



Social Research Working Paper

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Applying Marketing Principles to Policy Design and Implementation

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1. Introduction

One of the most fundamental decisions in formulating a policy is the selection of a policy instrument, or more usually, the selection of a mix of instruments. This decision is also one of the most difficult to make especially with regard to instruments that rely on voluntary change in behaviour because changes in peoples' behaviour can be exceedingly difficult to predict. In the absence of good predictions of what people will do, policy makers can struggle to identify the contribution that voluntary change can make towards achieving the policy objective. They may also struggle, as a consequence, to make sound decisions regarding the need for other, complementary instruments. In this paper we describe the role that market research can play in predicting peoples' responses to policy initiatives in regard to agriculture and natural resource management.

As consumers we are all constantly exposed to new ideas in the form of new products and new brands. And an extensive literature has developed about the ways in which the decision making and purchasing behaviour of consumers can, and cannot, be influenced. Surprisingly, little of the principles, concepts and constructs in this literature appear in the literature on behaviour change and policy in agriculture despite the fact that the technology transfer model that has underpinned much of the thinking in agricultural policy and extension (Black 2000) was originally formulated to explain the diffusion of innovations in consumer markets.

The objective of much of agricultural and natural resource management policy is to change the behaviour of primary producers, often by encouraging them to adopt new technologies and practices. In this, the intent of policy makers is similar to that of marketer. In this paper we illustrate how the concepts of marketing theory can be combined with farm management theory to describe a process for predicting primary producers' responses to policy initiatives, and how information about responses can inform the selection of policy instruments.

We begin by outlining consumer behaviour theory in relation to product purchasing and discuss its application to the adoption of agricultural innovations. We then briefly describe a process for identifying the potential population of adopters of an innovation. We then discuss the application and implications of this process for the design of policy and the selection of policy instruments.

2. Consumer behaviour theory

Consumers make purchase decisions in a variety of ways depending on two key factors (see figure one). These are the level of consumer involvement in the product and the degree of effort the consumer is willing to invest in making a purchase decision (Assael 1998). When involvement is high consumers tend to engage in complex decision making process or brand loyalty depending on the degree of effort they invest in the purchase decision (Assael 1998). When involvement is low consumers tend to engage in variety seeking behaviour or habit depending on the degree of effort they invest in the purchase decision (Assael 1998).

Consumer involvement depends on how important the purchase is to the consumer (Kapferer and Laurent 1986; Assael 1998). High involvement purchases are purchases that are important to the consumer. High involvement products are generally expensive, rarely or infrequently purchased, are often novel, and can be closely tied to self-image and ego. High involvement purchases usually involve some form of risk - financial, social or psychological. Where this is the case the consumer is more likely to devote time and effort to careful consideration of alternatives before making a purchase. Typical high involvement purchases are homes, motor vehicles, white goods, clothing and perfumes (Kapferer and Laurent 1986).

Low involvement purchases are purchases that are unimportant to the consumer (Assael 1998). These purchases are commonly inexpensive products that are routinely purchased and involve little risk. The consumer is unlikely to devote much, if any, time and effort to consideration of alternatives for low involvement purchases before making a decision. Typical low involvement purchases for many consumers are groceries, toiletries, and laundry products (Kapferer and Laurent 1986). Involvement has a number of dimensions such as interest, risk, symbolic value and reward or benefit (Kapferer and Laurent 1986). Hence consumers vary both in terms of the magnitude of their involvement with a product and the basis for that involvement.

The *level of effort* that consumers invest in the purchase decision increases with their involvement in the purchase. For instance, products that are costly or complex such as consumer durables evoke a greater investment of time and energy in the search for a suitable purchase (Arora 1982). In contrast, most consumers expend little effort on typical low involvement products such as groceries which involve little risk and are only distantly related to social and personal values.

The level of effort expended on a purchase also depends on the individuals' familiarity with the product and their perception of differences in the performance of different brands. As a general rule, consumers devote less effort to making decisions to purchase

products with which they are thoroughly familiar compared to products that they are not familiar with. Also, consumers will expend less energy on making decisions between brands of a product when they do not perceive any difference among brands in product performance (Assael, Reed and Patton 1995).

