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Policy Approaches to Environmental Practice in Agriculture: a review of international literature and recommendations for application in New Zealand

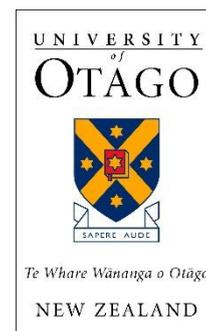
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Te Whare Wānanga o Otago
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Executive Summary

The New Zealand agriculture sector is facing ever growing demands that it produce verifiable environmental benefits. These demands raise the pressures on farmers to adopt and follow sound practices and technologies. This report provides a review of diverse approaches—documented in the international literature—to promoting or encouraging agri-environmental practice in the agriculture sector. The intent of the review is not to identify a single, optimal policy to address all environmental issues. Rather, it develops the argument that the reported success of given approaches is highly contingent on the context in which they were applied. Furthermore, there is fairly consistent evidence that the achievement of widespread adoption of agri-environmental practice (where it involves more than the fine tuning existing management systems) is dependent on the emergence of a shared (or social) sense of responsibility and willingness to value the outcomes of the practice.

In order to facilitate comparison of the contexts within which the diverse approaches achieve success, the analysis is conducted within a framework that focuses on the capacity of each approach to achieve legitimacy in the eyes of the range of stakeholders (including the farmer, processors and exporters, consumers, government policy makers and society in general). Legitimacy is examined on the basis of six criteria and the discussion is summarised in Table 1 (page 3).

The approaches are grouped into four categories according to the motive feature underlying the appeal to farmer engagement:

1. Directed approaches—these include a variety of audit defined approaches, including market based, industry initiated and audited self-management. These are directed approaches in that they establish a highly circumscribed set of acceptable practices, differing in the stakeholders who initiate or enforce compliance. The discussion of these approaches draws heavily on research conducted within the Agriculture Research Group on Sustainability project.
2. Voluntary approaches—these include several approaches that rely on the voluntary enrolment of participating farmers. The most commonly recognised in this group is organic certification, although it also includes Whole Farm Planning (WFP) which is practiced in New Zealand; Environmental Management Systems (EMS) which are most common in Australian agriculture; and Producer/Interest Group Partnerships (PIGP) using examples from the USA.
3. Mandatory approaches—these include environmental regulation enforced either by government or industry. Water quality regulations are the most commonly experienced in New Zealand.
4. Outcome based approaches—here a single approach is discussed, namely that of ecosystems services. This approach differs from audited practice in particular by stipulating not the ‘best practices’ to be followed, but the expected outcomes such as specific water quality measures and increasing biodiversity.

The report concludes with an analysis of the relative benefits of each of the policy approaches, while also noting the challenges particular to maintaining their legitimacy. The final section provides a framework through which the application of a particular approach can be assessed. The framework introduces four axes that are used to assess the particular context of the intended policy:

1. The relative urgency for change
2. The relative awareness of the environmental impacts and ecological processes
3. The relative propensity for the outcomes of changing practice to be valued
4. The relative cost of implementing practices

Each of the policy approaches is then ranked according to its relative capacity to address conditions raised by the axes (as shown in Table 2, page 18). Given that the complexity of the everyday situations into which policy will be introduced, it is likely that no single approach will be appropriate across the four axes for a specific context. This reinforces the conclusion that a mix of approaches may be the most appropriate means of encouraging agri-environmental behaviour, especially when the intention is to introduce long term shifts in management systems and farming practice.

Encouraging environmental practice in the agriculture sector

The practice of agricultural production is increasingly challenged by issues related to its social and environmental impacts. What has been considered normal and appropriate practice is now subject to scrutiny as the impacts (other than increasing production) of accelerating intensification and continually simplified agro-ecosystems become more apparent. Such scrutiny has been translated into public and political pressure for the adoption of alternative agriculture practices with objectives of improved soil management, strengthened environmental services and reduced pollution and contamination of air and water.

While the detrimental impacts of environmental degradation and the potential benefits of improved practice are widely recognised, the promotion of alternative, more environmentally benign practices are challenged by a long-established and persistent culture of productivism. In other words, the adoption of alternative practice must overcome prior concerns about production levels, financial returns, capital investments and the costs of labour and time. Moving toward more sustainable practice challenges deeply rooted beliefs about how agriculture should be practiced. The basis for initiating change is, therefore, often predicated on an individual's or group's acknowledgement of shared objectives that are currently not met or of a strong need to alter existing practice due to negative financial, social or environmental feedback.

A well established literature is available which examines the apparent difficulties of encouraging a change to improved environmental practice in agriculture. Much of this literature focuses on either the slow rate of adoption or the farmers' failure to develop a heightened environmental awareness associated with incentives or regulations. In Europe, the research focus has been on the response to agri-environmental policy that offers incentives for designated practices (for example, Morris and Reed 2007; Potter and Tilzey 2005; Wilson and Hart 2001). Similar issues are addressed in the context of Australia (Dibden et al. 2009; Higgins et al. 2008), Canada (Smithers and Furman 2003) and the USA (Bell 2004; Hinrichs and Welsh 2003; Lyson and Guptill 2004). In a recent contribution to this literature, Burton et al. (2008) argue that—due to the deviation from common practice—environmental practices fail to conform to farmers' learned assessments of appropriate or good management (cultural capital) and are not commensurable with the visual representations (symbolic capital) of such management. In the New Zealand context, Rosin (2008) identifies an emerging change in the identity of farmers (referred to as a *spirit of farming*) associated with the growing reliance on best practice auditing. The emergence of this identity is contested by the existing identity which emphasises the independence of farming and the cultural value and achievement associated with production. This shift in identity has also been shown to alter shared understandings of what defines a 'good farmer' (Hunt et al. 2012).

A common theme in these analyses is that adoption of environmental practices involves a change in the culture and identity of farming as much as a shift in behaviour. For example, Bell's (2004) detailed assessment of the adoption of environmental practices among farmers in Iowa (USA) provides strong evidence that the shattering of adherence to the predominant orientation toward production outcomes usually precedes the shift in practice. Sterk et al. (2006) refer to this as a "reframing" of the approach to agriculture, arguing that it is predicated on the acknowledgment of the inadequacy of current practice and recognition of the need for alternative approaches. Thus, encouraging environmental practice is recognised as a multi-faceted process, that must not only establish the potential and viability of the alternative practices but also overcome deep seated practices and preferences that underlie existing management systems.

Given the immediacy of environmental degradation associated with agriculture coupled with the escalating food and fibre demands of a growing global population, processes through which the impact of agriculture either can be mitigated or can contribute to beneficial outcomes is of utmost importance. Towards this ends, several approaches to encouraging change toward socially and

environmentally appropriate practice are currently recognised in the literature. Each of these approaches claims to incorporate the means to progress beyond social and cultural resistance to alternative practices in agriculture, while simultaneously working to establish their scientific rationale. Each also represents an attempt to address the issue of environmental practice within a particular context of agricultural commodity production ranging from the cultural, climatic and economic conditions of production, to factors of processing and distribution, to the concerns, demands and behaviour of consumers. This report provides a systematic assessment of selected approaches to encouraging environmental practice in agriculture with the intention of developing a framework and tool box to inform future attempts to achieve progress in the sustainability of New Zealand agriculture.

