

WA Wheatbelt landholders' perception of support for adoption of natural resource management practices

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Abstract. This paper presents findings of a study of WA Wheatbelt landholders. The aim was to describe their perceptions of individuals and organisations who support their adoption of natural resource management practices. It builds on 2012 Australian Bureau of Agricultural and Resource Economics and Sciences research findings that availability of support played an important secondary role, requiring further investigation. Results suggest use of services is linked to awareness, motivation and trust of support providers, and there is a general preference for the methods of support used. As landholders progress through the stages of practice change the methods of support they prefer changes, with the most accessible and relevant support for conservation agriculture practices, and least for agroforestry. These results underscore the benefit of channelling NRM information through preferred providers of support, and understanding landholders' stage of adoption and their preferred methods of support for NRM practices, so effective support can be tailored to influence NRM decision-making.

Keywords: Natural resource management, landholder, decision-making, adoption, agriculture, government.

Introduction

Background and aims

Research has found that local community support for adoption of NRM practices can motivate adoption decisions about NRM practices to some extent, and that providers of this support have their own particular strategies for communicating information about NRM practices (Marshall 2008; Ecker et al. 2012). The present research aims to improve understanding of the influence of those providing support to landholders for adoption of these practices, the methods of support most beneficial at each stage of change in adoption of NRM practices and the accessibility and relevance of the methods of support used to improve adoption. By understanding what landholders' attitude is toward the support provided to encourage adoption of NRM practices, those individuals and organisations providing this support can focus on addressing their shortfalls. Improved understanding of the methods of support landholders consider most beneficial at each stage of changing their NRM practice will also allow more appropriate strategies to be developed to tailor approaches more effectively. This understanding is important for both NRM policy-makers, and the individuals and organisations working to improve landholder adoption of these practices.

Research undertaken in 2011 by the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), investigated drivers motivating landholders to undertake NRM practices promoted under the Commonwealth government program, Caring for Our Country (Ecker et al. 2012). Their aim was to find out why landholders adopt particular practices and how best to support adoption of these practices. They found that financial and environmental motivations were the key influences on NRM adoption while personal motivations had less of an influence. They also found the availability of NRM support played an important secondary role in motivating the adoption of recommended practices. Two of their recommendations were to improve understanding of the influence of support in motivating adoption of NRM practices, and to determine the accessibility and relevance of current methods of support for different management practices. These recommendations informed the aim of the present research undertaken with landholders in the Wheatbelt of WA.

The WA Wheatbelt region has a population of around 75,000 people. Around 4,200 agricultural enterprises cover 11.2 million hectares, mostly consisting of broadacre crops, which produce around 80% of the gross value of agricultural production for the region, and livestock the other 20%. Agriculture accounts for around 46% of the value of production in WA. (Government of Western Australia 2011). WA grain growers are currently doing well with production in 2014 significantly higher than 2013, which likely contributed to the significant rise in optimism within the industry in 2014 (GRDC 2014).

However, past large-scale land clearing has reduced native vegetation to around 30% of its original cover (ranges from 6%-99%) causing major impacts on agricultural production including salinity, soil acidity and sodicity. Sandy, low fertile soils and unreliable rainfall also make agriculture difficult. Major challenges for the future health of this region remain, including:

land, soil and aquatic degradation, increasing input costs and farm financial debt, aging and declining populations with a loss of social services in some areas, and adaptation to climate change. Many individuals and organisations provide support for land management to landholders in the region. One of these organisations, the regional group Wheatbelt NRM, covers most of the region and has been actively promoting natural resource management (NRM) through past government-funded programs such as Landcare, Natural Heritage Trust programs (NHT1 and NHT2), Caring for Our Country (Allison & Hobbs 2006; Wheatbelt NRM 2014) and the current National Landcare Program.

Theoretical framework

The Stages of Change model (Prochaska, Norcross & DiClemente 2013) was used in this research to identify the stages where support for adoption of NRM practices is most beneficial. Six stages were used in the survey, and were developed with the assistance of Wheatbelt NRM staff. Four of these are used in this paper; contemplation (thinking about it), preparation (planning and trialling), action (currently doing) and the stage of maintenance which was interpreted as 'interested but currently unable to'. This latter stage may be due to a range of impediments including, lack of finance, knowledge and/or skills, technology problems, family circumstances, market or environmental conditions.

