidimensional; it is imperative case study research to use the widest variety of data sources, in order to cover as many dimensions as possible within the case. Fulfilling the requirement of multiple sources of evidence implies understanding the importance of obtaining data of different nature to allow multiple perspectives analyses. The use of multiple sources of evidences means to work with both qualitative and quantitative data collected through diverse strategies – interviews, surveys, experiments, and so on. For Creswell (1998) and Yin (2003), the most important point for methodological rigor in case studies, is the use of multiple sources of evidence. Any findings from a case study will be more credible if it has been based on different sources of information, following a “corroborative” model (Yin, 2003).
The use of multiple sources of evidence imposes to the researcher interested in conducting case studies a challenge to know how to carry out different data collection techniques. Yin (2003) points out that unfortunately many graduate programs place too much emphasis on one single data collection technique to the detriment of others. This prevents students from becoming familiar with a variety of techniques that would allow them to conduct their studies using triangulation of data and methods, which would confer greater methodological rigor. Over-emphasizing only one type of research – experiments, surveys, qualitative techniques, etc – may give the student the wrong impression that there is only one (scientifically correct) way to do research.

Documents, archival records, interviews, direct and participant observation, and physical artifacts are evidence sources listed by Yin (2003) as appropriate for case studies. Creswell (1998) indicates interviews and observations as central strategies in the process of data collection. Stake (1995) recommends the use of surveys. In this sense, case studies possess a hybrid character in regards to the sources of evidence, since it uses a variety of data collection techniques and strategies, comprising from experiments to document analysis, including surveys, quasi-experimental and non-experimental designs, interviews, observations and physical artifacts.

Gathering evidences from multiple sources creates the ideal condition for triangulating data and methodologies, which has been increasingly used in contemporary research (not only in case studies) and is recognized as a valuable strategy to increase the confidence and the credibility of a case (Ary, Jacobs, & Razavieh, 1996; Babbie, 2001). Triangulation is the process of confronting data and methodologies in search for convergence and contrasts. Methodological possibilities resulting from triangulation include examining convergences from different perspectives of the same phenomenon (complementarity), discovering paradoxes, contradictions, and new perspectives (discovery), and amplifying study breadth (expansion) (Greene, Caracelli, & Graham, 1989).

**Case Study Defined**

Case study is an intensive study of an individual, group of individuals, institution, program, company, phenomenon, situation or complex contemporary question, bounded for the object, context, and time, based on detailed data obtained from multiple sources of evidences and analyzed through a combination of methods that favor the understanding of the object of the study in a multi-dimensional way.

Case studies are appropriate “when a ‘how’ or ‘why’ question is being asked about a contemporary set of events, over which the investigator has little or no control” (Yin, 2003, p. 9). While in experimental and quasi-experimental designs significant behaviors are manipulated to concentrate on few variables, in case studies the phenomenon is studied immersed in the real situation in which it occurs, without manipulating any significant behavior.
A Typology for Case Study

A careful review of the literature allows us to categorize case studies in twelve types, according to a matrix based on three aspects, as illustrated in Figure 1. Such a matrix was constructed from typologies adopted by Stake (1995) and Yin (2003).

For Yin (2003), case studies can be classified according to its purpose, as being exploratory, descriptive, and explanatory, depending on the type of study question and the control the researcher has on the events. The borders between exploratory, descriptive and explanatory case studies are not sharply defined; actually, these purposes are often superposed on part or on the whole study (Yin, 2003).

A case study is exploratory when its purpose is to explore a phenomenon or a situation of interest within its context, under multiple perspectives, to formulate propositions, hypotheses or suggestions for further studies. Exploratory case studies do not present “a priori” propositions; “this is the condition in which a topic is the subject of ‘exploration’” (Yin, 2003, p. 22). The goal of descriptive case studies is to describe the phenomenon or situation in the context in which it occurs, from multiple perspectives. Like exploratory studies, descriptive studies do not usually construct “a priori” propositions.

Case studies are characterized as explanatory as they attempt to explain the phenomenon or situation of interest, by comparing and contrasting it with existing theory (or theories) or by contributing for the construction of a new theory. This is a kind of causal relationship different from those traditionally associated with the positivist paradigm; in this case, the phenomenon or situation is “explained” from the perspective of one or more existing theories, corroborating it or contributing in the creation of an alternative vision.