Criteria for assessment

The existing literature on the promotion of environmental practice in the agriculture sector identifies several important aspects of successful approaches. These aspects can be related to the concept of legitimacy—that is, an approach to encouraging environmental practice is successful to the extent that it is perceived as legitimate by the diverse stakeholders in the commodity chain. The most obvious element of legitimacy is the verification of actual environmental benefit from the promoted changes. The critical literature on implementation of practices also recognises that the adoption of environmental practice is a social process. As a result, environmental practices are exposed and subject to social understandings of appropriate management practice and promotional strategies must account for several social criteria.

This report identifies six criteria that help to distinguish the potential success of programmes for encouraging environmental practice, including:

1. the extent to which the outcomes of change in practice are measurable and the impact of the programme is evident;
2. the extent to which the measurement and claims for improvement associated with the programme can be verified in a manner that is satisfactory;
3. the extent to which change in practice is considered voluntary as compared to imposed;
4. the uniformity and rate of uptake;
5. the distribution of benefits and costs;
6. the extent to which the obligation to achieve change is shared.

Each of these six criteria refers to a particular aspect of a given programme's legitimacy and is subject to the assessment of all stakeholders (including consumers, producers/farmers, government, environmental organisations, etc). The diverse contexts in which agri-environmental practice occurs (such as the relative urgency of mitigating action, the awareness, scope and locality of impacts, the economic viability of a given agricultural commodity, etc.) belies any attempt, however, to specify predetermined targets for the criteria. Rather, the intent of the following analysis is to examine the logics of a diverse list of promising policy options as these address the six criteria. By further examining case studies of each approach as presented in the literature, it is possible to assess the potential 'mixes' of the six criteria that contribute to the success or failure of agri-environmental projects. A summary of the analysis is presented in Table 1, which highlights the characteristics specific to each approach in order to facilitate an initial comparison and as a reference while reading the more detail discussions. What is obvious from the outset is the growing awareness of the relative advantages of the different policy approaches, with common reference to the need for a combined policy approach that involves and encourages inclusive and collaborative engagement from all stakeholders.

Table 1: Summary of agri-environmental policy approaches relevant to assessment criteria.

Criteria	Policy Approaches							Gov't regulation	Industry regulation	Ecosystem Services
	Market audit	Industry audit	ASM	Organic	WFP	EMS	PIGP			
Measurable outcomes	Practice based	Practice based	Practice/ Outcome based	Practice based	Practice based	Practice based	Practice/ Outcome based	Practice and Outcome based	Practice based	Outcome/ practice based
Verifiable outcomes	Health and safety Consumer oversight	Health and safety Consumer oversight	Community oversight	NGO, Gov't and private oversight	NGO and Gov't oversight	Private oversight	NGO and private oversight	Gov't and public oversight	Industry oversight	Diverse
Voluntary practice	Voluntary Market access?	Enforced	Voluntary Resource access?	Voluntary	Voluntary Regulated	Voluntary	Voluntary	Regulated	Regulated	Voluntary Subsidised
Uniformity of uptake	Variable Industry wide?	Industry wide	Variable, project specific	Variable and limited	Variable Uniform if regulated	Variable, aided by economic incentive	Variable, aided by localised env'l threat	Uniform if applied in consistent manner	Industry wide if applied	Variable, depending on capacity to assess
Rate of uptake	rapid	rapid	slow while under negotiation	slow while converting	emerging process	emerging process	emerging process	immediate	immediate	slow
Distribution: costs/benefits	c: producers b: commodity chain	c: producers/ industry b: commodity chain	c: producers b: community society	c: producers, consumers b: producers, society	c: producers b: producers, society	c: producers b: producers, society	c: producers, consumers b: producers, interest gp.	c: producers, society b: society	c: producers, industry b: society	c: producers, consumers b: society
Obligation to change	producer	industry	producer, community	producer	producer	producer	producer, interest gp.	producer	producer, industry	producer

Means to encourage or enforce uptake of environmental practice

The challenge of introducing alternative management practices in agriculture which do not wholly conform to shared conceptions of best practice has led to a wide range of interventions and policies to encourage environmental practice. Here, a review of literature is used to critically examine the potential of diverse approaches to encouraging environmental practice. The approaches included in the review can be categorised as either practice or outcomes based, depending on whether participation is assessed according to compliance with a set of 'best practice' criteria or to achievements relative to targeted environmental outcomes. The practice based approaches can be further distinguished according to the means through which participants are enrolled. The directed approach has been the most common in New Zealand, in which participation is not truly enforced, but the advantages of participation in regard to market access make non-participation unappealing or, in some cases, unviable. The most common example of this approach would be the market-led audit scheme such as GLOBALG.A.P., which influences management practice in the horticultural sector in particular. Voluntary participation is also well recognised, if not widely implemented, in New Zealand and involves codes of practice certified according to organic principles or concepts of whole farm planning. These approaches appeal to a committed set of participants who perceive a benefit from compliance with the voluntary code of practice that distinguishes them from a majority of their peers. Finally, changes in practice can be imposed either through government or industry regulation. This approach has relatively limited application in New Zealand, but can result in situations of strong public sentiment supporting alternative practice or in response to extreme cases of environmental degradation. The most recognised current example would be the concerns regarding water quality.

In the following sections, designated types of intervention are evaluated in turn. The framework for evaluation includes the following aspects: a) first, the underlying logic of the intervention – involving the rationale through which each approach is expected to influence practice and behaviour; b) the contexts of application – the factors which contributed to the selection of a particular approach; c) the measurable outcomes of the approach based on reported case studies; d) the efficacy of the approach as determined by its legitimacy for stakeholders (i.e., the farmers or producers and the public demanding change).

Directed approaches:

Market audit schemes

The logic behind market-led audit schemes is that price signals are the most efficient means of translating consumer concerns about the social and environmental impacts of agriculture into practice. This is especially the case in globalised markets where the immediate impacts of production are made largely invisible to the consumer based on the distance the product travels – i.e., social exploitation or soil and water degradation in New Zealand does not impact on the everyday lives of the European consumer visiting the supermarket. It is assumed that, by rewarding sustainable production with price premiums, producers will be encouraged to utilise acceptable practices as elaborated in the audit criteria. Furthermore, audits are expected to deliver a more readily comprehensible assessment of diverse and complicated factors to the consumer, thus enabling more informed choice. Because this 'communication' of desired levels of social and economic benefit is achieved via market mechanisms, it is considered to be a more cost effective means to encourage change in practice relative to government regulation that would incur costs for non-consumers of a given product in the form of taxes.

The potential for market-led auditing of best practice to encourage improvements in social and environmental practice in the New Zealand agriculture sector has been thoroughly examined by the Agriculture Research Group on Sustainability project. The underlying premise of the research project

was to conduct a transdisciplinary assessment of the pathways to sustainability being pursued at the production end of the kiwifruit, sheep/beef and dairy commodity chains. Given the emphasis on a neo-liberal policy framework, New Zealand offers an excellent opportunity to examine the potential for market-led initiatives to influence on-farm/on-orchard practice largely outside the influence of government subsidy or regulation. By establishing geographically clustered panels of farmers and orchardists, the ARGOS research team is able to develop comparative analyses of the intentions, practices and outcomes associated with diverse market access pathways for each commodity. More specifically, the team was able to establish direct comparisons of the extent of and rationale for uptake of audited best practice schemes as well as the relative social, financial and environmental outcomes of such practices.