Prochaska, Norcross & DiClemente (2013) indicate that insight into an individual's motivation and readiness to change, provides guidance for the types of planned interventions they recommend that are most appropriate at the different stages of change. They also point out that change is not linear but generally occurs in a spiral pattern. However, with no established criteria on how to determine an individual landholder's stage of change it is difficult to accurately assess their adoption stage so appropriate methods of support can be provided, or even if support is feasible or necessary (Curtis and Mendham 2011).

This paper uses the agricultural extension definition by (Marsh & Pannell 2000, 607) for NRM support providers that includes: 'public and private sector activities relating to technology transfer, education, attitude change, human resource development, and dissemination and collection of information'.

Past literature has focussed mostly on landholder motivation for adoption of NRM practices (Pannell et al. 2006) with very few empirical studies on the role of support in motivating adoption of practices. One relevant qualitative study undertaken by Toric (2005) with a small number of Wheatbelt landholders includes information on the influence of support on adoption of NRM practices. This research, undertaken by the Department of Agriculture WA, showed media and agriculture extension officers had the greatest influence, but does not specifically mention regional NRM groups. A large study by Griffin NRM P/L (2000, p.8) using a grain industry sample, examined agribusiness. They found that landholders 'perceived a reasonably strong division' between the production information provided by private and retail suppliers and NRM information provided by the public sector. Recent research by Hollamby et al. (2013) also found landholders who adopt practices to improve profitability have high use of private consultants. The annual Grains Research & Development Corporation (GRDC 2014) survey also provides some useful results for comparison.

However, the changes in the availability of NRM support providers over time, the different focus on environmental issues or productive farming practices, and the different providers of support included in these studies, all limit comparison. It also needs to be acknowledged that these studies, like the present Wheatbelt study, are biased either by size, or sample and prestige bias (Creswell 2014). However comparisons of the broad trends have been used in this paper. In this way the paper contributes to the theoretical literature by providing evidence and discussion of landholder preferences for the providers and methods of support available to landholders in the WA Wheatbelt to encourage adoption of NRM practices.

Method

The research uses an explanatory correlational research design to explain the relationships among the study variables (Creswell 2014). Data was collected from 85 landholders, ranging from Badgingarra in the north to Wagin in the south and Southern Cross in the east. The survey was based on the NRM practices of the regional group Wheatbelt NRM and the methods of the various providers of NRM support available in the Wheatbelt. The questions referred to in this paper were developed based on the Stages of Change theory (Prochaska, Norcross, & DiClemente 2013), information from a literature review (Pannell et al. 2006), and the Ecker et al. (2012) recommendations. Demographic questions were drawn from Marshall (2008).

Two themes from the survey are included in this paper. The first theme explored landholders' perceptions about the different individuals and organisations that provide support for adoption of NRM practices, available in the WA Wheatbelt. They were asked to rate their awareness of, use of and motivation to use a range of providers of support for adoption of NRM practices. Respondents were also asked how well they thought NRM support providers understood the risks involved for them in undertaking NRM practices. This question measured respondent trust in the providers of NRM support; an essential component of relationships with landholders (Pannell et al. 2006). Attitudes toward risk were included as they are a key factor in landholder decision-making and significantly affect their requirements for information and advice (Rejesus et al. 2008). Open-ended questions were used to obtain their perceptions on the benefits of the support provided or how it could be improved.

The second theme aimed to find out what Wheatbelt landholders thought about the methods of support being provided by NRM support providers for adoption of NRM practices. They were asked to rate the methods of support most useful to them at different stages of undertaking NRM practices, and the accessibility and relevance of these methods of support for different land management practices. They were also asked whether they had received the support they preferred. These questions were all constructed in response to recommendations by Ecker et al. (2012), and based on the methods of support provided by individuals and organisations working to improve land management in the Wheatbelt.

Twelve demographic and farm characteristic variables such as, age, education, farm size, were included as past studies on adoption and NRM information use in agriculture have shown these variables to be a strong influence on farmer decision-making (Pannell et al. 2006; Marshall 2008; Rejesus et al. 2008). These were limited due to privacy, and landholder patience, and will be used as explanatory factors for relationships in further analysis.

The survey was distributed through e-newsletters and emails by those working in NRM in the Wheatbelt region, from March 2014 to March 2015. To assist completion and decrease sample bias, 28% of the 85 surveys were undertaken by telephone using field day contacts and the white pages directory. The sample bias in the survey, due to the reliance on NRM individuals and organisations for survey distribution and contacts, needs to be considered in data interpretation. A combination of Qualtrics survey software and Excel was used for the survey implementation and analysis.

