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Harnessing the science of social marketing and behaviour change for improved water quality in the GBR: Background review of literature

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ACRONYMS

AASM .... Australian Association of Social Marketing
ABS .... Australian Bureau of Statistics
BIRRR .... Better Internet for Rural, Regional and Remote Australia
CBSM .... Community Base Social Marketing
EFFIES .... International Advertising Effectiveness Awards
ESMA .... European Social marketing Association
4Ps .... Commercial Marketing's Product, Price, Place and Promotion
GBR .... Great Barrier Reef
IM .... Integrative Model of Behaviour Change and Prediction
ISMA .... International Social Marketing Association
NESP .... National Environmental Science Programme
NIFRS .... Northern Ireland Fire and Rescue Service
NRM .... Natural Resource Management
NSMC .... National Social Marketing Centre
OECD .... Organisation for Economic Cooperation & Development
PBC .... Perceived behavioural control
PPSTRE .... Proficiency in Problem Solving in Technology-Rich Environments
RAIN .... Readability Assessment Instrument
SCT .... Social Cognitive Theory
SEQ .... South East Queensland
SMOG .... "Simple Measure of Gobbledegook" Readability Measurement
TIB .... Triandis' Theory of Interpersonal Behaviour
TPB .... Theory of Planned Behaviour
TRA .... Theory of Reasoned Action
TWQ .... Tropical Water Quality

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EXECUTIVE SUMMARY

This document is intended to provide an extensive review of the existing literature relating to behaviour change, either directly in the agri-environment context, or from wider contexts where findings may then be applied to agri-environmental issues. A specific focus is placed on the use of social marketing approaches, acknowledging the complex range of influences on behaviours and pressures, such as climate change and extreme weather events that are beyond the control of land managers.

The tensions between land managers perceived freedom to manage their land in the way they believe will provide them with the best outcomes, and the range of attempts to influence that behaviour have been well documented in previous studies. There is a need to recognize the range and magnitude of barriers to behaviour change together with the need to identify potential enablers of sustained behaviour change.

The major behaviour change tools are reviewed, including the role of behavioural economics and social marketing concepts, together with examples of successful social marketing- based interventions. Two widely used social marketing approaches, Community-Based Social Marketing and the National Social Marketing Centre's Benchmarks are reviewed and contrasted, with a view to synthesising them for the agri-environment context. These should be viewed in the context of a range of behavioural influences that are seldom explicitly considered in intervention design.

As there is a considerable body of evidence regarding the value of using behaviour change theories to help in the analysis of the relative importance of a range of behavioural influences, a discussion of the way theory can be used to underpin future behavioural change interventions is provided. These influences include the impact of conflicting or competing information and the key role of social norms alongside attitudes and beliefs regarding abilities to undertake and maintain behaviours.

The influence of limited literacy and numeracy abilities for a large percentage of the population is under-recognised in behaviour change activity. Therefore, these factors are reviewed, together with other cognitive limitations such as the ability to perceive environmental impacts over a long period of time. Tools for evaluating the readability of printed material (including Internet-based material) are noted in this report but covered in depth in a separate report (Hay, R., & Eagle, L. (2016) Harnessing the science of social marketing and behaviour change for improved water quality in the GBR: Message framing and message tone analysis. Townsville: James Cook University). This is followed by a review of the impact of message framing and message tone factors and the use of visual imagery.

As agri-environmental behaviour is strongly influenced by social factors such as peer approval, the importance of communities and social networks in accepting the need to change and adapt behaviours is discussed. This is followed by a review of collaborative approaches to behaviour change, including knowledge brokerage, social learning and collaborative partnerships and co-management activity.

This review forms the foundation for the development of the research questions that are delivered as part of the longitudinal data collection activity for this project.

1.0 INTRODUCTION

1.1 Overview: Holistic Perspective

1.1.1 Context

This document should be seen in the context of wider policy and regulatory activity, and includes the use of market-based instruments such as water quality tenders and programmes (Rolfe, Greiner, Windle, & Hailu, 2011). We note claims in the literature that there is insufficient evidence of policy and regulatory effectiveness from instruments such as these, available to assist policy makers in planning future activity (Cooke & Moon, 2015; Taylor, Pollard, Rocks, & Angus, 2012; Whitten, Reeson, Windle, & Rolfe, 2013). There is also little empirical data internationally about how land managers perceive market based strategies or how these strategies ultimately affects environmental management decision processes (Hayes, 2012). A significant emphasis has therefore been placed on methods for gaining a deeper understanding of decision processes and on evaluating the effectiveness of interventions.

We acknowledge that the ongoing debate regarding climate change and its potential impact on agriculture must be taken into account (see, for example, Anwar, Li Liu, Macadam, & Kelly, 2013; van Oosterzee, Dale, & Preece, 2014). Also, while indigenous perspectives are not a specific focus for this project, there may be significant value in incorporating knowledge and beliefs into some aspects of the project (Maclean & The Bana Yarralji Bubu Inc, 2015). This will be reviewed once the initial data collection phase has been completed. Further, a large body of research comes from other countries, including the UK, the EU countries, and the USA: caution should be exercised in generalising findings from what may be very different environmental issues, socio-economic and legislative environments.

This project seeks to encourage best practice land management uptake amongst land managers who have not previously engaged in best land management practices by taking a social marketing approach to influencing behaviour change. Voluntary agri-environment schemes are key policy instruments but the level of adoption is '*highly variable*' (Emtage & Herbohn, 2012a, p. 107) and schemes are noted as often achieving very little permanent change in attitudes let alone in pro-environmental behaviours (Burton, Kuczera, & Schwarz, 2008; Greiner & Gregg, 2011). Previous programmes may have encouraged best land management practies only amongst those who were already pre-disposed (Greiner, Lankester, & Patterson, 2007). It has been claimed that:

> "Existing research is usually either biased towards ecological or economic perspectives and fails to provide a holistic picture of the problems and challenges within agri-environmental programming" (Uthes & Matzdorf, 2013, p. 251).

Support for the need for holistic perspectives from more moderate sources is evident. For example, part of the reason for a lack of success in achieving high levels of adoption of best land management practices strategies to improve water quality, is claimed to be a focus primarily on rational aspects of behaviours, as well as a failure to take into account the complex combinations of underlying factors. This includes a range of socio-cultural dimensions underpinning behavioural decisions as "*successful environmental outcomes are recognised as being inextricably linked with social acceptance and engagement*" (Colvin, Witt, & Lacey, 2015, p. 237). Thus, in

addressing best land management practices uptake, outward signs for skill and success should be visible to other members of the farming community (Burton et al., 2008).

1.1.2 Encouraging Landholder Engagement via Social Marketing

Two observations for best land management practice behaviour change interventions from a previous study are relevant here:

> Firstly, *"There is still much work to be done to convince land managers of the importance and value of changing management practices"; and*

> Secondly, *"Many landholders lack trust and confidence in governments' appraisal of causes and extent of 'environmental problems" (Emtage & Herbohn, 2012, p. 358).*

A third observation surrounds trust in information and advice in the agri-environment and the move from direct communication to indirect communication (Sutherland et al., 2013).

> *"Whilst farmers were often positive about initiatives studied, they did not necessarily select the organisations behind the initiative as the 'most trusted' source for information or advice" (Sutherland et al., 2013, p. 100).*

Issues affecting trust are explored in later sections of this document. There is a need for an integrated approach to the encouragement of participation in best land management practices projects based on an understanding of the multiple pressures and influences on farmer behaviour (Blackstock, Ingram, Burton, Brown, & Slee, 2010; Feola, Lerner, Jain, Montefrio, & Nicholas, 2015) and the specific factors that will lead to potential engagement (Rolfe & Gregg, 2015). There is an emerging recognition of the potential benefits of the adoption of social marketing principles (Emtage & Herbohn, 2012a). A social marketing approach is compatible with the move from knowledge transfer to knowledge exchange, which as noted in the extant literature is mediated through social norms and relationships (Blackstock et al., 2010; Fazey et al., 2013; Manning, 2013). Improved communication, trust and mutual understanding among land managers and those seeking to advise on, or influence best land management practices has been shown to lead to improved outcomes. While this field is more developed in the health sector, lessons can be learned from research in this area and from the more recent but growing body of research in environmental areas such as water and energy conservation.

We suggest that the water quality challenge issue should be perceived as:

> *"'Wicked' involving multiple actors, scales, and levels; diverse policies, goals, and interests; and uncertain, contested, and evolving situations. Wicked problems are resistant to traditional policy interventions applied at a single level or over short timeframe" (Patterson, Smith, & Bellamy, 2015, p. 479).*

The complexity of factors that affect land management practices means that no single policy instrument is likely to be universally effective (Greiner, 2014; Rolfe & Gregg, 2015). We note that Australia is not alone in recognising the challenge of increasing uptake of best land management practices programmes: *"in spite of the best intentions, many governance*

initiatives around the world are failing" (Bodin & Crona, 2009, p. 367). A further significant issue is that it is claimed that:

> "*Farmers frequently cite the lack of evidence linking specific farming practises to water or air quality outcomes and on the cost-effectiveness of on-farm interventions as barriers to improving existing uptake of interventions*" (Collins et al., 2016, p. 280).

1.2 Project Approach

Our approach to the evolving research programme will be to follow the recommendations of Anil et al (2015): to encourage a participatory action research approach to problem identification and resolution in order to encourage farmers to actively participate in, and ultimately drive, behaviour change adoption through their networks, consistent with a communities of practice approach whereby learning; and thus buy-in to behaviour change is viewed:

> "*As a collective process by a group of people, engaged in mutual action and interacting regularly to seek change and improvement. Learning in this context is 'situational' meaning it occurs as a result of active participation in practice where learners construct their understanding by using and contributing to a range of common resources*" (Anil, Tonts, & Siddique, 2015, p. 220).

It is noted that "*the initial belief elicitation phase is theoretically necessary to inform subsequent phases*" in developing persuasive communication strategies (Curtis, Ham, & Weiler, 2010, p. 568) and the identification of these in relation to best land management practices will be a key part of the development of recommendations for future activity.

We will show how the social marketing approach captures deep and actionable insights into the factors that enable or inhibit sustained behaviour change, including social acceptance, perceived social norms, forms of social capital and social identity (Colvin et al., 2015; Compton & Beeton, 2012; Crane & Ruebottom, 2011; Fisher, 2013) and then uses these to develop potentially effective social marketing-based interventions. As part of intervention development, we will also illustrate the importance of message framing, noting that it is claimed that:

> "*Too many water management interventions proceed as if diffuse pollution from agriculture is an understood and accepted pressure, rather than taking the time to discuss this with their farming partners…Therefore farmers will be reluctant to participate if they feel that they will not benefit from engagement*" (Blackstock et al., 2010, p. 5635).

There is the need to understand the styles of engagement or, as Bartel and Barclay (2011) term it "*motivational postures*" among different segments of land managers. These authors identified four postures: one compliant type '*the aligned*' type (farmers who would comply) and three non-compliant types including '*the disengaged*', '*the game playing*', and '*the resistant*'. There are social dimensions of land management practices; factors that have recently come

into more explicit focus (Cooke & Moon, 2015). Figure 1 provides an overview of the importance of social factors including social identity (i.e. as a landholder), salience, or relevance of specific environmental issues to current and likely future land management practices and social identity, and the importance of group outcomes.

Repertoire of latent social identities	**Cues or triggers** of social identity e.g. * Accessibility * Fit * Connect- iveness * Distinct- iveness	Social identity **salience** among individuals	**Self-identification** with stakeholder group based on salient social identity	Stakeholder group **outcomes** e.g. * Cohesion * Mobilisation
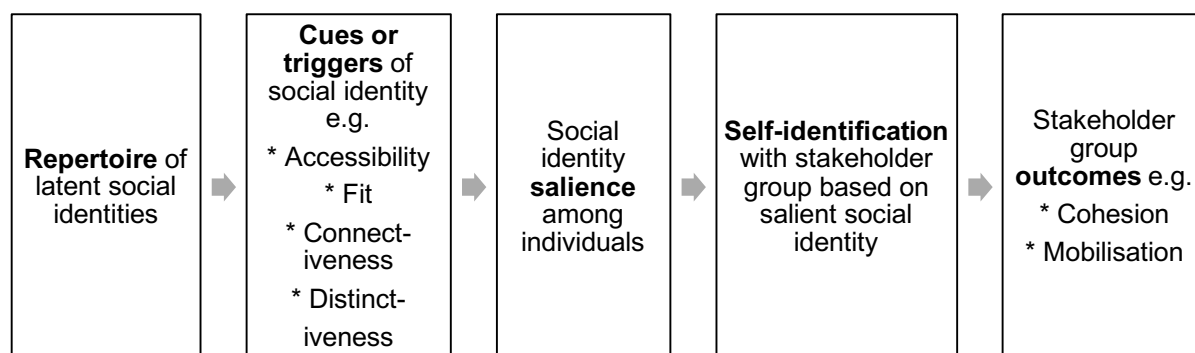
Figure 1: Stakeholder Group Membership Based on Social Identity
(adapted from Crane & Ruebottom, 2011)

While the emphasis is on voluntary behaviour change, the influence of existing and planned legislation and regulation on behavioural decisions must be considered. It will be important to understand how legislation and regulation are perceived in terms of fairness, aims, and probable outcomes. Depending on the results from the first phase of data collection, specific questions relating to this aspect of land management practice may be included in future data collection phases. There have been doubts expressed in the past about the efficacy of both regulation and regulatory enforcement, with well-intentioned regulatory requirements being found to not only not achieve compliance but potentially leading to resistance (Bartel & Barclay, 2011). Resistance is likely to be evident when the purpose of compulsory requirements are not understood or are contested (Barnes, Toma, Willock, & Hall, 2013). Resistance may be explained by the concept of psychological reactance, discussed in detail in Section 2.3.2.

> *"Farmer behaviour can be influenced using various institutional mechanisms: legal instruments, economic rewards, provision of advice and voluntary collective actions. Indeed, information and advice work in tandem with these other institutional mechanisms, as a cross cutting theme… Both the water management and agricultural extension literatures increasingly recognise the need for voluntary action by farmers to protect water resources due to the ever increasing burden of litigation, economic sanctions and government subsidies" (Blackstock et al., 2010, p. 5631).*

The importance of social norms cannot be underestimated and is discussed in more detail in Section 2.7. We note that there is an acknowledgement that social acceptance of the need for behaviour change, while widely recognized as important, has been neglected in behaviour change interventions in other environmental areas such as the need to transition to renewable energy sources (Huijts, Molin, & Steg, 2012). Research will be needed to determine the structure and relative influence of social networks and related structures such as webs of influence and communities of practice (Oreszczyn, Lane, & Carr, 2010; Prell, Hubacek, &

Reed, 2009). Compared to other information channels, both as part of social capital development and maintenance, and as potential barriers to or enablers of, sustained behaviour change. When analysing past interventions, approaches such as the Ladder of Interventions approach shown in Table 1 may be useful (Barnes, Toma, Willock, & Hall, 2013, p. 449). This was originally developed in the health sector but subsequently adapted to water pollution and other environmental issues. However, it was developed in the UK context and there are parts of the 'Ladder' that do not translate directly to the Australian context, let alone the GBR catchment. We also disagree with social norms and salience only being shown under nudges for the reasons given in the preceding discussion. Note: 'budges' are behavioural economics-informed behaviour change required by regulation as opposed to nudges that attempt to motivate behaviour change through altering the environment in which behavioural choices are made (Oliver, 2013). The strengths and weaknesses of 'nudge' strategies are discussed in more detail in Section 2.3.1 Behavioural Economics and Nudge Strategies.

Table 1: Nuffield Ladder of Interventions Applied to Water Pollution

(Barnes et al., 2013, p. 449)

Budges		Mixtures				Nudges			
Eliminate choice	Restrict choice	Fiscal incentives	Fiscal disincentives	Non-fiscal incentives and disincentives	Persuasion	Provision of information	Changes to the physical environment	Changes to default policy	Use of social norms and salience
Non-choice architecture						**Choice architecture**			
Ban application of chemical fertiliser	Ban over-application of fertilisers	Grants for extra storage capacity	Relate levels of intensity to subsidy payment	Emphasise cost-saving of nitrogen storage	Emphasise human health needs	Include fertiliser application within decision-support systems	Nitrate application levels including food labelling	Extend NVZ to whole country	Provide advice at catchment level
	Ban application on land at certain times of the year	Incentives for prescribed changes in machinery	Artificial increase in prices for chemical fertiliser	Emphasise cost-saving from limiting nitrogen application	Emphasise family health needs and access to clean water	Provide manuals / best practice guidance	Change demands of supply chain on quality of product	Increase monitoring of on-far practices	Establish monitor and best-practice farms
	Set quotas for sale of fertilisers to individuals	Grants for housing of cattle			Emphasise impact of livestock health of dirty water	Free advisory visits	Investment in 'Green' technology methods		Include fertiliser application rates within annual census data collection
	Set quotas on stocking numbers (for organic manure)	Incentives for livestock management (buffer strips etc.)				Emphasise the cost saving elements within private consultancy	Modify law to allow other technologies (e.g. nitrification inhibitors)		Report average fertiliser application rates at a catchment level
	Set quotas farm trading of organic manure	Encourage alternative markets (anaerobic manure digesters)							
	Restrictions on spreading technology (wide nozzles)								

1.3 Role of Government

1.3.1 Tensions between freedom and constraint

The role of governments or their agencies in achieving behaviour change is contested, with some arguing that it is legitimate to influence behaviours to improve people's lives, i.e. 'paternalistic' concern, while others argue that individuals should have the freedom to make their own choices (Jones, Pykett, & Whitehead, 2011). Rothschild (1999) suggests that governments have both the right and responsibility to protect free choice – but also to protect people from externalities – including costs – caused by others. In this specific context, environmental degradation is the major externality (Sarker, Ross, & Shrestha, 2008).

Determining the balance between freedom and constraint is not a simple task. There is evidence of concern regarding the role of government in health promotion, with opponents suggesting that:

> *"Health promotion is something the Nanny State (or the Welfare State) forces on us because it is good for us, such as a dose of nasty-tasting medicine that will make us grow big and strong and live longer" (Callahan, 2001, p. 83).*

However, some commentators note that assertions of 'nannyism' may be met with "postures of reticence" on behalf of government, but "in reality, complaints about nannyism have negligible influence. There is virtually no resistance to the advance of government intrusion in lifestyle if it is deemed to be justified in terms of public health" (Fitzpatrick, 2004, p. 645).

There is evidence of concern that some Australian environmental governance strategies are perceived as direct threats to property rights (Higgins, Dibden, Potter, Moon, & Cocklin, 2014). Climate change adaptation and pro-environmental behaviour present more complex challenges than public health issues in terms of governmental versus individual actions. Perceived risk and uncertainty of outcomes, together with the perceived likelihood of 'free rider' effects, including, for landholders, that other sources of diffuse pollution such as from industry or residential activity are not also being targeted for change. Some have criticised governments for applying what is perceived to be a short-term focus driven by political agendas and a lack of political will to make tough decisions (Ockwell, Whitmarsh, & O'Neill, 2009). A more pressing problem is that land managers appear to mistrust government sources (Bartel & Barclay, 2011).

1.3.2 Implications of Source Credibility and Trust

Critics question whether the change in emphasis from information provision to persuasion will be effective when, as noted earlier, there is widespread distrust of government advice. A more extreme view suggests that, in the context of public health, governments are perceived, by some sectors of society at least, as "*inherently bad*" and many citizens "*want as little to do with it as possible*", leading to the somewhat blunt question "*does government-sponsored health promotion have any chance of success where the government is the enemy*?" (Callahan, 2001, p. 83). There is evidence that credibility and trust issues are also relevant to the agri-environment sector. Prior research has identified issues with the usefulness of information provided to assist in property management, trust in advisers, and a range of organisations and institutions (Emtage & Herbohn, 2012).

In addition, the lack of coordination and integrated policy, let alone practical application, has been criticised, with the observation that "*atomised initiatives are unlikely to deliver requisite change*" (Lang & Raynor, 2007, p. 171). Within this, the concepts of communities of practice may be very useful, i.e.

> "*Communities of practice are repositories of explicit or formal knowledge as well as the less tangible tacit, informal knowledge, and hold the key to any form of change process. They are inherently stable and it is this stability that allows learning within and around the community to take place*" (Oreszczyn et al., 2010, p. 405).

These authors note that three aspects of communities of practice have been identified that may be barriers to or enablers of learning that leads to behaviour change:

> 1. ***Mutual engagement:*** *members come together because they are engaged in actions whose meaning they negotiate with one another. They develop shared practices and are linked through their mutual engagement in such activities.*
> 2. ***Joint enterprise:*** *members work together, explicitly or implicitly, to achieve a negotiated common goal, which may or may not be officially defined.*
> 3. ***Shared repertoire:*** *a common history and culture is generated over time by shared practices, stories, tools, concepts and repeated interactions. Writing, routines, rituals, ways of doing things and so on become a common repository.*

Further, there is evidence that persuasive messages alone have not been successful in changing some behaviours due to the influence of external or environmental factors (Verplanken & Wood, 2006). For example, it is claimed that the greatest source of sediment runoff is from high gradient slopes within Wet Tropics National Parks rather than from coastal plains (Benn, 2013). While this view runs counter to recent media reports (e.g. ABC News, 24 November 2015: "*How sediment is killing the Great Barrier Reef*"), it will be necessary to determine how strongly this view is supported, as well as what evidence can be presented and in what ways, in order to address misconceptions. The influence of competing influences and messages is discussed further in Section 2.8 Social Marketing Methods Mix.

In addition, we have anecdotal evidence of farmers whose land is adjacent to major rivers where significant washouts occur after the failure of local government installed boulder-based retaining walls. These farmers subsequently lose land with every flood event (see**Figure 2**, sample photos overleaf) and are unlikely to be prepared to amend their own practices until what is seen as a significant problem not of their making are rectified. They are being asked to fund the repairs themselves but believe that the placement of a weir at a particular point on the river caused a change to water flow, leading to the subsequent erosion problem. The weir does not act as a sediment trap thus the eroded sediment flows out to the ocean. Again, significant engagement with affected farmers over causes, effects, and mitigation strategies will be needed before any aspects of best land management practices involving farmer behaviours can begin to be their focus.

Figure 2: Landholder-supplied photos of Riverbank Erosion
Reproduced with permission of landholder.

Trust and effective communication between land managers and regulators are crucial for land managers when making decision on changing existing or adoption of new land management practices related to health of the GBR (Emtage & Herbohn, 2012b). However, in the past significant groups of landholders in rural Queensland reported the lack of trust of governments (Bartel & Barclay, 2011; Lockie & Rockloff, 2004).

Understanding landholders' trust in government agencies and people in the community is critical for developing and encouraging effective policies and programs. Trust and effective communication defining landholders' reaction to programs and practices aimed to improve management of natural resources. Building trust, thus, will help voluntary adoption of improved practices and programs (Emtage & Herbohn, 2012b).