At a general level, the findings from the project relative to the impact of market audit schemes on social and environmental practice on farms and orchards indicate that there were differences related to the pathways to market examined; but, these differences were considered to be relatively small in relation to the similarities within each of the commodity chains.¹ In other words, compliance with audit criteria appears to have some positive influence on the sustainability of a farm or orchard. Due to the fact that the application of any set of practices is variable among those who utilise them, however, the extent of difference is more difficult to gauge. Thus, recommendations regarding the value of audit schemes for improving social and environmental impacts of agriculture are subject to several conditions, including the context of production and commercialisation of a given commodity chain as well as the social and cultural norms of the farmers and orchardists.

The varying potential of market audit schemes is evident in the distinct patterns of uptake and response in the three commodity chains included in the ARGOS project. For example in New Zealand, kiwifruit production has a relatively long experience with best practice auditing. Initially, such auditing was imposed by the Kiwifruit Marketing Board (later as ZESPRI) as a means to develop a brand around fruit qualities including the elimination of pesticide residues. Arguably, the ability to introduce such regulation of practice was the result of the crisis of 1990s (Campbell, et al. 1997; van den Dungen et al. 2011). This exposure to external controls on practice appears, however, to have contributed to a level of acceptance within the orcharding culture, referred to elsewhere as a spirit of farming (Rosin 2008). After some early resistance, the introduction of more extensive audit criteria in the EuropeGAP and later GLOBALG.A.P. schemes has extended such external influence on orchard practice beyond the application of sprays. The lack of strong variation between the ARGOS kiwifruit panels may be an indication of the value of the auditing relative to organic certification to the extent that these achieve similar outcomes. Lacking a clear comparison with orchardists not involved in any form of auditing, however, the extent of benefit to social and environmental impacts is impossible to determine.

By comparison, the influence of market audit schemes is much less evident in the meat and dairy commodity chains. The ARGOS project interviewed meat producers supplying audited best practice contracts associated with the Waitrose and TESCO retail firms in the United Kingdom. For the most part, the impact of these schemes on management practice was considered nominal, involving increased attention to what the farmers already considered to be good and necessary actions (such as maintenance of stockyards and access to water). In addition, the contract arrangements proved to be of only moderate financial benefit by ensuring a set price and access if not always the highest price at time of supply. Furthermore, the timing criteria limited farmer flexibility in situations of adverse climatic events. Some farmers have responded positively to the programme's incentives and efforts to recognise the premium product sourced; the majority, however, appear to treat the scheme as one of several alternative pathways to access the market, strategically selecting the best at the time of supply. There were no strong indications of the scheme impacting on the social or environmental impacts of farming in the ARGOS data. The ARGOS analysis of the dairy commodity

¹ More detailed analysis from the ARGOS project can be found at www.argos.org.nz.

chain was much more limited in that it was only able to compare conventional and organic farms. The project identified some weak evidence of the potential for organic certification (as a form of market-led audit²) to have a positive impact on environmental outcomes despite the relatively recent date of conversion (five years) of the organic farms. The social pressures associated with falling milk solid production (despite some profitability gains) and reliance on apparently slower animal health treatments suggests, however, the need for alternative support networks for the organic farmers.

Based on the ARGOS research and a variety of literature on market audit schemes in other contexts (Busch and Bain 2004; Fulponi 2006; Hatanaka et al. 2006; Henson and Reardon 2005; Jahn et al. 2005), it is possible to draw some conclusions regarding their likely efficacy as means to encourage change in social and environmental practice in agriculture. First, the influence of audit schemes is highly dependent on the context of a given commodity chain. In particular, the implementation of auditing is more likely to be successful in instances where it is perceived to originate in the actions of a benevolent market actor or intermediary as opposed to efforts to imposed punitive or regulatory policies without producer participation. Here, the extent to which orchardists' positive impression of ZESPRI helped to mediate the introduction of the GLOBALG.A.P. scheme is noteworthy.

Beyond the initial receptivity of producers, any continued success for audit schemes will involve the attainment of a 'reward' associated with the limitations these impose on freedom of action. This is especially the case with market audit schemes in which the best practice criteria are usually driven by the consumer end of the commodity chain. The most obvious reward is that of a demonstrable price premium. Whereas during the interview period, the kiwifruit growers generally enjoyed acceptable prices, farmer commitment to the audit programmes in the meat sector waned when their contract prices were below spot market prices when lambs were sold. Any claims to greater market access through auditing practice, while likely very real, appear less easy to verify from the perspective of producers. An intermediate step to promoting this type of benefit is through educational and promotional programmes which reinforce the quality characteristics attributed to the practice of auditing. Non-financial rewards can also contribute to the acceptance and strength of an audit scheme. For example, many of the kiwifruit orchardists took pride in the fact that the controlled use of pesticides in the orchards translated into a safer and healthier environment for neighbours and to increasing biodiversity, especially of native birds. By comparison, the organic dairy farmers expressed some concern that their product would not be marketed on the basis of its exceptional qualities and, thereby, failing to acknowledge their efforts and achievement.

The analysis also raises a question regarding the general applicability of audits schemes as a means to encourage change. A particular characteristic of market led audit schemes is their reliance on the retail end of the commodity chain to set the benchmark for acceptable practice. As a result, they may be subject to challenges based on the relative applicability and practicality of the recommended practices. This challenge can rest on two grounds: 1) scientific legitimacy of the practice and 2) the practical capacity for producers to implement and utilise practices. In the first case, popularised concepts of environmental impact (for example the fraught concept of 'food miles') can establish a false basis for the assessment of the relative benefit of particular practices. In some instances, this may be the result not of a concept subject to general debate, but from the misapplication of a 'sustainable' practice to an inappropriate social or ecological context. Similarly, a practice that may seem perfectly rational to the average consumer may prove excessively burdensome to the viable management (financially, socially and ecologically) of the farm or orchard. The potential for a disparity in the perception and the application of a practice is heightened by the fact that demand for change often emerges in the context of particular food crises which may elicit rash and excessive

² It must be acknowledged that organic certification involves ethical responses to social and environmental practice that extend beyond the incentives of price premiums for organic products.

alterations of management.³ Such situations demonstrate the need for collaborative input to the development of audit criteria, continued scientific monitoring of the impact of recommended practices in diverse contexts and means for acknowledging the accomplishments associated with compliance.

Producer and industry led audit schemes

Findings from the ARGOS project have contributed to the parallel development of several best practice audit schemes that are initiated by producer or industry led groups. In application, these are largely similar to the market led schemes in that they are an attempt to position products relative to consumer demand for more sustainable practice. The principal difference rests in the type of stakeholder who acts to maintain consumer trust in the value of the scheme and to transfer market interests to producers. Thus, whereas market-led schemes generally rely on the market presence and reputation of retailers and their established relationships with consumers, the producer or industry led schemes must establish credibility through indirect engagement with the consumer—and in New Zealand’s case, at a great distance. The benefit of the latter approach lies in its capacity to better account for and respond to the social and environmental context at the site of production; however, the very ‘local’ nature of such audit criteria poses additional challenges to the legitimacy of its best practice schemes in international markets.