Figure 1: Consumer purchase behaviour

	<i>High involvement purchase decision</i>	<i>Low involvement purchase decision</i>
<i>Decision making</i> (More effort)	<p>Complex decision making (e.g. cars)</p> <ul style="list-style-type: none"> • High motivation to search for information • High effort into learning and discovery • Evaluation both prior to and after purchase 	<p>Variety seeking (e.g. snack foods)</p> <ul style="list-style-type: none"> • Low motivation to search for information • Some effort into learning and discovery • Evaluation after purchase
<i>Habit</i> (Less effort)	<p>Brand loyalty (e.g. athletic shoes)</p> <ul style="list-style-type: none"> • Less effort into learning and discovery as consumer already has a product they are satisfied with • Evaluation based on experience with the product 	<p>Inertia (e.g. laundry detergent)</p> <ul style="list-style-type: none"> • No motivation to search for information • No effort put into learning and discovery • Evaluation after purchase

3. Consumer behaviour and agricultural innovations

The purchase of an agricultural innovation by a primary producer has the characteristics of a high involvement purchase. By definition the adoption of an agricultural innovation involves consideration of the novel and unfamiliar. Usually the adoption of a new agricultural practice or technique has significant consequences for the future financial performance of the farm enterprise.

New agricultural technologies or practices must be integrated into the existing mix of technologies, practices and resources that exist on the farm (Crouch 1981; Kaine and Lees 1994). This means, generally speaking, the likely outcomes of adopting a particular technology or practice are difficult to predict as the compatibility of the technology or practice with the existing farm system, and the resulting benefits, depends on a range of contextual factors that are specific to the circumstances of each farm enterprise. Consequently, the decision to adopt an agricultural innovation is often financially risky. As such they entail social risks and psychological risks for the individual in that the outcomes affect the wellbeing of family members and can influence producers' feelings of achievement and self-fulfilment.

The adoption of most agricultural innovations can be characterised then, as a form of high involvement purchase for primary producers.