Results

Demographics

Most respondents undertaking the survey were males aged between 26-65 years, with over 3000 ha of mixed crop and sheep farms. Most had been farming more than 20 years, had young families, or were empty nesters (children all left home). Their households mostly consisted of two or three key decision-makers, they received more than 75% of their income from the farm, and considered their farm financial performance was average or above average compared to other local farms.

Providers of NRM support for adoption of NRM practices

For the first theme, all respondents were asked to rate their awareness of the providers of NRM support for adoption of NRM practices (Table 1). Results revealed that overall respondents were mostly aware of this support. Respondents rated the highest awareness of support for grower groups, other local farmers, private or agribusiness consultants and Landcare, and they were moderately aware of support provided by research organisations, regional NRM groups, WA government officers and industry groups (i.e. Meat and Livestock Australia). Fifty-eight percent of the 85 respondents were not sure of the support provided by non-government organisations (i.e. WWF or Greening Australia).

Respondents who were aware of the providers were then asked which ones they had received support from in the last five years. Results showed that respondents had received support from all providers, with most of the support from other local landholders, private/agribusiness and grower groups. The greatest difference between respondent's awareness and their use of support was for Landcare with 61 out of 85 respondents mostly or fully aware and only 48 of the 61 respondents using their support. Respondents who had used the providers of support were also asked how motivated they were to use them. Many were strongly or moderately motivated by grower groups, other local landholders and private/agribusiness consultants, with fewer motivated by Landcare, regional NRM groups and WA government officers. Different value systems, costs, relevance, lack of awareness, and insufficient or unhelpful support reduced their motivation.

Table 1. Respondent awareness of NRM support providers in terms of awareness of, use of and motivation to use NRM support providers (%)

NRM support providers	Moderate/strong awareness (n=85)	Used support	Moderately/strongly motivated
Grower groups	76	89 (n=65)	91 (n=57)
Other local farmers	75	98 (n=63)	81 (n=62)
Private/agribusiness	73	89 (n=61)	87 (n=54)
Landcare	72	79 (n=61)	73 (n=48)
R&D	64	87 (n=54)	68 (n=47)
Regional NRM Groups	59	84 (n=50)	76 (n=42)
WA government officers	56	77 (n=47)	47 (n=36)
Industry groups	46	69 (n=39)	59 (n=27)
Non-government groups	19	75 (n=16)	25 (n=12)

Most respondents were then asked to rate how well they considered the providers of support understood the risks involved for them in undertaking NRM practices (Table 2). Respondents also rated grower groups, other local landholders and private/agribusiness best at understanding the risks involved for them in undertaking NRM practices, while non-government groups were considered least likely to understand. Only half the respondents who answered this question considered WA government officers probably or definitely understand the risks.

Table 2. Likelihood of NRM support providers understanding the risks involved with undertaking NRM practices (%)

NRM support providers	Probably/ definitely understand risks
Grower groups	96 (n=78)
Private/agribusiness	86 (n=74)
Landcare	73 (n=78)
Other local farmers	96 (n=76)
R&D	73 (n=74)
Regional NRM Groups	71 (n=73)
WA government officers	49 (n=73)
Industry groups	72 (n=68)
Non-government groups	43 (n=35)

When asked what they considered were the benefits apart from financial, they received from providers of NRM support, many respondents' comments related to increasing their knowledge and understanding about factors such as practice change, environment, salinity, new ideas and technology, improving productivity and learning about the latest research. This helped them make more balanced decisions. Access to machinery, labour, improved social networks and building community capacity were also beneficial. Many also considered support could be improved by increasing the accessibility of information with more timely, unbiased, localised, relevant, concise information, using a greater range of mediums. Greater local government and Department of Agriculture support and information sharing amongst farmers were suggested as were increased and more accessible funding and people involved in supporting adoption of NRM practices.

Methods of support provided by NRM support providers

Questions for the second theme asked about the methods of NRM support provided to communicate information and improve skills for adoption of NRM practices. There were 17 methods of providing support. Respondents were firstly asked to rate the stage of practice when these methods of support for adoption of NRM practices are most beneficial. Some landholders undertaking the survey were unsure about the definition of rapid appraisal processes and decision support tools, and social media was not used by many landholders, so many were unsure about the assistance and relevance of these methods of support.