One of these schemes deserves particular attention due to its incorporation of cultural aspects as a significant element of the audit criteria and objectives. The Ngāi Tahu Mahinga Kai (later Ahika Kai) auditing regime draws on traditional ecological knowledge and cultural concepts of sustainable practice to establish an indigenous label for products of farming, hunting and gathering. In comparison to the logic of market signals that underlies the market driven audit schemes, the Mahinga Kai regime is rooted in the legitimising capacity of Māori cultural practice. The emphasis is on the Māori relationship to land and resources, with a particular focus on kaitiakitanga or sustainable relationship with mahinga kai resources. The logic in this case is that cultural predilections toward sustainable resource use will encourage the use of more benign environmental management as identified within the programmes criteria. The programme does not, however, completely separate itself from economic drivers to the extent that participation is largely motivated by the promise of preferential commercial exposure of enrolled products.

Like market-led audit schemes, the Mahinga Kai regime is regulated through the application of a set of audit criteria. These criteria operate distinctly from the market-led audits by setting a bottom-line for environmental practice within a culturally defined context (as opposed to seeking to address the perceived or real concerns of consumers). There is some expectation that, as a result of the labelling, some consumers will be willing to pay an economic premium; but the foundation for the scheme’s legitimacy rests in kaupapa Māori. While this speaks to Māori as consumers within a Māori community, it requires some level of cultural translation to attract and convince consumers from outside this community. The Mahinga Kai scheme will, therefore, test the potential for employing a distinct logic for translation of consumer interest to real world action. Its long-term viability and legitimacy will be tested and negotiated via reflexive understandings and acceptance of cultural claims as opposed to a response to market signals.

Additional cross-cultural legitimacy is achieved through the incorporation of organic certification within the scheme’s criteria. This attaches a ‘value’ to the branded products that is more commonly recognised outside the Māori community. As is the case in other best practice schemes (including certified organic), more legitimate measures of positive outcomes associated with audited practice require some level of external verification, especially for consumers located at a distance.

³ The example here is of the response to *E. coli* and similar tainting of fresh vegetables in the United States leading to recommended practices in agricultural areas that eliminate trees from the immediate landscape to discourage birds from the area.

The likely benefit of the cultural foundation of the Mahinga Kai project (in regard to its desirability for participants) involves its appeal to a distinctive group of producers who identify as Māori. Similar to other market directed schemes, however, it may face difficulties in attracting large numbers to a programme without proven benefit. This is confirmed by the current low level of adoption by participating producers. In order to maintain momentum and increase participation, the scheme will require early successes in marketing that confirms the value of the associated branding. Thus, while strongly rooted in cultural values, the Ngāi Tahu Mahinga Kai regime, by being structured as a marketing tool, will likely need to demonstrate economic benefit in order to attract a wider set of participants. Over time, the tensions between the cultural and economic bases of the scheme can potentially lead to tensions such as those experienced within certified organic production regarding the utilisation of cost-effective yet potentially less environmentally or socially sound practice.

In order to maintain its legitimacy, it will be necessary for Ngāi Tahu Mahinga Kai to continually pursue active promotion of cultural factors of identity and difference in addition to a codified set of practices. As already noted, this issue is more likely to affect people from outside the Māori community who may require more than statements of culturally embedded environmental and social responsibility. The current florescence of Māori cultural principles and an assumption (in some social groups at least) of their relationship to sustainable environmental practice provides an initial basis for verifying the scheme's sustainability claims. The fact that such claims will be subject to scrutiny by Pakeha consumers may expose the project to contradicting understandings of what indigeneity and its relationship to sustainable practice entail. As a result, retaining the value of the indigenous branding may require a reevaluation of stated ideals and approaches.

Audited self management

Audited self management (ASM) employs a distinct logic from that of the market and industry led schemes. Whereas the latter two approaches attempt to transfer concerns expressed by consumers regarding the social and environmental impacts of production to farmers, ASM generally addresses the concerns of a community of interest related to a particular ecosystem, landscape or public good (INZ 2008). Because of this distinction, ASM is not as dependent on market signals to generate the impetus for change in practice; by contrast, the commitment of the farmer or resource manager is encouraged by means of social pressure asserted by other stakeholders who benefit from the continued availability and quality of that resource. The reward for compliance, thus, involves the well being of the community and an individual's standing within that community rather than financial gains or market access. On the other hand, it is expected that community policing and restrictions will enhance and secure compliance in the longer term. In its applications to date, ASM is generally more focused toward particular policy objectives—e.g., nutrient management, water management, soil erosion—making it, to some extent, an alternative form of regulation (INZ 2008).

The legitimacy of any individual ASM is dependent on its capacity to encourage buy-in from resource managers, while convincing other stakeholders of the value of the audited practice in maintaining the resource. In seeking farmer compliance, proponents of ASM claim that the negotiated process of developing the audit criteria (which is expected to occur within the 'local' community of interest) is more likely to incorporate elements of flexibility inherent to self-policing of actions within set parameters or limits (Brown 2011; INZ 2008; Land and Water Forum 2012). Legitimacy is also maintained within the community of resource users through reference to and compliance with a shared sense of good practice. The whole of the community can expect to benefit from practices to increase the sustainability and quality of the resource. The capacity for ASM to translate its legitimacy outside the community is, however, less certain. In this manner, it shares the challenge faced by the Mahinga Kai scheme, which is also founded in locally developed criteria for best practice. If ASM is expected to achieve legitimacy with stakeholders outside the resource community, it will likely require additional verification of outcomes and benefits by an external assessor.

In New Zealand, ASM has been utilised as a mechanism to encourage greater attention to improved water use practices in irrigation schemes in Canterbury (Brown 2011). In these cases, ASM is presented as a means to address diverse interests (rural and urban; production and residential) regarding water use. The process facilitates shared negotiation of concerns and objectives within a community oriented framework. Another advantage of the process is the ability to avoid direct government regulation. The resulting criteria for management are viewed as those of the community, with the diverse interests recognised. Despite the reference to community interest, in these cases as elsewhere, ASM often is one element of a policy package. The best practice criteria are separated from government action; but also designed specifically to conform to environmental objectives. The implication of such coordinated policy is that ASM requires some external oversight, either from government imposed standards (e.g., water quality standards as recommended by the Land and Water Forum, 2010, 2012) or industry regulation in order to ensure that practices meet extra-local environmental concerns and benefits.

Voluntary approaches:

Organic certification

Organic certification, by establishing a set of management guidelines to define organic agriculture, is a well established approach to encouraging environmental practice in agriculture (Campbell et al. 2010; Guthman 2004; Lockie et al. 2006). The organic standards are governed by and given increased legitimacy by IFOAM, the international licensing organisation (IFOAM 2009). The standards appeal to the food health and safety concerns of consumers as well as making claims regarding a reduced impact on the environment. In order to encourage environmental practice, organic certification relies on the individual's dedication and/or support of objectives to remove chemical and synthetic inputs to the production process. Less idealistic farmers may adopt organic principles as a means to realise price premiums for their products. For example, organic production principles related to the encouragement of greater biodiversity and social equity are more difficult to assess via audit and not all certified organic producers adhere to them (Guthman 2004). In order to maintain its legitimacy among producers, organic certification relies on similar market logics to market and industry led audits with the distinction that participation is completely voluntary.