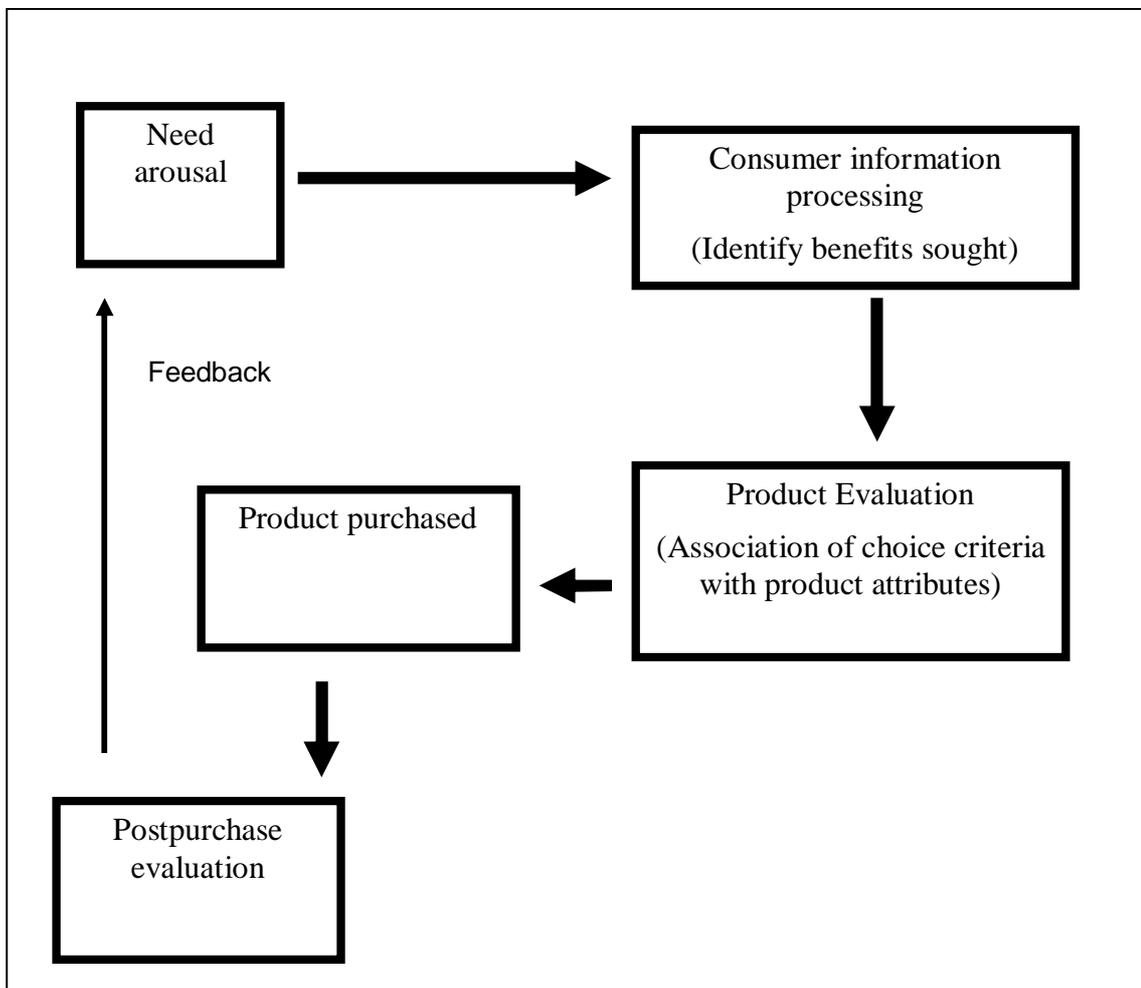
3.1 High involvement purchases and complex decision making

Consumer behaviour theory suggests that consumers follow either a complex decision-making process or exhibit brand loyalty with high involvement purchases (Assael 1998). Complex decision-making is a systematic, often iterative process in which the consumer learns about the attributes of products and develops a set of purchase criteria for choosing the most suitable product (see figure two). In complex decision making the consumer is portrayed as attempting to make the best product or brand choice.

The first step in complex decision making, need arousal, is the recognition of a need. The recognition of a need can be triggered by many causes including experience, an immediate cue, new information, or a change in circumstances or the environment (Assael, Reed and Patton 1995). The next step, information processing, is the process of noticing relevant stimuli, understanding and interpreting them, and retaining the stimuli in memory. This step captures the searching for, screening and gathering of information about products that the consumer perceives as relating to satisfying their need. The next step, product evaluation and purchase, encompasses the association of product characteristics with the benefits the consumer seeks, the selection and purchase of a product.

In the final stage following purchase, post-purchase evaluation, the consumer evaluates the performance of the product. Satisfaction is likely to result in repurchase and eventually brand loyalty. If the expectations of the consumer are not met then the consumer will be dissatisfied and unlikely to purchase the product again. The stages in complex decision making are not intended to be mutually exclusive, nor strictly sequential.

Figure 2: Stages in complex decision making



Adapted from Assael (1998)

Given need arousal, the key to understanding the purchase decisions of consumers is to understand the key benefits consumers are seeking and how those benefits translate into a set of criteria that consumers use to make their decisions. Generally speaking, consumers purchase criteria reflect their usage situation. In the case of consumer goods the usage situation is often a function of the consumer's past experiences, their lifestyle and their personality (Assael, Reed and Patton 1995). For example, economy, dependability and safety are key purchase criteria for many consumers with families that are buying motor vehicles that will be used daily to transport family members, especially children. Having settled on a set of purchase criteria for deciding between products, the consumer then evaluates the products against the criteria and makes a choice.