Results to determine the stage where the methods of support are most beneficial showed practical demonstrations were useful for all respondents at some stage of undertaking NRM practices. Most respondents (91%) considered support is moderately or very beneficial when they are first thinking about the practice, particularly for website and media information, practical demonstrations at field days and trials, group talks and case studies.

Ninety-one percent rated support beneficial when they are trialling and planning the practice when they prefer trials and demonstrations, workshops and forums, individual advice and property plans. Support is slightly less beneficial when landholders are undertaking the practice (87%) with support from peer networks, financial assistance, field guides and individual advice most useful at this time. Support remains somewhat or moderately beneficial when they are interested but currently unable to undertake the practice (69%) when peer networks, web and media information, case studies and workshops and forums are important. Of all the methods, trials and demonstrations, peer networks, field days and tours and financial grants were considered the most useful.

Accessibility and relevance of the methods of support provided for adoption of NRM practices

These methods of support were all used in the next set of 5 questions to determine the accessibility and relevance of the support provided for adoption of NRM practices. Respondents were first asked to rate the accessibility and secondly the relevance of the methods. The NRM practices were categorised to reduce the complexity and length of the survey and are set out below. The choices have been combined and only the highest ratings for each are shown. The responses for respondents who were unsure about the support are not included in the results.

Conservation agriculture (no-till, periods of fallow, variable rate technology, addressing soil acidity and controlled traffic farming, Table 3). Overall, the different methods of support were considered somewhat easy to access for conservation agriculture practices. Media and website information was rated very accessible but not so relevant, while financial assistance was rated very relevant but not very accessible. Individual advice and practical demonstrations were all easy to access and very relevant. Seminars and conferences were not very relevant and 83% of respondents rated social media as either slightly relevant, not relevant or unsure.

Table 3. Highest ratings for accessibility and relevance of support for adoption of conservation agriculture (%)

NRM support methods	Easy/ somewhat easy	Difficult/ somewhat difficult	Relevant/ somewhat relevant	Somewhat/ not relevant
Media articles, leaflets and flyers	77	17	61	35
Website info & E-news Bulletins	76	14	60	32
One-on-one advice	68	27	73	24
Field days and tours	68	29	76	19
Trials and demonstrations	68	27	77	18
Tax exemptions	26	73	73	19
Financial grants and paid assistance	14	69	69	25
Seminars and conferences	60	27	48	43
Social media ie Facebook	29	18	17	43

(n=84)

Agroforestry (Table 4). Nearly 40% of the respondents were unsure about support for this practice, while those that did know had mixed attitudes toward the accessibility and relevance of accessing the methods for this support. Websites and media articles again were easiest to access but less relevant and financial assistance was relevant but difficult to access. Trials and demonstrations, individual advice, property plans and field days were all more relevant than accessible and seminars and conferences were difficult but not very relevant. The relevance of media articles was comparatively low while social media was rated least relevant overall.

Table 4. Highest ratings for accessibility and relevance of support for adoption of agroforestry (%)

NRM support methods	Easy/ somewhat easy	Difficult/ somewhat difficult	Relevant/ mostly relevant	Somewhat/ not relevant
Media articles, leaflets and flyers	36	12	21	28
Website info and E-news Bulletins	35	12	27	20
Trials and demonstrations	25	20	34	14
One-on-one advice	21	21	33	18
Property Plans	21	22	28	19
Field days and tours	21	24	29	19
Tax exemptions	16	22	31	13
Financial grants and paid assistance	14	29	33	15
Seminars and conferences	16	26	19	27
Social media ie Facebook	9	13	7	28

(n=85)

Native vegetation (planting or encouraging regrowth and fencing native vegetation Table 5). Overall, accessibility of support for managing native vegetation was rated equal with managing WoNS. Many respondents found it easy or somewhat easy to access support for native vegetation management with media articles and websites easiest to access but less relevant. Individual advice and trials and demonstrations more relevant than accessible and financial assistance again highly relevant but the most difficult to access. Workshops and forums and seminars and conferences were only somewhat easy to access and somewhat relevant.