It is claimed that there has been a breakdown in collaboration between stakeholder organisations. There is some evidence that there is higher trust in regional organization staff than central government. Yet NRMs have lost financial support, ongoing investment and apparent influence in favour of centralised decision making with NRMs being relegated to implementers of government decisions (Colliver, 2012; van Oosterzee et al., 2014). The exact impact of this is unclear. However, the following commentary on the value of Landcare networks is relevant:

> *"Landcare networks were associated with an increase in the willingness of farmers to acknowledge that environmental degradation existed on their properties, to encourage peer review of their management practices, and to co-operate with others to address cross-boundary problems. At the same time, the mutual understanding of who has a legitimate interest in farming and land management was widened, with Landcare activities constructed as activities that should involve 'the whole family' and 'the whole community', thus valuing more highly the contribution of farm women and non-farming rural landholders" (Lockie, 2006, p. 27).*

The concept of risk "refers to the uncertainty about likely benefits or costs when new practices are adopted and the end results are yet to be realised" (Lockie and Rockloff, 2004, p.9). Risk is considered as one of the most significant factors when making decisions about how to manage agricultural land (Barr and Cary, 2000).

Resource investment and the required capital risk are the factors most frequently cited by landholders when considering adopting new practices, with the perception that the risk burden falls entirely on individual landholders (Lockie & Rockloff, 2004). Thus risk perceptions and perceived uncertainty regarding outcomes moderate the degree to which landholders believe they are successful in realising their goals (Pannell et al., 2006), with risk tolerances differing significantly between the individuals (Barr & Cary, 2000), making responses to risk assessments difficult to predict.

In more recent research, it has been confirmed that perceived risk and personal motivations of graziers in the Burdekin Dry Tropics region impact their decisions on adoption of water conservation practices. Graziers who stated taking more market and production risks were involved in significantly higher level of adoption (Greiner, Patterson, & Miller, 2009). As risk perceptions and risk management are essential for farm management, especially for managing beef sector in a tropical savannah environment (Greiner & Gregg, 2011), there is considerable potential for effective risk communication strategies to be developed to help reduce their potential negative impacts.

The National Academy of Sciences defines risk communication as:

> *"An interactive process of exchange of information and opinion among individuals, groups, and institutions. It involves multiple messages about the nature of risk and other messages, not strictly about risk, that express concerns, opinions, or reactions to risk messages or to legal and institutional arrangements for risk management" (Covello, 1998 cited in Covello, Peters, Wojtecki, & Hyde, 2001).*

Risk communication describes a variety of activities (Plough & Krimsky, 1987) and addresses issues associated with informational exchange of management of risk including its nature, significance, magnitude and control (Covello & Sandman, 2001). Risk communication integrates implicit and explicit goals/objectives for particular groups or events targeted and it is channelled from experts to the communities/general audience (Plough & Krimsky, 1987). Definitions of risk communication can be broad or narrow depending on the latitude of explanation of five components of its definition (see **Table 2**) (Plough & Krimsky, 1987).

Table 2: Definition of Latitude of Risk Communication
(adapted from Plough & Krimsky, 1987)

Components of risk communication definition	Broad	Narrow
Internationality	Risk communication goal unnecessary	Intentional and directed; outcome expectations about the risk message
Content	Any form of individual or social risk	Health and environmental risks
Audience directed	Targeted audience not necessary	Targeted audience
Source of information	Any source	Scientists and technical experts
Flow of message	From any source to any recipient through any channel	From experts to non-experts through designated channels

Risk communication analysis strategies evaluate the strengths and weaknesses of different information channels that are used to communicate risk information such as public meetings, exhibits and availability sessions, press releases, websites, electronic and print resources, group discussions, public service statements etc. (Arkin, 1989; Covello & Sandman, 2001). Evaluation of the effectiveness of risk communication has consistently displaying success in achieving of three main communication goals:

1. *Provision of knowledge that is necessary for making decision about the risk,*
2. *Building/rebuilding trust between participants (e.g. regulator and regulate); and*
3. *Stakeholders' engagement in discussion/exchange of ideas intended to solve disagreements and achieving consensus (Covello, 1998; Morgan, Fischhoff, Bostrom, Lave, & Atman, 1992)*

The main barriers to risk communication identified in the literature include poor risk communication planning, disagreement and absence of coordination between the participants, poor preparation, lack of resources and practical skills (Covello et al., 2001). Often conflict between the stakeholders is aggravated by:

1. *"Confusing/unclear, difficult, inconsistent, and/or inadequate risk messages" (Covello, McCallum, & Pavlova, 1989);*
2. *"Distrust in sources of information" (Renn & Levine, 1991)*
3. *"Psychological factors that influence processes of risk information" (Covello et al., 1989); and*
4. *"Degree of biases and selectivity by media" (Sjöberg, 2000)*

Effective application of risk communication requires appropriate interaction and respect towards different values and threats, relevant knowledge and planning, adequate preparation, practices and skills (Covello et al., 2001). It is therefore important to determine the preferred channels through which risk communication is discussed and who trusted discussants, centralised or decentralised are perceived to be (Taylor & Van Grieken, 2015).

1.4   Segmentation Issues

"To develop a strategy to promote the adoption of best land management practice's it is useful to better understand how the adoption of best land management practice's varies between different sectors of the community and whether these differences are related to variations in landholders' communication behaviour, beliefs, management objectives and socio-economic circumstances" (Emtage & Herbohn, 2012a, p. 108)

There is much debate over whether to apply relatively simple measures to many types of farmers or to give priority to measures that are more targeted (Van Herzele et al., 2013). Several 'typologies' or classification systems already exist (for a somewhat dated Australian review, see Emtage, Herbohn, & Harrison, 2006). Bohnet, Roberts, Harding, & Haug (2011) have identified three main types of <u>graziers</u>: traditionalists, diversifiers, and innovators, each with distinct characteristics, values, and perceptions regarding resource management. Van Herzele (2013) identified six modes or styles of farmer participation: "opportunisitic, calculative, compensatory, optimising, catalysing and engaged" , noting that "the same farmer might develop different modes of participation when farming different parts of farmland" (p. 114). This indicates that different strategies will be needed with each category of grazier, to achieve any form of engagement with the key issues, let alone sustained behaviour change. Other typologies have been developed in other countries such as the USA (McGuire, Morton, Arbuckle, & Cast, 2015) and Scotland (Barnes, Willock, Toma, & Hall, 2011; Sutherland, Barnes, McCrum, Blackstock, & Toma, 2011) but may not be directly applicable here. We are unable to locate any typology for <u>cane growers</u> specifically.

Some groups, such as small-scale lifestyle landowners may have a specific set of needs in terms of advice and supporting resources (Meadows, Emtage, & Herbohn, 2014). Decisions will need to be made regarding whether / what type of focus or what type of resources might be relevant for this sector.

A typology of farmers' compliance motivation is shown in **Table 3**. Again, this should be used when analysing data from previous studies in the region. This should also be aligned with the landholder typologies identified in earlier studies and contextualized for this specific context (Emtage et al., 2006).

Table 3: Compliance motivation: The Five Motivational Postures and Statements for Compliance with Environmental Laws
(Bartel & Barclay, 2011, p. 155)

Orientation	*Posture*	*Description*	*Example statement*
Deference	Commitment	Belief in environmental regulations as a means of securing the common good	Abiding by environmental laws and regulations is the right thing to do.
			Abiding by environmental laws and regulations is helping the government do worthwhile things.
	Capitulation	An acceptance of the regulator as a legitimate authority	Environmental laws and regulations may not be perfect, but they work well enough for most of us.
			No matter how cooperative or uncooperative the government environment agencies are, the best policy is to always be cooperative with them.
Defiance	Resistance	Attributing negative and harmful intentions to the regulator they are out 'to get' farmers	We need more people willing to take a stand against environmental laws and regulations.
			Government environment agencies are more interested in catching you for doing the wrong thing, than helping you do the right thing.
			If abiding by environmental regulations is going to cost me money then it is not worth it.
	Disengagement	A widespread disenchantment with the system whereby individuals have 'given up' on the governments and regulatory system.	If I find out that I am not doing the right thing by environmental law and regulations, I'm not going to lose any sleep over it.
			I don't really know what environmental laws and regulations expect of me and I don't really care.
	Game playing	Perception of the regulator as a partner in playing and finding ways to use the law to one's own advantage.	I like the challenge of finding ways to get around environmental laws and regulations. It's good to talk to other farmers about loop holes in environmental laws and regulations.

2.0 ACHIEVING BEHAVIOUR CHANGE

2.1 Recognising Barriers and Motivators / Enablers

Both the barriers to, and potential enablers of behaviour change must be recognized, including the role of the types of incentives used in the past. It will also be important to determine exactly what behaviours are to be targeted for change. It is only in recent years that the assumption of attitudes leading to behaviour change in this sector have been recognised, in particular that a general attitude about a thing has been proven in numerous studies to *not* lead to specific behaviours (Ham, 2009). Further, it is now well recognised that behaviour change will not occur "*unless a specific behaviour is explicitly targeted and communication is designed to address attitudes relevant to that behaviour*" (Stern & Powell, 2013, p. 35). The Community-based Social Marketing principles (McKenzie-Mohr, 2000; McKenzie-Mohr & Schultz, 2014) and the wider National Social Marketing Centre's Benchmark Criteria (National Social Marketing Centre, undated) support this strategy, both of which are discussed in more detail in Section 2.5 *Social Marketing Benchmarks.*

An aspect that should also be explored is that of the relevance and efficacy of the diffusion of innovation, first mapped in the agriculture sector in the early 1960s and frequently summarized in the diagram shown in Figure 3 below (Rogers, 1962).
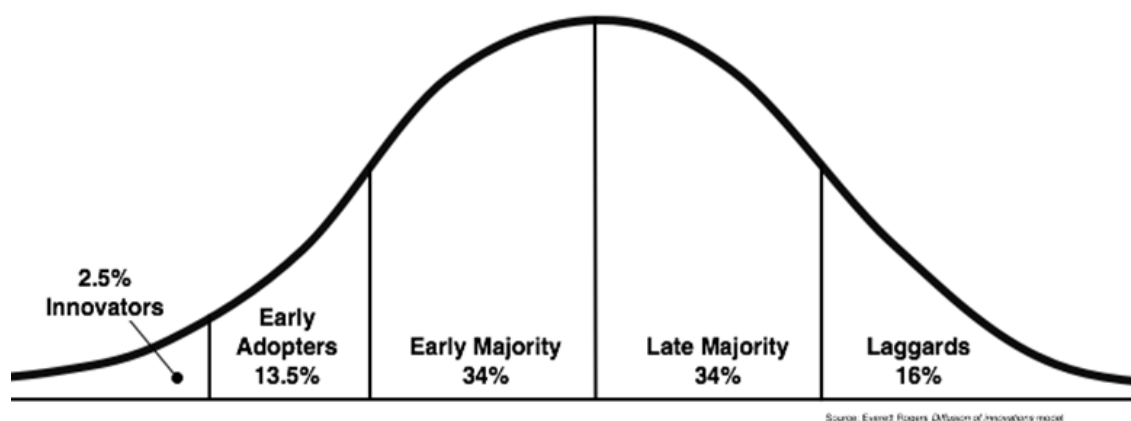
Figure 3: Standard Diffusion of Innovation Diagram (Rogers, 1962)

This concept was designed to summarise the process by which innovations are spread across a social system over time, with the assumption that adoption may initially be localized but that adoption density will increase over time. The success – or rejection - of an innovation is held to be dependent on several factors that are relevant here:

- Relative advantage
- Compatibility with existing values and practices
- Simplicity and ease of use
- Trialability
- Observable results

Innovations can also be classified according to their impact on established patterns of behaviour:

- **Continuous innovations** have the least disruption
- **Dynamically continuous innovations** have more disrupting effects but may not alter existing behaviours.
- **Discontinuous innovations** require substantial changes to existing behaviours and may therefore be slow to be adopted if at all (MacVaugh & Schiavone, 2010; Robertson, 1967).

While the concept has been widely used, it is not without criticism, such as the assumptions that all innovations will eventually spread and the assumption that categories of adopters are static, together with a tendency to blame non-adopters for their lack of change rather than investigating the causes behind their decisions (Stephenson, 2003). It also assumes that, once an innovation has been adopted, there will be no abandonment of it – i.e. a return to previous behaviours. The original author acknowledges that there is ample evidence that this in fact does occur and also acknowledges that adoption may be only partial (Rogers, 1962).

2.2   Barriers to and Potential Enablers of Behaviour Change

2.2.1 *Behaviour change time frames and social norm influence*

Behaviour change is unlikely to be immediate - actual behaviour change may be slow, complex and require consideration of potential trade-offs (Fleming & Vanclay, 2011). Resource constraints are significant inhibitors of adaptation, both for communities overall and for specific groups such as farmers: "*It's hard to be green when you are in the red*" (Cocklin, Dibden, & Mautner, 2006, p. 200). Lack of funding may therefore inhibit the ability to change land management practices, even if landholders are motivated to do so (Ecker, Thompson, Kancans, Stenekes, & Mallawaarachchi, 2012). In addition, indirect transaction costs such as time and effort required either to undertake land management practice changes or to prepare applications for support and then, if successful, complete all required monitoring and reporting requirements (Coggan, Grieken, Boullier, & Jardi, 2014).

A further reason for the lack of behavioural change impact in past interventions may be the failure to recognise the importance of social norms as a potential barrier to behaviour change: perceived norms may override knowledge and even individual desire to change behaviour (see Barr, Shaw, & Coles, 2011 and Hay & Eagle, 2016 for further discussion). Particularly if this would be at odds with observed peer behaviour: interventions that have attempted to use injunctive norms may have inadvertently reinforced descriptive norms and the belief that individual actions will not have any impact on the problem (Armitage & Conner, 2000; Minato, Curtis, & Allan, 2012).

A further barrier to environmental behaviour change may also be a perception that changing one's own behaviour will not make any difference to the impact of climate change (Semenza et al., 2008) or, in this specific context, the overall health of the Great Barrier Reef, given recent coral bleaching events and associated media coverage.

2.2.2 Potential Enablers of Behaviour Change:

Incentives

The underlying concept behind the use of incentives is that positive externalities produced by farmers should be rewarded (Burton et al., 2008). Current policy measures imply the reverse, i.e. that negative externalities should be punished. This is somewhat problematic due to the denial of primary responsibility for diffuse pollution effects discussed in earlier sections and the perceived difficulty of 'proving' direct links between land management practices and environmental outcomes (Collins et al., 2016).

In determining whether incentives are appropriate and, if so, what types of incentives may be the most effective, current assumptions should be revisited. Best land management practice reef-related programmes often assume that land managers are motivated by profit – offering financial (dis)incentives or seeking to 'prove' that best land management practices will raise profits. Finances are not the sole driver of on-farm conservation activities (Greiner & Gregg, 2011): socio-cultural and environmental values are crucially important to land managers (Lambert, Sullivan, Claassen, & Foreman, 2006; Stoeckl et al., 2015). Even those who focus on money may not focus on profit; they may instead wish to minimise costs and risks (Asseng, McIntosh, Wang, & Khimashia, 2012; Monjardino, McBeath, Brennan, & Llewellyn, 2013) and/or maintain flexibility (Greiner, 2015). This may explain why financial incentives for on-farm conservation initiatives do not always generate 'additionality' (Wunder, 2007), and suggests that the incentives used to encourage best land management practices are unlikely to appeal to all land managers (Burton et al., 2008; Greiner & Gregg, 2011). An increasing body of literature on farmers' behaviour confirms the complexity of land manager decisions and the range of socioeconomic and psychological factors (e.g. attitudes, beliefs, personal and social norms) that coexist alongside profit considerations (Carr & Tait, 1991; Willock et al., 1999).

An aspect of incentives that could be explored is that of community rather than individual rewards where visible and measurable positive behaviour change is rewarded by both public recognition ("*faming*" – the opposite of shaming) but also appropriate community-level rewards which can be given to encourage others to adopt the desired behaviours. These strategies have been used in energy conservation interventions in the UK (Behavioural Insight Team, 2011): we cannot locate any similar strategies in the agri-environment sector. However, this approach is compatible with the principles of collaborative / collective action identified as potentially successful ecosystem management strategies in other countries (Muradian, 2013). Other means of achieving behaviour change are now discussed.

2.2.3 Behaviour change tools

Options

In terms of available strategies to achieve needed change, options centre on legislation and education and on an array of persuasive strategies that are commonly used in social marketing (Rothschild, 1999). For example in Rothschild's applications of education, marketing and law, if the subject (landholder) has the opportunity and the ability to make changes then they will make changes, where if there is no opportunity or ability, then they are resistant to change. By contrast if they do not have the ability, for example, there is no education in the field of change then they are unable to change and therefore are resistant to change their behaviour.

Each change may be warranted individually or in combination, this is more clearly stated in Rothschild's table of applications of education, marketing and law (Rothschild, 1999, p. 31).

Additional insights regarding what types of behaviour change tools might be effective in different circumstances is provided by Schultz (2015, p. 110) as shown in Figure 4. This indicates that social marketing may be used in conjunction with a range of other strategies.

Figure 4: Classification of Behaviour Change Tools by Barriers and Benefits
Schultz (2015, p. 110)

Voluntary action is more likely to persist and become part of social norms. While our proposed research will assist in encouraging voluntary actions, it will also identify if regulatory interventions are desirable as well as the type of intervention most likely to achieve behavioural adoption and change (Feola et al., 2015). We now discuss each of Rothschild's strategies in turn.

Rothschild's Strategy: Legislation

> *"Law will be appropriate when the pre-existing self-interest of the target cannot be overcome with additional rewards through exchange, when rewarding is inconsistent with societal goals or when the rights of the target are believed to be irrelevant"* (Rothschild, 1999, p. 30).

Legislation has been used in a number of areas, such as anti-smoking (Haw & Gruer, 2007), 2007), speeding restrictions, the requirement to wear seatbelts and sanctions for driving with excess blood alcohol levels (Brenkert, 2002). Other mandatory interventions have existed for some considerable time without major current commentary, such as fluoridation of water supplies and the addition of vitamins and minerals to a range of foodstuffs, for example, the addition of iodine to salt.

Another example of mandatory interventions is the relatively recent restriction on smoking in public places, which has been introduced across many countries. There are, however, limits to the amount of legislation aimed at forcing behaviour change deemed acceptable. Though,

as noted in the UK's 2004 White Paper *Choosing Health,* the provision of information alone which aimed at aiding consumers to make health lifestyle choices has not been effective. As one observer notes:

> *"If information was all that was needed to change behaviour, cigarette smoking would have declined drastically in the mid-1960s and be non-existent today, and food consumption and exercise regimens would follow widely publicized government guidelines" (Schneider, 2006, p. 812).*

Threats of stronger government legislation and regulation may be interpreted as a form of fear-based messaging the use of law generally is thought of as coercive and punishing (Rothschild, 1999, p. 25). It is suggested that fear of penalties for non-compliance is not as effective in changing beliefs and convictions that behaviour change is necessary and desirable (Mols, Haslam, Jetten, & Steffens, 2015).

Rothschild's Strategy: Education or Information Provision only

Many past behaviour change interventions have been comprised of simple information provision in the expectation that this alone would result in changes to behaviour. This strategy is most effective when individual self-interest is strong and is consistent with societal goals (Rothschild, 1999). There is often frustration evident when well-intended programmes do not perform as expected or people do not follow expert advice (Haynes, Ackloo, Sahota, McDonalnd, & Yao, 2008). Past interventions such as those in the health sector have also shown unintended effects such as confusion and misunderstanding of health risks and risk reduction strategies, unnecessarily high levels of fear and apprehension or desensitization to the risk (Cho & Salmon, 2007). In the energy conservation field, 'rebound effects' have been noted, such as users of energy-efficient appliances using them more often and thus failing to reduce overall energy usage (Abrahamse, Steg, Vlek, & Rothengatter, 2005).

Educational programmes have also been debated extensively in relation to climate change: the findings from this sector that are relevant to best land management practices are summarised below:

> The way that climate change science is communicated has been criticised, with the suggestion that current strategies result in "islands of knowledge in a sea of ignorance" (Meinke et al., 2006, p. 101); there is a need for salience, legitimacy and credibility to also be considered in communicating climate change science. Other factors that makes comprehension difficult for those who lack specialised scientific knowledge is the invisibility of climate change causes, a tendency to discount the impact of distant events, lack of immediacy, disbelief about the impact of people overall and the efficacy of any individual action, uncertainty, perceptual limits and self-interest (Moser, 2010b).

While lack of knowledge (i.e. 'information deficit') is cited as causing misconceptions and apathy (Bulkeley, 2000; Owens & Driffill, 2008) and is therefore suggested as an impediment to attitude change and thus to meaningful behavioural change (Costello et al., 2009; Semenza et al., 2008). A gap between reported attitudes towards environmental issues and actual

behaviours is well documented in the literature (Lorenzoni, Nicholson-Cole, & Whitmarsh, 2007; Ockwell et al., 2009; Sheppard, 2005).

Attitudes are multi-factored and interact with a number of other key factors in influencing behaviour, especially norms (Ajzen, 1991) and self-efficacy (Fishbein, 2008).The implications of this for best land management practices programmes is discussed in more detail in the following sections.   Attitude change alone is unlikely to be effective in achieving sustained behaviour change as a focus on individual voluntary change ignores social, environmental, structural and institutional barriers to behaviour change (Ockwell et al., 2009). As noted earlier, behaviour change, or lack of it, may be driven by factors other than attitudes, such as financial constraints (Cocklin et al., 2006; Lorenzoni et al., 2007)*.*

The main weakness of the 'information deficit' model both in the health and environmental sectors has been identified as a failure to recognise the complex interaction of values, experience and other factors in achieving (or not achieving) successful and sustained behaviour change. This is discussed in the extant literature, together with the inadequacies of many current theories in capturing and charting the interaction of these factors across different population groups (Lorenzoni et al., 2007).

The above discussion shows that education or simple information provision is necessary, but not of itself sufficient to change behaviours (Muro, Hrudey, Jude, Heath, & Pollard, 2012). There are myriad reasons, including complacency, indifference, or merely a failure to understand the relevance and importance of the messages being sent. We now examine two forms of behaviour change persuasion, behavioural economics, and social marketing.

2.3   Persuasion

2.3.1 Behavioural Economics and Nudge Strategies

It has been questioned whether all forms of persuasion are inherently unethical or whether there are boundaries within which persuasive tactics are acceptable, such as when benefits outweigh risks (Rossi & Yudell, 2012). Under traditional economics, individuals are largely assumed to make choices which are rational, consistent, perfectly informed and which maximise their economic utility by balancing personal costs and benefits (Avineri & Goodwin, 2010). However, the failure of individuals and social groups to act in purely rational ways, and the predictability of this 'irrational' behaviour have been recognised for several decades (Tversky & Kahneman, 1974).

Behavioural economics differs from traditional economics in that it recognises individual cognitive limitations, tendencies to make behavioural choices out of habit rather than detailed deliberation and thus apparent irrational choices (Brekke & Johansson-Stenman, 2008). It therefore seeks to understand behaviour by incorporating insights from behavioural sciences into economics. The approach differs from the traditional, neoclassical economics mainly by giving more weight to what are sometimes called 'irrational' motives and behaviours.

