SEMINAR II REPORT ON

Application of Behavioural Economics in Agricultural Extension Research

INTRODUCTION:

Behavioral economics combines elements of economics and psychology to understand how and why people behave the way they do in the real world. It differs from classical economics, which assumes that most people have well-defined preferences and make well-informed, self-interested decisions based on those preferences. Shaped by the field-defining work of University of Chicago scholar and Nobel laureate Richard Thaler, behavioral economics examines the differences between what people "should" do and what they actually do and the consequences of those actions. Behavioral economics theories and principles can improve the way we present options to clients, increasing the likelihood of them choosing desirable behaviors.

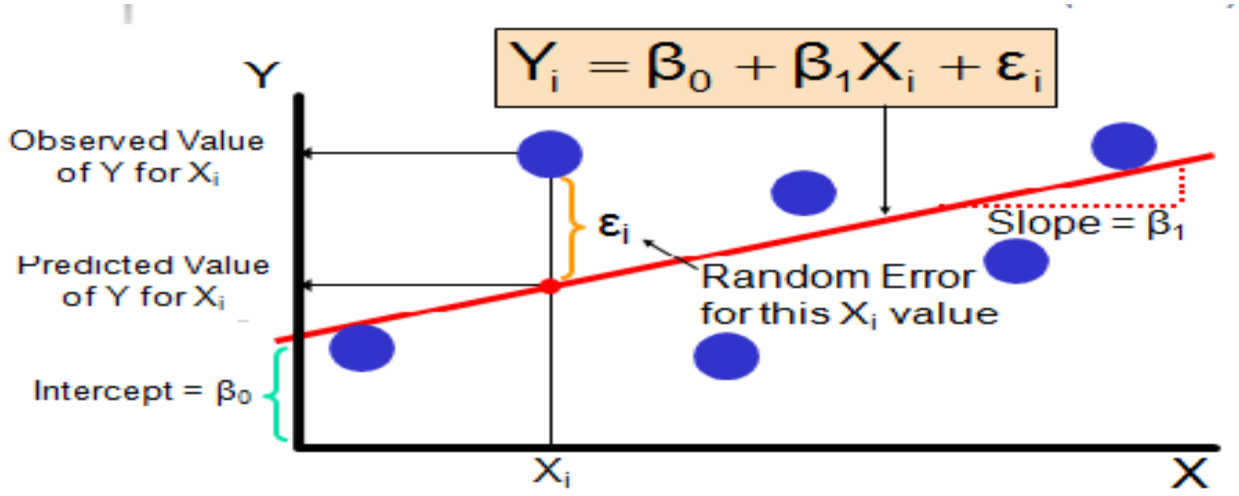
Choice architecture is a behavior-change tool employed by behavioral economists. Choice architecture refers to intentionally changing a decision-making environment (such as the presentation, timing, or context) to influence a decision. A specific type of choice architecture is known as nudging. Nudging is the act of subtly modifying the environments within which voluntary decisions are made without actually restricting any options. Classic examples of nudging are when healthier food is positioned to be easily accessible (e.g., displayed at eye level) to consumers in the line at cafeterias or when water options are displayed first before consumers can reach sugary drinks. In the context of Extension, extension professionals may find nudges can improve clients' decision-making so they can solve problems in their lives.

Behavioural Economics helps extension researcher to identify and study biases of farmers and other stakeholders in decision making, helps extension professionals to modify choice environment to support positive decision making to induce farmers to adopt new technologies, to promote agribusiness and agri-entrepreneurship, to induce farmers to opt for crop insurances etc. Behavioural Economics integrates normative message into decision making environment.

The use of social comparison can help people go by what others do so. This is helpful to influence farmers to join Farmer Producer Organisations and to reduce water use, pesticide use etc. Framing effect can be used to adopt less popular but socially desirable practices like conservation agriculture or to cut stubble burning and to devise extension strategies for upscaling of technologies. There should be capacity building of extension professionals to make use of behavioural economics theories to unravel decision-making behaviour of farmers and to frame suitable policies for better adoption of technologies and other development interventions.

The basic idea of Behavioural Economics is to understand the economic behaviour and its consequences. Dating back to 1960s Behavioural Economics "increases the explanatory power of economics through more realistic psychological foundations" (Camerer, 2004).

While standard economic models are based on a strong assumption of human's rationality, Behavioural Economics points researchers' attention to psychological, emotional and social factors which influence individual's decisions.



Daniel Kahneman and Amos Tversky (1979) developed the so-called Prospect Theory, which explains the role of cognitive psychology in individual's decision-making process that often demonstrates deviations from the neo-classical theory assumptions. Kahneman and Tversky described the risk averse and risk seeking behaviour of individuals when the decision context includes full information about alternatives and their probabilities.

Behavioural Economics led to the appearance of the term "bounded rationality". Herbert Simon (1955) in 1978 won a Nobel Prize for his "pioneering research into the decision making process within economic organisations", in which he led the reader to the idea that

homo economicus is not a good approximation of real behaviour. Simon proved that the concept of economic man should be replaced by "a kind of rational behaviour", which takes into account limited access to information, limited computational capacities of the individual and the influence of the decision making context. In his later works, Simon also mentions the influence of emotions and feelings on the individual's decisions.

Despite the fact that BE introduces a number of ideas, which contradict neoclassical model assumptions, it doesn't reject the neoclassical approaches which use utility theory and maximisation. Behavioural Economics enriches the theory adding greater predictability to the models and helping to identify better policies. The behavioural approaches are successfully applied in classical models and represent improved versions of Marshallian and Hicksian demand, reference dependent utility, the utility of sequences, etc.

Behavioral economics, a science of human decision-making that draws from theories of economics and social psychology, is a natural partner to social marketing. Principles of behavioral economics include the following (Executive Office of the President, 2016; Rothschild, 2001):

- There is a cost associated with making any behavior change, whether the individual is adopting, changing, or stopping something.
- Very small barriers to program access can make the difference in whether it is successful or not.
- People tend to discount the benefits of adopting a behavior when there is a delay in receiving the reward.
- There are typically many competing choices.
- The resources needed to change behaviors (e.g., money, energy, time, health) are not unlimited.

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Behavioral economics have been used in health and personal finance sectors but have been underused by those working in environmental contexts, especially water issues. We feel there are unlimited opportunities to integrate behavioral economics, specifically nudges, into Extension programs in the environmental sector and beyond.