Consumers can be grouped into market segments on the basis of similarities and differences in the key purchase criteria that they use to evaluate a product (Assael, Reed and Patton 1995). Knowledge of the key purchase criteria that will be used by consumers in a segment can be employed to tailor products to meet the specific needs of consumers in that segment and to promote products accordingly.

In the case of agriculture the purchase criteria that producers use to evaluate new technologies should reflect the key benefits the technology offers given producers' usage situations. The mix factors that define the usage situation for an innovation will vary across innovations and among farm managers. In many instances the usage situation is likely to be a function of the farm context into which a new technology must be integrated. Generally speaking, the farm context is the mix of practices and techniques used on the farm, and the biophysical and financial resources available to the farm business that influence the benefits and costs of adopting an innovation (Crouch 1981; Kaine and Lees 1994).

However, for some innovations the farm managers' perceptions of relevant risks and the management strategies that have been implemented to ameliorate those risks may be the relevant contextual variables that define the usage situation. In some instances, the usage situation for an innovation could even be defined by the social and personal values of the farm manager. Hence, the notion of farm context can at times encompass the personal and social values of the farm manager and their perception of relevant risks and associated management strategies. Similarities and differences among farm contexts for an agricultural innovation will translate into similarities and differences in the key purchase criteria that producers will use to evaluate that innovation.

Given that the usage situation for agricultural innovations is defined by farm contexts, differences in farm contexts will result in different market segments for an innovation. Logically, the market for an innovation will be defined by the set of farm contexts for

which the innovation generates a net benefit (see Kaine and Bewsell (2002a); Kaine and Bewsell (2003); Kaine and Niall (2001a) and Kaine, Court and Niall (2002) for examples).

As is the case with consumer products, knowledge of similarities and differences in the key purchase criteria that will be used by producers to evaluate an innovation can be used to classify producers into segments, to tailor the innovation to meet the specific needs of producers in a segment, and to promote the innovation accordingly.

3.2 High involvement purchases and brand loyalty

When repeated purchasing of a chosen product consistently generates a high degree of satisfaction then, over time, complex decision making may be replaced by brand loyalty. Brand loyalty is the second approach to purchasing high involvement products. Brand loyalty is more than just habitual purchasing of a brand. It represents a personal commitment to repeatedly purchase a brand on the basis of favourable attitudes towards the brand (Assael 1998). In situations where the purchase of a product entails a high level of risk, then brand loyalty may be an effective strategy for reducing risk. Brand loyalty does not equate with habit (Assael 1998).

Brand loyal consumers may change brands for three reasons. First, because they experience a change in their needs and the original product does not satisfy or match new needs. Second, brand loyal consumers may be forced to change brands because of dissatisfaction with the favoured product due to continually poor performance of the product over a period of time. Finally, brand loyal consumers may be induced to change brands because they learn of an alternative which is demonstrably superior.

In the case of agricultural innovations, brand loyal behaviour translates into a personal commitment to the use of an agricultural technology or practice that has been proven through experience to be successful, especially in situations where failure can have serious consequences. This means that producers are likely to be particularly unwilling to change technologies in situations where the failure of a technology can have serious consequences for the farm enterprise and existing technologies and practices have proved to be reliable. In such situations the rate of adoption and diffusion of alternative technologies is likely to be exceedingly low unless a change in circumstances leads to the failure of the traditional technology. The loyalty of producers to traditional technologies and practices in this type of situation is a structured, strategic response to risk.

Kaine and Niall (2001b) found that wool producers' approach to sheep breeding and their choice of stud for purchasing rams resembled brand loyal behaviour. Evidence of brand loyal behaviour has also been identified with respect to pest and disease management in horticulture and animal health management in dairying, cattle and sheep production (Bewsell and Kaine 2004; Kaine, Tarbotton and Bewsell 2003).

In conclusion, the application of consumer behaviour theory to the adoption of agricultural innovations suggests that primary producers are likely to be motivated and discriminating purchasers of new technologies who actively seek information on, and systematically learn about, innovations that are highly relevant to their needs. In circumstances where the failure of an innovation can have serious consequences for the farm enterprise, and existing technologies and practices have proved to be reliable, producers will sensibly resist the introduction of an innovation. This behaviour can be interpreted as resembling brand loyalty and is a rational and strategic response to risk.