Behavioural economics provides insights into the limitations of financial (dis)incentives to motivate behaviour change, particularly the role of social influences and norms (Heyman & Ariely, 2004). Financial incentives, such as those for energy use reduction, might crowd out feelings of civic responsibility and may actually discourage the kinds of behaviours needed to

solve collective social problems (Steg, 2008). Similarly, this may occur in the agri-environment (Greiner & Gregg, 2011).

The field of behavioural economics received a significant increase in focus with the release of a US text *Nudge: Improving Decisions about Health, Wealth, and Happiness* (Thaler & Sustein, 2008) which advocates a range of non-legislatory interventions based on altering the contexts ('choice architecture') in which behaviour decisions occur. Choice architecture is claimed to alter behaviours in predictable ways through the manipulation of choice options intentionally made available or not (Lockton et al., 2009).

Nudging approaches are not without criticism. It works best on unintentional /automatic behaviours (Chatterton & Wilson, 2014). These do not impact on knowledge, attitudes and values, therefore they are difficult to maintain in the long term (Avineri & Goodwin, 2010). There is also a potential conflict between the assumption of choice architecture that maximises healthy eating proposed in Thaler & Sunstein's (2008) Nudge text and commercial imperatives. Many marketers and large retailers use sophisticated computer-based analysis to enable decisions to be made on optimum shelf position and space allocation that will maximise profit (Lira et al., 2004; Urban, 2002). The same principle applies to fast food flyers and menus (Eagle & Brennan, 2007) which are beyond the influence of nudge strategies.

In the agri-environmental context, it is difficult to determine what choice architecture could be directly influenced by nudge strategies, given the complexities of issues involved. Land managers do not have an 'off the shelf' product that requires a simplistic purchase decision. Land manager decisions are dependent on elements such as inclement weather, soil type now, during, and after flood, drought and land conditions, as well as timing to meet market needs. Therefore, nudging may have limited use as land manager decisions are rarely made without careful consideration. However, we note recent interest in nudge strategies within the agri-environment context, particularly those reinforcing the stance that voluntary actions are more likely to result in changes to social norms and thus sustained behavior, than those actions enforced by legislation (Barnes et al., 2013; Mills et al., 2016). In addition, we note within recent academic literature that information provision and monetary payments appear to be conflated with nudge in discussions (see, for example,Kuhfuss, Préget, Thoyer, & Hanley, 2015).

Even in situations involving largely automatic behaviours, there is a need for caution in terms of the acceptability of allowing ourselves to be nudged towards what experts judge to be desirable (Sugden, 2009). What may be interpreted as a nudge by the originators may be perceived as a shove by recipients (Marteau et al., 2009) – and the media. Research in other areas suggests that this approach may also lead to reactance effects. These are discussed in more detail in Section 2.3.2. It has been suggested that acceptability is dependent on "*the right kind of nudge for specific circumstances*" (Cohen, 2013, p. 10). While it has also been suggested that the acceptability of nudge strategies may be context-dependent, incorporating the nature of the nudge and both the nudger and nudgee (Lucke, 2013). The precise contexts have not been identified. Of more concern is that some nudge strategies have been found to backfire (Johnson et al., 2012; Mols et al., 2015).

In spite of these concerns, the influence of the Thaler & Sustein (2008) text has been far reaching. A Behavioural Insights Team (commonly referred to as the 'Nudge' unit) was established within the UK Cabinet Office (Corner & Randall, 2011), and a Behavioural Insights

Team has been established in Australia in partnership with the UK organisation and the New South Wales Department of Premier and Cabinet in 2012 (The Behavioural Insights Team, 2012).

We note a critique of the Nudge approach as applied to the UK government policy sector comes from a 2011 House of Lords report (Committee, 2011). Consistent with the plea for research to investigate "*what works, for whom, in what circumstances and for how long*" (Marteau, Ogilvie, Roland, Suhrcke, & Kelly, 2011, p. 264) and similarly relating specifically to environmental management: "*What works, why, when and with whom?*" (CM Taylor, Pollard, Angus, & Rocks, 2013, p. 488), the House of Lords report recommended *"applied research at a population level"* in order to increase understanding of behaviour change interventions and criticised the use of non-regulatory tactics such as Nudge in isolation.

Another weakness is that nudging may not be sufficient – and at times 'shoves' and 'smacks' (i.e. penalties) maybe needed – but it should be noted that 'hugs' (rewarding) may also at times be appropriate (French, 2011). The nudge approach has not yet been tested or systematically analysed across a range of intervention types, nor has its relative efficacy been compared to other approaches or intervention types across population segments and behaviours. Concerns have been raised within the public health community that the Nudge approach could widen health inequalities if strategies targeting high-risk groups are used at the expense of wider-focussed approaches (Marteau et al., 2011).

Ethical dimensions of nudge strategies

It is also suggested that using 'negative option marketing' - where the *"consumers failure to reject or cancel an offer (i.e. to act) signals consent"*, i.e. specific limited default behavioural (Von Bergen & Morgan, 2015, p. 128); may increase distrust - and it may also raise several wider ethical issues (Von Bergen & Miles, 2015). Firstly, there is the issue of who defines desired behaviour, what evidence should be necessary to justify an intervention and whether consideration of potential harm to others that may arise as a consequence of any intervention. Indeed, when developing interventions, "*who has the mandate to represent large and diverse populations for the purpose of informed consent, and how can this be implemented*?" (Guttman & Salmon, 2004, p. 537). In communicating risk (Callahan & Jennings, 2002), who decides whether levels of risk that may be acceptable to different segments of society are acceptable to society as a whole?

2.3.2 Psychological Reactance

The theory of psychological reactance originated in the 1960s (Brehm & Brehm, 1981; Ringold, 2002). It states that direct or potential perceived threats to personal freedom, such as consumption of specific products or engaging in particular behaviours, may be resisted. Furthermore, people may then become motivated by the perceived threat itself, rather than the actual consequences of the threat, to assert their freedom and regain control of their own decision-making and thereby of their threatened freedom.

Engaging in the threatened behaviour is one means of re-establishing this freedom (Rummel, Howard, Swinton, & Seymour, 2000). This has potential implications for 'budging' strategies discussed in Section 1.2 and shown in Table 1. Reactance effects appear to be strongest when the threatened freedom is perceived as important and the affected individual perceives that their 'counterforce' efforts will achieve personal control. Conversely, if an individual does

not perceive that their actions will be effective in countering the threat, reactance will be minimal (Hellman & McMillin, 1997).

In terms of persuasive communication such as mass media public health intervention programmes, reactance may generate actions that resist or are the opposite of those desired by the individuals or organisations seeking to influence both attitudes and behaviours. Reactance effects explain not only why some public health interventions may not be effective, but also why they may produce effects contrary to those intended (Buller, Borland, & Burgon, 1998). A further danger is that awareness of attempts to manipulate behaviours may result in the behaviour itself becoming more attractive – the 'forbidden fruit' problem that has been seen in interventions such as tobacco cessation programmes targeting adolescents (Sussman, Grana, Pokhrel, Rohrbach, & Sun, 2010).

2.4   The Rationale for a Social Marketing Approach

Note: the following rationale is common to most social marketing intervention strategies and has been adapted for the agri-environmental context from our previous work (see, for example, Cupitt, Costello, Eagle, & Raciti, 2015; Eagle et al., 2013).

2.4.1 Overview of Social marketing

Social marketing is regarded as a non-coercive form of persuasion and is held to be compatible with, or a natural ally of, behavioural economics (Rothschild, 2001; Smith, 2010). In the last decade, there has been a substantial growth in research analysing the effects and effectiveness of social marketing and the field is now recognised as "empirically well-supported" (Corner & Randall, 2011, p. 1008). While primarily focussed on health-related issues initially, it has expanded to include a wide range of issues and behaviours. **Table 4** provides an overview rather than an exhaustive list of issues for which social marketing approaches have been successful. All of the issues shown in the table focus on forms of actions by individuals and groups of individuals that potentially affect, positively or negatively, both their own wellbeing and that of others, thus generating externalities – and potential costs for the public health system or, through externalities, negative environmental impacts.

Table 4: Indicative List of Social Marketing Interventions and Studies Examining Impact
(adapted from Eagle & Dahl, 2015; Eagle et al., 2013)

Issues / Behaviour Targeted
Health / well being
Domestic violence reduction
Drug education
Exercise / physical activity
Genetic testing to reduce the occurrence of inherited diseases
Immunisation
Medical screening (cancer, cholesterol etc.)
Malaria control
Mental health
Nutrition / countering obesity
Responsible drinking / alcohol consumption reduction
Responsible driving / Anti-speeding
Safe sex / condom use / contraception
Seatbelt use
Smoking cessation
Sun protection / skin cancer awareness
Workplace health
Environmental issues
Agricultural / natural resource management
Energy and water conservation
Pollution reduction
Recycling
Other
Community disengagement / dissociation
Disaster management and preparedness, e.g. hurricanes, earthquakes, volcanic eruptions
Education participation
Volunteering

Unfortunately, it is not possible to compare success (or otherwise) of the factors across the issues listed in **Table 5** due to variations in methodology and reporting procedures. A further limitation is that, while activity may claim to be social marketing, it may be limited to educational activity only. Conversely, some activity does not 'brand' itself as social marketing but largely follows its concepts and principles. In health education in particular, activity generally involves the use of a single programme, led by expert knowledge and provider-driven rather than receiver-drive programmes specifically customised to meet the needs and likely responses of population segments (see, for example Peattie and Peattie (2003)). A further limitation is that it is difficult to determine the relative impact of individual components of social marketing campaigns, let alone what impact or influence the components may have had, individually or in combination, on factors underpinning behaviour. This is a challenge still faced by the commercial marketing sector – in spite of heavy investment in a range of measurement metrics for behaviour considerably less complex than that challenging social marketers. As has been wryly observed in the health context, "*it is more difficult to ascertain usage rates for condoms than for coffee*" (Goldberg, 1995, p. 348).

2.4.2 The Historical Development of Social Marketing

As for many other concepts, there has been debate over the precise origins of social marketing. It has evolved over time from narrow and somewhat simplistic foundations, in the early 1950s with one of the first indications of the potential for social marketing coming from the question: "*why can't you sell brotherhood and rational thinking like you sell soap?*" (Wiebe, 1951-52, p. 679). From that point, however, only a few isolated academic papers appeared

through to the1970s, with their focus on what social marketing entailed rather than providing empirical evidence of its impacts (see, for example, Kotler & Zaltman, 1971; Luck, 1974). The field became the focus of specific attention in the late 1980s with the release of the first textbook and an increase in the number of academic articles (see, for example, Bloom & Novelli, 1981; Fox & Kotler, 1980; Kotler & Roberto, 1989; Lefebvre & Flora, 1988).

The field came into much sharper focus in the UK, due to a major change in behaviour change policy in the early years of this century, with the initial focus being on public health. This was due to the release of the White Paper *Choosing Health* (Department of Health, 2004). This paper specifically advocated the adoption of the principles underpinning social marketing in order to attempt to influence a range of public health issues. A feature of this document was the acknowledgment that existing educationally focussed communication-based strategies were not effective. The centrality of social marketing in the dissemination of innovation in health promotion is also acknowledged in the academic literature (Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004).

The field then began to develop rapidly in the health sector in the early years of this century with the establishment research centres in some universities. Most notably initially at the University of Stirling but more significantly the establishment of the London-based National Social Marketing Centre (NSMC) and the release of their seminal report that reinforced the evidence presented in the 2004 white Paper, that existing strategies were ineffective and also quantifying the magnitude of health-related behavioural costs by stating that:

> *"The total annual cost to the country of preventable illness amounts to a minimum of £187 billion. In comparative terms this equates to 19% of total GDP (gross domestic product) for England" (National Social Marketing Centre, 2006, p. 3).*

The NSMC document also presented evidence of social marketing's potential contribution in the area and of its superiority compared to information-based strategies in achieving sustained behaviour change. More recently, social marketing's focus has extended to a wide range of issues including rubbish reduction and, energy and water conservation, although there is far more research in the health sector than in the more recent environmentally focussed social marketing sectors (Eagle, Low, & Vandommele, 2015; Hornik, Cherian, Madansky, & Narayana, 1995; McKenzie-Mohr, 2000).

2.4.3   Social marketing environmental case studies

Social Marketing agri-environment cases
While there is a growing body of literature relating to social marketing in the agricultural context, much of it is of little relevance to this project. It focuses either on broad principles (Green, DeWan, Arias, & Hayden, 2013; Kennedy, 2010; McElhinney, 2016; Takahashi, 2009), workplace health and safety issues (Yoder & Murphy, 2012), electricity and water consumption efficiency or climate change adaptation (Fleming & Vanclay, 2011; Maibach, Roser-Renouf, & Leiserowitz, 2008).

Two graduate student theses address agri-environment issues from a social marketing perspective, with specific focus on community-based social marketing, but neither provides

detailed analysis of issues nor tests interventions, relying instead on proposals for future activity. The focus of these are as follows:

- Wetland Conservation in Agricultural Nova Scotia (Greenland-Smith, 2011),
- Private Land Stewardship (USA) (Ramsdell, 2014).

Case Studies with wider environmental focus

Ocean Sustainability Campaigns

It is noted that rigorous reviews of past interventions are scarce, with many interventions lacking detail on aspects such as theoretical frameworks, use of either Community Base Social Marketing (CBSM) or other benchmark tools or actual behavioural outcomes (Bates, 2010). Other interventions do not report all stages of the intervention. Often stopping at the insights stage without showing how these insights informed subsequent strategies and tactics (see, for example, in the context of semiarid shrub land restoration, Westley, Holmgren, & Scheffer, 2010).The case studies that follow offer insights into a range of behaviours that are relevant to the current project, but with varying amounts of detail.

Queensland Water: Target 140 (adapted from Walton & Hume, 2011)

<u>Background:</u> In 2007, South East Queensland (SEQ) was in the worst drought on record; regional water storages were at record lows (19.5%) and declining, despite residential water restrictions. Predictions indicated combined dam levels could reach 6% before new water supply infrastructure could be completed in December 2008, therefore decisive action was required to keep combined dam levels above 10% to ensure SEQ's water security. This meant that SEQ residents needed to reduce their average consumption from 181 litres per person, per day to 140 litres.

This intervention aimed to engage and educate SEQ residents to develop, implement and maintain water saving behaviours.   To accomplish this goal, specific and measurable consumption and communication objectives were established:

> *Consumption objective: Achieve 140 litres per person per day (l/p/d) residential consumption by 31 August 2007.*
> *Communication objectives: Generate 60% awareness among SEQ residents of Target 140 by 31 August 2007 and achieve 70% outtake of key messages among SEQ residents by week commencing 3 June 2007.*

The primary target was: all SEQ residents. The secondary target was high residential water users (accounting for 10% of SEQ, but consuming 25% of water). Engagement of the target public was crucial to campaign success as indoor water use was not able to be regulated by restrictions and social pressure.

Research identified that people felt no personal responsibility for the water situation. They strongly reported that the Government was responsible for water supply and that they had failed in their duty to secure this. They also attributed the majority of water consumption to business and industry, assuming that their personal saving would make little difference. (At this time, residents were using 70% of the region's water).The residents of SEQ had been exposed to advertising and media commentary about the drought for 18 months and were

suffering "*crisis fatigue*". They no longer responded with the same concern about the water situation and felt the media was responsible for scare mongering.

The residents of SEQ demonstrated little knowledge of where the majority of their water was used and tended to think about drinking water only; some research respondents claimed to use only 30 litres a day.

The theory chosen to inform the intervention was the Stages of Change Model, which was used to guide the development of strategies and tactics to:

- Motivate behavioural change contemplation
- Remove the barriers and excuses
- Provide the information and tools for behavioural change, implementation and maintenance.

Mass media was used, combining television, print, outdoor signage and web-based material, with the television commercial used for the first phase showing a lone figure walking over a dry dam bed carrying a water cooler, which he then empties into the dam. This lone figure is joined by many different people, all carrying their own contribution of water in different carriers – bottles, buckets, fish tanks. The commercial was shot at Wivenhoe Dam in April 2007 and people were stunned to see how dry it actually was - jolted people from their "crisis fatigue".

(This video is available at: http://www.youtube.com/watch?v=vSfG2b13SQc).

Media activity in the second phase was designed to remove the barriers by demonstrating that residents use 70% of SEQ's water. "Big Tap" launched two weeks into the campaign and was run on even rotation with the launch TVC. "Big Tap" opens on what appears to an industrial outlet with water gushing out of it to coax viewers into believing they already know the right answer – industry and big business use most of our water. It then pulls back to reveal it is in fact an ordinary kitchen sink, turning this perception on its head.

The final phase involved a series of TVCs, called "Day in the Life" and a direct mail information booklet with a 4-minute shower timer. Both of these were developed to provide people with information to help them implement behavioural change. The "Day in the Life" series used a split screen to show different everyday activities, such as teeth brushing, shaving, washing vegetables etc. A split screen was used to demonstrate efficient and inefficient use of water, with the amount of water shown by a supered number of litres on screen. This series was intended to show how small changes in behaviour can amount to a significant water saving.

Print ads thanked people for reducing their water consumption and showed water consumption data in easy-to-understand formats.

Immediate results:
SEQ residents contributed to reducing the region's water use by 22.2%; residents saved a massive 20,680 million litres during the campaign. At an average of 129 l/p/d SEQ was recognised as one of the most water efficient regions in the developed world. In comparison, USA consumption is 380 l/p/d and Britons use an average of 150 l/p/d.

Residents on average used under 140 l/p/d for 63 consecutive weeks. Despite the personal usage target being increased to 170 l/p/d from 31 July 08 to 11 April 09, SEQ residents maintained average usage at 135 l/p/d.

High residential water users, (defined as households using more than 800 litres per day) made up 37% of residents before the intervention but only 6% by the end of June 2007.

Longer term results:
Target 140 achieved significant water use behavioural and attitudinal change. Nearly all residents (95%) are consciously saving water in their home and taking shorter showers, 75% have installed water saving devices 86% of residents believe water scarcity is here to stay and long-term changes have to be made. Prior to the campaign running, 65% agreed they had already made water saving changes within their home – this rose by 17% as a result of the campaign.

Note: this intervention won a silver medal in the Australian 'Effies' (advertising effectiveness) awards. The case study for this award submission can be found on the Effies website and also on the World Advertising Research Centre's website.

"Save the Crabs, the Eat 'Em" (USA: Chesapeake Bay) (Landers, Mitchell, Smith, Lehman, & Conner, 2006)

Background: Nutrient pollution from excess residential lawn fertilising in spring was flowing into the Chesapeake Bay, upsetting the ecological balance and leading to excess algae growth, which reduced underwater grass growth (the habitat for blue crabs and other marine life). The commercial harvest of blue crabs had declined to near record lows prior to the intervention

Like the Target 140 intervention, the region had seen a long line of environmental action projects and the population was known to be suffering from message fatigue and increasing scepticism. Rather than continuing with broad environmental messages, the decision was made to target one single behaviour, lawn fertilising, which had not received specific focus in prior activity. It required an attitude change but not a large effort to change behaviour (fertilising in autumn rather than spring).

While no specific theory is cited as having informed the intervention, community-based social marketing principles were noted and there was a clear 'exchange': giving up an established habit in exchange for a benefit, which was valued, i.e. increased availability of a popular food.

This intervention also used mass media and web-based information, together with a range of promotional items including window stickers and drink coasters but also involved lawn care companies and local restaurants as partners. Television commercials used humour to impart the message. The post campaign evaluation data indicated high awareness of the core message and also significant increases in the percentage of people who had changed their behavioural intentions. The authors of this case note that there were problems with the input sought from partners and the distribution of promotional material to them, as well as with a major manufacturer of lawn chemicals. Actual nutrient pollution data is not available for this intervention.

Watershed Outreach Professionals' Behaviour

Of indirect relevance is one analysis of the USA 'Watershed Outreach Professionals' Behaviour' (Kelly, Little, Phelps, Roble, & Zint, 2012) which, while not reporting on an intervention per se, offers valuable insights into the current practices of, and perceived challenges faced by outreach professionals. A number of common themes were identified, particularly in relation to the need for positive messages, extrinsic and intrinsic rewards, feedback, skills development, participatory programmes and the need to recognise the influence of social norms. Of particular interest are the recommendations for those funding outreach works, i.e.:

- Encourage clearer justification of behaviour change strategies,
- Strengthen abilities to develop, implement and evaluate outreach programmes,
- Facilitate collaboration among outreach practitioners
- Sharing of examples of effective behaviour change strategies.

An interesting component of the discussion is the encouragement of outreach professionals through promotional activity such as competitive photographic evidence portfolios showing successful interventions.

2.4.4 The Changing Scope of Social Marketing

2.4.4.1 Transdisciplinary Approach

Social marketing should not be seen as a specific theory, but rather as a sector that draws on specific processes drawn from a transdisciplinary range of concepts and theories, such as those validated within the fields of psychology, sociology, anthropology, behaviour science and communication as well from within commercial marketing. Achieving integration across disparate disciplines with diverse philosophies and potential research methodologies is far from straightforward. There are three major approaches to the combination of expertise from multiple disciplines: multidisciplinary, interdisciplinary and transdisciplinary. Multidisciplinary approaches combine input from different disciplines independently. The result may be a mosaic of non-integrated interventions, which may potentially conflict with each other. In Interdisciplinary approaches, individual disciplines work together to provide input but individuals stay within their own disciplinary boundaries (Holmes et al., 2008). Without effective coordination, this approach may again result in limited cohesion and integration and thus potentially inefficient use of resources.

The transdisciplinary approach is synergistic in that it uses concepts, theories, research approaches, analytical methods and strategies for the interpretation of findings to develop shared conceptual frameworks that integrate the concepts, theories and knowledge from individual disciplines. The key features of this approach that differentiate it from the multidisciplinary and transdisciplinary approaches are that this approach is based on the acceptance that no one group or discipline has a monopoly on knowledge. In addition, that collaboration must be created not only between different academic disciplines but also with stakeholders with specific interest or expertise in the issue (Kreps & Maibach, 2008; Mâsse et al., 2008; Ramadier, 2004). Partnerships between stakeholders in intervention delivery, such

as those that are integral to agri-environmental issues, have been found to be most effective when transdisciplinary approaches are used (Eagle, 2009). This approach draws on collective expertise and insights to enable the identification and development of strategies to overcome complex obstacles to behaviour change and potential enablers of sustained behaviour change. In addition, the approach can also help policy makers to understand more comprehensively the contributions of their policies to improving or harming the well- being of individuals, communities and the wider environment (Fielding, Brownson, & Green, 2011).

As with other complex areas, best land management practice-focussed behaviour change activity lends itself to transdisciplinary approaches due to the influence of intrapersonal, interpersonal, organisational, community and societal influences and the multi-level interventions that will be required to address the widening participation agenda (Colditz, Emmons, Vishwanath, & Kerner, 2008).