Organic certification faces several challenges to its legitimacy with stakeholders throughout the commodity chain. Much of the struggle for legitimacy lies in the attempts to justify the (level of the) price premium attached to organic food and fibre (Rosin and Campbell 2009). Consumers must be sufficiently convinced of the benefits of organic practice to pay higher prices than for similar products at retail outlets. As a result, the auditing of organic practice must involve criteria that: a) are readily distinguished from those that characterise more commonly utilised practices; b) are verifiably associated with desirable outcomes; and c) are regulated by a credible institution. The process through which a national-scale organic standard was established in the USA provides an example of how a certification scheme can be subject to criticism due to the influence of corporate farming interests (see, e.g., DuPuis and Gillen 2009).

For retailers and processors, organic products often involve added costs and risks within their supply chains. Of particular issue here is the currently limited size of the organic supply for most products, limiting the consistency of supply. Additionally, the presence of separate supply chains necessarily implies that one of the two, by default, is an inferior (and possibly risky) product. Thus, any price premium leads to the contestation of the value of organic ranging from retailers with an exclusive focus on organically certified products to those which openly challenge the claims to health and environmental benefits. Some larger retailers also market both organic and non-organic products placing pressure on the pricing and supply capabilities of organic producers.

The competing nature of organic and non-organic practice also extends to the production level. For example, farmers considering the adoption of organic methods often must disregard existing

conceptions of best practice or 'good farming' shared amongst peers (Mortlock and Hunt 2008; Rosin et al. 2010). For the committed organic farmer, this can be empowering; on the other hand it can challenge the perceived viability of conversion due to exposure to ridicule or exclusion from colleagues.

In New Zealand, organic farming has received somewhat mixed acceptance with some strong variation between productive sectors. For example, there is greater acceptance of organic practice in the horticulture than in pastoral sector. In the former, organic farmers and orchardists are often seen as contributing to a broader range of management strategies, especially in relation to proving the value of alternative inputs for soil fertility and practices for pest control. In the latter sector, organic practice is more frequently perceived as a competing approach to farming that implicates 'conventional' practice as necessarily having negative environmental impacts.

Whole farm planning

Another means of encouraging more sustainable (socially and environmentally) practice with a longer history than market audit schemes is whole farm planning (Horizons Regional Council n.d.; Martin and Ferry 2011; Miller et al. 2003; Pannell 1996; Simpson and Langford 1996). The premise for this approach is that most conventional planning strategies for agriculture have focused excessively or even exclusively on economic and financial aspects. In whole farm planning, by contrast, the economic performance of the farm is reduced to one of several, equally important objectives and feedbacks for management success. The whole farm planning approach is, thus, expected to facilitate an organised and structured management of the *whole farm* with progress toward social and environmental as well as financial objectives. The approach has achieved success in specific contexts of production by means of two general implementation formats: 1) as a wholly voluntary project and 2) as an incentivised or regulated element of government policy. For the proponents of WFP, the value of the approach lies in the development of individualised management strategies that reflect the social and environmental context of the farm (Simpson and Langford 1996). This feature of WFP is expected to enhance the flexibility of farmers in meeting objectives and raises their ability to review the viability of stated objectives.

As voluntary practice, whole farm planning operates in a similar manner to organic or biological farming. The incentive for implementation generally rests on an individual's acknowledgement of the need for change and dissatisfaction with current practice and conditions. In fact, examples of successful adoption listed by organisations promoting WFP frequently involve farmers who have arrived at moments of crisis or are faced with severe challenges to the viability of their farm (e.g., Kansas State University 2009; University of Massachusetts n.d.; University of Minnesota 2011). In these cases, the promotion of WFP mimics that utilised in self-help programmes, emphasising the radical benefits of following the method.

The apparent appeal of WFP for the farmer or producer is the structured and formalised process of plan development. By providing detailed and reasoned pathways, the WFP process provides a sense of order amidst the chaos of competing demands for time from social, environmental and financial demands. The literature analysing WFP in practice suggests that the process can facilitate improved attention to the diverse impacts of farm management on society and the environment as well as encouraging more sustainable practice. Analyses are often associated with situation of extreme environmental or social stress. It is difficult to assess the potential for uptake in conditions where no imminent threat to farm viability is evident. To date, there is no documented evidence that voluntary participation in WFP has diffused widely beyond initial areas of adoption. The extent of adoption may reflect the structured nature of the planning process which is not desirable for farmers who perceive this as an imposition on their independence and freedom to act.

Whole farm planning has also attracted the attention of regulatory agencies looking to establish clear sets of practice that offer both the potential for assessment of compliance as well as some flexibility to address the social and environmental context of individual properties. For example, the

OECD includes farm plans as a necessary aspect of sustainable farm management (OECD 2008). More situation specific regulations—for example hill country erosion in New Zealand (Horizons Regional Council (2012)—have also included farm planning as a mandatory element in encouraging change in practice related to a particular environmental issue. In such cases, the expectation is that the forced implementation of a process (i.e., planning) will encourage greater awareness of environmental benefit without raising issues of regulated practice. In other words, the benefits of farm specific planning and a range of management options that are associated with voluntary WFP will remain. Thus, enforced WFP is considered a tactic for impelling change in farm practice with minimal impact on farmers' desire for independence in decision making.

While WFP appears to reflect criteria related to the both voluntary nature and the distribution of cost and obligation of change, it does raise potential concerns regarding the verifiability of benefits from any resulting change in management. This may explain the frequency with which successful WFP case studies involve mitigation of environmental degradation with a readily identified cause such that the impact of management change is more easily attributed to the planning process. Another concern regarding voluntary WFP is that it is process as opposed to outcome based. Other than setting a baseline financial return, the planning often relies on implementation of best practice without verification of the impacts of this practice. Furthermore, it also relies on the awareness and motivation of the individual land manager, having no external assessment of plan compliance. In fact, the OECD (2008) establishes compliance at the point of plan construction without reference to application.

Environmental management system (EMS)

A further approach for encouraging environmental practice that is closely related to whole farm planning is environmental management systems, albeit the latter is more exclusively focused on environmental practice. The underlying rationale of EMS is similar to that of WFP, with the intent to raise the farmer's or producer's awareness of the environmental implications of management practices. This approach is expected to counteract the more conventional emphasis on the financial outcomes of management. In comparison to WFP, EMS derives greater market and consumer legitimacy through its compliance with internationally recognised verification criteria as articulated in ISO 14001, which can be externally verified. These criteria were not specifically designed for agricultural practice and are applied to industry and service organisations as well. Despite this broader focus, EMS has become an important feature of alternative agricultural practice especially in Australia (Cary and Roberts 2011; Dibden and Cocklin 2005; Gunningham 2007; Higgins et al. 2008; Huhn et al. 2007; Sallur et al. 2007; Seymour et al. 2007).

Again, similar to WFP, the intent of EMS is to develop situation or farm specific set of management practices that are oriented toward reducing targeted environmental impacts. Because of its voluntary nature, however, individuals must recognise the potential value of a self-defined set of environmental practices to the social and economic viability of their property. It is evident from the Australian literature that the success of EMS as a tool for realising change in management systems is highly dependent on the presence of a 'champion' with a strong belief in its outcomes as well as the capacity to enrol others within the project. Because of this limitation, several authors suggest that EMS, on its own, cannot drive change as it is more accurately seen as a tool for practitioners to plan for compliance with established regulations or standards. For example, In a review of a recent edited book examining the potential of EMS across diverse sectors (including agriculture), Bosso (2002:148) notes that "the editors conclude that the best policy response may simply be to continue to enforce meaningful environmental regulations. Faced with the need to comply with the law, corporations may turn to the EMS as a flexible and organizationally-sensitive means to achieve their goals."