4. Identifying the population of potential adopters

To the degree that the mix of farm practices, technologies, resources, risks and values that influence the benefits and costs of adopting an innovation are different for different innovations, the purchase criteria used to evaluate innovations will change accordingly. This means purchase criteria are frequently innovation specific and often cannot be generalised across innovations. Farming system researchers have also observed that the adoption of an innovation within a farming system often depends on a set of technical, economic and social characteristics that tend to be highly specific to the innovation (see Gibon 1999; Dorward et al 2003 for example).

The use of complex decision making in high involvement purchasing implies that the purchaser develops explicit chains of reasoning to guide their decision making. This is consistent with explanation based decision theory, where the focus is on "reasoning about the evidence and how it links together" (Pennington and Hastie 1989). The idea is that producers gather 'evidence' on the attributes of the technological alternatives available to them. This evidence is processed into a coherent causal model, or explanation, which is used by the producer to evaluate the extent to which the alternatives will meet their farming needs and upon which a decision is finally made (Cooksey 1996).

If the purchase criteria that producers use to evaluate innovations are defined by farm contexts, and if producers do base their evaluations of innovations on explicit chains of reasoning, then there should be shared and complementary patterns of reasoning among producers that adopt a technology and those that do not, and there should be an

accompanying consistency in the decisions they reach. In other words, producers with similar farming contexts will offer similar explanations for the decision making, and these explanations will differ from those of producers whose farm contexts are dissimilar. Furthermore, the differences in the reasoning of producers from different segments should follow logically from differences their farm contexts.

Consequently, the criteria influencing producers' decisions to adopt an innovation should be discoverable using a convergent interviewing process (Dick 1998). Convergent interviewing is unstructured in terms of the content of the interview. The interviewer employs standard laddering techniques (Grunert and Grunert 1995) to systematically explore the reasoning underlying the decisions and actions of the interviewee.

Given a limited set of different farm contexts for an innovation then, in principle, that set can be identified by interviewing producers from each context. That the set has been identified can be known by the fact that the same patterns of reasoning keep recurring in interviews. As the set of relevant contexts cannot be known in advance 'snowballing' sampling techniques (Cooper and Emory 1995) must be employed. As interviews progress the various characteristics that define different farm contexts for an innovation will emerge. Confirmation of the relevance of those characteristics, and the manner in which they influence the adoption of the innovation, is obtained by identifying and interviewing producers that differ on those characteristics as they emerge.

Given producers' decisions to adopt an innovation are systematically related to salient factors that define the farm context for an innovation, the relationship between adoption and the presence or absence of those factors can be validated statistically using standard market survey techniques. In other words, by distributing a mail questionnaire to producers, data can be gathered to statistically test hypotheses about relationships between farm contexts and the incidence of adoption, and to quantify the size of segments and so provide an estimate of the population of likely adopters.

The process we have described here has been used successfully to identify segments for innovations such as irrigation systems in the horticultural, viticultural, vegetable and dairy industries in Australia, breeding practices and animal health practices in sheep and cattle in Australia and New Zealand, and pest and disease management practises in horticulture and viticulture in Australia and New Zealand among others (see Kaine and Bewsell (2002b); Burrows et al (2002); Bewsell and Kaine (2002); Kaine and Bewsell (2000); Kaine and Niall (2001b); Kaine, Tarbotton and Bewsell (2003); Kaine and Bewsell (2003) and Bewsell and Kaine (2003) respectively).

5. Policy design and instrument selection

We have shown that the behaviour of primary producers in regard to the adoption of innovations can be predicted using information about key characteristics relating to their farming context. Although the relevant contextual characteristics differ depending on the innovation, market research techniques can be used to isolate the set of characteristics that are relevant for any particular innovation. On the basis of these characteristics, producers can be classified into segments such that producers within a segment behave similarly but differently from those in other segments. Given information on the relative size of segments, predictions can then be made about the aggregate level of adoption of the innovation.