Table 5. Highest ratings for accessibility and relevance of support for adoption of native vegetation management (%)

NRM support methods	Easy/ somewhat easy	Difficult/ somewhat difficult	Relevant/ mostly relevant	Somewhat/ not relevant
Media articles, leaflets and flyers	68	11	52	34
Website info and E-news Bulletins	68	9	53	31
One-on-one advice	56	25	59	32
Trials and demonstrations	43	33	56	34
Workshops and forums	41	35	44	45
Seminars and conferences	39	32	36	47
Tax exemptions	27	36	65	19
Financial grants and paid assistance	23	46	64	22

(n=85)

Sustainable grazing (cell or strip rotational grazing, setting minimum long-term groundcover targets, and planting deep rooted perennials or grazing shrubs, Table 6). In general, respondents were relatively unsure, and had mixed views about the accessibility of support for sustainable grazing practices with the support for media articles, websites and case studies almost equally accessible and relevant. Support for practical demonstrations and group talks, individual advice and peer networks were relevant but less accessible. Financial assistance was the most difficult but also relevant and seminars and conferences and field guides were the least relevant.

Weeds of National Significance (WoNS) (Table 7). Apart from financial assistance, many found support for WoNS easy or somewhat easy to access. However, they also rated it the most difficult to access of all the NRM practices. Websites, media and one-on-one advice were easiest and all very relevant while support for group talks and practical demonstrations were more relevant than accessible. Financial assistance was again highly relevant but difficult to access while support for field days and tours and workshops and forums were rated moderately relevant and accessible for managing weeds.

Overall, respondents who completed the survey were happy with the method of support they received, with 65% either preferring or generally preferring the method of support they received and only 12% unhappy with their support for adoption of NRM practices. Final remarks suggested respondents were most concerned about accessibility and relevance of information and the impacts of government policy. Funding issues, different value systems and a lack of support by regional NRM groups in some areas, were also raised as areas of concern.

Table 6. Highest ratings for accessibility and relevance of support for adoption of sustainable grazing practices (%)

NRM support methods	Easy/ somewhat easy	Difficult/ somewhat difficult	Relevant/ mostly relevant	Somewhat/ not relevant
Media articles, leaflets and flyers	54	15	55	26
Website info and E-news Bulletins	51	14	53	25
Case studies	44	20	41	26
Trials and demonstrations	43	29	53	22
Field days and tours	42	31	51	24
Group talks	42	33	53	21
One-on-one advice	39	35	56	20
Peer networks	30	38	42	31
Financial grants and paid assistance	14	46	51	21
Seminars and conferences	38	32	39	34
Field guides	40	25	46	32

(n=85)

Table 7. Highest ratings for accessibility and relevance of support for managing weeds of national significance (%)

NRM support methods	Easy/ somewhat easy	Difficult/ somewhat difficult	Relevant/ mostly relevant	Somewhat/ not relevant
Website info and E-news Bulletins	68	13	62	25
Media articles, leaflets and flyers	66	16	65	24
One-on-one advice	60	24	69	22
Group talks	49	31	65	25
Trials and demonstrations	45	35	61	31
Tax exemptions	26	31	60	18
Financial grants and paid assistance	20	45	60	24
Field days and tours	46	34	55	35
Workshops and forums	46	33	55	35

(n=85)

Discussion

The survey respondents' awareness and use of the local community and private NRM support providers, compared to lower awareness and use of state government-funded support or non-government groups, was anticipated due to the decline in state government support in recent decades. The large area of land involved also likely makes it difficult for non-government groups to assist landholders. The survey results also confirm recent studies such as Hollamby et al. (2013) who reported the increasing use of private or agribusiness consultants with 72% of respondents in their study using them annually. The transition to private sector support is the result of the unravelling of both Federal and State government support for NRM in recent decades, reflecting global trends in privatisation of agricultural extension services (Marsh & Pannell 2000; Hunt et al. 2012). Industry research for WA also shows significant increases in the use of other local growers, grower groups and private consultants, and a significant decline in the use of government support in recent years (GRDC 2014). The difference between the awareness and use of Landcare is likely due to the awareness of their national brand.

Most respondents were also motivated to use other landholders for support, either individually or in groups, and more likely to use private sector or retailer-funded support than government-funded support. Landholder preference to learn from other landholders is reported by other researchers (Pannell et al. 2006) and this was confirmed by both the Ecker et al. (2012) survey and the Wheatbelt survey. Of the 35% of respondents in the Ecker et al. (2012) survey who indicated they were motivated by support for crop management practice decisions, 31% rated peers or neighbours the most important source of support. Likewise in the Wheatbelt survey 39% of respondents were strongly motivated to use the support of other local farmers. The importance attached to the support of other local farmers and grower groups suggests a relatively high normative influence amongst Wheatbelt landholders. Whilst the rising trend for landholder reliance on private sector support raises concern amongst some researchers about the ability of the private sector to deliver unbiased support and public benefits (Cawood 2013; Sutherland et al. 2013; Keogh & Clementine 2014). The comments by Wheatbelt respondents also provided evidence of their concern about receiving biased information.