2.4.4.2 Definition Evolution

As with other aspects of marketing which have received increased focus, such as integrated marketing communication (Cornelissen & Lock, 2000), there have been (sometimes acrimonious) debates from those who are unwilling or unable to accept a transdisciplinary perspective to solving complex behavioural problems. These debates largely focussed on what social marketing is, where its borders are relative to other disciplines (with attempts to 'capture' the area) and what other behaviour-change interventions might either complement or compete against it (Andreasen, 2002), although this has died down since the release of the Consensus Definition in 2013 which is shown below. These types of conceptual debates and arguments over what are largely relatively minor definitional issues detract from areas deserving more focus, such as investigation of the factors leading to interventions with high impact versus those with minimal impact. As well as, the challenges of taking an intervention that has achieved success in a narrowly defined area and successfully scaling it up to wider populations.

The 2013 consensus definition of social marketing shown below was developed by the (then) three Social Marketing organisations – the International Social Marketing Association (ISMA), the European Social marketing Association (ESMA) and the Australian Association of Social Marketing (AASM). Additional associations have been established in Asia and in the USA since this definition and the definition remains to be under ongoing fine tuning.

2.4.4.3 The iSMA, ESMA and AASM Consensus Definition of Social Marketing (2013)

The following definition has been endorsed by the Boards of iSMA, ESMA and AASM:

> *Social Marketing seeks to develop and integrate marketing concepts with other approaches to influence behaviours that benefit individuals and communities for the greater social good. Social Marketing practice is guided by ethical principles. It seeks to integrate research, best practice, theory, audience and partnership insight, to inform the delivery of competition sensitive and segmented social change programs that are effective, efficient, equitable and sustainable.*

2.4.4.4 Earlier Definitions

Earlier definitions upon which the Consensus definition drew included:

Social marketing is:
> *"The systematic application of marketing concepts and techniques to achieve specific behavioural goals, for a social or public good' and health-related social marketing is 'the systematic application of marketing concepts and techniques to achieve specific behavioural goals, to improve health and reduce health inequalities" (National Social Marketing Centre, 2006, p. 1).*

> *"A social change management technology involving the design, implementation and control of programs aimed at increasing the acceptability of a social idea or practice in one or more groups of target adopters. It utilizes concepts of market segmentation, consumer research, product concept development and testing, directed communication, facilitation, incentives and exchange theory to maximise the target adopter's response" (Andreasen, 2002a, p. 7).*

Other definitions have also been proposed but have not been included here as they overlap considerably with the illustrative definitions presented here and have not gained widespread support within the social marketing community.

While the focus is on encouraging sustained, positive behaviour change among individuals and groups, social marketing also encompasses environmental and policy factors 'upstream' of actual behaviour change that may be barriers to, or enablers of, that change, leading to three distinct divisions as shown below:

> ***Upstream****: influencing the environment in which behaviour occurs including policy makers, the media, lobby groups and influential organisations*
> ***Midstream****: working with partners, communities and institutions (for example, schools and other educational agencies)*
> ***Downstream****: working with specific individuals and groups of individuals (including families, peers and immediate neighbourhoods or communities) (Dibb, 2014; Kamin & Anker, 2014; Russell-Bennett, Wood, & Previte, 2013)*

As already noted, social marketing draws on many disciplines to bring about voluntary behaviour change as well as addressing 'upstream' factors such as supporting policy and environmental change (Cairns & Stead, 2009). Social marketing processes focus on the generation of insights into attitudes, beliefs and values that underpin actual behaviours, thus helping to bridge attitude-intention-behaviour gaps.

Key elements include creating satisfying exchanges, use of integrated strategies to develop interventions, and the use of competitive analysis and segmentation (Luck et al., 2009). These will be discussed in more detail in Section 2.5 Social Marketing Benchmarks. Social marketing is complementary to many established practices and does not seek to replace them, but rather to add value through its strong focus on understanding the attitudes, beliefs and perspectives of target groups (Neiger, Thackeray, Barnes, & McKenzie, 2003) and thus to ultimately influence sustainable positive behaviour change.

2.4.4.5 Social Marketing is Not Social Advertising

A common misconception is that social marketing relates only to the use of mass communication or 'social advertising', i.e. successful interventions centre around mass media advertising such as television in order to communicate the desired messages. A second, more recent, misconception is that social marketing involves primarily the use of digital media platforms, especially social media. This latter sector often uses the term 'social media marketing'. Social marketing may indeed involve both social advertising and social media. It is now increasingly common to refer to mass media-based activity as 'campaigns' and full social marketing-based activity as 'interventions'. As we will show in the Benchmark section, social marketing employs a range of strategies to interact with and serve identified target groups. Some interventions may indeed use advertising or other forms of marketing communication where this is an appropriate and effective means of communicating with the specific target groups and where resources permit. These are usually single-issue campaigns.

Two examples illustrating the successful use of social advertising as the dominant communications vehicle are: Firstly, the American "Truth' anti-smoking campaign, which used funding from the legal settlement between the majority of US states and the Tobacco industry (National Association of Attorney's General, 1998) to fund a mass-media based anti-smoking campaign. Revealing the covert strategies used by the tobacco industry to encourage smoking commencement among young people. This campaign was successful in increasing anti-smoking attitudes and beliefs and decreasing smoking commencement among young people (Richardson, Green, Xiao, Sokol, & Vallone, 2010).

The second example is the campaign by the Northern Ireland Fire and Rescue Service (NIFRS), which ran a sustained multi-faceted mass media-based intervention aimed at reducing domestic fires through ensuring smoke alarms were both properly fitted and maintained. This campaign reduced fire incidents by 24%, fire-related injuries by 23% and saved an estimated £132.9 million in value of lives saved. Almost £4 million through not having to mobilise NIFRS and over £44 million in savings against damage to domestic property, with an overall return on investment of over 80:1 over the 2003 – 2008 period (World Advertising Research Centre, 2009).

However, there are many examples of interventions that do not rely on marketing communication, relying instead on other ways of reaching the target groups (see both the National Social Marketing Centre and the World Advertising Research Centre case study databases for examples of such activity).

2.4.4.6 Social Marketing is not a Panacea

Social marketing offers a framework for designing behaviour change programs that is flexible enough to be applied to a range of behavioural change issues (Corner & Randall, 2011; Haldeman & Turner, 2009). It is not a panacea and success for complex issues is often based on relatively small, incremental changes in the desired behaviours over time rather than attempting to achieve substantial immediate changes in behaviour (French, 2010). Upstream factors may hinder the potential effectiveness of social marketing interventions and effectiveness can also be limited if the focus is placed only on individuals rather than including both midstream (communities and social networks) and upstream factors (including policy

makers and their agents) (Wymer, 2011). Interventions need to be adequately funded over time to ensure effective ongoing activity and the integration of all aspects of an intervention – often a challenge due to multiple stakeholders involved in its implementation. A recent study indicated that practitioners struggle to integrate even the communication aspects of interventions (Dahl, Eagle, & Low, 2015).

2.4.4.7 Social Marketing's Ethical dimensions: Neutrality or Value Ladenness?

In our earlier work, we have noted that the potential ethical dimensions of social marketing should be considered (Eagle, Dahl, & Low, 2015). A value-neutral perspective of social marketing has been suggested by a few authors (Dann, 2007) but has not received support. The counter view is very different: one body of research reveals the value-ladenness aspect of activity (Rossi & Yudell, 2012). Key issues in this regard relate to the issue of who defines desired behaviour, determines and prioritises specific target groups and whether consideration of potential harm (including psychological harm) to members of a target group or others that may arise as a consequence of a social marketing intervention should be a requirement in the development of any intervention.

As with behavioural economics, the question has been raised as to:

> *"who has the mandate to represent large and diverse populations for the purpose of informed consent, and how can this be implemented?" (Guttman & Salmon, 2004, p. 537).*

Others have questioned how individual freedoms of choice and individual rights can be balanced against benefits for society as a whole (see, for example, Lefebvre, 2011). To this, we would add the urgent need to involve land managers in discussions such as this to ensure that there is adequate buy-in to attempting to resolve the problem of diffuse pollution and, as we discuss in later sections, how solutions can be co-created and managed.

There is a growing body of literature, which reviews a range of wider ethical issues and unexpected impacts of interventions. The literature includes issues regarding targeting, segmentation, use of incentive schemes and the consequences of focusing on easy-to reach or influence groups rather than those with the greatest need, and the needs of low literate groups and minority groups and cultures (Eagle et al., 2015; Eagle, 2008; Newton, Newton, Turk, & Ewing, 2013).

2.4.4.8 The Role of Social Marketing in Health and Lifestyle Issues

As we noted earlier, the fact that preventable illness was estimated in 2006 to cost the English economy £187 billion, 19% of total gross domestic product (National Social Marketing Centre, 2006) was a major impetus for the rapid and widespread application of social marketing principles in public health. While it is difficult to compare data across nations due to differences in data collected, the problems of preventable illness are international. In the USA, similar effects to those noted in the NSMC report were apparent when data was released showing that approximately 1 million deaths per annum are attributable to lifestyle and environmental factors (Rothschild, 1999). Some indications of the magnitude of various health and lifestyle issues in the USA are shown in Table 5.

We have no reason to believe that, in the absence of more specific data, the figures cannot be used as a crude indicator of the potential magnitude of similar issues in other developed countries. Unfortunately, we cannot locate equivalent environmental data, but we believe that being able to generate a table of the direct and indirect costs of diffuse pollution and its impacts on fragile ecosystems. Coupled with direct and irrefutable evidence of cause and effect, would have the potential to focus public attention, particularly among land managers and provide the impetus for integrated behaviour change strategies.

Table 5: Magnitude (in USA) of Health and Lifestyle Issues
(Philip. Kotler, Roberto, & Lee, 2002)

Issue	*Magnitude*
Alcohol use during pregnancy	Estimated 5,000 infants born with fetal alcohol syndrome each year
Sexually transmitted diseases	40% of sexually active high school students report not using a condom
Diabetes	About 1/3 of the nearly 16 million people with diabetes are not aware they have the disease
Skin cancer	Approximately 70% of American adults do not protect themselves from the sun's dangerous rays
Breast cancer	More than 20% of females aged 50 and over have not had mammograms in the last two years
Prostate cancer	Only about half of all prostate cancers are found early
Colon cancer	Only about 1/3 of all colon cancers are found early
Seat belts	An estimated 30% of drivers and adult passengers do not always wear their seat belts
Fires	Almost 50% of fires and 60% of fire deaths occur in the estimated 8% of homes with no smoke alarms

2.4.5 The Role of Social marketing in Climate change and sustainability issues

Agri-environmental behavioural interventions need to be seen within the context of the wide and contentious sustainability and climate change adaption and mitigation debates, with the relevance to, and potential role of, land managers about these issues needing to be explicitly stated. Together with appropriate recommended strategies that can be taken to mitigate negative impacts for land management and ultimately for the wider ecosystems.

2.4.5.1 Sustainability Defined

Both the academic and news media indicate that there is widespread agreement (albeit not universal) that sustainability and climate change are major issues facing society (Maibach, Roser-Renouf, & Leiserowitz, 2008; Peattie & Peattie, 2009).   Unfortunately, this agreement is not universal and a considerable body of vocal sceptics and deniers exist (for an evaluation of the potential effects of this, see: Low & Eagle, 2016). In terms of sustainability, there is recognition that continued pursuit of economic growth based on the exploitation of finite resources is unsustainable (Burroughs, 2010; Kilbourne & Pickett, 2008).   There is also increasing recognition that human activity has disrupted many of the ecological systems on which people depend. For example, it is estimated that:

> *"60 per cent of ecosystem services, involving climate regulation, fresh water provision, fisheries and many other services were either being degraded or used unsustainably" (Assadourian, 2010, p. 187)*

For climate change, it is suggested that:

> *"Avoiding dangerous climate change will require lifestyle changes and cross-cultural cooperation on an unprecedented scale" (Gowdy, 2008, p. 64).*

However, while the problems may be recognised, there is not a clear agreement – let alone clear communication – of what action should be taken and by whom.   The challenges presented by climate change and sustainability are more complex than many 'single issues' involved in improving health and lifestyle. For example, there is an assumption among policy makers of "*spill over effects*" i.e. small and simple behaviour changes will lead to wider behavioural change and catalysts for other changes (Corner & Randall, 2011; Thøgersen & Crompton, 2009).   However, there is limited evidence for this expectation. There is also a danger that by engaging in one pro-environmental behaviour, people may feel that they have compensated for other environmentally detrimental behaviours (Corner & Randall, 2011; Mazar & Zhong, 2010).

In the energy conservation field, 'rebound effects' have been noted such as when energy-efficient appliances are purchased, but are used more often and thus fail to reduce overall energy usage (Abrahamse, Steg, Vlek, & Rothengatter, 2005). Even more alarming is the potential for negative environmental impacts, such as in the form of greenhouse gas emissions to actually increase ('backfire effects'), as people 'reward' themselves for taking environmental actions in a specific area (Druckman, Chitnis, Sorrell, & Jackson, 2011). It will be important in the agri-environment context to ensure that neither rebound nor 'backfire' effects occur, or, if they appear, that they are discouraged. The use of co-creation strategies, discussed in the next section, may assist in this regard.

There is widespread agreement (albeit not universal) that sustainability and climate change are major issues facing society (Maibach et al., 2008; Peattie & Peattie, 2009).   For sustainability, there is recognition firstly that continued pursuit of economic growth based on the exploitation of finite resources is unsustainable (Burroughs, 2010; Kilbourne & Pickett, 2008). Secondly, there is increasing recognition that human activity has disrupted many of the ecological systems on which people depend.

For example, it is estimated that:

> *"60 per cent of ecosystem services, involving climate regulation, fresh water provision, fisheries and many other services were either being degraded or used unsustainably" (Assadourian, 2010, p. 187)*

For climate change, it is suggested that:

> *"Avoiding dangerous climate change will require lifestyle changes and cross-cultural cooperation on an unprecedented scale" (Gowdy, 2008, p. 64).*

There is not, however, recognition – let alone clear communication – of what action should be taken and by whom. The challenges presented by climate change and sustainability are more complex than many 'single issues' involved in improving health and lifestyle.

2.4.5.2 Communities and Co-creation

We stress that in this context, care should be taken with the definition of community as landholders should not just be analysed in terms of immediate geographic proximity but rather in terms of common cultural heritage and kinship ties that may have evolved over a century or more (Missingham, Dibden, & Cocklin, 2006; Reeve, 2001). Hence social networks rather than conventional communities may be more applicable.

The ability of communities and social networks, however defined, to take control of their own change management activities is important as many social marketing / behaviour change interventions are predicated on the basis that communities are better able to understand their own needs and to develop, or co-create appropriate solutions to challenges they face (McKenzie-Mohr, 2000a,b). Co-creation involves the joint development of interventions, including the social and economic benefits of behaviour change, and the management of relationships by organisations and the range of stakeholders, including current and potential partners involved in addressing an issue (Desai, 2009; Domegan, 2008; Lefebvre, 2012). It has proven to enhance the perceived quality and value of offerings (Ouschan, Sweeney, & Johnson, 2006), as it enables target groups to be active in decisions that can potentially transform their lives (Saunders, Barrington, & Sridharan, 2015).

Co-creation of interventions enables the development of innovative ideas, which may not be considered without the involvement of stakeholder perspectives (Nambisan & Nambisan, 2009). It requires an understanding of what is valued by identified target groups – with the caution that this can be perceived as manipulation if not handled sensitively (Domegan, Collins, Stead, McHugh, & Hughes, 2013). It is supported by researchers who stress the value of incorporating stakeholders' experiences and preferences   (Podestá, Natenzon, Hidalgo, & Toranzo, 2013) with the positive outcomes of gaining better quality decisions, improved legitimacy, improved chances of decision acceptance and improved social capital (Von Korff, d'Aquino, Daniell, & Bijlsma, 2010; Von Korff, Daniell, Moellenkamp, Bots, & Bijlsma, 2012).

There is clearly a significant role for the various organisations and bodies interacting with land managers in applying social marketing principles in and across social networks and communities (Taylor & Lawrence, 2012). We believe that the benchmarks discussed in the next section may go some considerable way towards helping to support this.

2.5 Social Marketing Benchmarks

Table 6 shows two sets of widely used benchmarks. Firstly, in the left-hand column, we show the benchmarks developed by the UK National Social Marketing Centre, drawing on earlier work by Andreasen (1995) that have been suggested as enabling the separation of 'social marketing interventions from other forms of behaviour change – oriented activity. While the originators note that not all elements will feature explicitly in all interventions, and the exact nature of several of the elements is still being debated (for a recent discussion, see Rundle-Thiele, 2015), the Benchmark criteria form a useful basis for intervention planning, development and ongoing research. These benchmark criteria are being continually updated (see, for example, French & Russell-Bennett, 2015). In the right hand column, the community-based social marketing benchmarks originally developed by McKenzie-Mohr (McKenzie-Mohr, 2000). It is intended that a separate report be developed using the NSMC benchmarks as a foundation and integrating principles from CBSM. This will have a specific agri-environmental focus and will aim to provide a context - specific practical resource for those interacting with land managers.

Given the interest in both social marketing and community-based social marketing, we have provided a review of the benchmarks used in each approach. One of the major advantages for the CBSM approach is that it promotes change through strategies and tactics that are appropriate for a specific community rather than taking a 'one size fits all' approach, addressing:

> *"Specific barriers and challenges that program participants will experience as they attempt to adopt the new behaviour. These barriers are inherently local, if not individual, and thus CBSM programs are inherently custom-made to fit the needs of the target community. The design of the program is most cost-effective when constructed around barriers identified through research of the target audience through local research" (Vigen & Mazur-Stommen, 2012, p. 4)*

Successful community-based social marketing interventions have been implemented in areas such as public health (Bryant et al., 2009) and recycling (Haldeman & Turner, 2009). This approach is not unproblematic as existing systems, structures, attitudes, beliefs and norms present significant potential barriers to sustained behaviour change (Moloney, Horne, & Fien, 2010). Additional challenges relate to competing knowledge and parochialism (Lane & McDonald, 2005) or the claim that land manager knowledge is not valued. Additionally, the well-known "*commons dilemma*" whereby personal advantage overrides common interests (Aitken, Chapman, & McClure, 2011) may also require focus.   Further, there is reluctance within some sectors to recognise the consequences of potential changes to land and resource use (Bohnet, 2008).

Other approaches to behaviour change, such as the Social Marketing Indicator approach (Wettstein & Suggs, 2016) and Intervention Mapping (Kok, 2014) also have significant commonality with these benchmarks, with variations reflecting the disciplinary background of developers and the specific context in which the targeted behaviour occurs. Because of the level of commonality for these two later approaches, we have not discussed them in detail.

We believe that the most effective intervention development strategy will be for the full project team to synthesise the two benchmarks to ensure that the strengths of each are blended.

Table 6: Community-based Social Marketing Steps and NSMC Social Marketing Benchmark Criteria

NSMC Benchmark Criteria and Key Components	CBSM Benchmarks / Steps
(National Social Marketing Centre, undated). Originated approximately 2006	(Adapted from Basil, Lynes, Whitney, & Murray (2014)). See also McKenzie-Mohr & Schultz (2014) and McKenzie –Mohr (2011)
Behaviour: Aims to change people's actual behaviour • The intervention is focused on influencing specific behaviours, not just knowledge, attitudes and beliefs • Clear, specific, measurable and time-bound behavioural goals have been set, with baselines and key indicators established • Focus on influencing specific behaviours not just knowledge, attitudes and beliefs.	**Step 1: Selecting Behaviours** Clearly identifies target audience Selects behaviours that are both non-divisible and end state: • Evaluates list of selected behaviours for potential impact, penetration and probability • Limits number of behaviours to target in any given CBSM campaign (e.g. not more than five to six behaviours)
Commonality between NSMC and CBSM **Application to NESP Research Agenda: Recommendation:** There is a need to identify the specific behaviours that should be targeted for change, such as those relating to fertiliser application management and erosion controls. This data is being explicitly sought in the ongoing research phases of this project, with the questions that focus on these issues having been developed and refined with significant input from practitioners in the field.	
2. Customer Orientation: Focuses on the audience. Fully understands their lives, behaviour and the issue using a mix of data sources and research methods • Goes beyond interviews and focus groups to use ethnographic techniques as well • Uses a range of research analyses and combines data • From different sources (qualitative and quantitative) • Gains key stakeholder understanding and feeds it into methods mix (Benchmark 8) development • Interventions are pre-tested with the audience • Involves the target audience and local community, rather than treating them as research subjects.	**Step 2: Identifying Barriers and Benefits:** • Conducts research on barriers and benefits for each of the potential segments in the target group • Identifies and distinguishes between barriers and benefits that are • Internal versus those that are external to the target segments

Commonality between NSMC and CBSM

Note: Recent work has emphasised the need to create value for those whose behaviours are targeted, placing value creation at the core of activity (French & Russell-Bennett, 2015, p. 152) as per their model in Figure 5. The values-based approach is consistent with other work in the area (Dibb, Marylyn Carrigan, Zainuddin, Russell-Bennett, & Previte, 2013; Domegan et al., 2013; Gordon et al., 2013) and has also been proposed as useful in segmenting target audiences (Gordon, Butler, Magee, Waitt, & Cooper, 2015). It also forms a substantial component of a recent text, Strategic Social Marketing (French & Gordon, 2015) that places considerably greater focus on 'upstream' policy-related issues than previous texts, which focused more on operationalising social marketing principles.

Co-creation of behavioural solutions that are acceptable to, and achievable by, the target groups, for specific behaviour change is implicit rather than explicit in both the NSMC and CBSM benchmarks but has received considerable focus recently (see section 2.4.5.2 for a more detailed discussion).

Recommendation: A transdisciplinary approach will enable an extensive critical review of the extant literature across disciplines to determine what is known, what key gaps in understanding exist, and what sources of data and research methods might most cost-effectively provide data to improve understanding of the way the targeted behaviours fit into people's lives.