In principle, the same process can be used to predict the responses of primary producers to persuasive policy initiatives that are intended to achieve sustainable agricultural and environmental outcomes by encouraging producers to change agricultural their farm and natural resource management practices. This has important consequences for policy design and instrument selection.

One important consequence relates to the targeting of persuasive policy initiatives such as awareness raising and education and training programs to achieve voluntary change. The purchase criteria used by producers to evaluate a change reflect the benefits they seek. As we have noted, producers seeking different benefits will employ different purchase criteria. A key insight from consumer behaviour is that consumers selectively process information (Assael 1998). This means that efforts to raise the awareness of producers and foster learning among them will be most successful when such efforts align with the benefits producers are seeking. As a consequence different promotional messages may be required to attract the attention of producers from different segments.

For example, a major objective of Australian government policy in regard to horticulture and viticulture has been to increase water use efficiency so as to reduce the incidence of environmental problems such as salinity. In concrete terms this policy translates into promoting the adoption of micro-irrigation techniques (among other things). Market research has shown that fruit and grape growers in some of the largest segments of growers that are adopting micro-irrigation to save time irrigating and to improve control over product quality. Growers in these segments are not adopting this technology primarily to increase water use efficiency. Hence, efforts to attract growers to field days demonstrating the application of this technology for the purpose of saving water have met with limited success. Field days demonstrating the application of these technologies to improve grape quality for example will likely be more successful in attracting growers. See Kaine and Bewsell (2002b) and Kaine and Bewsell (2002c) for more detailed examples.

Another important consequence relates to the selection of policy instruments. Consider, for example, a situation where a policy maker wishes to promote a change in agricultural or natural resource management practices, that is, the adoption of an innovation, in order to achieve an environmental outcome such as reduced use of irrigation water by agriculture or lower rates of nutrient emissions from farms. In figure three the population of potential adopters of an innovation is drawn as a frequency distribution over time. Broadly speaking this distribution can be influenced in two ways.

First, an initiative can accelerate the uptake of the innovation but does not alter the population of potential adopters. In other words the innovation spreads through the population of adopters more rapidly. This is shown in the diagram as a shift to the left of the adoption curve. Initiatives that hasten the spread of awareness of the innovation among adopters, or that provide earlier access to education and training when certain skills are required to adopt an innovation are of this type. Many initiatives based on incentives such as subsidies are of this type (Kaine and Gow 1994; Kaine and Bewsell 2002d).

Second, an initiative can change the population of potential adopters by either creating a need for change or by substantially changing the purchase criteria used by producers to evaluate alternatives. Initiatives such as the provision of relatively large subsidies or the introduction of regulations can be interpreted as creating a need to change. Initiatives such as changes in the provision of regional infrastructure tend to alter the purchase criteria used to evaluate alternatives, thereby changing the population of potential adopters of each alternative. The provision of pressurised irrigation delivery systems, for example, reduces the potential population of adopters of micro-jet irrigation in favour of drip irrigation (Kaine and Bewsell 2002b, Kaine and Bewsell 2002c). This type of change is shown in figure four as an upward shift in the adoption curve.

Assume now that, to achieve the policy target in terms of reduced water use or lower environmental emissions the innovation in question must be adopted by the larger population in figure four (that is, N_2). Clearly, policy initiatives that simply accelerate the spread of the innovation among the original population of potential adopters cannot succeed in reaching this target. In other words, a combination of persuasive and other policy initiatives is required to achieve the desired outcome.