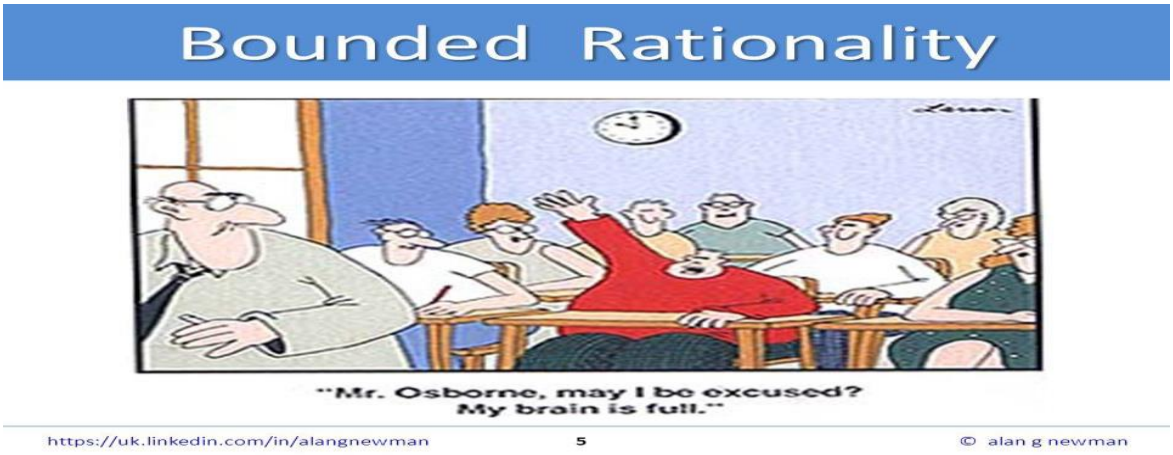
BE add a number of concepts, which focus the researchers' attention on the reasons of limited rationality. These concepts include the cognitive biases, which represent propensity to think in a certain way what leads people to a systematic deviation from rational behaviour. Another important concept, introduced by BE is heuristics, which is a simplified approach to problem solving, which minimize the time, spent on decision making, but doesn't guarantee the optimal choice. Heuristics include intuitive guess, stereotypes, rules of thumb, which are the simplifying rules helping individuals to make decisions faster with smaller time costs, what can lead to the status quo bias. Status quo is a cognitive bias that leads people to overestimation of a certain alternative, which was already chosen before.

Other cognitive biases include reference dependent utility when people evaluate their satisfaction or happiness through comparison with other people. The so-called framing effect which assumes that choice of an individual or his answer to a certain question depends on the way the question was asked. The endowment effect, according to which when an individual is asked to choose between two alternatives which consist of two equal by price products, but the difference is that one product was already given to the individual and he is asked whether he wants to exchange it to another alternative; in a vast majority of cases the individual will choose the one he already has in his hands. This effect can be explained through reference dependence and loss aversion. Bounded awareness described as a process when people "routinely overlook important information during the decision-making process."

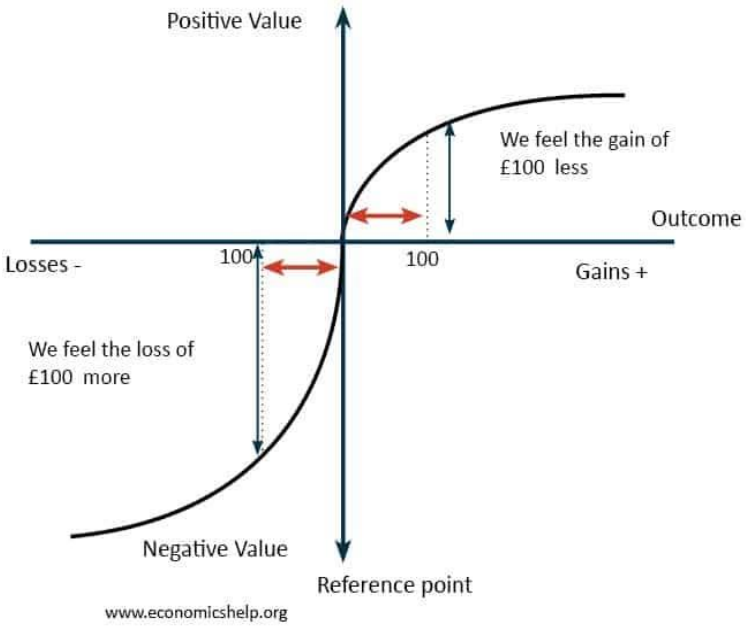
The list of cognitive biases is not limited to the examples presented above; one of the types of biases, which represent a separate group, is the emotional bias. The effect of emotional biases as well as cognitive biases is similar; they decrease the rationality in individual's decision making process. Despite the fact that emotions, beliefs and subjective opinions often become a reason of a decision bias, they might also represent decision criteria and important influencing factors in decision making process. Paying greater attention to the non-pecuniary factors and decision criteria, Behavioural Economics theory helps in improving predictability of new economic models.

Theories of Behavioural Economics:

Rational Choice



In an ideal world, defaults, frames, and price anchors would not have any bearing on consumer choices. Our decisions would be the result of a careful weighing of costs and benefits and informed by existing preferences. We would always make optimal decisions. In the 1976 book The Economic Approach to Human Behavior, the economist Gary S. Becker famously outlined a number of ideas known as the pillars of so-called 'rational choice' theory. The theory assumes that human actors have stable preferences and engage in maximizing behavior. Becker, who applied rational choice theory to domains ranging from crime to marriage, believed that academic disciplines such as sociology could learn from the 'rational man' assumption advocated by neoclassical economists since the late 19th century. The decade of the 1970s, however, also witnessed the beginnings of the opposite flow of thinking, as discussed in the next section.



Prospect Theory

While economic rationality influenced other fields in the social sciences from the inside out, through Becker and the Chicago School, psychologists offered an outside-in reality check to

prevailing economic thinking. Most notably, Amos Tversky and Daniel Kahneman published a number of papers that appeared to undermine ideas about human nature held by mainstream economics. They are perhaps best known for the development of prospect theory (Kahneman & Tversky, 1979), which shows that decisions are not always optimal. Our willingness to take risks is influenced by the way in which choices are framed, i.e. it is context-dependent. Have a look at the following classic decision problem:

Which of the following would you prefer:

1. A) A certain win of $250, versus
B) A 25% chance to win $1000 and a 75% chance to win nothing?
2. How about:
C) A certain loss of $750, versus
D) A 75% chance to lose $1000 and a 25% chance to lose nothing?

Tversky and Kahneman's work shows that responses are different if choices are framed as a gain (1) or a loss (2). When faced with the first type of decision, a greater proportion of people will opt for the riskless alternative A), while for the second problem people are more likely to choose the riskier D). This happens because we dislike losses more than we like an equivalent gain: Giving something up is more painful than the pleasure we derive from receiving it.

Bounded Rationality

Long before Tversky and Kahneman's work, 18th– and 19th-century thinkers were already interested in the psychological underpinnings of economic life. Scholars during the neoclassical revolution at the turn of the 20th century, however, increasingly tried to emulate the natural sciences, as they wanted to differentiate themselves from the then "unscientific" field of psychology. The importance of psychologically informed economics was later reflected in the concept of 'bounded rationality', a term associated with Herbert Simon's work of the 1950s. According to this view, our minds must be understood relative to the environment in which they evolved. Decisions are not always optimal. There are restrictions to human information processing, due to limits in knowledge (or information) and computational capacities.

While the idea of human limits to rationality was not a radically new thought in economics, Tversky and Kahneman's 'heuristics and biases' research program made important methodological contributions, in that they advocated a rigorous experimental approach to understanding economic decisions based on measuring actual choices made under different conditions. About 30 years later, their thinking entered the mainstream, resulting in a growing appreciation in scholarly, public, and commercial spheres.

Mental Accounting

The economist Richard Thaler, a keen observer of human behavior and founder of behavioral economics, was inspired by Kahneman & Tversky's work (see Thaler, 2015, for a summary). Thaler coined the concept of mental accounting. According to Thaler, people think of value in

relative rather than absolute terms. They derive pleasure not just from an object's value, but also the quality of the deal – its transaction utility (Thaler, 1985). In addition, humans often fail to fully consider opportunity costs (tradeoffs) and are susceptible to the sunk cost fallacy.