Methodologies chosen should not be just be reliant on self-reported behaviours that are commonly used in other environmental research areas such as wildlife and sustainable tourism as these methods are known to lead to socially desirable responses and overstatement of actual pro-environmental behaviours (Hughes, 2013).We have followed proven best practice to control for these effects (see, for example, Nederhof, 1985)
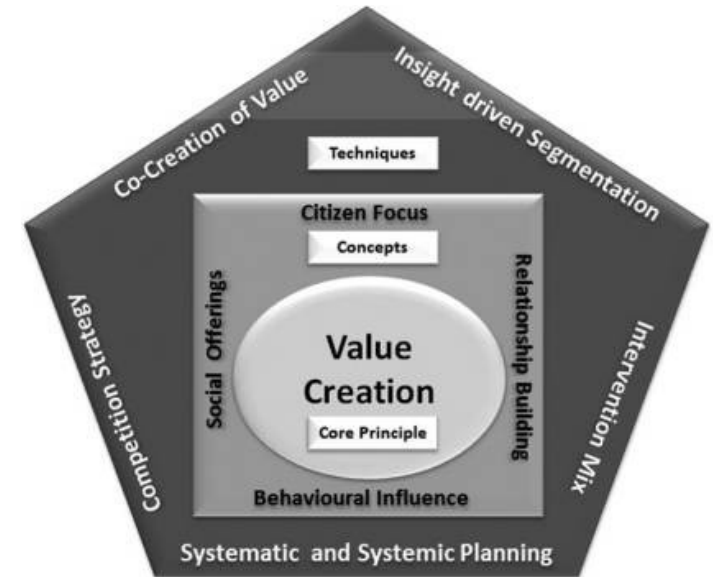
Figure 5: Model of Three Categories of Social Marketing Criteria
(French & Russell-Bennett, 2015)

3. Theory:	**CBSM silent on role of theory**
Uses behavioural theories to understand behaviour and inform the intervention • The theory, or theories used, are identified after conducting the customer orientation research • Appropriate behavioural theory is clearly used to inform and guide the methods mix (Benchmark 8) Theoretical assumptions are tested as part of the intervention pre-testing.	**Not explicitly discussed** – for example, in the text McKenzie-Mohr, Lee, , Schultz, & Kotler (2012), theory is not included in the index, nor is it included in the McKenzie-Mohr (2011) text

Commonality between NSMC and CBSM

Comment: See Section 2.0 for a more detailed discussion of the role of theory. We reiterate here that considerable evidence exists regarding the use of theory (Andreasen, 1997; Brug, Oenema, & Ferreira, 2005; Fishbein & Cappella, 2006; Glanz & Bishop, 2010; Michie & West, 2013). Theory-driven approaches have been found to lead to more persuasive messages across the range of socio-economic groups than those that do not use theoretical foundations (Avery, Donovan, Horwood, & Lane, 2013; Schneider, 2006). The value of theory use is in the identification of factors that influence behaviours (Bartholomew & Mullen, 2011).

Concerns have been evident for some time regarding how theory should be applied, leading to suggest that many interventions are 'theory inspired' rather than being truly based on specific theory (Michie & Abraham, 2004). While beyond the scope of the current project, a more detailed exploration of how to apply theory at all stages of intervention development is recommended (see, for example, Kok, 2014; Luca & Suggs, 2013; Michie & Johnston, 2012; Michie & Prestwich, 2010).

Recommendation: The latest iteration of the Theory of Planned Behaviour has been recommended for this specific project, with the likely outcome that additional constructs warranting inclusion will be identified, including those from other theories, as has been identified in other contexts such as electricity consumption reduction (Abrahamse & Steg, 2011). As further work evolves in this specific context, it is recommend that a detailed meta-analysis of the analytical and predictive effects and effectiveness of a range of behavioural theories across a range of behaviours in order to identify which theories have the most promise to contribute to developing knowledge in this context. The approach taken in this project is to adopt the recommended strategies proposed by Michie and colleagues to identify and map the causal pathways from the determinants of behaviour posited by individual or combinations of theories in order to inform the development of future interventions (See, for example, Michie et al, 2008). The findings from the surveys will link directly to the theoretical foundations identified and thus can inform the development of the methods mix as outlined in the NSMC's Benchmark Criteria 8.

4. Insight:	**Step 3 Developing a Strategy:**
Customer research identifies 'actionable insights' – pieces of understanding that will lead intervention development	Creates strategies that are appropriate for the barriers of the behaviour (s)being promoted and reduce the benefits of the behaviour (s) being discouraged
• A deep understanding of what moves and motivates the target audience, including who and what influence the targeted behaviour • Insight is generated from customer orientation work (Benchmark 2) • Identifies emotional barriers (such as fear of testing positive for a disease) as well as physical barriers (such as service opening hours) • Uses insight to develop an attractive exchange and suitable methods mix (Benchmarks 5 and 8).	• Develops commitment tools that: emphasize written over verbal; seek commitments in groups; actively involve the individual; avoid coercion; help people to view themselves as environmentally-concerned; and are public and durable • Develops prompts that are: noticeable; self-explanatory; presented in close proximity to where the action is taken; and encourage positive behaviours rather than discouraging negative behaviours • Engages well-known and well-respected people to be part of the campaign • Encourages the use of norms that are visible and reinforced through personal contact • Develops communication tools that are: captivating; tailored to the target audience; uses credible sources; appropriately frames the message; and makes message easy to remember • Establishes incentives/disincentives that: reward positive behaviour; are closely paired with behaviour; and are visible • Initiates convenience strategies that attempt to address external barriers

Commonality between NSMC and CBSM	
Comment: Incentives are not universally successful as discussed earlier (see also Eagle, Dahl, & Low, 2015)	
Note: Norms implicit in NSMC Benchmarks – but not specifically included, although discussed in detail in other NSMC – related material (French, Merritt, & Reynolds, 2011; Lister, McVey, French, Stevens, & Merritt, 2008) and material authored by the former NSMC director, Prof Jeff French (French & Lefebvre, 2012). Not discussed in detail in McKenzie-Mohr et al., 2012) text but discussed in more depth in McKenzie-Mohr (2011) text, including distinction between injunctive and descriptive norms.	
Recommendation: Identification of the barriers to and potential enablers of, specific behaviour change across a range of population segments (see Benchmark criteria 7 below), including willingness to change behaviours and individual versus community factors that influence, positively or negatively, behaviours (see, for example, Haldeman & Turner, 2009). This data will be used to develop exchange and intervention methods mix strategies as outlined in Benchmark criteria 5 and 8.	

See pre-testing under Benchmark 3	**Step 4. Conducting a pilot**
	- Develops a pilot that can be compared with baseline measurements - Utilises a control group - Whenever possible, participants are randomly selected and then randomly assigned to strategy or control groups - Whenever possible, evaluates strategy effectiveness through unobtrusive measurements of behaviour change rather than through self-report - Focuses only on the strategies that can be implemented at a broad scale

Commonality between NSMC and CBSM
Recommendation: All material should be pre-tested to ensure that the message intended is that which is being received and to enable any fine-tuning to occur.

5. Exchange:	**CBSM silent on role of Exchange**
- Considers benefits and costs of adopting and maintaining a new behaviour; maximises the benefits and minimises the costs to create an attractive offer - Clear and comprehensive analyses of the perceived/actual costs versus perceived/actual benefits - Considers what the target audience values: offers incentives and rewards, based on customer orientation and insight (Benchmarks 2 and 4) findings - Replaces benefits the audience derives from the problem behaviour and competition (Benchmark 6) - The exchange offered is clearly linked to 'price' in the methods mix (Benchmark 8).	**Not explicitly discussed** – for example, in the text McKenzie-Mohr, Lee, Schultz, & Kotler (2012), exchange is not included in the index, nor is it discussed in the McKenzie-Mohr (2011) text.

Commonality between NSMC and CBSM

Comment: The concept of exchange has been shown to be an important factor in interventions as diverse as injury prevention (Newton, Ewing, & Finch, 2013), and land use (Wilhelm-Rechmann, Cowling, & Difford, 2014).

Recommendation: McKenzie-Mohr et al. and many American-based authors rely on the traditional 4Ps approach in planning social marketing interventions. We believe that the approach advocated by Peattie & Peattie (2003) is more useful in this context, i.e. replacing:

Product with *Social Propositions*

Price with *Cost of Involvement* (i.e. not just financial but also social costs)

Place (distribution) with *Accessibility; and*

Promotion with *Social Communication*

This is also relevant to choices made in relation to the Methods Mix Benchmark.   We recommend that this framework should guide evaluation of all communications material.

6. Competition:	CBSM silent on impact of Competition
• Seeks to understand what competes for the audience's time, attention, and inclination to behave in a particular way • Addresses direct and external factors that compete for the audience's time and attention • Develops strategies to minimise the impact of competition, clearly linked to the exchange offered (Benchmark 5) • Forms alliances with or learns from the competing factors to develop the methods mix (Benchmark 8) The impact of competition has been recognised for well over a decade (Andreasen, 2002b; Grier & Bryant, 2005; Hastings, 2007; Lee & Kotler, 2011; Peattie & Peattie, 2003; Wettstein & Suggs, 2016)	**Not explicitly discussed** – for example, in the text McKenzie-Mohr, Lee, Schultz, & Kotler (2012), competition is not included in the index, nor is it discussed in the McKenzie-Mohr (2011) text.

Commonality between NSMC and CBSM

Comment: A recent text discusses the impact of actual and potential actions that might compete with, or be used as substitutes for, behaviours being advocated planning (Lefebvre, 2013); other texts discuss both **competing** ideas and **competing** messages, together with the need for competition analysis and ongoing monitoring (Eagle et al., 2013).

Other recent authors assert that more emphasis should be placed on examining the effects of competition (Dibb, Marylyn Carrigan, & Gordon, 2013; Schuster, 2015).

Recommendation: Research will help to identify address strategies that address the battle for attention and acceptance of the interventions that will be developed, including the impact of commercial counter-marketing, social encouragement, and / or discouragement to change behaviours and ways of overcoming apathy and disinclination to change behaviours (Peattie & Peattie, 2003).

7. Segmentation:	CBSM role of Segmentation
- Avoids a 'one size fits all' approach: identifies audience 'segments', which have common characteristics, then tailors interventions appropriately. - Segmentation is drawn from the customer orientation and insight work (Benchmarks 2 and 4) - Does not only rely on traditional demographic, geographic or epidemiological targeting - Draws on behavioural and psychographic data - Identify the size of your segment or segments - Segments are prioritised and selected based on clear criteria, such as size and readiness to change Interventions in the methods mix (Benchmark 8) are directly tailored to specific audience segments	The need to identify segments is acknowledged but no guidance is provided on how to define them or to use commonalities and differences in developing interventions.

Commonality between NSMC and CBSM

Comment: Some commonality between NSMC and CBSM but coverage in the latter is brief.

Recommendations: Identification of population segments, including decision makers and influencers and their key characteristics, then development of segmentation strategies, determining what interventions were most likely to be successful in encouraging adoption of specific sustainable behaviours, such as outlined under Benchmarks 1, 2 and 4. (Dinan & Sargeant, 2000). See more detailed discussion in Section 1.4

8. Methods mix:	Step 5. Evaluating broad scale implementation
Uses a mix of methods to bring about behaviour change. Does not rely solely on raising awareness - Uses all elements of the marketing mix (product, price, place and promotion) and/or primary intervention methods (inform, educate, support, design and control) - Promotion is used to 'sell' the product, price, place and benefits to the target audience, not just to communicate a message - Takes full account of existing interventions in order to avoid duplication - Creates a new brand, or leverages existing brands appropriate to the target audience - Methods and approaches are financially and practically sustainable	- Measures activity prior to implementation and at several points afterwards. - Utilises evaluation data to retool strategy and/or provide feedback to community.

Commonality between NSMC and CBSM

Comment: Some commonality between NSMC and CBSM but coverage in the latter is brief

Recommendation: We have already noted the limitations of approaches that focus on information provision. The precise intervention components that are likely to be most effective will only be developed once the first phases of research have been undertaken. Evaluation of proposed material and, ideally, co-creation of potential interventions with a range of stakeholders should then be undertaken. Co-creation, as notes earlier in this table and in Section 2.4.5.2, involves the joint development of interventions, including the social and economic benefits of behaviour change, and the management of relationships by organisations and their clients (Desai, 2009; Domegan, 2008). It has proven to enhance the perceived quality and value of offerings (Ouschan, Sweeney & Johnson, 2006), to enable the development of innovative ideas (Nambisan & Nambisan, 2009) and, where on-line groups are involved, rapid dissemination of knowledge (Brainard, 2003).

It is likely that a range of materials may be needed in order to determine "*What works, for whom, in what circumstances, and for how long*" (Marteau et al., 2011: 264). Consideration must also be given to message framing, tone and design effects (see Section **Error! Reference source not found.** and the separate documentary analysis report).

Longitudinal studies will be needed to identify across segments what behaviours were or were not successfully adopted and, for the latter, what would enable successful adoption. Further, studies should determine how well behaviour has been maintained and, where it has been discontinued, what factors lead to this.

We now focus on several individual benchmark elements, starting with the role of theory.

2.6 Theory

2.6.1 Role of Theory

> *"He who loves practice without theory is like the sailor who boards ship without a rudder and compass and never knows where he might cast" (quote attributed to Leonardo da Vinci: Silva, Marques, & Teixeira, 2014, p. 171)*

At least sixty different models and theories relating to understanding and predicting behaviour have been identified (Chatterton & Wilson, 2014). In spite of the frequent citing of the one in particular, the Theory of Planned Behaviour (TPB), we note that there are several other theoretical models that may also be relevant in this area; these require testing to determine their analytical and predictive powers in the environmental protection context. Many models claimed to be theories lack the four basic criteria for theory, i.e. conceptual definitions of terms, domain limitations within which the theory applies, sets of relationships between variables and specific predictions (Wacker, 1998). An investigation of the analytical and predictive power of a range of theoretical models should form part of an integrated research agenda to investigate what behaviour change strategies are most likely to be effective in achieving long-term sustained behaviour change.

We believe that a key finding from the health sector is generalizable to the best land management practice context, i.e.:

> *"Increasing evidence suggests that public health and health-promotion interventions that are based on social and behavioural science theories are more effective than those lacking a theoretical base" (Glanz & Bishop, 2010, p. 399)*

In considering the complexity of factors impacting on health, we believe that the key question in addressing the behavioural change question is, as noted earlier:

> *"What works, for whom, in what circumstances, and for how long" (Marteau et al., 2011, p. 264).*

This also applies to the selection of the most applicable theories to guide intervention development and implementation. There is concern that existing research too often relies on theoretical models that "do not capture the complexity of farmer behaviour", especially if focussed primarily on rational action models alone (Feola et al., 2015, p. 75).

We do not intend providing a comprehensive discussion of all possible theories. This type of analysis has been the subject of several texts and recent reports: more useful is the growing

body of work in relation to how theoretical concepts should be applied (see, for example, the extensive body of work by Michie and colleauges, such as: Michie & Johnston, 2012; Michie, Johnston, Francis, Hardeman, & Eccles, 2008).

We have selected a limited number of social learning theories to illustrate both the complexity of factors influencing behaviours and the way in which different disciplines can contribute to understanding the factors and using this knowledge to develop effective interventions.

2.6.2 Selected theories

The following section has been adapted from previous studies by the authors (Eagle et al., 2013; Eagle, Morey, Case, Verne, & Bowtell, 2011).

2.6.2.1 Social Cognitive Theory (SCT)

SCT (Bandura, 1986, 2001) indicates that behavioural, personal and environmental factors are reciprocal, interacting determinants of each other (reciprocal determinism), so changing one element has implications for the others, see Figure 6.
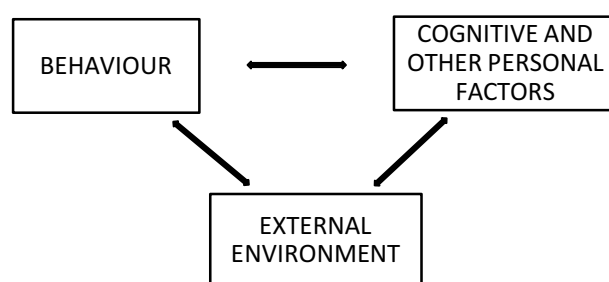
Figure 6: Social Cognitive Theory Components

2.6.2.2 Integrated Model of Behaviour Prediction and Change

Related to SCT theory and reflecting ongoing development from, and extension of, the widely used Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Middlestadt, 1987) and its successor the Theory of Planned Behaviour (TPB) (Ajzen, 1991), is the more complex Integrative Model of Behaviour Prediction and Change (IM) shown in Figure 7. Confusingly, in their more recent texts (Ajzen, Albarracín, & Hornik, 2007; Fishbein & Ajzen, 2010), the theory is once again referred to as the Theory of Planned Behaviour. This latest iteration of the theory shares many attributes of its predecessors in explaining behaviour change as the outcome of behavioural intention, and behavioural intention as the outcome of social norms and an individual's attitude to the behaviour in question. The element of perceived behavioural control (PBC) accounts for variance in behaviours with incomplete volitional control i.e. where individual's lack complete control of the behaviour and are therefore unable to change behaviours.

The IM / updated TPB places more stress on the influence of background factors than did the original TPB, including, importantly, the role of intervention activity and media exposure (see later discussions of social networks, media and celebrity influences on health). A key contribution of research underpinning the effective use of this theory is that different population segments may be driven more strongly by attitudinal factors, normative influences or perceived

self-efficacy, i.e. ability to change behaviour and sustain the change (Fishbein, 2008). This indicates that very different intervention strategies may be needed for different population segments (Fishbein & Yzer, 2003).

Further considerations illustrated by this model are the relative importance of attitude, perceived norms and self-efficacy:

> *"The relative importance of these psychosocial variables as determinants of intention will depend upon both the behaviour and the population being considered".*

and:

> *"One behaviour may be primarily determined by attitudinal considerations, whereas another may be primarily influenced by self-efficacy. Similarly, a behaviour that is attitudinally driven in one population or culture may be normatively driven in another" (Fishbein & Cappella, 2006, p. S3).*

A common misconception regarding the Theory of Reasoned Action, Theory of Planned Behaviour and the Integrative Model is that the models assume all behaviour to be strictly rational. The theories' primary developers state that:

> *"The processes… whereby people arrive at their intentions represent a 'reasoned approach to the explanation and prediction of social behaviour only in the sense that people's behavioural intentions are assumed to follow in a reasonable, consistent and often automatic fashion from their beliefs about performing the behaviour. This does not mean that people are assumed to be always logical and rational. The beliefs they hold need not be veridical; they may be inaccurate, biased or even irrational" (Fishbein & Ajzen, 2010, p. 24).*

The theory has been widely applied successfully in the health sector, but it has also been applied to farming practices such as pesticide use and forestry management (Feola & Binder, 2010), hence our recommendation for its inclusion in framing the survey questions for the data collection phases of this project. It should be noted that the more stages or steps leading to the successful undertaking and maintenance of a specific behaviour, the lower the correlation between intention and behaviours is likely to be (Fishbein & Ajzen, 2010). The steps and their implications will be identified in the data collection processes.

While some research treats norms as a single concept, others distinguish between injunctive norms (portrayal of what people ought to do) and descriptive norms (what people actually do) (Cialdini, 2007) – this is reflected in the figure below. Additionally, it has been recognised for more than two decades that, when there is a perceived conflict between message effectiveness will also be hampered (Cialdini & Goldstein, 2004). Cialdini also cautions against depicting behaviour that is problematic and thus targeted for change as being widespread as this may result in the perception of behaviour change being seen as contrary to prevailing social norms or that changing one's own behaviour will be futile. An example of this is the American 'Crying Indian' anti-littering campaign in which an indigenous American is shown

paddling down an increasingly polluted river. While the campaign received numerous awards and was hailed as powerful (Searles, 2010), subsequent research revealed that it reinforced descriptive norms, i.e. the perception that it was normal to litter rather than the injunctive norm that people should <u>not</u> litter (Maio et al., 2007).
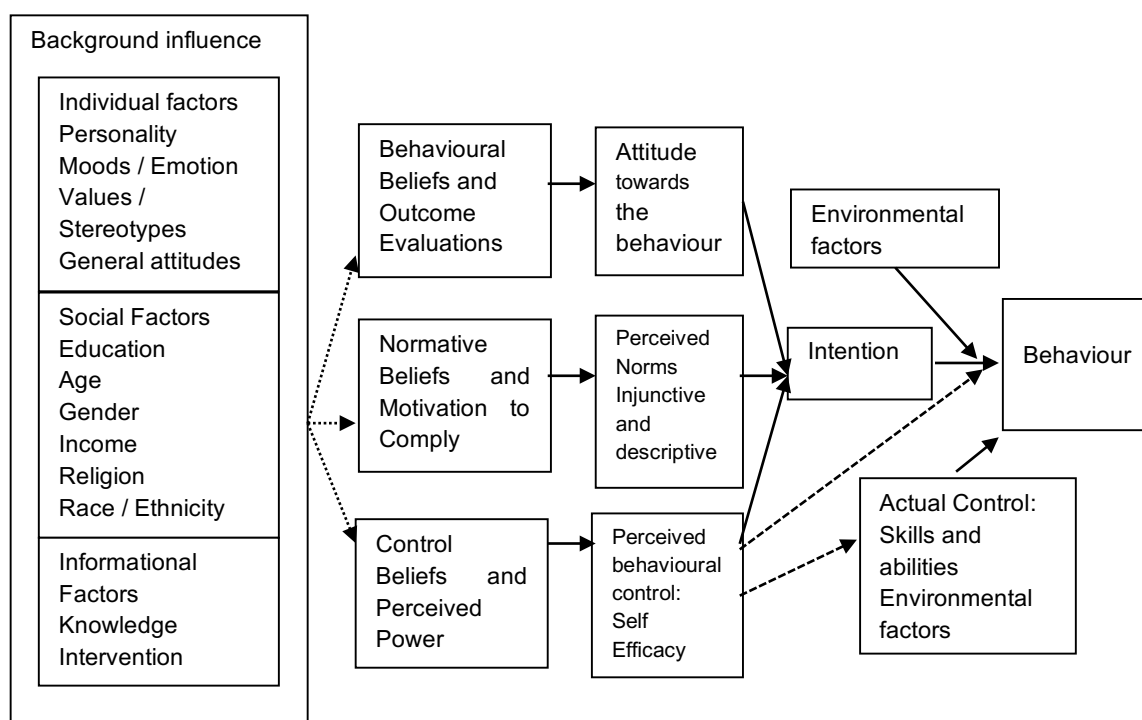
Figure 7: Fishbein et al. Integrative Model of Behaviour Prediction and Change
(Originally developed by Fishbein and Ajzen and subsequently refined
see, for example, Fishbein & Cappella, 2006)

The figure shown here incorporates amendments and fine-tuning of the background influences shown on the left side panel (Ajzen et al., 2007; Fishbein & Ajzen, 2010).

2.6.2.3 Triandis' Model of Interpersonal Behaviour

Triandis proposed a framework in which affective factors (values, feelings and emotions) were shown as impacting on behaviours. His model shares many similarities with the Theory of Planned Behaviour and related theories, but adds two additional dimensions – habits and role beliefs, as shown in Figure 7 (Triandis, 1977). These factors are potentially important in the agri-environment context in conjunction with the influence of social factors and social norms in particular as discussed in earlier sections of this document.

The TIB did not receive considerable attention when it was first released but has received considerable interest more recently, particularly in the field of general pro-environmental behaviours. It identifies a process of *intention* formation, which is made up of three main factors that are similar to the IM / TPB – attitudes, social factors and affect which are seen as impacting directly on intentions but which are themselves influenced by a number of other factors including evaluation of, and beliefs about outcomes of behaviours.   In the agri-environment context, these would include risk perceptions, role perceptions and social norms as discussed in earlier sections of this document.