Figure 3: Accelerating the rate of adoption

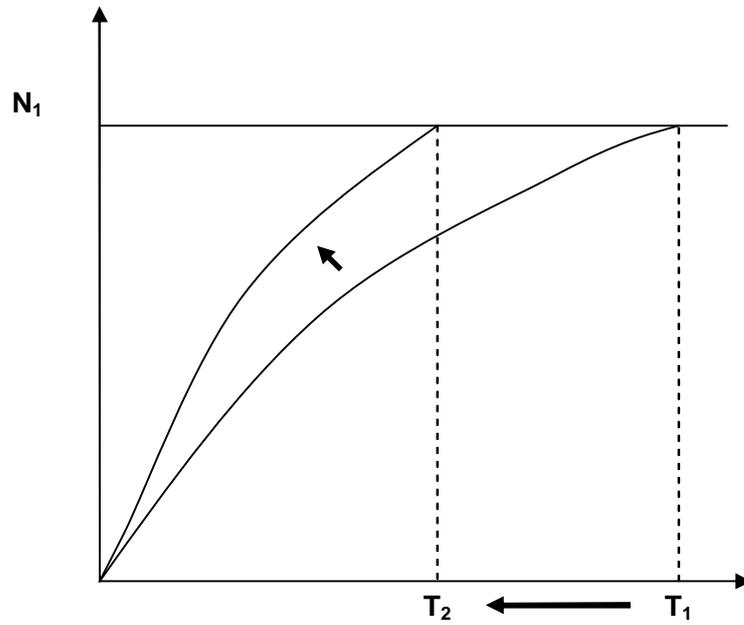
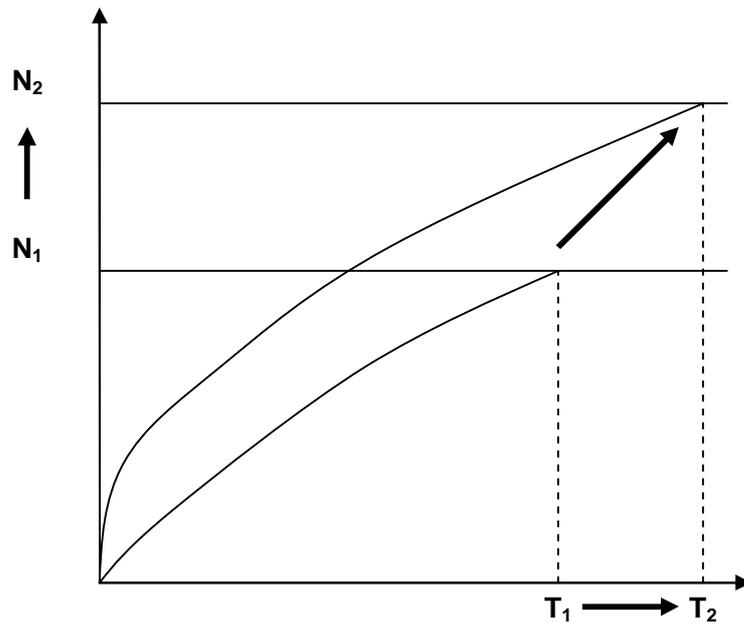


Figure 4: Increasing the population of adopters



This highlights the limits to the effectiveness of initiatives such as education, training and extension as policy instruments. Extension can facilitate or accelerate change by reducing the effort and time primary producers need to spend in searching for information and acquiring skills. In other words, extension can disseminate information and skills more rapidly than would otherwise be the case resulting in higher rates of diffusion of an innovation. That is, faster rates of behaviour change. Extension and education do not in themselves change the population of potential adopters. Generally speaking this requires other policy interventions such as taxes and subsidies, though only if sufficiently large, or changes in property rights, or changes in regulations.

The nature of the additional interventions or initiatives that are required to achieve the outcome can be inferred from the purchase criteria that define the different market segments for an innovation. A high degree of intervention is required in situations where the policy maker cannot influence one or more of the purchase criteria used by producers to evaluate an innovation. This is because the policy maker must induce a need for change by introducing legislation to restrict access to a resource for example. Such initiatives tend to be somewhat controversial because such initiatives are often likely to provoke antagonism among the target market. Examples of such initiatives are regulations limiting water allocations and moratoriums on issuing of water entitlements or the banning of pesticides and insecticides.