Why are people willing to spend more when they pay with a credit card than cash (Prelec & Simester, 2001)? Why would more individuals spend $10 on a theater ticket if they had just lost a $10 bill than if they had to replace a lost ticket worth $10 (Kahneman & Tversky, 1984)? Why are people more likely to spend a small inheritance and invest a large one (Thaler, 1985)?

According to the theory of mental accounting, people treat money differently, depending on factors such as the money's origin and intended use, rather than thinking of it in terms of the "bottom line" as in formal accounting (Thaler, 1999). An important term underlying the theory is fungibility, the fact that all money is interchangable and has no labels. In mental accounting, people treat assets as less fungible than they really are. Even seasoned investors are susceptible to this bias when they view recent gains as disposable "house money" (Thaler & Johnson, 1990) that can be used in high-risk investments. In doing so, they make decisions on each mental account separately, losing out the big picture of the portfolio.

Consumers' tendency to work with mental accounts is reflected in various domains of applied behavioral science, especially in the financial services industry. Examples include banks offering multiple accounts with savings goal labels, which make mental accounting more explicit, as well as third-party services that provide consumers with aggregate financial information across different financial institutions (Zhang & Sussman, 2018).

Another concept related to mental accounting captures the fact that people don't like to spend money. We experience pain of paying (Zellermayer, 1996), because we are loss averse. The pain of paying plays an important role in consumer self-regulation to keep spending in check (Prelec & Loewenstein, 1998). This pain is thought to be reduced in credit card purchases, because plastic is less tangible than cash, the depletion of resources (money) is less visible and payment is deferred. Different types of people experience different levels of pain of paying, which can affect spending decisions. Tightwads, for instance, experience more of this pain than spendthrifts. As a result, tightwads are particularly sensitive to marketing contexts that make spending less painful (Rick, 2018).

Too Much Information: Choice Overload

Humans' bounded rationality is particularly well illustrated by the concept of choice overload. Also referred to as 'overchoice', this phenomenon occurs as a result of too many choices being available to consumers. Overchoice has been associated with unhappiness (Schwartz, 2004), decision fatigue, going with the default option, as well as choice deferral—avoiding making a decision altogether, such as not buying a product (Iyengar & Lepper, 2000). Many different factors may contribute to perceived choice overload, including the number of options and

attributes, time constraints, decision accountability, alignability and complementarity of options, consumers' preference uncertainty, among other factors (Chernev et al., 2015).

Choice overload can be counteracted by simplifying choice attributes or the number of available options (Johnson et al., 2012).

Limited Information: The Importance of Feedback

Bounded rationality's principle of limited knowledge or information is one of the topics discussed in the 2008 book Nudge. In the book, Thaler and Sunstein point to experience, good information, and prompt feedback as key factors that enable people to make good decisions. Consider climate change, for example, which has been cited as a particularly challenging problem in relation to experience and feedback. Climate change is invisible, diffuse, and a long-term process. Pro-environmental behavior by an individual, such as reducing carbon emissions, does not lead to a noticeable change. The same is true in the domain of health. Feedback in this area is often poor, and we are more likely to get feedback on previously chosen options than rejected ones.

The impact of smoking, for example, is at best noticeable over the course of years, while its effect on cells and internal organs is usually not evident to the individual. Traditionally, generic feedback aimed at inducing behavioral change has been limited to information ranging from the economic costs of the unhealthy behavior to its potential health consequences (Diclemente et al., 2001). More recent behavior change programs, such as those employing smartphone apps to stop smoking, now usually provide positive and personalized behavioral feedback, which may include the number of cigarettes not smoked and money saved, along with information about health improvement and disease avoidance.

Information Avoidance

Behavioral economics assumes that people are boundedly rational actors with a limited ability to process information. While a great deal of research has been devoted to exploring how available information affects the quality and outcomes of decisions, a newer strand of research has also explored situations where people avoid information altogether.

Information avoidance in behavioral economics (Golman et al., 2017) refers to situations in which people choose not to obtain knowledge that is freely available. Active information avoidance includes physical avoidance, inattention, the biased interpretation of information (see also confirmation bias) and even some forms of forgetting. In behavioral finance, for example, research has shown that investors are less likely to check their portfolio online when the stock market is down than when it is up, which has been termed the ostrich effect (Karlsson et al., 2009). More serious cases of avoidance happen when people fail to return to clinics to get medical test results, for instance (Sullivan et al., 2004).

While information avoidance is sometimes strategic, it can have immediate hedonic benefits for people if it prevents the negative (usually psychological) consequences of knowing the

information. It usually carries negative utility in the long term, because it deprives people of potentially useful information for decision making and feedback for future behavior. Furthermore, information avoidance can contribute to a polarization of political opinions and media bias.

"Irrational" Decision Making: The Example of the Psychology of Price

Boundedly rational choices, made due to limits in our thinking processes, especially those we make as consumers, are illustrated well in Dan Ariely's popular science book Predictably Irrational. A good portion of the research he discusses involves prices and value perception. One study asked participants whether they would buy a product (e.g. a cordless keyboard) for a dollar amount that was equal to the last two digits of their US social security number. They were then asked about the maximum they would be willing to pay. In the case of cordless keyboards, people in the top 20% of social security numbers were willing to pay three times as much compared to those in the bottom 20%. The experiment demonstrates anchoring, a process whereby a numeric value provides a non-conscious reference point that influences subsequent value perceptions (Ariely, Loewenstein, & Prelec, 2003).

Ariely also introduces the concept of the zero price effect, namely when a product is advertised as 'Free', consumers perceive it as intrinsically more valuable. A free chocolate is disproportionately more attractive relative to a $0.14 chocolate than a $0.01 chocolate is compared to one priced at $0.15. To a 'rational' economic decision maker, a price difference of 14 cents should always provide the same magnitude of change in incentive to choose the product. Finally, price is often taken as an indicator of quality, and it can even serve as a cue with physical consequences, just like a placebo in medical studies. One experiment, for instance, gave participants a drink that purportedly helped mental acuity. When people received a discounted drink their performance in solving puzzles was significantly lower compared to regular-priced and control conditions.

Price can also be an ingredient for a decoy effect. Choices often occur relative to what is on offer rather than based on absolute preferences. The decoy effect is technically known as an 'asymmetrically dominated choice' and occurs when people's preference for one option over another changes as a result of adding a third (similar but less attractive) option. Ariely (2008) illustrates this with subscription options advertised by The Economist newspaper. Subscription options included web-only content for $59, print-only for $125, or print and web combined, also for $125. Ariely asked his students. As you would expect, 0% chose the print-only subscription. 84% chose the print-online combination, and 16% the web-only subscription. When repeated the poll without the print-only option, 32% opted for print-only, while 68% preferred to go web-only. The presence of the inferior option (print-only for $125) made the web and print subscription seem like a better deal.

Predictably Irrational and Nudge alerted the public to a new breed of economists influenced by the study of behavioral decision making that was pioneered by Kahneman and Tversky's work (sometimes referred to as 'choice under uncertainty'). The psychology of homo economicus—a rational and selfish individual with relatively stable preferences—has been challenged, and the traditional view that behavior change should be achieved by informing, convincing, incentivizing or penalizing people has been questioned. The field associated with this stream of research and theory is behavioral economics (BE), which suggests that human decisions are strongly influenced by context, including the way in which choices are presented to us. Behavior varies across time and space, and it is subject to cognitive biases, emotions, and social influences. Decisions are the result of less deliberative, linear, and controlled processes than we would like to believe.