Producer/Interest Group Partnerships (PIGP)

The approaches referred to here as producer/interest group partnerships include those in which the initiative for participation in an agri-environmental project is initiated by a non-governmental

interest group, for example an environmental non-governmental organisation (NGO). Such a partnership may, therefore, involve any of the approaches reviewed to this point (e.g., best practice auditing, whole farm planning, etc.). The additional attraction of the partnerships lies in the potential to raise the legitimacy of the project based on the credibility of a given organisation with a significant fraction of consumers. In other words, the overt sponsorship of an agri-environmental project by an organisation recognised for its leadership in environmental protection or conservation will reduce scepticism regarding the actual value of the environmental outcomes. The credibility is exploited through the development of an eco-label that gains a price premium for product from farms participating in the project.

PIGPs are most frequently reported in the USA (see Warner 2007a,b,c ; Zedler et al. 2009). The success of such projects in that country is likely the product of two factors: 1) the strength of 'local' marketing of agricultural products, allowing for greater connection to and awareness of the benefits of an agri-environmental project; 2) the relative lack of government subsidy for agri-environmental practice. As a result of the first factor, producers are more likely to realise a price premium given that the eco-label will involve a locally relevant environment or species (Warner 2007b; Zedler et al. 2009). In addition, the label will act as an *ersatz* indicator for support of local (most likely family) farmers, further increasing its appeal in local markets. The second factor increases the importance of such partnerships for the organisation, which is unable to rely on government action or regulation to achieve desired ends. This raises some questions regarding the potential for similar rewards to be realised (and thus legitimacy from the perspective of the producers) where the product involved is largely oriented toward export markets and consumers who are less likely to have a personal connection to the environmental or social benefits.

In addition to enhancing the legitimacy of the project through the credibility of the partnering organisation, PIGPs also are of potentially greater legitimacy from the perspective of producers due to their voluntary nature. NGOs and other interest groups lack the negative association attached to government regulation. Furthermore, they are not able to impose action and rely on negotiation of project parameters in order to encourage participation. In addition to the financial rewards attached to labelling of the product, the participating farmers also benefit from the positive social feedback as the environmental outcomes of the project are publicised by the partner organisation. Despite these advantages, PIGPs are only able to achieve rapid and uniform participation of farmers in situations where the rewards are sufficiently large and the promoted management changes are within acceptable limits.

Mandatory approaches:

Government regulation⁴

Government regulation remains an option for encouraging social and environmental practice in agriculture. As in the other approaches discussed, regulation is only necessary in those instances where resistance (due to the lack of a ready financial or other socially recognised benefit) to a desired practice occurs. The rationale for the use of government intervention to initiate change in practice relates to its enforceability. The legitimacy of the policy lies with the legal authority of the government to regulate practice in the name of public good. (Such legitimacy is, of course, subject to public consent where democratically elected, albeit within the given election cycle.) Whereas voluntary approaches rely on the willingness of individuals to participate (with varying types of incentive), government regulation can impose punishment for non-compliance. It is expected that,

⁴ This is not to discount the use of subsidies or incentives by government actors. Such policies do, however, operate in a similar manner to many of the voluntary approaches. As in those cases, the success of incentives is subject to the existing predisposition of individuals towards the promoted practice and to the ability of the government to legitimise adoption by demonstrating the benefits of changed practice. For a critique of the potential of such agri-environmental schemes to realise long-term change, see Burton et al. (2008).

once change has been enforced, the new practices will eventually become common practice and, potentially, preferred practice as long-term benefits begin to materialise.

Where much of the appeal of regulation lies in the uniform (albeit enforced) uptake of alternative practice, the approach is also subject to several issues which limit the desirability of implementation. The most recognised issue involves the top-down aspect of implementation. Government actions, if enforcing an unwanted change, are generally seen as uninformed and unjustified, which can threaten the political will of elected officials to legislate such change. In order to facilitate enforcement, regulation usually has a very narrow focus, resulting in rigidity of application that limits its suitability in diverse contexts and sites. A final frequently mentioned disadvantage of regulation involves the cost of monitoring and enforcement. Because these are government activities, the cost is shared by the respective rate payers and is not the sole responsibility of stakeholders as in the case of market led audit schemes.

An example of the unsuccessful application of government regulation in regard to environmental outcomes involves the New Zealand Emissions Trading Scheme (ETS). Despite early intentions to include the agriculture sector in the scheme, the current government has responded to discontent among pastoral farmers in particular by delaying exposure to emissions trading until 2015 or later pending review. The initial attempts to require farmers and orchardists to purchase carbon credits equivalent to the emissions attributed to their management system demonstrate the challenges associated with government led regulation (Rosin et al. 2008). First, given the uncertainty surrounding climate change and its likely impacts and causes, the apportioning of responsibility for mitigation to the agriculture sector was seen by many as confirmation of the government's lack of understanding of and consideration for the sector and the challenges it faced in international markets. As a regulatory policy with apparently inescapable costs, the implementation of the ETS was viewed not as a means to encourage more carbon efficient production but as a punishment or tax on the farming sector. The lack of viable strategies for mitigation that did not require actions perceived to harm the international competitive position of meat and dairy products provided the basis to challenge the fairness and benefit of the policy which was claimed to impact on global food security (Rosin, *in press*). Finally, the repeated delay in fully including the agriculture sector (and other sectors as well) in the ETS has diminished the legitimacy of the policy for many of the stakeholders. Thus, despite the intentions to encourage rapid and uniform response to the dangers associated with climate change, the application of government regulation appears to have generated increased opposition to New Zealand's participation in international agreements such as the Kyoto Protocol.

Recently, there have been attempts to address this issue by moving toward outcomes based regulation as opposed to enforced practice, for example in proposed water quality policy by the Otago Regional Council (Otago Regional Council 2012). This form of regulation allows some flexibility in choice of practice, but individuals are required to meet government set standards. In the Otago case, standards for water quality indicators would be established and farmers provided with a list of recommended mitigation practices from which they can select those that are more appropriate and desirable for the conditions of their farm. Water quality change is to be monitored with fines applied when standards are exceeded. In the initial stages of the regulation, farmers would be given warnings to adjust practice before fines were imposed.

Industry regulation

An alternative form of regulated environmental practice relies on other participants in a specific commodity chain to oversee compliance—that is the 'industry' that processes and/or markets the product supplied by the farmer or orchardist. There are several expected advantages of regulation enforced from within the industry as compared to by the government. Most importantly, perhaps, industry regulation eliminates the active role of the government, which is commonly contested by those subject to the regulation. The shift from local government implementation also changes the distribution of costs to those most directly responsible for the agri-environmental action—and, thus,

away from rate payers. The costs of policing compliance with regulation remain, and may be passed to the consumer; those who do not consume the product would not, however, be liable. Within the New Zealand context, the costs of regulation also raises issues regarding their impact on products in export markets where competitors may not be exposed to similar levels of regulation. Furthermore, the legitimacy of regulation is dependent on the capacity of the industry actor to control supply on the one hand, and their perceived trustworthiness among consumers and the general public.