A valuable addition is the recognition of the role of *habits*, which may influence behaviour in an entirely separate way to consciously formed intentions, hence their being shown as having a direct effect on behaviour as shown below. Habits were originally seen as being determined solely by the frequency of past behaviour. However, more recently other work has indicated that habits are more usefully defined by *automaticity*, where past behaviours are repeated without conscious thought or conscious deliberation, making them difficult to control; although dependent on a stable context, as habits are unlikely to be continued if circumstances are significantly altered (Bargh, Chen, & Burrows, 1996). As behaviours are repeated, habits may become stronger predictors of some behaviour than intentions (Verplanken & Wood, 2006).
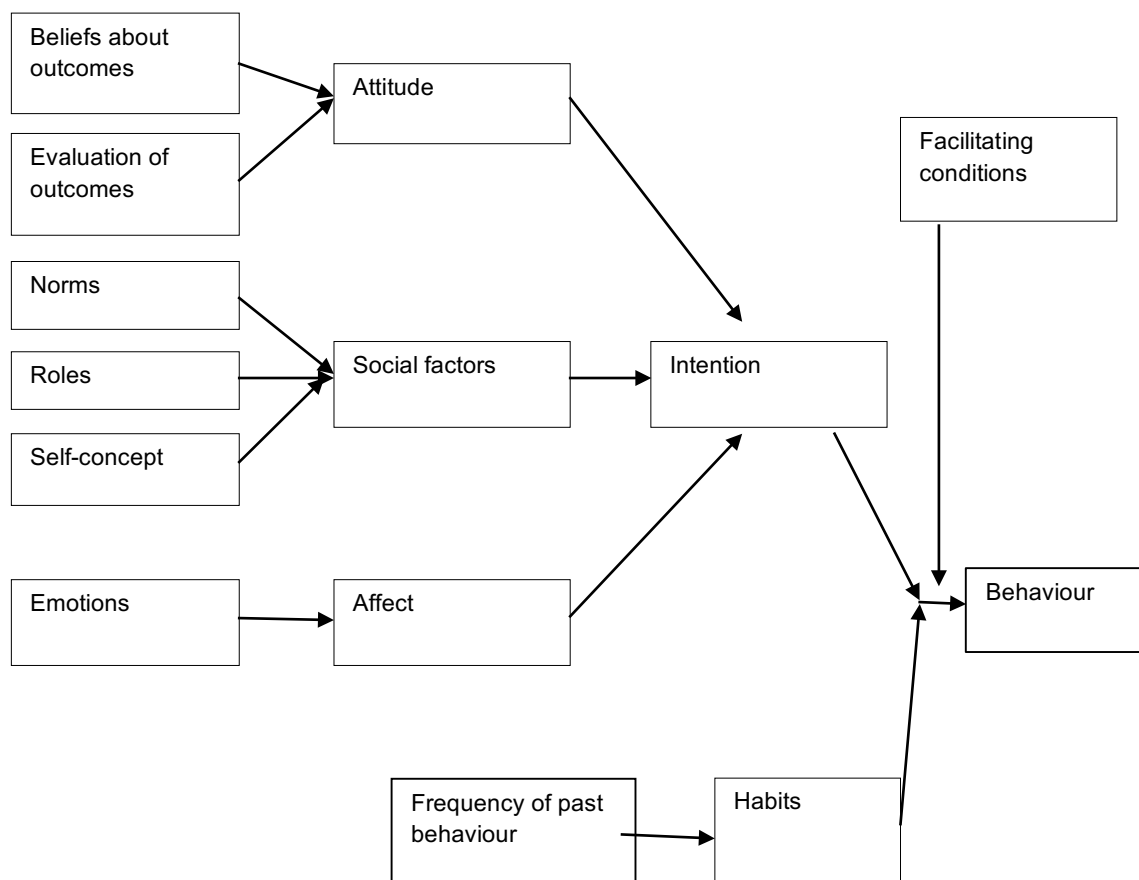
Figure 8: Triandis' Theory of Interpersonal Behaviour (TIB)

The Three Elements model was developed in the field of sociology. It has been applied in contexts that have a significant level of social influence or determination. The model was developed in the area of personal energy usage within the context of climate change. Its major contribution is to stress that the individual is no longer the unit of enquiry (Darnton, 2008; Darnton, 2010; Shove, 2010). Instead, 'behaviour' is seen as consisting of sets of 'social practices' that exist and occur outside any individual (re) enactment of them. These practices relate to how things are done (and in some cases, whether things are visible or are done at all). Thus, it relates closely to the social influences such as norms, identity and values that have been discussed in earlier sections of this document. This model sees these practices as emerging from the relationship between three elements: Material, Meanings and Procedures as shown in Figure 9, where these are defined as follows:

> *Materials:* *Physical objects, which permit or facilitate certain activities to be performed in specific ways.*
> *Meanings:* *Images, interpretations or concepts associated with activities that determine how and when they might be performed.*
> *Procedures:* *Skills, know-how or competencies that permit, or lead to activities being undertaken in certain ways.*

These three elements are not all independent from each other, there will be interactions that will ultimately impact on actual behavioural practices. This approach is receiving increasing recognition from a number of UK government departments – including the UK's Department of Energy and Climate Change, the Department for Food and Rural Affairs and the Department for Communities and Local Government (Shove, Watson, & Spurling, 2015).
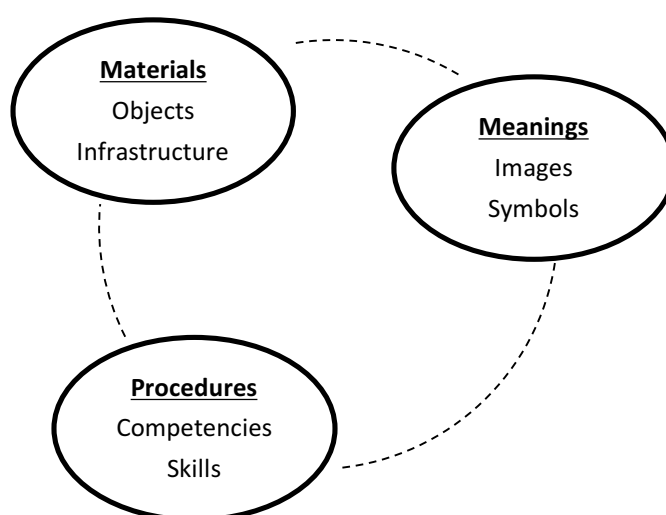
Figure 9: Elements Model of Social Practices
(Shove, 2010)

Theories of Social Practice are also closely related to a large body of work on socio-technical systems, which look at the interactions between people and technology in society, and how technologies tend to drive and control behaviours. These theories are currently receiving attention in the field of climate change and the need to move to a low-carbon economy (Geels & Kemp, 2007). However, they can also offer much to other sectors, particularly when it is accepted that problems are influenced by the wider societal landscape, and is not just a consequence of the isolated choices of individuals.

2.7   Competition - multiple influences and the role of norms

A range of potential pro- and anti-influences on behaviour is shown in Figure 10. Exposure to interventions through whatever means, will not occur in isolation and needs to be seen in the context of a range of other influences. Such as family, friends, peer groups and social networks; where the perceived norm may be to continue doing what has been done in the past or what other landholders state they are doing or can be observed doing. Thus, any best land management practice activity will be subject to conflicting messages (Bernthal, Rose, &

Kaufman, 2006) and to potentially competing messages, as well as to 'social discouragement' where those whose views are valued actively discourage behaviour change. Involuntary disinclination relates to factors that prevent behaviour change occurring (in health, this might include nicotine addition, in the agri-environment context potentially factors such as lack of financial resources or the lack of necessary skills).
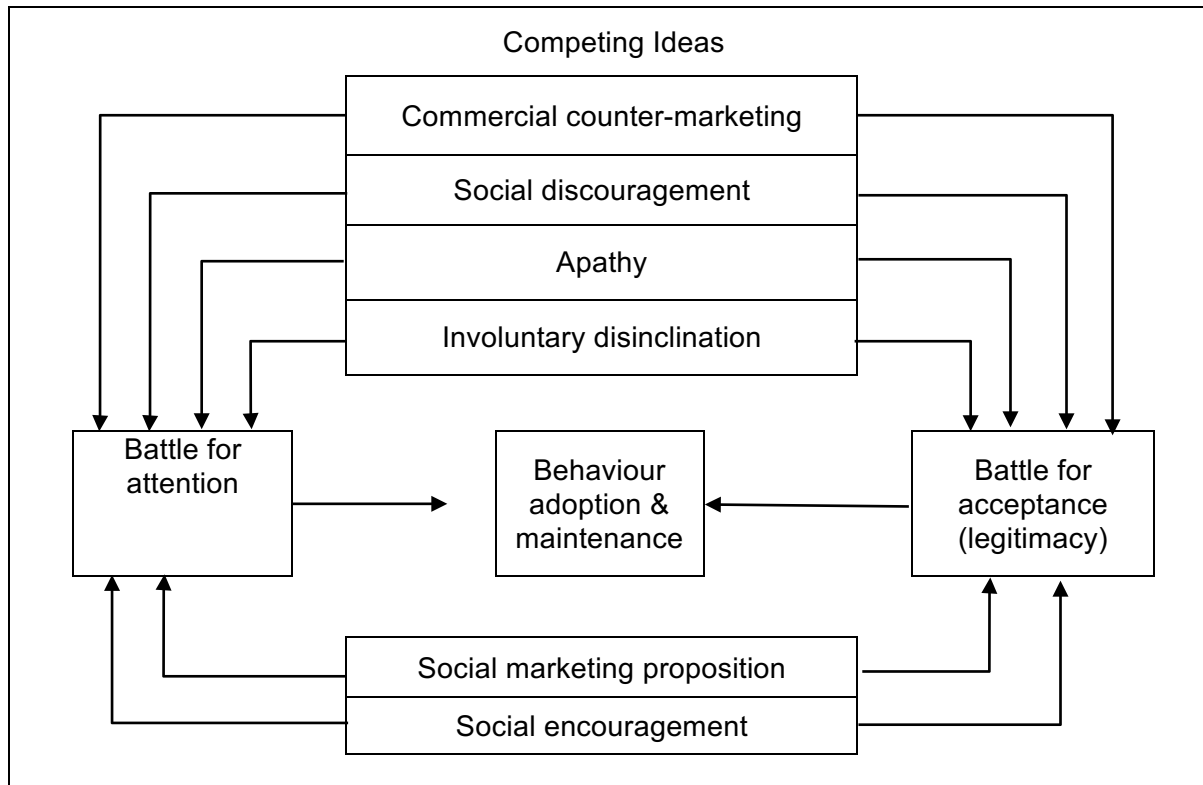
Figure 10: Competition in Social Marketing - A Battle of Ideas
(Peattie & Peattie, 2003, p. 376)

Drawing on Figure 10, social values, perceived social norms, family and social network influences may both offer social encouragement (to participate in agri-environmental programmes) or social discouragement (to continue with existing practices). The research currently underway as part of this project, will enable identification of major positive versus negative influences. Portrayal of, or knowledge of potential role models who have / have not participated in prior programmes and successfully changed their land management behaviours may also offer encouragement.

2.8   Social Marketing Methods Mix

The full description of methods mix in the NSMC's Benchmark criteria was shown in Table 6. The traditional "4Ps commercial marketing model (strategies combining product, pricing, promotional and place – i.e. distribution – decisions) has been in use in the commercial sector for over 50 years. The model is still expounded in many US social marketing descriptions (see, for example, Lefebvre, 2011; Wymer, 2011). The NSMC's definition and work by non-US based authors has stressed the need to think beyond these, including factors widely used in services marketing, such as people delivering the intervention and even to replace them as suggested by Peattie and Peattie (2003) as shown in **Table 7**.   We believe that the social

marketing terminology shown in this table is more appropriate for best land management practices interventions.

Table 7: Comparison of Standard 4Ps and Suggested Social Marketing Terminology
(Peattie & Peattie, 2003)

Standard 4Ps	Social Marketing Terminology	Best land management practice Examples
Product	Social propositions	Land management to protect the GBR while maintaining optimum land value
Price	Cost of involvement (i.e. not just financial but also social costs)	Financial costs in infrastructure / social costs in potentially going against prevailing norms
Place	Accessibility	Accessibility to expertise, markets, skills
Promotion	Social communication	All forms of direct and indirect communication including social networks and extension officers

Figure 11 takes the Peattie and Peattie concept further and expands considerably on it to include many of the upstream and midstream factors discussed earlier (Gordon, 2012, p. 125). Note: it does, however, still use the traditional nomenclature of the 4Ps (see bottom right hand box).
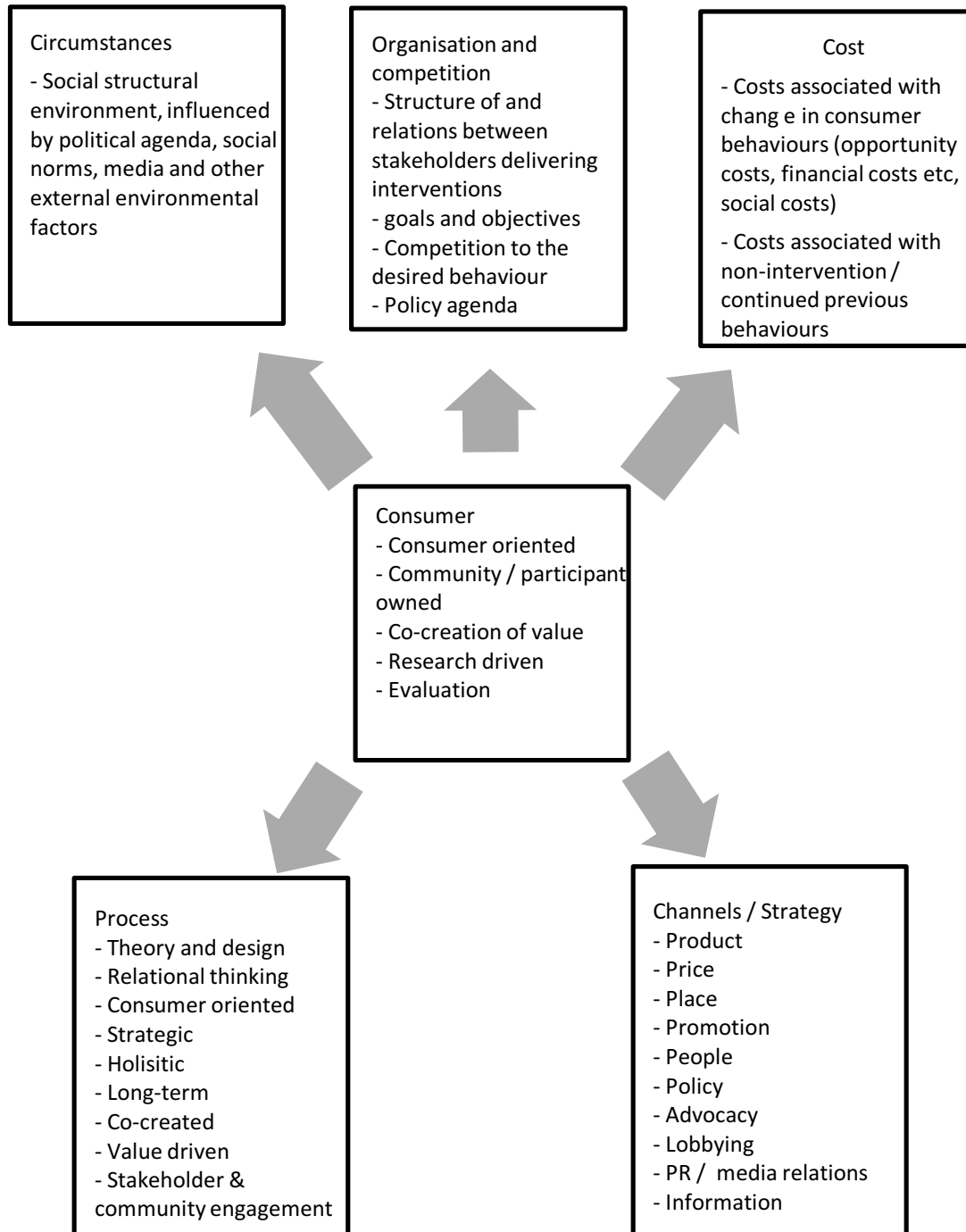
Figure 11: Proposed "Re-tooled" Social marketing Mix

Critical in the social communication aspect is the role of comprehension of messages, including the wider context of functional literacy, the way in which messages are framed, the tone of message and the contribution to understanding of the inclusion of appropriate visual elements. These are discussed in the report (Hay & Eagle, 2016) relating to Readability, Message Framing and Message Tone Analysis. Functional literacy and then the results from Hay & Eagle's (2016) readability analysis are summarised below, for a deeper understanding refer to the Hay & Eagle (2016) documentary analysis.

3.0 FUNCTIONAL LITERACY - ANALYSIS RESULTS

Section 3 is an extract from the Hay & Eagle (2016) documentary analysis. For further discussion see Hay, R., & Eagle, L. (2016). Harnessing the science of social marketing and behaviour change for improved water quality in the GBR: Message framing and message tone analysis. Townsville: James Cook University.

3.1 Functional Literacy Defined

The most useful definition of functional literacy provided by the Organisation for Economic Cooperation and Development (Nutbeam, 2008) is based on determining whether a person is able to understand and employ printed information in daily life, at home, at work and in the community. The multiple literacy definitions used in a range of studies make cross-study comparisons difficult. In spite of this, there is agreement that some 20% of the population of most developed countries have severe literacy problems and a further 20% have limited literacy (Adkins & Ozanne, 2005; Office for National Statistics, 2000).

In addition, the 2006 Australian Bureau of Statistics' Adult Literacy and Life Skills Survey used an internationally recognised five-level assessment of literacy to assess functional literacy levels of Australians aged between 15-74 years of age (Australian Council for Adult Literacy, 2009). Level 3 is regarded as the "*minimum required for individuals to meet the complex demands of everyday life and work in the emerging knowledge-based economy*". Table 12 shows a high percentage of the Australian population aged between 15 and 74 years old, who fail to meet the minimum functional literacy level, which is a concern given the increasing amount of print-based material provided either by conventional print media or via the Internet (Adult Literacy and Life Skills Survey, Australian Bureau of Statistics, 2006 (reissued 2008)).

Figure 12: Summary of Functional Literacy Levels - Australians aged 15-74 years (ABS, 2006; 2008)

Domains Measured	*Domain Definition*	*% with scores falling in the lowest two quintile levels*
Prose literacy	The ability to understand and use information from various kinds of narrative texts, including texts from newspapers, magazines and brochures.	46
Document literacy	The knowledge and skills required to locate and use information contained in various formats including job applications, payroll forms, transportation schedules, maps, tables and charts.	47
Numeracy	The knowledge and skills required to effectively manage and respond to the mathematical demands of diverse situations.	53
Problem Solving	Goal-directed thinking and action in situations for which no routine solution is available.	70

A further concern is that of the ability to understand technical rather than generic material. Scientific literacy is defined as having "*a basic vocabulary of scientific terms and constructs*

and a general understanding of the nature of scientific inquiry". One study estimated that only 17% of US adults could be regarded as scientifically literate (Miller, 2004, p. 273). In addition, there is an additional group that could be classed as 'alliterate': while they can read, they choose not to, and rely on television rather than print media for news. This group prefers to learn through trial and error rather than by reading instructions (Wallendorf, 2001).

3.2   Proficiency in Problem Solving in Technology-Rich Environments (PPSTRE)

Proficiency in problem solving in technology-rich environments is defined as "using digital technology, communications tools and networks to acquire and evaluate information, communicate with others and perform practical tasks" (Organisation for Economic Cooperation and Development (OECD), 2012, p. 5). There are known socio-economic differences in digital literacy (specific skills and wider competencies), also termed 'technology fluency' (Garcia, 2014) affecting both time online and tasks carried out (Castaño-Muñoz, 2010).   These differences affect people's ability to access, extract and apply information from websites or use technology-based tools with confidence and proficiency (discussed further in Hay & Eagle, 2016).

3.2.1   Cognitive Limits: Time Dimensions

As stated in Hay & Eagle (2016), an individual's ability to visualise the future is only 15 – 20 years for most people (Tonn, Hemrick, & Conrad, 2006); 50 years seems to be the longest conceptualization limit (O'Neill & Hulme, 2009), with scenarios projected beyond this being seen as largely hypothetical (Lorenzoni, Nicholson-Cole, & Whitmarsh, 2007). Thus, talking about what will happen in a hundred years or by the end of the century is unlikely to be effective). A major barrier to engagement with climate change information is that the information may be inaccessible to those who are not experts in the field (Moser & Dilling, 2004). The problem of understanding and engagement with best land management practices issues is also closely related to the functional literacy capacity of individuals.

3.3   Readability Analysis Tools

Readability can be analysed using a specific set of tools including the SMOG readability index, message framing and appeals, message tone and the use of visual imagery. We recommend that those charged with developing printed material in any form, including website material familiarise themselves with tools for analysing readability.

3.3.1   SMOG readability index

The SMOG index has been described as "*the gold standard readability measure*" (Fitzsimmons, Michael, Hulley, & Scott, 2010, p. 294). The SMOG readability index uses a calculation that takes three groups of 10 consecutive sentences at the beginning, middle, and end of a document, giving a total of 30 sentences. Following this, all words with three or more syllables within these selected sentences are counted and the square root of the total is then calculated and rounded to the nearest integer. Finally, the number 3 is added to the integer to obtain the grade level of the document. This is then aligned with a table of conversions to approximate grade/year level of reading, see **Table 8**. This calculation measures only the

likely reading level required for comprehension of the material and no other aspects such as readability and suitability.

Table 8: SMOG Conversion Table (Kemp & Eagle, 2008; McGraw, n.d.)

30 or more sentences			*Conversion for less than 30 Sentences*			
Word Count	*Approximate Grade Level +/- 1.5 grades*		*Number of Sentences*	*Conversion # multiplier*	*Number of Sentences*	*Conversion # multiplier*
0-2	4	Nursery, Junior/ Primary School	29	1.03	14	2.14
3-6	5		28	1.07	13	2.3
7-12	6		27	1.1	12	2.5
13-20	7		26	1.15	11	2.7
21-30	8		25	1.2	10	30
31-42	9		24	1.25		
43-56	10		23	1.3		
57-72	11	Secondary School	22	1.36		
73-90	12		21	1.43		
91-110	13		20	1.5		
111-132	14		19	1.58		
133-156	15		18	1.67		
157-182	16	Further Education	17	1.76		
183-210	17		16	1.87		
211-240	18+	Higher Education College/University	15	2.0		

As has been noted in previous research, reading is a skill like any other. If a person leaves school but does not continue to read regularly, either in employment or in private activity, their reading skill level will fall by 3 – 5 grades below the level achieved at the completion of formal education. Thus an adult who left school after 12 years of formal education but who does not maintain their reading skills can be expected to have a reading skill level of 7 – 9 (Kemp & Eagle, 2008), i.e. equivalent to a student in the early stages of high school (**Table 8**). It is recommended that material be written at no more than grade/year 9 level to enable the majority of the general population to understand it (Carbone & Zoellner, 2012).

3.3.2 *Norms, Message Framing and Message Appeals (including fear appeals)*

Norms revolve around standards of proper or acceptable behaviour. While some research treat norms as a single concept (Barnes et al., 2013, p. 449), others distinguish between injunctive norms (portrayal of what people ought to do) and descriptive norms (what people actually do) (Cialdini, 2007). Additionally, it has been recognised for more than two decades that, when there is a perceived conflict between actual or perceived norms and attempts to change behaviours in a way that would conflict with those norms, message effectiveness will be hampered (Cialdini & Goldstein, 2004). Cialdini (2004) also cautions against depicting behaviour that is problematic and thus targeted for change as being widespread as this may result in the perception of behaviour change being seen as contrary to prevailing social norms or that changing one's own behaviour will be futile.