Dual-System Theory

Daniel Kahneman uses a dual-system theoretical framework (which established a foothold in cognitive and social psychology of the 1990s) to explain why our judgments and decisions often do not conform to formal notions of rationality. System 1 consists of thinking processes that are intuitive, automatic, experience-based, and relatively unconscious. System 2 is more reflective, controlled, deliberative, and analytical. Judgments influenced by System 1 are rooted in impressions arising from mental content that is easily accessible. System 2, on the other hand, monitors or provides a check on mental operations and overt behavior—often unsuccessfully.

Example 1: Availability and Affect

System 1 is 'home' of the heuristics (cognitive shortcuts) we apply and responsible for the biases (systematic errors) we may be left with when we make decisions. System 1 processes influence us when prior exposure to a number affects subsequent judgments, as evident in the anchoring effects discussed previously. One of the most universal heuristics is the availability

heuristic. Availability serves as a mental shortcut if the possibility of an event occurring is perceived as higher simply because an example comes to mind easily; for instance, a person may deem pension investments too risky as a result of remembering a family member who lost most of her retirement savings in the recent recession. Readily available information in memory is also used when we make similarity-based judgments, as evident in the representativeness heuristic.

Finally, another 'general purpose' heuristic is that of affect, namely good or bad feelings that surface automatically when we think about an object. Applying the affect heuristic can lead to black-and-white thinking, which is particularly evident when people think about an object under conditions that hamper System 2 reflection, such as time pressure. For example, consumers may consider food preservatives' benefits as low and costs as high, thus leading to a significant negative risk-benefit correlation.

The role of affect in risky or uncertain situations is also evident in the risk-as-feelings model. 'Consequentialist' accounts of decision making tend to focus on expectations along with the likelihood and desirability of possible outcomes. The risk-as-feelings perspective explains behavior in situations where emotional reactions to risk differ from cognitive evaluations. In these situations, behavior tends to be influenced by anticipatory feelings, emotions experienced in the moment of decision making.

Example 2: Salience

Availability and affect are processes internal to the individual that may lead to bias. The external equivalent of these processes is salience, whereby information that stands out, is novel, or seems relevant is more likely to affect our thinking and actions (Dolan et al., 2010). For example, a technological device can be framed as being 99% reliable or having only a 1% failure rate, thereby emphasizing either positive or negative information. Salience also underlies heuristic judgments that rely on external cues. Some psychologists have derived effort-reducing heuristics that simplify consumer decision making. The brand name heuristic, for example, suggests that salient cues in the form of brand names can be used to infer quality. In terms of degrees of visual salience, one study found a congruence effect between price and font size, where showing a lower sale price in a small print size relative to the regular price resulted in greater purchase likelihood than presenting the sale price in a relatively large font. Finally, the salience of options can also be manipulated by rearranging the physical environment; for instance, a change as simple as moving water bottles closer to the cashier in a cafeteria has been shown to increase the salience and convenience of this healthier drink choice and thereby significantly boost water sales

Example 3: Status Quo Bias and Inertia

While many heuristics and biases are the result of quick impressions, the automatic character of System 1 is also reflected in a human aversion to change. One aspect in this respect is evident in the formation of habits, automatic behavioral patterns that are the result of repetition and

associative learning (Duhigg, 2012). The preference for things to remain the same, such as a tendency not to change behavior unless the incentive to do so is strong, has been termed the "status quo bias"(Samuelson & Zeckhauser, 1988). Inertia is one form of people's propensity to remain at the status quo (Madrian & Shea 2001), a well-known manifestation of which includes low rates of pension plan enrolment when people have to make the effort to sign up ('opt-in'). In this case, an effective way to increase enrolment rates is to change the default—what happens when people do not make an active choice. Inertia, procrastination, and a lack of self-control are problems that make changes in default options from opt-in to opt-out an effective strategy, so, instead of having to take action to enroll (opt-in), people now have to make an effort to dis-enroll (opt-out) (Thaler & Sunstein, 2008). Nudging with defaults is one of the primary tools of the 'choice architect' (Goldstein, Johnson, Herrman, & Heitmann, 2008).

Example 4: Optimism Bias and the Overconfidence Effect

System 1 is dominated by gut feelings and a limits to information processing, which may lead people to be overly optimistic. People often overestimate the probability of positive events and underestimate the probability of negative events happening to them in the future (Sharot, 2011). For example, we may underestimate our risk of getting cancer and overestimate our future success on the job market. A number of factors can explain unrealistic optimism, including perceived control and being in a good mood (Helweg-Larsen & Shepperd, 2001).

The overconfidence effect is observed when people's subjective confidence in their own ability is greater than their objective (actual) performance (Pallier et al., 2002). It is frequently measured by having experimental participants answer general knowledge test questions. They are then asked to rate how confident they are in their answers on a scale. Overconfidence is measured by calculating the score for a person's average confidence rating relative to the actual proportion of questions answered correctly.

Overconfidence is one of the manifestations of optimistic bias, which, according to Daniel Kahneman "may well be the most significant of the cognitive biases."

Temporal Dimensions

Another important domain of BE introduces a time dimension to human evaluations and preferences. This area acknowledges that people are biased towards the present and poor predictors of future experiences, value perceptions, and behavior.

Time Discounting and Present Bias

According to time-discounting theories, present events are weighted more heavily than future ones for example, many people prefer to receive £100 now over £110 in a month's time. Discounting is non-linear, and its rate is not constant over time. People's preference for receiving £100 a week from now versus £110 a month and one week from now will not be the same as their preference for receiving £100 a year from now versus £110 a year and one month

from now. Although the gap is one month in both cases, the value of events that are farther in the future falls more slowly than those closer to the present.

In addition to inertia, future discounting is another key problem that explains low retirement savings rates. One piece of research suggests that behavioral change could be achieved by helping people connect with their future selves. In the study, people who saw an age-progressed avatar of themselves were more likely to accept future financial rewards over immediate ones.

Diversification Bias and the Empathy Gap

Time inconsistency also occurs when our present self fails to predict accurately the preferences of our future self, a point illustrated well by diversification bias. When shopping for multiple future consumption episodes, I may choose the variety pack of cereal, only to realize two weeks later that I would have enjoyed my breakfasts more if I had just stuck to my favorite kind. In the case of food, diversification bias should be particularly strong if you make your purchasing decision when you're satiated (e.g. right after a meal). This inability to appreciate fully the effect of emotional and physiological states on decision making is known as the (hot-cold) empathy gap, a term coined by George Loewenstein, one of the founders of the field of behavioral economics. Hot states include a number of visceral factors, ranging from negative emotions associated with high levels of arousal (e.g. anger or fear) to feeling states (e.g. pain) and drive states (e.g. thirst, cravings related to addiction, or sexual arousal). The best known illustration occurs in sexual decision making, whereby men in a 'cold', unaroused state often predict that they will use a condom during their next sexual encounter, but when they are in an aroused 'hot state' they may fail to do so.