Enforcement of industry regulation may occur in two general ways: a) the application of a price bonus or penalty on product at point of supply from the farmer or orchardist; or b) the refusal of acceptance of supply. Both means of enforcement have been used in association with retailer initiated audit schemes in the New Zealand kiwifruit industry. In order to maintain supply line flexibility, ZESPRI requires all export kiwifruit to be produced on orchards compliant with the GlobalG.A.P. audit. There was some early resentment to the forced implementation; but, as the audit has become an element of standard practice, there appears to be growing acceptance of and to some extent pride in compliance with the international standards (Hunt et al. 2005; Rosin et al. 2007b; 2008). As a result of their marketing structure, ZESPRI is also able to provide price premiums to orchardists whose kiwifruit meet particular standards at the time of harvest. To date, these have been largely related to fruit quality, but there would appear to be potential to extend the practice to the achievement of environmental benefits as well. The Clean Streams Accord provides another example of industry led implementation of agri-environmental standards (Blackett and Le Heron 2008). In this case the dairy cooperative, Fonterra, has negotiated an agreement with regional government to address concerns raised regarding the impact of dairy farming on freshwater resources. While the original accord set targets of compliance with best practice in regard to stream and groundwater protection, no specific punishments were indicated. As the deadline for compliance nears, however, there is increasing pressure for Fonterra to refuse milk supplied by non-compliant farms. For these New Zealand cases, it is noteworthy that the industry actor involved controlled the great majority of the market, limiting the ability of suppliers to avoid the regulations.

Outcomes based strategies:

Ecosystem services

Another means of encouraging improved environmental practice that relies on a financial bottom line is the elaboration of ecosystem services (Royal Society of New Zealand 2011; UK National Ecosystem Assessment 2011; MA 2005). This approach attempts to establish the monetary value of ecosystem processes as they contribute to human welfare. The logic behind ecosystem services is that current assessments of the financial viability of agriculture fail to incorporate the value of non-market ecosystem services. Through a proper accounting for ecosystem services, it is expected that a meaningful comparison with the standard costs and benefits associated with diverse management practices can be facilitated. In the process, farmers and policy makers will become more sensitive to the impact of environmental degradation on agricultural production. To this point, the approach is predominantly used for informational purposes with the intent of influencing decision making. The concept has, however, also contributed to programmes which provide financial compensation to land managers for the maintenance of ecosystem services.

The United Nations *Millennium Ecosystem Assessment* (MA 2005) is generally considered the foundational document for defining ecosystem services. In the MEA, ecosystem services are categorised according to four types including: *provisioning*, such as the production of food and water; *regulating*, such as the control of climate and disease; *supporting*, such as nutrient cycles and crop pollination; and *cultural*, such as spiritual and recreational benefits. The relative ease of establishing the monetary value associated with each of the types varies (Burkhard et al. 2010, 2011). For example, provisioning services are commonly sold through markets already, providing readily available price data. Regulating and supporting services must be estimated through the use of indicators, using temporal comparisons to establish the relative contribution of such services to

production and other human wellbeing indicators. Cultural services, by comparison, pose greater difficulties due to the vagaries in the attribution of value by different social groups and individuals. For example, the recreational value of clean water in a stream will vary according to the desired use—fishing cf. swimming cf. boating cf. aesthetic value. The challenges of identifying and measuring appropriate indicators as well as translating these into financial values are a primary impediment to a more general application of this approach to agri-environmental contexts.

Despite these shortcomings, the ecosystems services approach has great ability to influence shared understandings of appropriate agricultural management. The potential impact is similar to that of Whole Farm Planning approaches, to the extent that the accounting of ecosystem services expands the awareness of the stakeholders to factors other than the immediate outcomes of production. The basis for comparison in this case, however, shifts completely to the realm of financial comparisons, with the expectation that the process will account for the divergent values and ethics among the stakeholders. As a result, the legitimacy of the approach is dependent on the ability to measure and then monitor rates of change in ecosystem services. The approach also requires a shared acceptance of the valuation exercise and, likely, the potential to negotiate values as these change over time. Similarly, the valuation would be subject to the emergence of new capacities for measurement and the identification of additional indicators for assessment. The reliance of the process on the existing capacity to measure also raises the potential to concentrate achievement on measurable aspects of the agro-ecosystem, while ignoring potentially significant causes of degradation that cannot be measured.

In comparison to other approaches, the ecosystem services approach is arguably more outcome than process based. The value of this orientation lies in its capacity to facilitate policy that targets particular outcomes (environmental conservation or improvement) without constraining flexibility in regard to the practices employed to achieve that outcome. The implementation of the approach may, however, face impediments in the need to negotiate relative values, especially in regard to the more difficult to value services. In other words, the benefits derived from ecosystem services are not always mutually exclusive and improvement in one outcome may be achieved to the detriment of another. Because many ecosystem services operate at scales that cross property boundaries, the approach offers a basis for community wide practice; thus, there is additional effort required to facilitate collaboration among the diverse sets of resource users in order to realise accumulated impact/benefit. In this process, “researchers have to recognise their role as creators and honest brokers of knowledge within a given social context and recognise that choices of biophysical and socioeconomic indicators reflect prevailing value systems” (Sandhu et al. 2008).

There has not been an extensive formal application of ecosystems services approaches as features of agri-environmental projects in New Zealand. A recent review of the state of the approach by the Royal Society of New Zealand (2011) emphasised the potential for ecosystem services to operate as a dialogue tool in environmental decision-making processes. The Welsh government has, however, attempted to incorporate ecosystem services liabilities and payments within its agricultural policy, largely in an effort to design incentives and regulations that complied with emerging European Union mandates relative to the CAP (Wynne 2012). The results in Wales have been mixed, as farmers have learned to exploit the system without necessarily realising the intended environmental benefits. In addition, Wynne (2012) found that the agency in charge of implementing the policy faced significant difficulties associated with developing verifiable indicators for myriad services as well as assessing the value of the outcomes in financial terms. These issues suggest the approach is faced with diverse challenges to legitimacy at the point of application.

Conclusions

It is apparent from the diversity of approaches and the mixed results they achieve that none of the approaches reviewed here offers a panacea or cure-all for mitigating the environmental impacts

associated with agricultural production.⁵ Such a conclusion is hardly surprising given the challenges faced by any effort to initiate change in practices which are deeply embedded in the identity of those who employ them. As noted in the introduction, promotion of management practices that target specifically environmental objectives in New Zealand agriculture are likely to be contested within a productive sector that has a strong productive focus.⁶ This situation is confounded by the fact that raising production intensity generally involves increasing simplification and intensification of practice often resulting in greater environmental impact and degradation. Thus, the variety of policy approaches identified in this review can all be categorised as attempts to attach 'value' to environmental outcomes or achievements such that these are more readily incorporated in the assessment of management strategies. In order to insert a new parameter for valuing practice, the policy approaches utilise one of two methods to 'distract' the farmer or orchardist from the allure of production.

