



Measuring farmer conservation behaviors: Challenges and best practices

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ABSTRACT

This article presents a guide for understanding the purposes and appropriate uses of different measures of conservation behavior. While applicable across natural resource management contexts, we primarily draw upon agricultural conservation research to illustrate our points. Farmers are often of interest to researchers, program managers, extension professionals, and non-governmental environmental organizations due to the significant impact of agricultural production practices on environmental resources. Practitioners are often interested in producer behaviors when they are planning or evaluating a project, developing or evaluating policy, or developing and testing theory. Within those bounds, we identify when it is most useful to assess an actual behavior (self-reported or observed) or behavioral intention (willingness or intent to pay/accept, support/participate in a policy or program, or engage in a conservation practice), and present examples of how they have been used in the past. We close with three recommendations for those conducting research related to agricultural producer behaviors: 1) research should be theoretically grounded, even when the purpose isn't to develop theory; 2) great care should be used when selecting behavior measures, dependent upon the purpose of the research, and 3) composite measures should be used when possible and appropriate.

1. Introduction

Agricultural practices can have significant impacts on environmental quality, and substantial effort has been dedicated to identifying what influences farmers' decisions and incorporating that knowledge into projects, programs, and policies. For example, fifty-five articles that quantitatively modeled conservation adoption were identified and synthesized by Prokopy et al. (2008) and Baumgart-Getz et al. (2012), and numerous articles have been published in subsequent years, providing evidence that this is an important area of research. Given this effort, it is important to consider how behavioral information is collected and measured for different purposes. Behavior measures, often collected through observation and self-reports, are commonly used for three general purposes: to inform planning/evaluation of project-level activities, to develop/evaluate policies intended to influence behaviors, and to develop/test theoretical constructs. Survey questionnaires –

administered via mail, phone, web, or a trained interviewer – rely upon respondents to accurately self-report their behaviors and factors likely to have influenced those behaviors, rather than directly measure behavior through observation. Baumeister et al. (2007) critique over-reliance on self-reported behavior, stating, “people have not always done what they say they have done, will not always do what they say they will do, and often do not even know the real causes of the things they do” (p. 397). Observations, on the other hand, are unique in that they do not rely on self-reports and can result in more accurate measurement. However, they can be cost-prohibitive and may not provide information about independent variables relevant to behavioral decisions.

Recognizing these issues, along with needs and constraints associated with incorporating behavioral information into programs and policies, this paper provides an overview of how behavior can be measured using observation and questionnaires. Using examples from

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studies of farmers, we discuss common ways behavior is measured, and outline when each is best used for theory development, program/policy development, and project level planning/evaluation.

2. Types of behavioral measures

Behavioral research generally focuses on two categories of dependent variables: 1) behavior and 2) willingness or intent. These variables can be operationalized in a variety of ways: behavior can be observed by a researcher or self-reported by participants on questionnaires. Willingness or intent is usually measured through questionnaires. In social psychology, behavioral intentions refer to the proximate antecedent of behavior (Fishbein and Ajzen, 2010), though economists often conceptualize this direct antecedent as a clear preference for a particular choice (willingness-to-pay, discussed below).

Within these two categories of dependent behavioral variables, there are a number of approaches researchers can use for measurement depending upon the theoretical approach or purpose of the research. While some posit observed behavior is the ultimate goal of behavioral research (Baumeister et al., 2007), other forms of behavioral data can be useful for theory development, policymaking, or program development. Table 1 shows the types of behavioral dependent variables and their characteristics, including how they are typically assessed, their primary uses and applications, and example measures used in research. In the following sections, we present more detail about these categories of behavior measures and factors to be considered when selecting a behavior dependent variable.

2.1. Observed behavior

Actual behavior (e.g. not willingness or intent to take an action) is measured through direct observation or self-reports. Direct observation allows researchers to “find out how something factually works or occurs” by evaluating how people act versus what they say (Flick, 2009p. 222). Participant observation, when a researcher studies people’s actions by observing and/or participating in those activities, is a hallmark of social science research and provides rich first-hand descriptions of activities (Kawulich, 2005). However, this type of research can be time consuming, costly, and not always possible, so alternative methods, including field observations and secondary data, are also used.

Field observations can occur in numerous ways, but windshield surveys and GIS are commonly used. Coffey et al. (1998), for example, describe conducting “windshield surveys” of study participants’ farms, where they drove by and recorded crops that had been planted. Satellites offer an additional option for observing behavior: Hively et al. (2015) used a windshield survey and satellite imagery to assess cover crop adoption on farms over time, which was used to help evaluate educational program impacts. Overall, directly measuring behaviors has the potential for producing highly reliable information on actual behaviors. However, field studies can be costly and time consuming, and programmatic, remote sensing, and consumer data may not always be available or at the appropriate scale for analysis.

Another option for collecting measures of actual behavior is secondary data from program participation (e.g., farm conservation programs). Schaible et al. (2015), for example, evaluated field-level conservation practice and program participation data from a United States Department of Agriculture farmer survey and environmental data from the National Resources Inventory to investigate factors influencing environmental stewardship in U.S. agriculture.

2.2. Self-Reported behavior

Researchers often rely on self-reports to assess the degree to which social actors are engaged in actual conservation or ecological behaviors (Milfont, 2009). For example, study participants have been asked to report their behaviors related to nutrient management (Ulrich-Schad

Table 1
Behavioral dependent variable measures and their characteristics.

	Methods of Assessment	Uses/Applications	Expense/special considerations	Common Measures
Behavior				
Observational behavior	Programmatic/secondary data, researcher observation, remote sensing data	Highly reliable measures of actual behavior Geographic extent of behavior	High cost Sometimes data unavailable	Programmatic data, including program participation rates, recorded adoption of practices Remotely sensed or researcher observed practice adoption (rare in studies exploring decision making processes) Reported adoption of practices/behaviors
Self-reported behavior	Questionnaires	Cost effective way to measure actual behavior among research population	Program data may underreport extent of behavioral adoption (only assesses program participation) Most commonly used behavioral measure, easy to collect Possibly misreports actual adoption	Reported program participation
Behavioral Intention			Difficult to measure intensity of behavioral adoption, rather than binary adopt/do not adopt	
Willingness to pay/willingness to accept	Surveys (especially stated choice/contingent valuation studies)	Useful for assessing impacts of program design and implementation (highly useful at policy and program levels)	Complex instrument design, often high cost compared to other survey methods	Contingent valuation
Willingness to participate	Surveys, programmatic/secondary data	Policy assessment, program development and evaluation	High respondent burden, possibly leading to response bias Social desirability bias	Stated choice Self-reported willingness to participate in policy or program
Willingness to adopt	Surveys	Useful in prospective explorations of behavior, esp. program development	Social desirability bias	Self-reported willingness to adopt a behavior or practice

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