Forecasting and Memory

When we make plans for the future, we are often too optimistic. For example, we are subject to committing the planning fallacy by underestimating how long it will take us to complete a task and ignoring past experience (Kahneman, 2011). Similarly, when we try to predict how we will feel in the future, we may overestimate the intensity of our emotions (Wilson & Gilbert, 2003). The level of happiness that I expect to feel during my next vacation, for example, is likely to be higher than how I will rate it during the actual experience. There are different explanations for this error, including how we remember past events. My memory of a past holiday is likely to be non-representative of the holiday overall and I may evaluate my last vacation based on the most pleasurable points and its end, for example, rather than the average of every moment of the experience. Finally, as my vacation days go by, I will simply get used to it and my happiness will level out. According to the concept of hedonic adaptation, changes in experiences tend only to induce happiness temporarily as we get used to new circumstances.

Social Dimensions

Contrary to the homo economicus view of human motivation and decision making, BE does not assume that humans make choices in isolation, or to serve their own interest. Aside from cognitive and affective (emotional) dimensions, an important area of BE also considers social

forces, in that decisions are made by individuals who are shaped by—and embedded in—social environments.

Trust

Trust, which is one of the explanations for discrepancies between actual behavior and that predicted by a model of self-interested actors, makes social life possible and permeates economic relationships.

Although neoclassical economic theory suggests that trust in strangers is irrational, trust and trustworthiness can be widely observed across societies. In fact, reciprocity (discussed later) exists as a basic element of human relationships and behavior, and this is accounted for in the trust extended to an anonymous counterpart (Berg et al., 1995).

Both trust and trustworthiness increase when individuals are closer socially, but the latter declines when partners come from different social groups, such as nationality or race. Furthermore, high status individuals are found to be able to elicit more trustworthiness in others.

Trust has been investigated in experimental games. In trust games, participants are asked to split money between themselves and someone else. Player A is asked to determine an initial endowment of zero or a higher value (e.g. $5). The money is then multiplied (e.g. tripled to $15) by the experimenter and given to Player B, who is then asked to return an amount of zero or a higher value back to Player A. The game is about reciprocity and trust, because Player A must decide how much of the endowment to give to Player B in the hope of receiving at least the same amount in return. In the original experiment (Berg et al., 1995), 30 out of 32 first players sent money, and 11 of these 30 decisions resulted in a payback that was greater than the initial amount sent. This finding confounds the prediction offered by standard economic assumptions.

Trust has been linked to the concept of "betrayal aversion" People take greater risks when they are faced with a given probability of bad luck than the same probability of being cheated by another person.

Dishonesty

In human relationships, deception is often considered a violation of trust, while in standard economics, dishonesty can be seen as a natural by-product of actors with self-interested motives. However, the BE perspective does not consider humans to be more honest; rather, it takes a more social-psychological perspective by showing that dishonesty is not just about tradeoffs between external incentives (such as material gain) and costs (such as punishments). Dishonesty is the product of situations as well as both internal and external reward mechanisms, which often involves self-deception—the reframing of dishonest acts (e.g. not declaring all of your income to the tax authorities) in a way that makes them appear less dishonest.

People typically value honesty, tend to have strong beliefs in their morality and want to maintain this aspect of their self-concept. Self-interest may conflict with people's honesty as an internalized social norm (a concept discussed later), but the resulting cognitive dissonance can be overcome by engaging in self-deception, creating moral "wiggle room" that enables people to act in a self-serving manner. When moral reminders are used, however, this self-deception can be reduced, as demonstrated in laboratory experiments conducted by Mazar and colleagues. It is not surprising, then, that a lack of social norms is a general driver of dishonest behavior, along with high benefits and low costs of external deception, a lack of self-awareness, as well as self-deception.

Fairness and Reciprocity

Behavioral research on individual decision making in social contexts often relies on experimental games. Along with behavioral decision theory, behavioral game theory is the second major theoretical area found in behavioral economics. Typically, these games endow participants with rewards (e.g. tokens), which then change hands based on choices made by individuals within the rules of the game. This occurs over the course of one or more rounds of playing. The outcome of the game is evident in the way rewards are split between players, and the results often show that people have inequity aversion, i.e. they prefer fairness over inequality in many contexts

Fairness is related to a human desire for reciprocity, our tendency to return another's action with another equivalent action. Reciprocity, however, can have positive and negative aspects. As Ernst Fehr's work in this area has shown, people's responses to positive actions are often kinder than a self-interest model would predict, but on the flipside it can also lead to punitive responses to negative actions. In the real world, charities sometimes use reciprocity to their advantage. For example, one field experiment investigating donation behavior showed that people who received a large gift with a donation solicitation letter had a 75 percent higher donation frequency compared to a 'no gift' baseline condition.

Social Norms

The sociologist Alvin Gouldner referred to reciprocity as a "generalized moral norm". Social norms are implicit or explicit behavioral expectations or rules within a society or group of people and they are an important component of identity economics, which considers economic actions to be the result of both monetary incentives and people's self-concepts. Our preferences are not simply a matter of basic tastes; they are also influenced by norms, as manifested in gender roles, for example.

Norms vary across cultures and contexts. For example, while market norms would dictate that payment is required for a good or service, social norms are quite different—would you offer to pay a family member for the meal that he has prepared for you. Sometimes social norms of exchange such as reciprocity and market norms co-exist in the same sphere. For instance, while market exchange norms dictate that I will charge a client for a consulting job, I may also give

that client free advice, on some occasions, in the hope that the favor will be reciprocated in the future.

Social norms signal appropriate behavior or actions taken by the majority of people (although what is deemed 'appropriate' is itself subject to continual change). Along with informational feedback (e.g. the amount of money saved by not drinking alcohol), descriptive normative feedback (e.g. how one's drinking level compares to the national average) is often used in health behavior change programs (Diclemente et al., 2001), while non-profit organizations sometimes use normative information to affect donation levels. One study compared contribution levels for a public radio fundraiser in the US. When potential donors were provided with social information signaling norms (e.g. "We had another member, they contributed $300"), they saw up to a 12% increase in average contribution amounts (Shang & Croson, 2009).

Consistency and Commitment

Human susceptibility to feedback about social norms is related to our desire to maintain a positive view of who we are as a person. When the outcome of an action threatens this desire, we may change our behavior, though we often simply change our attitudes or beliefs. When this happens, we usually resort to 'rationalization', which is a form of cognitive dissonance reduction (Festinger, 1957). Unlike the rational choice view of human decision making, where preferences guide choices, rationalization implies the opposite: Sometimes preferences can justify actions after the fact (March, 1978). Cognitive dissonance theory is an illustration of the human need for a continuous and consistent self-image (Cialdini, 2008). In an effort to align future behavior, being consistent is best achieved by making a commitment, especially if it is done publicly. Thus, pre-committing to a goal is one of the most frequently applied behavioral devices to achieve positive change.

The 'Save More Tomorrow' program, aimed at helping employees save more money, illustrates a number of behavioral biases and remedies, including commitment (Thaler & Benartzi, 2004). The program gives employees the option of pre-committing to a gradual increase in their savings rate in the future, each time they get a raise. The program avoids the perception of loss that would be felt with a reduction in disposable income, because consumers commit to saving future increases in income. People's inertia makes it more likely that they stick with the program, because they have to opt out to leave.

Herd Behavior and Market Bubbles

People's susceptibility to social forces is also evident in herd behavior, which occurs when people do what others are doing instead of using their own information or making independent decisions. The idea of herding has a long history in philosophy and crowd psychology. It is particularly relevant in the domain of finance, where it has been discussed in relation to the collective irrationality of investors, including stock market bubbles.