It is also important to ensure that communications work with, rather than against prevailing social norms. If threats to autonomy and identity are perceived, resistance and even defiant behaviour may occur (Mols et al., 2015), particularly when, as we have noted earlier, there are

some land manager groups who are unwilling or unable to accept that they are contribution directly or indirectly to water quality problems.

Message framing derives from prospect theory (Gerend & Cullen, 2008; Rothman & Salovey, 1997; Tversky & Kahneman, 1974). Prospect theory itself is developed from extensive research into responses to people's perceptions of the prospect of positive (gain) or negative (loss) outcomes resulting from a range of specific behaviours. This research confirmed that people tend to be loss averse, being prepared to take risks to avoid losses but avoid risk if there is potential gain from an action (Van de Velde, Verbeke, Popp, & Van Huylenbroeck, 2010).

As we have noted in many other areas of behaviour change discussed in earlier sections of this document, far more research has been conducted into message framing effects in the health sector than in environmental sectors. Although research in the latter sector is growing, albeit largely in terms of broad pro-environmental areas (Chang & Wu, 2015) and climate change communication (Scannell & Gifford, 2013). We believe that the general message framing principles identified in prior research are likely to be applicable to the agri-environment sector (see Hay & Eagle, 2016 for further discussion) .

Message appeals are the connection between the emotion or the cognition and the consumer's response to the message (Sheth, 2011). Appeals are either rational or emotional and can include fear appeals. Fear appeals should be used with caution as, while early studies suggest that fear appeals have the potential to influence attitude change and subsequent behaviour, there are numerous examples of interventions based on fear appeals not achieving the objectives (Donovan, Jalleh, Fielder, & Ouschan, 2009). Other research also suggests the need for caution. Most studies claim fear appeals to be effective have been laboratory-based, often with methodological shortcomings, and have measured only short-term effects. It is suggested that real-world effects are weaker – and that this type of strategy will be least effective with people with low self-efficacy (Hastings, Stead, & Webb, 2004).

3.3.3 Message Tone

While readability and message framing have been identified in past research as impacting significantly on the way that messages are processed (if at all) and whether the messages are ultimately influential in encouraging the behaviours desired. Message tone effects have received less attention (Clark, 2014). Unfortunately, much of the work in relation to these areas, especially message tone, relates to health issues with a focus on the need for concern and for empathy (van Stolk-Cooke, Hayes, Baumel, & Muench, 2015) or for political campaigning (Barton, Castillo, & Petrie, 2016) and therefore is of limited use in the agricultural- environmental context.

3.3.4 Design Principles

Design of communication, whether it is documents, posters or websites is important to conversions of the advertised material. If the communication is poorly designed then it will have less chance of being understood, less attention will be paid to its content resulting in less uptake of its product. Good design relies on six principles: balance, proximity, alignment, repetition, contrast and space (J6 Design, 2015).

Balance provides stability and structure to the design, whereas proximity creates relationships between the included elements. This is particularly important when considering the use of visual imagery (see section 3.3.5). Aligning the material creates visual relationships between elements of the design features. Repetition amongst documents, in terms of brochures, posters and other paper based advertising and amongst websites where each page has certain elements repeated can create association and consistency and in turn trust (J6 Design, 2015). Contrast emphasises key elements in the design, while space refers to the area around the other elements that creates space (J6 Design, 2015). As such overall design is important when considering readability.

3.3.5 Use of Visual Imagery

It is claimed, "Knowledge, attitudes and behaviours underpinning sustainability are all mediated through communication", with visual communication playing a key role in "synthesizing complex information" (Thomsen, 2015, p. 1). The use of visual aids should be considered for three reasons. First, they may help in gaining attention and interest in a message, in order for time and effort to be allocated to the remainder of the material (Lazard & Atkinson, 2014). Secondly, the use of appropriate visuals can help those who struggle to understand text-based information (Dowse, 2004) or abstract concepts (Altinay, 2015). Finally, they can "amplify the verbal portion of a persuasive message" (Seo, Dillard, & Shen, 2013, p. 565), or make specific elements within a specific communication stand out (Altinay, 2015). There is evidence that images can communicate more effectively than words alone (Lazard & Atkinson, 2014).

In the context of environmental impacts (including the impact of climate change), the use of iconic images that are not personally relevant and focused on local impacts or which are based on model simulations is discouraged (Thomsen, 2015). Conversely, the use of local images in climate change communication has been shown to be effective in gaining acceptance of the need for local action, and consideration of alternative courses of action (Scannell & Gifford, 2013). A caveat is that the visuals should be pre-tested to ensure that the message intended to be conveyed is that actually received rather than having the potential for miscommunication (Dowse, 2004). Visually demonstrating the link between environmental pollution causes and impact is noted as being challenging (Hansen & Machin, 2013). However, visuals can be a powerful tool for demonstrating that positive actions are possible and achievable (Altinay, 2015).

3.4   Findings from Hay & Eagle (2016), Documentary Analysis

3.4.1 Overview

The intention of the documentary analysis was to assess the way that messages to land holders about water quality in the Great Barrier Reef are presented in terms of their readability, message framing, and message tone. Two programmes were selected (1) the Reef Programme and (2) the Reef Trust Tender (Burdekin).

The programmes selected for evaluation had been marketed within both the wet and the dry tropics, and they had been designed for both graziers and cane farmers. In addition, the programmes were selected from different time periods (early and late), as well they targeted a broad (Reef Programme) and narrow (Reef Tender - Burdekin) range of issues with different

philosophical approaches, **Table 9** summarises those key characteristics. The Reef Tender rolled out in the Burdekin Dry Tropics, had been preceded by a Tender in the Wet Tropics (with a closing date for submissions in February 2015), and was thus thought to have contained 'learnings' from its predecessor. As such, the Wet Tropics Tender was not included in our analysis. When evaluating the Reef Programme, materials were analysed from both the Burdekin Dry Tropics and the Wet Tropics, both regions having been identified as being of 'high risk' for nitrogen, and the Burdekin also having been identified as being of high risk for sediment (see **Table 10** – from Brodie et al).

Table 9: Key Characteristics of the Reef Trust Tender (Burdekin) and the Reef Programme

	Reef Programme	*Reef Trust Tender (Burdekin)*
Region	**Wet & Dry Tropics**	**Dry Tropics**
Sector	Cane & Grazing	Cane
Period	2008-2013	2015 – 2018
Focus	Anything that could help improve water quality	Nitrogen reduction
Philosophical approach	Bottom up and extremely diverse including grants, training programmes and extension activities. When applying for grants, land managers could develop their own ideas about what to do and what to 'target'	Top down and tightly prescribed, in that all tenders needed to specifically address the issue of nitrogen

Table 10: Relative risk of degraded water quality to the Great Barrier Reef
(Source: Brodie *et al.,* 2013 Scientific Consensus Statement, Chapter 3)

Region	Overall relative risk	Priority pollutants for management		
		Nitrogen	Pesticides	Sediment
Cape York	LOW			
Wet Tropics	VERY HIGH	VERY HIGH	HIGH	
Burdekin	HIGH	VERY HIGH	VERY HIGH	VERY HIGH
Mackay Whitsunday	MODERATE	HIGH	VERY HIGH	
Fitzroy	HIGH		HIGH	VERY HIGH
Burnet Mary	UNCERTAIN**			HIGH

Material analysed included case study examples, landing pages of websites, applicant guidelines, contracts, fact sheets, tender forms, information brochures, programme plans and training modules.

3.4.2 Results

3.4.2.1 Readability

The initial SMOG analysis has shown all three programmes to be written at a similar level, with the Reef Programme (Burdekin) being slightly more readable than the Reef Trust Tender (Burdekin) or the Reef Programme (Wet Tropics). However, all three programmes have a readability level well above the recommended reading level of grade / year 9, see Figure 13.
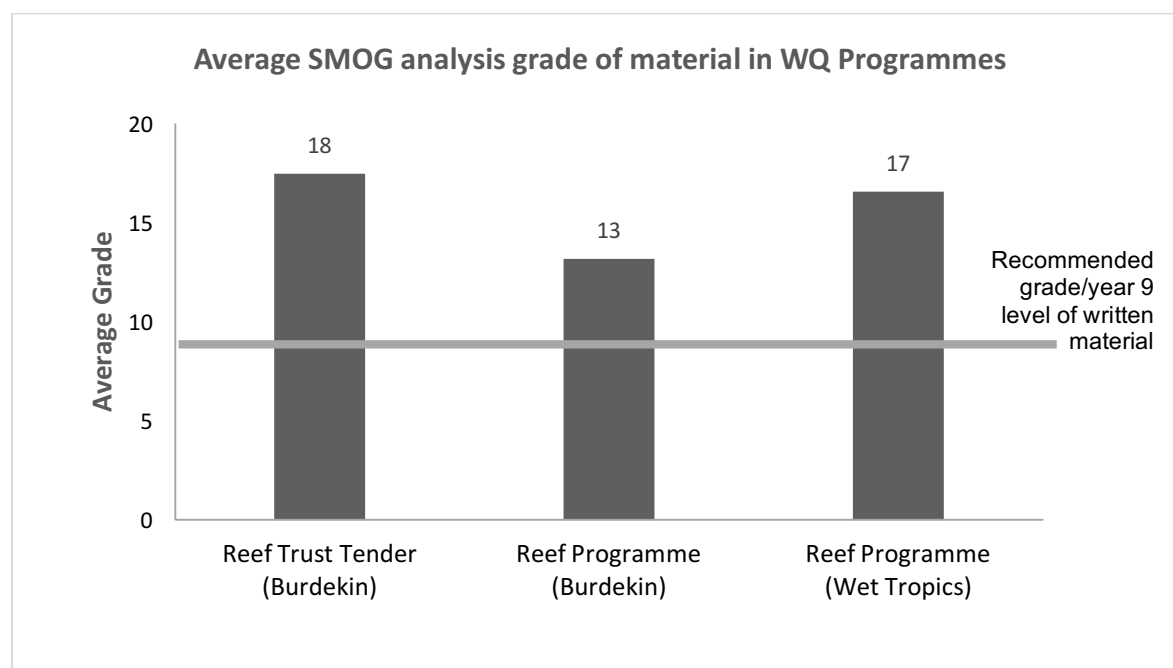
Figure 13: Average SMOG Scores for Water Quality Programmes Analysed

The readability score of 18 requires the reader to have achieved a university degree and for a score of 17 they must have received a level of further education beyond high school, whereas for the readability level of 13 the reader must have completed high school. All of the material reviewed produced readability score over the recommended reading level of grade/year 9. When examining this in the light of wider Australian literacy level data, the Australian Bureau of Statistics note that just over 80% of Australians aged between 15-74 have a literacy level of less than Level 3 (the minimum reading level required to meet complex demands of everyday life and work) (Hay & Eagle, 2016, p. 5, Table 3). While people at Level 3 can read, identify, interpret or analyse dense, lengthy text (37.9%). At Level 2 people can only perform simpler tasks such as matching text and information (30.1%) and the remaining 14.1% are at or below Level 1, where they can read relatively short and simple text material to locate single pieces of information (i.e. they cannot analyse or synthesise information). The analysis of water quality information indicates that many communications may be written in language too complex for a substantial percentage of the Australian population. It should be noted that the nature of the text used in the agri-industry uses large amounts of three syllable words for example: management and government, which has an effect on the overall readability score. To test for bias, three syllable words imposed by managing guidelines were removed from the document to compare the scores. In all cases the document score reduced only by one to two grades.

3.4.3 *Norms, Tone and Message Framing*

Each of the programmes analysed were slightly different in terms of norms, tone and message framing used. The analysis of the Reef Trust Tender (Burdekin) shows that most of the messages were positively framed, with some element of guilt used. They also have an overall tone of dictatorship, although some messages appear to be collaborative and use injunctive norms to inform that other land managers approved the subject offered (fact sheets, learning modules and programme plans). Likewise, the Reef Programme (Dry Tropics) used positive message framing with elements of rational appeals as well as fear appeals. Injunctive and

descriptive norms were used to demonstrate approved methods of how others were behaving. However, many of the documents were dictatorial or patronising. The analysed documents included webpages, programme information, case studies, and grant documents). The Reef Programme (Wet Tropics) used positive message framing and descriptive norms, sharing messages of what had been done and the results of the trials. However, some of the messages were also dictatorial. These messages were mostly found in the website landing pages and programme overviews.

Overall, the material was written above the recommended reading level of year/grade 9. It was mostly written using a positive tone using injunctive and descriptive norms appropriately. However, the materials were mostly dictatorial and sometimes patronising. During the analysis, it became evident that there were limitations to the materials content imposed by various Government Guidelines and the unavoidable use of three syllable words such as government and management, which impacts heavily on readability. Therefore, it is important that the outcomes of this analysis are used in discussions to inform stakeholders beyond the regional natural resource management groups and others who supply the current programmes to land managers.

4.0 THE IMPORTANCE OF COMMUNITIES AND COMMUNICATION

4.1 Rural Communities

It is acknowledged that it is unwise to treat 'rural communities' as homogeneous, "ignoring the diversity in ethnicity, class and occupational status which are evident in many rural areas" (Scott, Park, & Cocklin, 2000, p. 433). We now draw on literature relating to climate change adaptation and sustainability issues to discuss the need to examine a range of community-based factors likely to impact on best land management practice initiatives. We must again stress that communities should not be narrowly defined by geographic proximity but conceptualised as complex social networks with ties of cultural heritage and kinship (refer Social Marketing Benchmarks).

4.1.1 Adaptation

We have noted the need to consider land management behaviours in the wider context of climate change. Adaptation has received less focus than mitigation. Recently, there have been multiple calls for research to inform policy in areas such as to what extent various adaptation measures can reduce the impacts of climate change and thus what policies are needed, and how they can be applied – and funded (Burton, Huq, Lim, Pilifosova, & Schipper, 2002). In addition, there is also recognition that adaptation will not take place automatically and that specific strategies aimed at boosting mitigation self-efficacy should be developed (O'Brien, Eriksen, Sygna, & Naess, 2006). It has also been noted that some adaptation strategies may undermine social, economic or environmental issues (Eriksen et al., 2011) although the precise implications of this have yet to be determined.

Decisions are made on behalf of communities by individuals or groups, but may result in perceived or actual winners and losers.

> "Thus, the effectiveness of strategies for adapting to climate change depend on the social acceptability of options for adaptation, the institutional constraints on adaptation, and the place of adaptation in the wider landscape of economic development and social evolution" (Adger, 2003, p. 387).

4.1.2 Balancing Adaptation and Mitigation

> "Mitigation without adaptation will not prepare societies for inevitable changes in the climate, and adaptation without mitigation will eventually lead to conditions to which adaptation is inconvenient, expensive or impossible"(Picketts, Curry, & Rapaport, 2012, p. 121).

However, while there is *recognition* that combinations of mitigation and adaptation strategies are necessary, it should also be recognised that these may be problematic:

> "These two strategies do not always complement each other, but can be counterproductive. A similar argument can be made for linking climate

change adaptation with sustainable development. In order to avoid these conflicts, priorities need to be set" (Laukkonen et al., 2009, p. 287).

Experiential knowledge is lacking on how to effectively and proactively plan for adaptation and what actual results from this activity might be. For example, in agriculture, coping behaviours are based on past events and may be inhibited by lack of resources, infrastructure, education and institutional support (Meinke et al., 2009). A further barrier to the acceptance of the need for change may be the perception of risk (Nursey-Bray et al., 2012) as discussed earlier, given that the lack of first hand experiences of climate change consequences may be lacking or that changes may be attributed to 'normal' climate fluctuations rather than as permanent changes (Spence, Poortinga, Butler, & Pidgeon, 2011)*.*

Two closely related concepts are a*daptive capacity,* the ability of a community (or social system) to withstand environmental changes (Petheram, Zander, Campbell, High, & Stacey, 2010; Taylor, Larson, Stoeckl, & Carson, 2011) and adaptive governance which examines formal and informal organisations and structures that manage the use of shared assets (Hatfield-Dodds, Nelson, & Cook, 2007)*.* A key factor in achieving successful adaptation to external influences and changes is the complex concept of social capital, which is now discussed in detail.

4.1.3 Social Capital

"Social capital is a necessary condition for sustainable community development as it enhances linking ties that increase access to resources outside the community. Social capital in and of itself however is not always sufficient to sustain and develop local community initiatives" (Dale & Newman, 2010, p. 5).

Social capital is recognised as a component of community-level adaptation (Adger, 2003) but the concept is still, in spite of a large body of literature on the subject, difficult to define. Multiple definitions exist as a result of studies from different disciplinary approaches such as economics, political science, sociology and anthropology and other social sciences. The definition used in the context of complex socio-ecological systems, which is potentially useful in the current context, is "*the social norms, networks of reciprocity and exchange, and relationships of trust that enable people to act collectively*" (Armitage et al., 2009, p. 96).

The lack of a single cohesive definition has predictably resulted in a lack of standardised measurement instruments (Van Der Gaag & Snijders, 2005) and thus empirical data that enables cross study comparisons (Sabatini, 2009). A further challenge is that past research has over-emphasised easily measured utilitarian economic factors at the expense of other aspects of community sustainability, well-being and adaption to change, such as cultural and non-material impacts (Adger, Barnett, Chapin, & Ellemor, 2011). There is a lack of agreement regarding the contribution social capital analysis can make, with conflicting views ranging from it potentially providing a 'magic bullet' or it being a misrepresentation of structural factors over which communities have little control (Onyx, Edwards, & Bullen, 2007).

Standardised measurement attempts have proved problematic, when used across different cultural contexts. For example, attempts to use the World Bank's Social Capital Assessment

Tool, developed using small-scale case studies within specific developmental situations in two very different countries (Peru and Vietnam) "*found "significant differences between what researchers intended them to measure and what they actually do*" (De Silva et al., 2006). These authors stress the importance of validating generic tools in the cultural settings in which it is to be used. The OECD took a broader focus in an attempt to provide a single definition and measurement tools but found that "social capital can manifest itself very differently depending on local, regional, and national contexts and can vary widely in form depending on the issue involved" (Franke, 2005).

The UK Office of National Statistics incorporates social capital measurement as part of a social integration scale but does not provide an integrated conceptual framework (Ruston & Akinrodoye, 2002). Australia's Bureau of Statistics and the Productivity Commission have explored social capital in relation to public policy issues (Edwards, 2004; Productivity Commission, 2003). However, some of the definitions used in previous studies to measure social capital appear significantly out of date, such as the Productivity Commission's use of newspaper readership as a proxy for interest in civic affairs.

Further criticisms relate to the fact that it "*does not distinguish between what social capital is and what it does*" (Franke, 2005, p. 6), although it is suggested that social capital makes "*other forms of capital more efficient*" (Woodhouse, 2006, p. 83). The interdependence of social capital and other forms of capital such as human, natural, physical and financial capital, while recognised, is poorly understood (Myers, Blackmore, Smith, & Carter, 2012).

In this project, we will build on this critique, focussing on the specific contribution social capital makes to community sustainability, adaptation and behaviour change in conjunction with wider socio-economic factors external to networks**.** Prior research has identified that remoteness and sparse populations may generate a set of community interaction features that are not evident in other environments (Stafford Smith, 2008).

Social capital can be examined at four different levels, *microsystem* (individual) , *mesosystem* (interrelations), *exosystem* (where an individual does not actively participate in discussions or decisions, but may be affected by them) and *macrosystem ("blueprints" for defining and organizing the institutional life of society, including overarching patterns of culture, politics, economy, and the environment)" (Ebi & Semenza, 2008, p. 502).* We believe that the building on the three types of systems identified above is useful, i.e., - a micro approach provides an analysis of the nature and forms of co-operative behaviour, a meso approach the structures that enable this behaviour and the macro the conditions, favourable or unfavourable for co-operation, including environmental, social, and political factors (Franke, 2005).

Within these levels, social capital can be broken down into two principal construct dimensions, structural and cognitive capital. The former includes social networks, the latter includes norms, values, attitudes, and beliefs that impact on factors such as interpersonal or inter-group trust and willingness to share information or resources.   This two-dimensional construct can be further categorised into three subsets, bonding, bridging and linking. Bonding social capital focusses on homogeneous groupings, *"such as religious, cultural, professional, racial, or ethnic groups" (Ebi & Semenza, 2008, p. 502).*   Bridging social capital focusses on the connections between socially heterogeneous *groups and linking social capital on the connections between people at different levels of power and influence.* However, while forms

of social capital such as bonding are seen as necessary, they may not be sufficient to effectively support major change-related actions due to the lack of problem-solving capacity, including *"expertise, authority, and financial resources to enact necessary changes" (op cit)*. Both bonding and bridging social capital have been found to be important for positive economic development (Woodhouse, 2006).

The various forms of social capital are particularly important when governmental agencies are not actively involved in planning for major adverse events or in recovery from them: "*social capital, in effect, takes over as a substitute for help from the state. The rolling back of the state in times of crisis or "adjustment" often means that this substitution of social capital is a necessity, rather than a choice*" (Adger, 2003, p. 397). Successful adaptation requires social networks, together with leadership and trust and is regarded by some authors as "the glue for adaptive capacity and collaboration" (Folke, Hahn, Olsson, & Norberg, 2005, p. 451). Strengthening social ties and the impact of this on behavioural outcomes can be determined by Social Network Analysis (Prell, Hubacek, & Reed, 2009).

It is suggested that "*planning processes and decision making arrangements invariably shape social capital*" through consultation, negotiation and interaction between planners, individuals and groups. Further, this indicates that activity such as conservation planning "*is a social process in that conservation aims ultimately to alter the attitudes and behaviours of people through incentives or regulation*" (Bottrill & Pressey, 2012).

Positive impacts of social capital are evident when strong ties exist and there is a belief that working together can make a difference; general expectations that support this work will develop, evolving into descriptive norms (i.e. norms about what most other people are actually doing (Cialdini, 2007) about effective behaviours and motivating others to support the activity (Foster-Fishman, Pierce, & Van Egeren, 2009).

However, the fact that social capital may have positive or negative impacts is not widely recognised. Negative social capital may reinforce inequalities, exclude 'outsiders' or restrict freedom to act (Adhikari & Goldey, 2010). Negative impacts may also be evident in situations such as when "*group loyalties can be so strong that they isolate members from information about employment opportunities, foster a sense of ridicule towards efforts to study and work hard, or siphon off hard-won assets*" (Hunter, 2004, p. 5). Negative social capital may generate negative outcomes for a whole group such as a reduction in norms, (in) tolerance of 'outsiders' or may produce positive outcomes for some at the expense or exclusion of others (Patulny & Svendsen, 2007). Power abuses may occur when social networks are tightly bound and hierarchical in nature (McAllister et al., 2008). Understanding how positive and negative impacts vary across different types of communities is important as is the development of an understanding of the factors that enhance or diminish social capital, such as inequality, exploitation and power tactics (Onyx et al., 2007) and the impact, positive or negative of policy implementation (Talbot & Walker, 2007).