A lower degree of intervention is required where the policy maker can influence one or more of the purchase criteria used by producers to evaluate an innovation more favourably than where this is not the case. Here the policy maker is not forced to motivate change. The policy maker is attempting to influence producers that have recognised a need for change to adopt a particular alternative favoured by the policy maker. For example, policy makers can increase the attractiveness of drip irrigation by installing pressurised irrigation delivery systems or subsidising the construction of on-farm storages (see Kaine and Bewsell 2002b). Such initiatives are less likely to provoke antagonism among the target market.

A third important consequence for policy design that arises from the application of the type of market research we have described relates to management of an innovation. A fundamental insight from consumer behaviour is that consumers in different segments use a product in different ways. Their use of a product depends on the nature of the benefit they are seeking and this is reflected in the purchase criteria used to evaluate a product. This leads to the customising of products for different segments. By the same token, although primary producers in different segments may adopt the same innovation they will implement the innovation in different ways. This means that innovation will be used in different ways by different producers.

The consequence is that producers may adopt and implement an innovation in ways that do not contribute as strongly to the outcome sought by the policy maker as might have been anticipated. In some cases innovations may be implemented in ways that are actually counter-productive from the perspective of the policy maker. The end result is a gap between the policy objective in terms of desired outcomes and the outcomes actually achieved.

For example, the construction of on-farm storages has been promoted as a means of ensuring irrigation water is contained in a closed system on farms, thereby increasing irrigation efficiency. The use of storages for this purpose requires that storages be empty at the commencement of irrigations. However, producers in some segments construct on-farm storages in order to control the timing of irrigations. The use of storages for this purpose requires that storages be full at the commencement of irrigations, negating the purpose of the policy (Kaine and Bewsell 2000).

Similarly, attempts to reduce nitrogen emissions from dairy farms by removing stock from farms during summer periods appear to be countered by the higher stocking rates carried over the winter (Thorrold et al 2001).

In summary, market research can contribute to the design of policy and the selection of policy instruments in three ways. First, market research can assist policy makers to better target policy initiatives by identifying the purchase criteria that producers employ to evaluate a change in agricultural practice or technology. Second, it can provide assistance in assessing the likely contribution of persuasive policy initiatives such as education and extension to the achievement of policy outcomes. And, as a consequence, draw attention to the need for complementary initiatives to achieve those outcomes. Market research can achieve this by identifying the population of producers that will voluntarily change an agricultural practice or technology and the ways in which such changes are implemented by different segments of that population.

Third, market research can distinguish between those producers who experience a need and whose purchase criteria lead them to change in ways that are desirable from a policy perspective and those producers who recognise a need for change but whose purchase criteria lead them to change in ways that are less desirable from a policy perspective. In doing so, market research can provide assistance in the selection of a mix of instruments that will best complement a persuasive policy initiative.

6. Conclusion

The objective of much of agricultural and natural resource management policy is to change the behaviour of primary producers, often by encouraging them to adopt new technologies and practices. In this, the intent of policy makers is similar to that of marketer. In the absence of information on the population of primary producers that are likely adopters of an innovation, and the factors motivating or inhibiting adoption, policy makers have little to guide them in making sound judgements about what mix of policy instruments will best meet their objectives. They also lack a sound basis for making judgements about the relative success of policy initiatives and the causes of any differences in the apparent success of initiatives.

In this paper we described how the concepts of marketing theory can be combined with farm management theory to describe a reliable process for determining how an agricultural practice or technology contributes to satisfying the needs of primary producers as managers of agricultural enterprises and, by extension, how the factors motivating or inhibiting adoption and change can be identified. We outlined how this process can be used to predict the population of primary producers that are likely adopters of an innovation.

We demonstrated that this type of market research can be used by policy makers to better target persuasive policy initiatives such as education and training programs. We illustrated that this type of market research can be used to ascertain the extent that persuasive policy initiatives can contribute to achieving policy outcomes and highlight the need for complementary initiatives to achieve those outcomes. We also described how this market research can provide assistance in the selection of the mix of instruments that will best complement a persuasive policy initiative.

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