Economic (or asset) bubbles form when prices are driven much higher than their intrinsic value. Well-known examples of bubbles include the US Dot-com stock market bubble of the late 1990s and housing bubble of the mid-2000s. According to Robert Shiller (2015), who warned of both of these events, speculative bubbles are fueled by contagious investor enthusiasm (see also herd behavior) and stories that justify price increases. Doubts about the real value of investment are overpowered by strong emotions, such as envy and excitement.

Other biases that promote bubbles include overconfidence, anchoring, and representativeness which lead investors to interpret increasing prices as a trend that will continue, causing them to chase the market. Economic bubbles are usually followed a sudden and sharp decrease in prices, also known as a crash.

Discussion of behavioural economics applications and their effects in resource conservation

In this section four applications of behaviour economics to water demand studies based on four different behavioural frameworks, namely prospect theory, asymmetric price elasticity (APE), reference transaction and social comparison are suggested. These potential applications are not exhaustive. Here approach is to focus on the introduction of some new methods into the residential water demand literature.

i) Reference block pricing

Prospect theory proposes a model of decision making under risk which accounts for some behavioural biases, namely the certainty effect, the reflection effect and the isolation effect[11] (Kahneman & Tversky 1979). Prospect theory assumes an asymmetric value function with three characteristics: value depends on the deviation from the (neutral) reference point[12] (e.g. status quo or current asset position), the function is concave for gains and convex for losses and it is steeper for losses than for gains, i.e. there is loss aversion. This means that individuals are more sensitive to changes seen as losses than to gains of the same magnitude with respect to a reference point. Supported by the existence of loss aversion the potential application suggested for this concept is the reference block pricing. Notice that most pricing research in both economics and marketing has been focused on intrinsic prices, although the "behavioural aspects of pricing", including reference-price effects, acquired some importance over the last three decades. For a categorization of these behavioural aspects.

As noted in the Introduction, the significant amount of literature on pricing structures in regulated water utilities does not explain the popularity of increasing block tariffs, given the theoretical efficiency of marginal-cost pricing in most situations. Some countries and regions do use decreasing block tariffs, predominantly for users with high consumption levels, due to their weight on the total revenues of water utilities. Since these large costumers ensure "substantial revenues" and "stable flows", the water utilities could be in such cases reluctant to apply tariff structures which promote water conservation (OECD 2010, p.11).

Despite this extensive discussion of block-tariff settings in water, the impact of asymmetric value functions with loss aversion has never been proposed. We think that consumer responses could be based on a reference point which we call the consumer's reference block tariff. This may be the tariff of their actual block or, alternatively, the initial blocks of a tariff structure could be interpreted as reference points, so that framing effects would influence customers to view a change to the following block as a loss (increasing block tariffs) or discount (decreasing block tariffs).

Furthermore, loss aversion indicates that individuals are more sensitive to variations interpreted as losses and consequently IBT could lead water consumers to reduce consumption by more than higher flat rates. Therefore, the reduction on water consumption due to changing to a more expensive block tariff, which would be typically explained by the price effect, could also be explained by this loss aversion effect.

This behavioural application could have several implications to sectors with nonlinear prices. The concept of reference block price could contribute to the redefinition of tariff structures, revision of the effectiveness of pricing policy, redefinition of water policies and also influence the determination of price elasticities in terms of magnitude and persistence.

ii) Asymmetric elasticities of residential water demand

Asymmetric price elasticity (APE) can be defined as the asymmetric behaviour of consumers to price changes, according to the seminal work developed in the field of marketing (Putler 1992). Typically if prices increase with respect to a reference point (i.e. reference price) the price elasticities of demand will be higher, whereas we will have lower price elasticities with price reductions. The author argues that reference price influences consumer behaviour. Moreover, he corroborates the existence of loss aversion. We propose that both the asymmetric price elasticity and the asymmetric income elasticity of demand are relevant issues in residential water demand.

Water pricing is one of the most important policy instruments to deal with scarcity and sustainability issues, allowing the implementation of demand management strategies (Griffin 2006). Therefore, the study of the price elasticity of water demand is an essential measure for evaluation of the impact of pricing policies.

The APE has been commonly applied in marketing studies according to Ho et al. (2006). More recently the study of APE has also been extended to the energy sector (Adeyemi & Hunt 2007; Gately & Huntington 2002), but it has not been approached so far in the domain of residential water demand, according to our previous literature review. Moreover the study of asymmetric income elasticity (henceforth AIE) has not been analysed in this domain either. However, there is a piece of research in energy economics stating that income changes have asymmetric effects in the energy and oil demand in many non-OECD countries and these should be accounted for to mitigate biased estimations (Gately & Huntington 2002).

The existence of APE could have several policy implications, from which we highlight the formation of reference prices, their effects on water consumption, implications for the design of tariff structures and impact on optimal water pricing policies.

Note that we argue that asymmetry in price and income elasticities should be tested, not implicitly assumed to exist. In this sense we believe that residential water demand studies should look into the issue instead of implicitly assuming that both price and income elasticities of water are symmetric.

iii) Reference transaction impact on cost recovery and tariff acceptability

The reference-transaction framework was first suggested by Kahneman, Knetsch and Thaler during the 1980s. The concept is based on the dual entitlement principle under which firms are entitled to a (positive) reference profit and individuals are entitled to reference terms (i.e. price, salary, rent). The most puzzling finding of the authors was that consumers and employees consider it acceptable for a firm to increase price and/or cut wages in order to ensure a reference positive profit. Additionally, firms' behaviour seems to be influenced by fairness constraints which lead to inefficient decisions according to standard rational theory. Using a framework with fairness constraints could explain many market anomalies. In particular, we believe the reference transaction framework could provide a better understanding of the low levels of cost recovery in the water sector.

Notably, one of the major aims in the development of water policies has been the cost recovery of the services provided by water utilities through water prices (OECD 2010). According to this report it is often difficult to reach full cost recovery exclusively through tariffs in water sector, with this concern reflected in the article 9 of the Water Framework Directive (Directive 2000/60/EC 2000). Given this difficulty the core debate has changed from full cost recovery to sustainable cost recovery, which implies a mix of tariffs, taxes and transfers (i.e. three types of revenues, also known as "3Ts") to achieve that aim.

According to our perspective the use of the reference-transaction framework could be tested using an experiment that inquires water users and managers of water utilities in at least two different ways within the scope of cost recovery. First, how does framing influence individual perceptions of fairness in water pricing? Second, why do water utilities so often seem to be financially unsustainable if they are entitled to a positive reference profit? Both questions seem important in order to develop new approaches to cost recovery. In the first question the underlying idea is to understand how different frameworks influence the application of water pricing policies, especially tariff increases aimed at ensuring full cost recovery. The second question is more puzzling. On one hand, the concept of reference transaction implies the existence of fairness constrains which limit the water utilities' profit maximization and hence could explain (at least partially) the financial unsustainability. On the other hand, water utilities should be entitled to a positive reference profit, which would minimize the issue of insufficient

cost recovery. The essentiality of the good in question and the traditionally low prices may provide clues to answer these questions.

The reference transaction framework has not been applied to water resource economics as far as we know, although it seems appealing to understand whether water utilities could be a counter-evidence of the reference profit entitlement. This topic has been explored in experimental research, with a recent application in the comparison of allocation rules related to two scarce resources, seats in a high-speed train and parking spaces. The authors tested different allocation rules and conclude that they depend of the educational level of the individuals, the type of the good and the type of scarcity (exceptional or recurrent).