One general strategy is to attempt to raise awareness of the environmental (and social) impacts and implications of agricultural management. This involves such approaches as best practice auditing, whole farm planning (WFP) and environmental management systems (EMS). In these cases, the assumption is that the practitioner (farmer or orchardist) lacks the knowledge for an informed response to environmental concerns and, thus, must be guided to obtain the necessary experience. This strategy may subsequently follow either a prescriptive or enabling pathway with the intention of developing more appropriate practices based on the experience gained. Programmes organised according to this strategy will generally garner a more gradual pattern of uptake in which the practitioners adjust to the new orientation over time. These approaches also have tended to rely on the promotion of 'best practice' as opposed to indicators of outcomes. Thus, it appears that this strategy is best suited to situations in which the environmental impact is not in peril of immediate and irreversible degradation. In addition, the appropriate practices to mitigate the intended impacts are largely externally defined.

The second general strategy involves the rewarding or punishing of the practitioner based on their performance relative to standards for specific outcomes. This strategy confronts the practitioner with the measurable outcomes of practice on which their liability is calculated. When this strategy is implemented, the policy is commonly accompanied with recommendations and educational material regarding possible means to mitigate the environmental impact of relevant management practices or systems. Thus, the intent is to raise awareness not only of impact, but of ameliorating practices as well. Compared to the awareness raising utilised in the first strategy, the second strategy is more likely to involve mandatory participation and compliance and thereby promise more uniform engagement. The rapidity of uptake may also be increased, although the rate is somewhat dependent on the extent to which the application of the policy allows for a response period. This strategy is most commonly used in situations where public concern about a particular type of environmental impact is sufficient to pressure government or industry actors to regulate practices in pursuit of improved outcomes.

Guidelines for approach selection

Based on the assessment of case studies available in the literature, it is possible to offer several general recommendations or guidelines for selecting the appropriate approach (or approaches⁷) in light of the context in which change is desired. These guidelines focus on four axes which are more

⁵ For a critique of the pursuit of panaceas as a solution for sustainability issues see Anderies et al. (2007) and Ostrom et al. (2007).

⁶ This is, of course, not an issue exclusive to New Zealand. For a more global analysis of the challenges posed by a productionist orientation, see Johnson (2006).

⁷ It is noteworthy that recommendations originating in collaborative dialogues on environmental issues (e.g., the Land and Water Forum) refer to a mixed policy set in an attempt to realise the benefits and strengths of different approaches.

or less directly related to the criteria for analysis of policy success identified in the introduction. (Note that Table 2 provides a coded assessment of the relative potential of each policy approach to deal to the constraints defined by each axes while maintaining legitimacy among farmer stakeholders in particular.)

1. The first axis relates to the relative urgency of realising the change in practice. The more urgent the change, the more likely that mandatory regulation of practice is required. This is especially true in cases where practitioners fail to acknowledge the importance or severity of the impact that the change is expected to ameliorate. (This issue is addressed as the second axis.) Where there is less urgency in achieving change, the more voluntary approaches to policy become more appropriate. The latter approaches allow for change to occur as an accepted element of the practitioners' identity. Reliance on a voluntary approach may, however, be limited by the perceived legitimacy of a policy that from the perspective of external observers appears to be realising only marginal improvement.
2. As referred under the previous axis, the extent of the awareness of the environmental impact targeted by the policy is a further axis influencing the recommendation of policy approaches. A readily acknowledged condition of environmental degradation is less likely to require an authoritarian imposition of change in practice, making voluntary approaches more appropriate. Where the awareness is limited either by distance between practice and impact (e.g., downstream impacts or accumulative impacts at regional or global scale), a greater level of encouragement is likely to be required. For example, partnerships with interest groups that are more sensitive to a particular form of degradation may be able to facilitate the realisation of incentives to encourage change at the regional level. Response to more distant impacts may require regulation where there is a lack of legitimate and empowered interest groups to engage in partnerships. The discussion of the ETS in the section on government regulation provides precautionary evidence, however, of the challenges involved in such a strategy.
3. A third axis to be considered involves the perceived value of the outcome of change (and who realises those benefits). In the extreme case that the desired change in practice involves a tangible and immediate financial benefit, it is unlikely that a policy is required to realise uptake of the change. Given that most agri-environmental outcomes involve costs of implementation (financial, skills acquisition, etc.), this is seldom the case; and as argued above environmental practice faces the additional challenge of an existing productivist orientation. The extent to which 'value' can be attached to the outcome, however, will greatly influence the choice of policy approach. For example, if there is an established 'willingness to pay' for the outcome as a quality of the agricultural product in the market, the use of market driven auditing (and associated price premiums) offers a viable means of realising change. Similarly, a cultural or aesthetic value that is realised through the application of change in practice may compensate for the cost (either invested capital or shadow costs, time, uncertainty, etc.) of implementing the change. Where the outcome is largely 'unvalued' (at least in terms realised by the practitioner), there is increasing need to rely on mandatory approaches. In this latter instance, the legitimacy of the policy is likely to be challenged without suitable definition of the value realised by other stakeholders.
4. A further axis is related to the costs of implementing change. In this case, the cost may act as a deterrent to uptake of change in practice, especially if this cost is not compensated through the realisation of value once implemented. The types of cost that occupy this axis range from one-off capital investment to long-term maintenance to impacts on competitive advantage in export markets. In relation to the first cost, the immediacy and uniformity of mandatory regulation may be an appropriate policy approach whereby either a fine for non-compliance or a subsidy to assist the investment can serve to motivate compliance. At the other extreme, as is evident in the ETS example, any change that is perceived to influence competitive position in markets is difficult to implement through government regulation, especially in the

Table 2: Appropriateness of policy approaches relative to the four contextual axes.

Axis	Policy Approach									
	Market audit	Industry audit	ASM	Organic	WFP	EMS	PIGP	Gov't regulation	Industry regulation	Ecosystem Services
High urgency for change	Yellow	Orange	Orange	Yellow	Orange	Yellow	Yellow	Red	Red	Yellow
High awareness of impact	Orange	Orange	Orange	Red	Red	Red	Red	Yellow	Yellow	Orange
Outcome has market value	Red	Red	Orange	Red	Orange	Orange	Red	Yellow	Yellow	Orange
High cost of implementation	Yellow	Orange	Orange	Orange	Yellow	Yellow	Orange	Red	Red	Yellow

The colour coding indicates the relative applicability of the agri-environmental policy approaches identified in the review based on the indicated extreme for the four axes (see p. XX). The most appropriate approach is coded as red, followed by orange and then yellow. A yellow coding does not mean that a particular approach would have no impact, only that the legitimacy of the approach is more likely to be subject to challenge. As noted in the discussion, greater applicability should not necessarily be taken as indication of a single optimal approach as the context within which the change is desired may best be addressed through the application of a mix of the approaches.

neoliberal policy environment of New Zealand. Long-term maintenance costs are potentially addressed through partnerships and auditing schemes through which eco-labelling can lead to price premiums that compensate for the costs. In such cases, the issues discussed relative to the 'value' of outcome axis are brought to bear as well.

From the perspective of these axes, it should be apparent that no agri-environmental policy will involve sole consideration of a single dimension. The choice of policy approach is likely subject to considerations across three or four axes; and these considerations may involve contradictory implications for the type of policy pursued. In such cases, it is necessary to determine which of the axes is most pertinent to the desired outcome and which legitimacy concerns are more easily mitigated through other means. An additional alternative is that proposed by the Land and Water Forum (2012), namely the combination of policy approaches that attempts to realise the benefits of government regulation (in setting clear environmental standards), while retaining the benefits of voluntary approaches (in avoiding prescribed practices that ignore the innovative capacity of farmers and orchardists as well as the specificities of particular places).

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