A related concept is that of *social cohesion:* disruption of social cohesion reduces adaptive capacity and thus also resilience (Grothmann & Patt, 2005); as part of this is consideration of the long-recognised difficulties of attracting and retaining key workforce sectors such as medical and educational services (Green & Reid, 2004; Humphreys, Wakerman, & Wells, 2006). As an explanatory of the lack of social cohesion, social disorganisation theory links

increased crime in rural areas to a lack of shared values and beliefs and an inability to solve common problems (Jobes, Barclay, Weinand, & Donnermeyer, 2004). While we will endeavour to investigate the factors that influence social cohesion or its limitations, a detailed examination of the impact of problems created by lack of cohesion is beyond the scope of this paper.

Closely related to social capital is the concept of social distance, which reflects the perceived distance in terms of involvement, power and trust between individuals such as land managers and government agencies (and their staff) (Whaley & Weatherhead, 2015).

4.1.4 Social Vulnerability and Resilience

While the development of resilience in various forms is noted in the literature, its dimensions and impact are not well understood:

It is not clear whether resilient ecosystems enable resilient communities in such situations" (Adger, 2000, p. 347).

Six attributes of social resilience have been identified (Berkes & Ross, 2013):
- People-place connections
- Knowledge, skills and learning
- Community networks
- Engaged governance
- Diverse and innovative economy
- Community infrastructure

Social vulnerability relates to the disruption to livelihoods and loss of security as a result of the impacts of environmental change (Adger, 2000; Cinner et al., 2011) However, despite its frequent use, the concept is rarely converted into analytical measures that can be used to prioritise policy interventions and evaluate their impact (Nelson, Kokic, Crimp, Meinke, & Howden, 2010).   If individuals or communities perceive that they are not vulnerable, or that they are unable to take effective actions, adaptive measures are unlikely to be supported. There are numerous alternative definitions of resilience, although they share many characteristics (Berkes & Ross, 2012).

> *"Resilience is the ability of socio-ecological systems to cope with and adapt to change. Resilient systems are adaptable, flexible, and prepared for change and uncertainty. Non resilient systems, in contrast, are prone to irreversible or catastrophic change and are at risk of shifting into another, often undesirable, state governed by different rules and processes" (Marshall & Marshall, 2007, p. 2).*

While resilient communities respond to challenges more quickly and effectively (Gooch & Rigano, 2010), resilience is also a factor in disaster management and recovery, but a detailed investigation of this is beyond the scope of the present project (G. O'Brien, O'Keefe, Rose, & Wisner, 2006).

It is suggested that *community-based resilience* is an indicator of social sustainability and that communities can actively develop resilience, with clearly identified dimensions to successful

resilience, including development and engagement of community resources towards a common goal, collective action and consideration of equity issues (Magis, 2010). Closely related to this is the concept of social resilience, i.e. the ability of groups or communities to respond to external stresses and disturbances that may be due to social, political and environmental change or a combination of these. The way these attributes impact on each other has not been explicitly studied.

4.1.5 Community Capacity and Willingness to Adapt

In the agri-environment context, communities should be taken to include the more loosely defined social networks noted earlier. These groups may vary widely in terms of their ability to adapt to change (Ivey, Smithers, de Loë, & Kreutzwiser, 2004). Adaptive capacity may be classified on a continuum from 'powerless spectators' (who are unable to change behaviours due to a lack of capacity, skills or resources) through to 'coping actors' (who may have the capacity to adapt but who may not be doing so effectively for a range of reasons that require specific investigation). To 'adaptive manager' communities (who have been able to adapt to changing environments and continue to do so) (Fabricius, Folke, Cundill, & Schultz, 2007). The most effective methods of assisting communities to achieve adaptive manager status are not clear, although the capacity for social learning has received some attention (Ison, Röling, & Watson, 2007). Further, "*adaptive capacity will not necessarily translate to adaptation*" (Berrang-Ford, Ford, & Paterson, 2011, p. 25) and there are substantial differences in the willingness of individual rural communities to adapt (Buys, Miller, & van Megen, 2012). Four main requirements are necessary for successful adaptation to change:

- The will and intention to maintain socio-ecological resilience
- Knowledge about current problems and the desired direction of change
- Proactive behaviour
- The capacity to change existing patterns of behaviour (Fazey et al., 2007).

The ability of communities to take control of their own change management activities is important as many social marketing / behaviour change interventions are predicated on the assumption that communities are better able to understand their own needs and to develop, or co-create, appropriate solutions to challenges they face (Fishbein, 2008; McKenzie-Mohr, 2000).

4.1.6 Communication of the Need to Adapt

People are unlikely to take action unless they perceive potential positive or negative *personal* consequences, but are also influenced by social interactions with others in their communities (Gooch & Rigano, 2010) as we have discussed earlier in relation to social norms.

It is important to identify sources of information used and the level of trust these sources have across different population groups. Different information sources may be used at different points during which behaviour change is considered, with social networks and trusted individuals likely to be more important than impersonal (e.g. mass media) sources if a decision is made to investigate how to make that change (Emtage & Herbohn, 2012). Further, access to Internet-based resources may be more limited than assumed. The 2006 census identified

57% of homes within the GBR catchment area as having Internet connections. However, this figure may be lower within some segments of the community. Rural, regional and remote land managers who have an internet connection may be subject to low speeds, shaped accounts, high costs and limited reliability. The 2016 BIRRR Regional Internet Access Survey found that the current service did not meet the needs of 88% of respondents living in rural, regional and remote areas, limiting the way they communicate, learn, share and do business (Hay, 2016). The sources of information used and preferred for communication will therefore be explored in the ongoing research programme for this project in order to determine how well current information provision meets the needs of the communities included in the study.

Findings from previous studies in the climate change context are worthy of consideration in the agri-environmental context. For example, we have already noted concerns about climate change science communication effects. There is a need to communicate clearly the science underpinning the drive for behaviour change. Other factors include the invisibility of the links between causes and effects, a tendency to discount the impact of distant events (see Section Cognitive Limits: Time Dimensions), lack of immediacy, disbelief about the impact of people overall and the efficacy of any individual action, uncertainty, perceptual limits and self-interest (Moser, 2010). We suggest that these factors should be considered in the development of future communications activity.

4.1.7 Media Coverage and wider Issues of Mass Media Influence

A factor beyond the control of those implementing behaviour change interventions that may affect positively or negatively on the perceptions of target segments is news media coverage. The majority of people obtain a large portion of information from the media, with the potential for misinformation or for erroneous perceptions to be reinforced (Lewandowsky, Ecker, Seifert, Schwarz, & Cook, 2012). As has been found in other areas such as climate change (Boykoff & Boykoff, 2004; Gross, 2009; Lewandowsky et al., 2012), the news media frequently gives equal coverage to both sides of debate on specific issues, irrespective of the volume of evidence to support or refute claims. Balance, i.e. presenting all views 'objectively' as facts is claimed to be a basic principle of journalism (Clarke, 2008). However, this stance can result in intentional or unintentional bias: giving equal coverage to opposing views, even if one view is clearly in the minority has been noted in other areas such as climate change coverage (Boykoff & Mansfield, 2008) and similar effects appear to have occurred in relation to vaccine controversies (Picard & Yeo, 2011). The omission of the relative strength of evidence may lead to perceptions that there is a major lack of consensus on particular issues (Clarke et al., 2015). Critics claim that conflicting stories are deliberately created in order to stimulate interest but may result in 'manufacturing doubt' and decreasing confidence in scientific evidence (Jensen & Hurley, 2012; Stocking & Holstein, 2008).

> *In regard to the MMR vaccine in the early 2000's, the media coverage gave the impression that there was "no smoke without fire" (Serpell & Green, 2006, p. 4043), which then lead to claims that government agencies might be withholding information regarding vaccine dangers (Burgess, Burgess, & Leask, 2006).*

Unfortunately, it is likely that "the media will continue to emphasise conflicting views and dramatise differences in opinion, giving what has been described as "disproportionate

attention" to minority views, resulting in perceptions of a 'false balance' (Finnis, Sarkar, & Stoddart, 2015, p. 2).

Recent media coverage of disagreement by one scientist, under headlines such as "Great barrier battleground over coral bleaching" (see, for example, the June 24 item: http://www.theaustralian.com.au/news/inquirer/great-barrier-battleground-over-coral-bleaching/news-story/e74d24eee3c4a01400e91ec7cefa5258). Experience with other issues such as climate change suggests that coverage such as this may have increased doubt regarding the validity of scientific evidence regarding the health of the Great Barrier Reef, coupled with the perception that risks have been exaggerated (Weingart, Engels, & Pansegrau, 2000) and overstating the amount of disagreement between members of the scientific community (Poortinga, Spence, Whitmarsh, Capstick, & Pidgeon, 2011).

More worrying for this particular project is the recent media coverage such as the 29 June article "Great Barrier Reef debate leaves farmers frustrated over their negative portrayal on water quality improvements" (http://www.abc.net.au/news/2016-06-29/great-barrier-reef-debate-leaves-farmers-frustrated/7549652). Which, along with other similar news items, may reinforce the perception noted earlier in this document that some farmers do not believe that they are the cause of water quality problems, hampering attempts to gain engagement with them and, ultimately, to buy-in to behaviour change initiatives.

5.0   KNOWLEDGE BROKERAGE AND EXCHANGE

5.1   The Need for Exchange

We must reemphasise that the strategies we recommend involve knowledge exchange not a uni-directional knowledge transfer.   This is in keeping with recommended best practice, recognising that farms feel marginalised by scientists and industry organisations and, further, that their own knowledge and beliefs are disregarded (Benn, 2013; Manning, 2013; Morgan, 2011; Sewell et al., 2014; Wood et al., 2014). See also the wider issues of exchange discussed in the social marketing benchmarks section.

There may be a need for some form of knowledge brokerage to aid in communicating the need to adapt and to assist in the development of strategies whereby skills and knowledge necessary to achieve change are developed. Knowledge brokers and the development of trans-disciplinary knowledge networks have been proposed as a means by which collaboration with research end users. Aspects such as the interpretation and translation of research evidence into policy may result in co-produced shared understanding of the significance of research and ways in which it can more effectively influence policy development (Dobbins et al., 2009; Feldman & Ingram, 2009; Pohl, 2008). Strategies that appear most effective are those that involve iterativity, i.e. several 'rounds' of dialogue, interaction and deliberation between knowledge producers and knowledge users rather than uni-directional research dissemination (Dilling & Lemos, 2011; Jones, Jones, & Walsh, 2008).

Top-down influence at the expense of knowledge accumulation may hinder effective decision-making(Weiss, Hamann, Kinney, & Marsh, 2011), while resource management programmes that may focus on ecological systems without understanding the impact of social influences on ecosystems have been described as being , at best, "socially illiterate" and thus unlikely to achieve stakeholder support and participation (Glaser & Glaeser, 2011).

A key factor appears to be clear communication and understanding of what communities need to adapt to, who needs to adapt and in what ways, and how this can be best achieved (Larson, 2010). Affecting this are both place attachment and the need to recognise trade-offs as being, at times, unavoidable.

5.2   Place Attachment

Attachment to a place of residence and / or employment is claimed to lead to positive outcomes including individual group and cultural pride (Larson, De Freitas, & Hicks, 2013).Place can be tangible or intangible, and significance and meaning of the place can vary over time as well as between groups, individuals and cultures (Halpenny, 2010).

Place attachment contained two major components: dependence on place (the level at which a place assists in preferred activities' implementation) (Vaske & Kobrin, 2001); and place identity (the degree at which a place integrates into the individual's self-awareness) (Kudryavtsev, Stedman, & Krasny, 2012). Place attachment can play an important role in predicting an engagement in different actions that individuals take according to how they feel about the place, what that place means for them and how they value things attached to this place particularly if it is in danger (Cass & Walker, 2009; Wakefield, Elliott, Cole, & Eyles,

2001). If individuals are positively attached to the place, they are more likely to have feelings for and to be involved in behavioural changes (Walker & Ryan, 2008).

Numerous studies have found attachment to place to be a predictor that has a positive effect on pro-environmental/conservation behaviour including land conservation and planning (Walker & Ryan, 2008), recycling (Rioux, 2011), participation in clean-up activities (Vaske & Kobrin, 2001), shoreline remediation (Kaltenborn, 1998) and pro-environment behavioural intentions in general (Halpenny, 2010). However, this stance ignores counter-views; there does not appear to be a direct link between place attachment and civic participation. Further, strong local identity and place attachment are claimed to be negatively, rather than positively co-related with pro-environmental attitudes (Lewicka, 2005). The implications of this for the agri-environment sector need further investigation.

5.3   Trade-offs

The lack of recognition in the extant literature of synergies and trade-offs between ecological sustainability and socio-economic sustainability is criticised (Chapin et al., 2010). The complexity of these issues is evident in areas such as fisheries where sustainability objectives at the species level, economic objectives at the fleet level and social objectives at the community level may conflict (Dichmont et al., 2012). This is further complicated where rural and urban populations exist in close proximity with each other, with the potential for competing and conflicting resource use (Dobbs et al., 2011). The way different groups value ecosystems and services and the actual and potential trade-offs inherent in resource management are poorly understood (Hicks, McClanahan, Cinner, & Hills, 2009).

5.4   Social Learning

Knowledge brokerage is linked to social learning, which recognises that learning occurs at individual and a range of collective levels, including organisations, networks and societal levels. Social norms are therefore important at the collective level, affecting both positively and negatively on encouragement of change or reluctance and resistance to change (Diduck, 2010). Adaptive capacity includes both resources, including the various forms of capital, but also the capacity to learn at all levels, and is intertwined with perceptions of vulnerability and also resilience (Brown & Westaway, 2011).

5.5   Collaborative Environmental Management / Co-Management

We have noted the potentially important role of collaborative activity in earlier sections of this document. Collaborative management has been explored in England with positive findings in regard to future environmental impacts (Emery & Franks, 2012). The Co-management requires a sharing of power and responsibility between public, private and civil sectors of society and thus links to social learning processes (Berkes, 2009). Learning at multiple levels is central to successful environmental management but is not a passive process. To be effective, it must include economic and livelihood implications for any changes and address conflicting perspectives and goals (Armitage, Marschke, & Plummer, 2008). This approach can help to develop policy, help to access resources and to build trust and social capital. As such, it is a process, a problem solving strategy and a governance structure   (Miller, 2004). However, considerable time periods may be necessary for learning to build both trust and social capital levels and thus to successfully impact on behaviours.

The following diagram (Figure 14) indicates the complexity of learning connections at different social unit levels and the linkages between them.
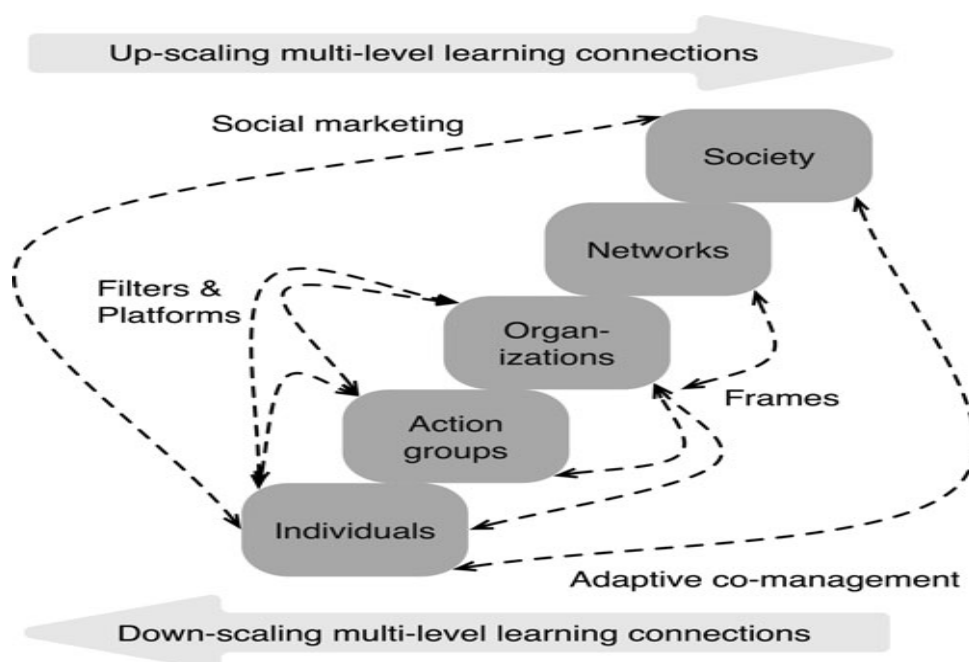
Figure 14: Multi-learning Connections across Social Units
(Diduck, 2010, p. 210)

The authors note that "Adaptive co-management arrangements and community-based social marketing touch every level of organization, but for the sake of simplicity are only shown as connecting the individual and societal levels". These learning connections are impacted by a range of social filters, but are also facilitated by platforms and organisational frames, co-management arrangements and community-based social marketing strategies as shown in **Table 11**.

Table 11: Five Conceptions of Multi-Level Learning Connections
(Diduck op cit.)

Social-cognitive filters	Psychological and social mediators of individual and action group/ organizational learning; e.g., communication, peer engagement and social action
Facilitated platforms	Deliberate interventions in which interdependent stakeholders are brought together to interact in a forum for collective decision making towards concerted action
Organizational frames	Cultural, strategic and structural arrangements that enable individual and action group learning within the organization plus the development and use of organizational memory
Adaptive co-management arrangements	Flexible, community-based systems of management tailored to specific places and situations; supported by and working with various groups and organizations at different scales
Community-based social marketing	Principles, strategies and practices for influencing human behaviour to achieve public goals; emphasizes the involvement of the involvement of the people whose behaviour is targeted

Ten conditions for successful adaptive co-management are shown intable **Table 12**.

Table 12: Ten Conditions for Successful Adaptive Co-management

(D. R. Armitage et al., 2009, p. 101)

Condition of success	*Explanation*
Well-defined resource system	Systems characterized by relatively immobile (as opposed to highly migratory and/or transboundary) resource stocks are likely to generate fewer institutional challenges and conflicts, while creating an enabling environment for learning.
Small-scale resource use context	Small-scale systems (e.g. management of a specific rangeland or local fishery) will reduce the number contexts of competing interests, institutional complexities, and layers of organization. Larger-scale resource (transboundary stocks, large watersheds) will exacerbate challenges.
Clear and identifiable set of social entities with shared interests	In situations where stakeholders have limited or no connection to "place", building linkages and trust social entities with shared will be problematic. In such situations, efforts by local/regional organizations to achieve better outcomes may be undermined by non-local economic and political forces.
Reasonably clear property rights to resources of concern (e.g. fisheries, forest)	Where rights or bundles of rights to resource use are reasonably clear (whether common property or individual), enhanced security of access and incentives may better facilitate governance innovation and learning over the long term. Such rights need to be associated with corresponding responsibilities (e.g. for conservation practices, participation in resource management).
Access to adaptable portfolio of management measures	Participants in an adaptive co-management process must have flexibility to test and apply a diversity of management measures or tools to achieve desired outcomes. These measures may include licensing and quota setting, regulations, technological adjustments (e.g. gear size), education schemes, and so on. In other words, economic, regulatory, and collaborative tools should all be available.
Commitment to support a long-term institution-building process	Success is more likely where stakeholders accept the long-term nature of the process, and recognize that a blueprint approach to institutions or management strategies is probably not advantageous. Commitments of this type can provide a degree of relative stability in the context of numerous changes and stresses from within and outside the system.
Provision of training, capacity management building, and resources for local-, regional-, and national- level stakeholders	Few stakeholder groups will possess all the necessary resources in an adaptive co- context. At the local level, resources that facilitate collaboration and effective sharing of decision- making power are required. Regional- and national-level entities must also be provided with the necessary resources.
Key leaders or individuals prepared to champion the process	Key individuals are needed to maintain a focus on collaboration and the creation of opportunities for reflection and learning. Ideally, these individuals will have a long-term connection to "place" and the resource, or, within a bureaucracy, to policy and its implementation. Such individuals will be viewed as effective mediators in resolving conflict.
Openness of participants to share and draw upon a plurality of knowledge systems and sources	Both expert and non-expert knowledge can play productive and essential roles in problem identification, framing, and analysis. The tendency in most resource management contexts is to emphasize differences in knowledge systems. However, there are substantial contributions to social–ecological understanding, trust building, and learning, where the complementarities between formal, expert knowledge and non-expert knowledge are recognized.
National and regional policy environment explicitly supportive of	Explicit support for collaborative processes and multi-stakeholder engagement will enhance success. This support can be articulated through federal or state/provincial legislation or land claim agreements, and the willingness to distribute functions across organizational levels.

collaborative management efforts	Additionally, consistent support across policy sectors will enhance the likelihood of success, and encourage clear objectives, provision of resources, and the devolution of real power to local actors and user groups.

Some useful caveats have been provided for the potential success of this approach, including recognition of the importance of social and cultural factors; the need for mutual understanding of the problems and potential solutions; recognition of the diverse range of risk perceptions; the need to recognise and address land manager concerns and to demonstrate the benefits of adopting recommended practices together with flexibility in their application (Emery & Franks, 2012). These views are totally compatible with the discussions in earlier sections of this document and with the recommendations of the Great Barrier Reef Water Science Taskforce's Final Report (2016).

6.0 CONCLUSIONS

The preceding discussion has highlighted the complexity of achieving effective long-term behaviour change with regard to improving best land management practices. It has provided a critique of the usefulness of a range of behaviour change approaches that may be of use in achieving the ultimate aim of this project, i.e. to improve the water quality of the Great Barrier Reef. The material discussed and the recommendations provided are designed to stimulate discussion regarding future intervention strategies and to help to fine tune those already in place.

This review has also provided a foundation for the development of appropriate research instruments that are about to be put into the field. In the approach to this, we note that it is necessary to gauge attitudes towards, and acceptance of, the need to modify specific land management practices. In this, there is a need to move beyond simple descriptions of existing behaviours to be able to predict the outcomes of alternative actions, policy instruments and related strategies.   Previous research has noted, "The initial belief elicitation phase is theoretically necessary to inform subsequent phases" in developing persuasive communication strategies (Curtis et al., 2010, p. 568).   This stance is supported by Stoutenborough et al. (2015), who, in the context of gaining greater public acceptance of the need to transition to renewable energy sources, state that "without a base-line comparison to attitudes, beliefs and knowledge about alternative technologies, it is difficult to truly understand the public's perspectives on energy issues" (p. 2).

Questions have been drawn from key themes in the literature, (including, but not restricted to: Barnes et al., 2011; Bartel & Barclay, 2011; Davies & Hodge, 2012; Ecker et al., 2012; Rolfe & Gregg, 2015; Toma et al., 2011). Following the procedures outlined in relation to the construction of an effective questionnaire based on the factors contained in the Theory of Planned Behaviour and its derivatives (Fishbein & Ajzen, 2010). The research phase will be described in more detail in a future report. As noted in section 2.5, it is intended that a separate report be developed using the NSMC benchmarks as foundation and integrating principles from CBSM. This will have a specific agri-environmental focus and will aim to provide a context – specific practical resource for those integrating with land managers.

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