This framework could have some policy implications for water management, such as understanding why prices charged by water utilities are often insufficient to cover their costs, defining economic criteria for equitable allocation of scarce resources and general redefinition of water policies, in particular those related to public vs. private ownership of utilities, since the reference transaction could be seen differently by consumers in each case.

iv) Social comparison (and water reference consumption)

The theory of social comparison was developed in the seminal work of Festinger (1954). Typically, social comparisons are based on framing individuals with comparative information in order to promote a specific behaviour. Since Festinger's findings there have been several studies on this issue, but only recently has the theory been applied to residential water demand. In particular, the use of social comparison as well as pro-social information and technical advice given to the members of a household can influence their water consumption. The authors show that social comparison has the strongest impact on consumer behaviour, using as reference consumption the neighbours' consumption levels. Households in a randomized field experiment were provided with their own consumption along with two types of comparison: the median household consumption of their region and the percentile of that household considering all households of the region.

In this sense, the neighbours' consumption levels could be seen as the reference consumption, defined as a reference value of consumption (normally the average or median consumption) which frames the consumers into a social comparison framework. Consequently, if consumers have household consumptions above average (or median) they will categorize their actual situation in the domain of losses (i.e. these consumers will try to save water in order to achieve the domain of gains) and vice versa. In the field of energy economics the reference consumption framework has also been applied recently in a field experiment with the aim of promoting energy conservation by consumers through two reference consumption set-ups: an average consumption level of the neighbours and an efficient consumption level of the neighbours. The author concludes that non-pecuniary strategies of energy savings can change consumer behaviour in a significant and cost-effective manner. Moreover, there is also another avenue of

research focused on environmental conservation in Hotels. A recent study concludes that guests of Hotels reacts more to social- comparison frameworks (e.g. “the majority of quests reuse their towels”), than to the typical appeals to environmental protection.

It underpins the importance of the information provided to water consumers through the water bill and the relevance of this information in the effectiveness of water pricing policies. Frondel and Messner (2008) corroborate the importance of incorporating information in the water bill (e.g. price and cost perception) and argue that pricing policies need to be complemented by the availability of information to consumers in their bill, including price and cost information. More recently, found that the clarity of water bills is a major issue in residential water sector. According to the authors the bills fail to have environmentally relevant impacts on consumers, namely in terms of fostering water conservation, thus their redesign to make them clearer and simpler could contribute to the effectiveness of price-based policies.

The social comparison measure could be tested in other ways. For example the use of the typical average (or median) household consumption does not account for household size when framing the consumers. This fact could lead to biased conclusions if the household size has a significant impact on consumption. They recently argued that using household data which accounts for household size could matter in the estimation of residential water demand.

This social comparison framework which frames users into a reference-consumption framework could have some potential contributions to water management, such as development of water conservation strategies, redefinition of water policies and influence the price elasticities in terms of magnitude and persistence.

Framing effects are well-known to behavioural economists. Our aim in this section was to briefly explain some behaviour frameworks which we use to frame the reader into some of the application and effects in the water demand studies. In the next section we discuss further research of the suggested behavioural applications.

BENEFITS OF APPLYING BEHAVIOURAL ECONOMICS IN EXTENSION

Extension professionals may appreciate the many benefits of using nudges:

- They are subtle changes that are typically simple to integrate into a program while being cost effective and easy to test

- Nudges "could lead to significant increases in participation or effort, making the programs highly cost-effective and desirable to policy-makers" at a relatively low cost.

- Nudges can have a "surprisingly persistent effect" on behaviors.
- Nudges can be evaluated on small scales before they are rolled into larger Extension programs.
- Nudges can create momentum—they can be used to promote small changes that lead clientele to make bigger changes in the future (Williamson, 2018).

RECOMMENDATIONS EXTENSION PROFESSIONALS CAN USE TO APPLY NUDGES TO EXTENSION PROGRAMS

- Learn about Extension clients' decision-making pertaining to your topic area: What decisions do clientele make that can influence the problem at hand? Consider the timing and contexts within which they make decisions. How can you modify the choice environment to support positive decision-making?
- Consider integrating normative messages into the decision-making environment. Inform people of the norm—that is, the decisions others make in the same situation. The use of

social comparisons (for example, 60% of your neighbors have signed up for a solar energy evaluation) can help people follow what others do. This approach should only be used when the norm is the desirable behavior and the target audience is engaged in a less desirable behavior.

- Develop strategies to reduce the amount of time between the desired choice and the reward, or develop alternate intermediate rewards. For example, Extension clientele might not immediately see the results of eating a set number of fruits and vegetables each day. You could develop a checklist, calendar system, or series of social media badges to help clientele celebrate their good choices.
- Identify opportunities to convert passive defaults to active choices. For example, you might typically invite Extension program participants to come up to the front of a room to sign up to receive a new resource you've described during a presentation, meaning participants would not receive the information by default. Instead, you might ask them to actively opt in to or out of receiving this resource when they complete the program registration before class or program evaluation afterwards.
- Revisit the slate of choices you provide. Could you offer multiple desirable choices instead of a single desirable versus the less desirable option? For example, as part of a postprogram evaluation you might ask program participants to pledge to do one of the following: 1) Calibrate their sprinklers, 2) share an publication about water conservation on their social media pages, 3) test their rain shutoff device to determine if it is working, or 4) invite a neighbor to the next landscape water conservation program.

CASE STUDIES 1:

Use of Behavioural insights in the Swachh Bharath Mission

- SBM, as a nation-wide cleanliness drive, was launched on 2nd October, 2014. Behavioural economics emphasizes the role of context in influencing choices and decisions, which has been effectively adopted. To initiate behavioural change in usage of toilets, more than five lakh *swachhagrahis*, public post, in news famous personalities etc are influencing and Relies on community-based approaches to sanitation. Behaviour change techniques such as Participatory Rural Appraisal and Community-led Total Sanitation induce people to come together, appraise their community's well being

CASE STUDY 2:

Beti Bacho Beti Padav (BBBP)

- The success of the BBBP Scheme demonstrates a powerful use of the insight on 'social norm' in its 'Selfie with Daughter' initiative.
- This scheme was launched to address a highly imbalanced child sex ratio in India.
- People's attitude towards the girl child needed to change – people needed to stop viewing girls as burdens and start celebrating them instead.
- Two elements enabled the campaign's success: first, telling people what the norm is, and second, showcasing the thousands of other people who were acting in line with that norm(social learning theory)

REAEARCH STUDIES

1. Impact of poverty on cognitive function of sugarcane farmers of Tamilnadu district.

   By ANANDI,M, MULLAINATHAN, SHAFIR AND ZHAO *(2013*)

Objectives

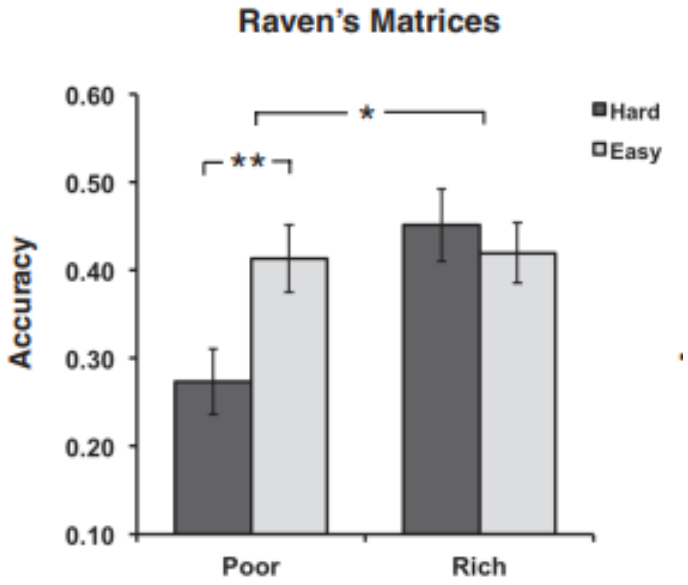
- To analyse the financial situation in relation to cognitive capacity of the farmers