Case studies can be typified as related to the number of cases (Bressan, 2000; Merriam, 1998; Stake, 1995; Yin, 2003), as single or multiple cases. A case study is single when examining only one case that represents: 1) an important test of a certain theory; 2) a rare or unique circumstance; 3) a typical or representative manifestation of a certain phenomenon or
situation; 4) a revelatory phenomenon or situation before inaccessible to scientific study, or; 5) a longitudinal study in which the same case is studied using two or more different points in time (Yin, 2003).

A case study is multiple when it involves the examination of more than one similar case. However, studies involving multiple cases do not follow the sampling logic: case studies (even multiple-case designs) are not probabilistic. They follow the replicability logic. This means that cases are selected taking into consideration the context in which they occur, in order to: a) obtain similar results (literal replication), or; b) obtain contrasting results for predictable reasons due to changes that occurs in one or more contextual conditions (theoretical replication) (Yin, 2003).

Multiple case studies offer the researcher the possibility to conduct cross-case analysis, a powerful tool to make the findings more robust (Yin, 2003). For Merriam (1998, p. 194-195), in multiple case studies “there are two stages of analysis – the within-case analysis and the cross-case analysis.... Once the analysis of each case is complete, cross-case analysis begins. A qualitative, inductive, multi-case study seeks to build abstractions across cases.” For Yin (2003), cross-case analysis can be performed considering cases previously conducted by different researchers or cases that are part of the same study. The more cases involved in a cross-case analysis, the more consistent the findings.

Both single and multiple case studies can involve the examination of one or more units of analysis. The unit of analysis defines what the “case” is and it is related to the way the study question or questions are defined. Therefore, if the individual is the case of interest (the individual is the unit of analysis), you can have a case in which there are three, four, or more individuals (in the same context, place and time) and still treat it as a single case study with multiple units of analysis.

The third aspect in the typology of case studies refers to the interest the researcher has in the case. According to Stake (1995), a case is intrinsic when the researcher has particular interest in a situation or phenomenon, previous to the study. Intrinsic case is defined by anticipation – the case is given. The researcher is not interested in studying the case in order to learn about a certain problem or other similar, but rather to learn about that particular case (Stake, 1995).

Most evaluation research using case study methodology is intrinsic case studies. On the other hand, there are circumstances in which the researcher wants to answer a particular question, and believes that by studying a certain case (or multiple cases) he or she will be able to clarify the issue. These are the so called instrumental case studies, devoted to understand phenomena or situations that transcend the specific case.

**Concluding Remarks**

It is important to highlight some points that ensure greater methodological rigor and are able to tackle the most frequent criticisms against case studies:

1. The research problem, expressed in the form of question, objective, or purpose statement, should be carefully outlined, comprising the study purpose clearly bounded for object and time. It should contemplate the specification of the type of case study that will be conducted and the unit of analysis. The written composition of the research problem also deserves special attention: a clear and objective problem statement gives the reader and the researcher the necessary clarity about the aims of the study.
2. The indissociability between the object of study and its context is one of the tenets of case studies. Consequently, it requires a detailed description of the context within which the object is inserted, including the following five aspects whenever possible and pertinent: economic, social, cultural, historical and environmental. It is necessary to be careful linking the object to its context during the whole description, avoiding the risk of inserting information that does not contribute to the aims of the study.

3. The theoretical-contextual framework, represented by the description of the object of study, context and a strong theoretical support from an exhaustive revision of the literature, should be constructed in a way that harmonizes the research problem with the criteria of data collection and analysis. The theoretical-contextual basis is justified by the research problem, and in turn, justifies the outline of the data collection and analysis processes. Clarity in writing, cohesion and objectivity of the information, and depth in its construction, are important for methodological rigor, related to the theoretical-contextual framework.

4. The theoretical-contextual framework has additional importance in case studies because it allows, if well founded, transferability and analytical generalizations, which is one of the main targets of criticism by some sectors of the academic community. A thick contextual description provides the readers with the basis to transfer the findings to their own situation.

5. It is important to reinforce the compulsory need to the use of multiple sources of evidence, comprising both quantitative and qualitative data. Cross-case analysis is of paramount importance for strengthening conclusion validity of case studies. This is a critical point to face the criticisms related to the subjective nature of the data collection process and to the extrapolation of results without support of collected data. Case study research is essentially a mixed method approach, which favors the use of triangulation of data, methods and researchers as a tool for enhancing its methodological consistency. Triangulation is a strategy that should be used in a universal way in case studies, in the search for complementarity, discovery and expansion. The use of multiple source of evidences analyzed through methodological triangulation, and the possibility of cross-case analysis are decisive for increasing credibility and trustworthiness of case studies.

References