This Wheatbelt survey did not investigate the motivation for use of the different providers of support for each NRM practice, as (Ecker et al. 2012) had done this. Their study found that for

all practices, only 20-30 per cent of respondents were influenced by the availability of NRM support providers to some extent, and that those who were influenced, rated Landcare and production groups (grower groups) as the most important for all NRM practices. A qualitative study of the Wheatbelt region by Toric (2005) also found that membership of Landcare and other local groups was not a key factor in motivating adoption of NRM practices, but suggested they may be influential in decision-making through social norms, particularly for native vegetation management.

Australian Bureau of Statistics (2009a) data shows around 20% of landholders were a member of a Landcare group in 2009-10, and grower groups were becoming more popular. The separation of choices for Landcare and grower groups in the Wheatbelt survey showed higher motivation to use grower groups than Landcare; evidence of the growing influence of these groups in this region. WA has now developed a network alliance of 39 grower groups, providing both production and NRM support, and partnering with research organisations and industry as key drivers of research (Hall & Wallis 2013; Taylor 2013). The modest level of awareness of regional NRM group support, was also reflected in respondents' level of motivation to use these groups for support.

Although many respondents believed they benefited from the support they had received, many also suggested improvements to accessibility and relevance of information, with some suggesting a need for greater government funding and staff expertise. Problems arising from the separation of landholder and government objectives, and the commoditisation of knowledge, were identified as substantial problems by some respondents and were also evident in the Ecker et al. (2012) results. These issues have been raised in literature and research and are recognised as key problems for policy and NRM support providers (Griffin nrm P/L 2000; Barr 2010; Sutherland et al. 2013; Keogh & Clementine 2014)

It was anticipated that the providers of support generating the highest motivation would correlate with landholder perceptions of those who best understand the risks involved for them when undertaking NRM practices, and this was confirmed in the results. Nicholson (2015) argues that landholders have traditionally developed their own risk strategies with little understanding or assistance from those working in extension, and the results also showed this to be landholders' perceptions of some providers of support. Results showed respondents had particularly low confidence in WA government officers understanding of the risks involved, which is likely due to greater emphasis of current State government focus on regulatory control. O'Kane, King & O'Brien (2009) also argue that attitudes toward farming, such as whether it is a business asset for production purposes or a family farm with inheritance value, also affect risk perceptions, which influence decision-making and the choices made. These factors likely contributed to the results and are worth investigating further.

In general, the results of respondents' rating for the method of support at each stage of practice was also expected, with both practical demonstrations and electronic and media information important in the earliest stages of contemplation, workshops, individual advice and practical demonstrations when trialling and planning a practice, and more practical financial assistance and peer motivation when they are undertaking a practice. Ecker et al. (2012) also found practical support of field days and trials was rated highly and noted the link with the importance of trialability to adoption (Pannell et al. 2006). Training courses or workshops were rated second highest in importance in the Ecker et al. (2012) study, while in the present Wheatbelt study, workshops and forums were rated the most beneficial in the preparation stage. Llewellyn & D'Emden (2009) also found that field days, workshops and seminar participation encouraged adoption of minimum-till practices.

Website information was rated the most useful when landholders were initially interested in a practice and moderately useful at all other stages. Australian Bureau of Statistics (2009b) data showed that in 2007-08, only 27% of WA farms were not using the internet for their farm business operations. With the rapid growth in internet use over the last few years, this resource has important potential for learning and adaptive capacity (Dhakal 2014), particularly as the National Broadband Network expands into regional areas. Social media was considered relevant by a few younger landholders but was not seen as a useful means of support, as yet, by many older respondents. Of note was that support remained moderately useful when landholders were interested but currently unable to undertake a practice.

Of the five different categories of NRM practices, support for conservation agriculture practices was considered the most accessible and relevant. Although most methods of support were moderately easy to access for conservation agriculture, financial support was most relevant but also considered relatively difficult to access. The results suggest financial barriers may be limiting greater adoption of some of these practices.