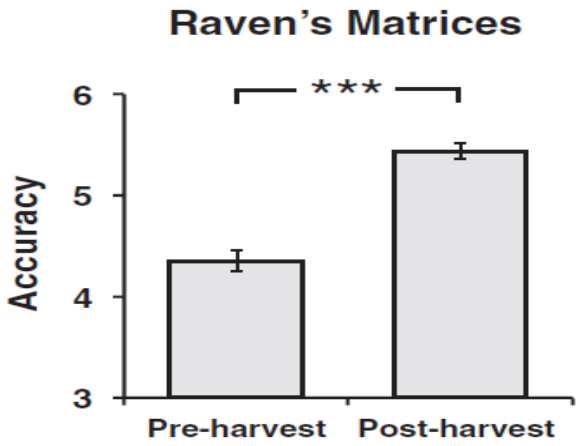
Research methodology:

- Ravens matrics used for studying the cognitive performance

Sampling method and sample size

- The data have been collected through Random sampling technique with the help interview schedule before and after the harverst of the sugarcane farmers
- Data has been collected from 464 sugarcane farmers from 54 villages in Tamilnadu state





RESULTS :

- Same farmer shows diminished cognitive performance before harvest, when poor, as compared with after harvest, when rich.
- Being poor means coping not just with a shortfall of money, but also with a concurrent shortfall of cognitive resources.
- The poor, in this view, are less capable not because of inherent traits, but because the very context of poverty imposes load and impedes cognitive capacity
- Poverty itself reduces cognitive capacity. This explains a spectrum of behaviors among the poor.

RESEARCH STUDY 2:

Why behavioural science matters in extension

By PICKERING, MOORE AND MARKEY (2020)

Objectives

- To develop and test a behavioural science training model for extension professional

Research methodology:

1. The Psychology of Resistance: A "crash course" in psychological and behavioural science theories that explain key sources of resistance to practice change, especially in agriculture.

2. A Toolkit for Change: An exploration of practical techniques that extension officers can use to enhance their interactions and relationships with farmers

3. Putting it all into practice: A consolidation and application of the prior modules by use of a case study, as well as an exercise creating a personal implementation plan

Sampling method and sample size

- The data have been collected by purposive sampling technique through survey method
- Data has been collected from 57 extension professional

Evaluation survey question	Mean pre-workshop score	Mean post-workshop score
How would you rate your understanding of the psychological reasons behind farmers' resistance to change?	3.93	5.31

How would you rate your understanding of the cognitive and behavioural skills used to enhance farmer engagement?	3.45	5.14
How would you rate your ability to apply behavioural science with farmers?	3.43	4.90

A range of quantitative and qualitative feedback was obtained through a survey that was administered before and after the workshop.
It comprised three questions which were evaluated using a 7-point Likert scale ranging from 1 (very poor) to 7 (excellent).

Findings :

An improved understanding of the psychological underpinnings of farmers' resistance to practice change. Improved understanding of behavioural science-based skills to enhance farmer engagement and increased ability to apply behavioural science with farmers.

REAEARCH STUDY 3:

Nudging Farmers to use fertilizer: Theory and Experimental Evidence from Kenya

By ESTHER,D., KREMER,M. AND ROBINSON (2011)

Background

- Farmers in Kenya procrastinate, postponing their fertilizer purchases until later periods.
- Farmers fail to take the advantage of apparently profitable fertilizer subsidies

Objectives

- To understand the biases in farmers decision making inspired by procrastination models of psychology

Research methodology:

- Experimental design was done using two versions of the SAFI programs, two are varied with respect to time of application, and subsidies

Sampling method and sample size

- The data have been collected by Random sampling technique with the help of interview schedule
- Data has been collected from 204 farmers who attended saving and fertilizer initiative programs in kenya

Findings: (Behavioural bias)

- This model suggested small, time-limited discounts can help farmers commit to substantial increase in the fertilizer use, and thus overcome procrastination problem
- Overall, 41 percent of farmers purchased fertilizer under SAFI with ex ante timing choice (compared to 39 percent without timing choice)
- With respect to season and subsidies more than half i.e, 54.23 percent of the farmers have purchased with in the sowing season under SAFI programe as compared to without it.

CONCLUSION

In order to take our country to a long way in terms of agriculture economics play a vital role in farmers life and behavioural economics make an world of difference in making better decisions to make an desirable behaviour that are rational as well as humanistic in nature. Voluntary behavior change is an important outcome of both Extension programming and social marketing. Nudges are a type of choice architecture that help remove or mitigate barriers to action. The use of nudges can help reduce chances of selecting less desirable behaviors and help people make good choices with minimal cognitive effort. Nudges are relatively simple to integrate into Extension programs and may result in increased adoption of desirable behaviors.

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DISCUSSION:

1. Difference between behavioural economics and psychology in extension?

Ans : Pschycology is the branch of science dealing with the human brain how it works so on and so forth, and it mostly consists of theoretical aspects. But the behavioural economics is the application of psychological principles from the theory to understand and improve the economic conditions of the people and in case of extension the respondents are farmers and to influence them for better economic and livelihood security.

2. Why to use behavioural economics in extension?

Ans: Behavioural Economics helps extension researcher to identify and study biases of farmers and other stakeholders in decision making, helps extension professionals to modify choice environment to support positive decision making to induce farmers to adopt new technologies, to promote agribusiness and agri-entrepreneurship to induce farmers to opt for crop insurances etc. It integrates normative message into decision making environment. The use of social comparison can help people go by what others do so. This is helpful to influence farmers to join Farmer Producer Organisations and to reduce water use, pesticide use, electricity consumption etc. Framing effect can be used to adopt less popular but socially desirable practices like conservation agriculture or to cut stubble burning and to devise extension strategies for upscaling of technologies. There should be capacity building of extension professionals to make use of behavioural economics theories to unravel decision-making behaviour of farmers and to frame suitable policies for better adoption of technologies and other development interventions.

3. At what rationality does the hotel management and all apply?

Ans : They usually use decoy effect of the psychological principles which means they use a trap price (third component) which tends to influence to buy the target product of the business person. Complementary breakfast in hotels also applies the same principle.

4. Gold medals in university comes under which principle of psychology

Ans : It is nudge effect where university gives a gentle push for the betterment of the students it act as a motivation for the students but the criteria should not be only marks or giving many medals to one students. Then it could act as a better way to look at students success.

5. In real situations drastic changes in fertilizers price?

Ans : in order to promote usage of bio fertilizer during the sowing periods the input dealer should which act as nudge for the farmers to purchase and their rationality can be increased by proving good training programs on importance of fertilizer etc.

6. In sales 99,199,999 is used than 1000 which pshycological principle supports?

Ans: This is based on the loss aversion principle and lure aspect where people feel 99 is lesser than whole number 100 which makes more people to buy the product more.