The small percentage of landholders undertaking agroforestry, limited the usefulness of these results. Agroforestry was also rated lowest for relevance of support. Again financial support was considered relevant but was the most difficult to access. However, the mixed attitudes toward the accessibility and relevance of this support may mean that respondents consider they are getting enough support for Agroforestry.

The moderate number of landholders practising native vegetation management was matched by a similarly moderate response to the relevance of support, which likely illustrates the overall attitudes toward native vegetation conservation in this region. These results, including the difficulty of accessing financial support, suggest that greater financial incentives combined with alternative methods need to be considered if conservation of native vegetation is to increase.

Respondents provided a relatively mixed response between accessibility and relevance for sustainable grazing practices with many unsure about the accessibility and relevance of this support. Landholders also rated overall support for these practices as moderately relevant suggesting more support may be required to improve understanding of the long-term value of these practices.

Support for managing WoNs rated second highest of all the categories of NRM practices for relevance and although support for adoption of these practices was reasonably accessible, this practice had the greatest difference between relevance and accessibility. This may suggest a need for greater accessibility of support for this practice, particularly for financial incentives, group talks and trials and demonstrations.

Although respondents considered they were generally getting the support they preferred, the evidence of the accessibility and relevance of these interaction methods suggest greater use of the preferred methods of support may improve adoption of some practices, while other practices may require the use of alternative methods and financial incentives to increase adoption. Of course, those providing NRM support need to first, fully understand the adoptability and benefits of the practice before promoting it (Pannell et al. 2006). Ecker et al. (2012, p.3) found that 'using farmers' preferred or common interaction methods can help target efforts for improving land management'. Policy and programs developed with this understanding in mind will therefore assist targeted efforts to improve land management.

Conclusion

Past changes in the providers of NRM support, from government to private individuals and organisations, is clearly shown in the awareness, motivation and use of the providers of support, and landholders' belief in how well the different providers understand their risks in adoption of NRM practices. The benefits and disadvantages of these changes have been comprehensively discussed in the literature. The significant difference between respondents' motivation and use of private sector and government-funded support, suggest this change in support may be influencing the extent and methods of support, as well as their attitudes toward NRM. This has important implications for government policy and providers of NRM support.

According to Ecker et al (2012) their findings indicate that the availability of support was not a driver of decisions for adoption of NRM practices in the same way as financial, environmental and personal motivations were. As such, they argue that the provision of support may best be used as a tool to influence decision-making rather than as a motivator. One useful suggestion is to channel information through influential providers of support. With this in mind, the Wheatbelt survey results show an imperative for better engagement with the three providers of support most influential to landholders; other local landholders, private or agribusiness consultants and grower groups. However as Ecker et al (2012) note, NRM support providers need to be aware that the group-based approach, farming views and focus on outcomes inherent in agribusiness and many grower groups, may not always be suitable for NRM engagement or landholder's needs.

Results overall concur with literature suggesting that as landholders progress through the stages of practice change their preferences for the method of support they receive for adoption of NRM practices also changes. External information is most important in the contemplation stage, while social support is most important in the trialling and early adoption stages (Pannell et al. 2006) when information is evaluated with trusted contacts (Barr 2010). It also appears important for providers of support to bear in mind, that support remains of relative importance when landholders are waiting to undertake a practice and that social support is most important at this stage.

The results show clear differences between the accessibility and relevance of the methods of support provided to landholders for adoption of NRM practices. As such, they demonstrate the

need for a greater understanding by providers of NRM support of both the stage of landholder adoption, and the accessibility and relevance of the different methods of support for each practice. This understanding will provide a strong indication of the method of support most beneficial for each NRM practice and stage of landholder adoption, as well as the level of support that is required.

Overall the results demonstrate the importance for providers of NRM support to understand the risks involved for landholders' adoption of NRM practices, the stage of landholders' adoption and the most effective method of support to provide at each stage. This understanding will enable better design of NRM practices that integrate government objectives more effectively with landholder goals. In this way they are better able to develop strategies that are effectively targeted to improve their influence on the adoption of NRM practices.

Further analysis will be undertaken to establish whether other relationships exist between: respondent awareness, use and motivation to use the providers of support for adoption of NRM practices, accessibility and relevance of support for the different categories of NRM practices and the demographic and farm characteristic variables and respondent awareness, motivation or attitudes.

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