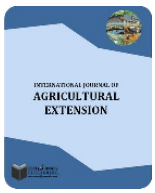

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TRAINING AS PART OF THE CAPACITY-BUILDING LADDER IN AUSTRALIAN AGRICULTURE

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A B S T R A C T

To maintain the efficiency and economy of their farming, Australian farmers and advisers perceive a need to continually update their skills and knowledge by attending informal and formal training activities such as field days, workshops and grower group meetings. Using a mixed methods approach, this research evaluates: a) what types of training events farmers and advisers prefer; b) why they prefer that type; and c) if their knowledge increased as a result of training. The data were analysed using non-parametric tests and inductive thematic coding before triangulating the results. Farmers preferred field days held on farms, because of the relevance of the location and field experiments and the opportunity for informal interactions, but thought workshops were redundant. Advisers preferred formal workshops, because they provided interaction with specialists. Participants liked to attend grower groups because they were local, interactive and informative. However, the majority of grower groups are made up of farmers and only half the advisers surveyed belonged to one. Participants' knowledge increases after training and is related to the activity attended. Many participants indicate that they would use their new knowledge on their farm or in the workplace. This research shows that the demographic characteristics of farmers and advisers influence the type of training they will attend; this information can be used to refine existing and develop new training events.

Keywords: Field days, workshops, grower groups, farmers, advisers, knowledge levels, evaluation.

INTRODUCTION

The political, social and economic climate has changed how extension (broadly meaning training and education) reaches Australian farmers (Carberry *et al*., 2002; Cristovao *et al.,* 2009; Jones & Garforth, 1998; Marsh & Pannell, 2000). Extension has evolved; in the 1960s it was a government-provided service but by the 1990s it was predominantly delivered by advisers from private and commercial and commercial companies (Keogh & Julian, 2014; Marsh & Pannell, 2000). However, because state agencies were still providers of research information they remained responsible for the dissemination of information to primary extension agents such as advisers (Marsh & Pannell, 2000). These changes correspond to changes in farming in Australia. Farming has become more mechanised and specialised (Keogh & Julian, 2014), and farmers now need more specialist advice and targeted information (Cristovao *et al*., 2009; Jones & Garforth, 1998; Marsh & Pannell, 2000). Farms have also grown in size since the 1990s. In Western Australia, farm size has trebled (from 1000 ha to 3,500 ha under crop); increases in other states have been lower, to an average size of 1000 ha (Keogh & Julian, 2014).

In rural communities, informal education programs enable change in individuals, communities and industries (Feder, Birner, & Anderson, 2011; Vanclay & Leach, 2011). In Australia, since the early 2000s, extension has focussed on capacity-building and community engagement (Coutts & Roberts, 2011). This paradigm relies on interactions between five models: a) facilitation and empowerment, b) technological development, c) information access, d) training and e) consultancy. These models can work alone but are ineffective for capacity-building unless linked (Coutts &

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Roberts, 2011). Vanclay & Leach (2011) argue that extension is only related to the primary industry sector, and yet, as the analogous example of the American university land-grant system shows, it is much more. In the USA, extension not only operates in rural communities but also in cities, and includes nutrition programs, youth programs, community gardens and master gardener programs

Grower groups in Australia are very popular among the farming community and have increased in number since 1990, when the Australian government encouraged rural communities to work together, initially to protect water, vegetation and soil (Gianatti & Carmody, 2007). These groups continue to be productive, conducting research trials, providing local publications and running field days (Anil *et al.,* 2015; Gianatti & Carmody, 2007). In Western Australia, there are 40 major grower groups (Grower Group Alliance, 2016) and in Victoria there are seven (Victorian Grower Group Alliance, 2016).

It has been argued that extension activities such as field days, workshops, seminars and grower group meetings are training activities for farmers and advisers (Coutts & Roberts, 2011; Keogh & Julian, 2014; Miller & Cox, 2006). However, it is not clear which activities farmers and advisers prefer. It is also unclear whether demographic characteristics such as education levels, age and place of residence influence the activities in which they choose to participate. However, any training program should be evaluated to determine its impact and effectiveness (Alvarez, Salas, & Garofano, 2004; Dart, Petheram, & Straw, 1998; Roberts & Coutts, 2011). For extension activities this includes determining their effectiveness to support capacity building and engage participants.

Alvarez *et al.* (2004) defined effectiveness as the examination of the variables that increase or decrease the success of training at different stages of the program. Haccoun & Hamtiaux (1994) suggest a simple procedure for measuring training effectiveness: using the 'internal reference' strategy to assess participants' knowledge before and after training, on the assumption that training with relevant content will show more change than training with irrelevant content (Salas & Cannon-Bowers, 2001). A considerable body of literature discusses the successes or failures of extension strategies in developing countries (Amudavi *et al.,* 2009; van de Berg & Jiggins, 2007; Yang *et al.,* 2008) but there is very little research on their use in the grains industry of developed countries. This paper discusses the training preferences of Australian grain farmers and advisers and an evaluation of these activities to determine if farmers' and advisers' knowledge changed and how they planned to use this knowledge.

Theoretical Background: The capacity-building ladder proposed by Coutts and Roberts (2011) consists of five main components. Three form the legs of the ladder: i) information access; ii) facilitation and empowerment and iii) technological development. The other two, training and consultants, form the rungs of the ladder. These components are complementary, allowing a training participant to 'climb the ladder'; in other words, to build their skills, abilities and resources. The training model component of the capacity-building ladder is specifically designed to increase the skills and understanding of participants in the agricultural industry. In general, training programs have set curricula and learning objectives and must meet the standards (Llewellyn *et al.,* 2006) required under the National Qualifications Framework in Australia, being part of the Vocational Education and Training (VET) system. VET allows participants to gain accreditation for their learning and training (Coutts & Roberts, 2011). However, this training component does not take into account informal training events, such as field days and grower groups, yet informal knowledge is very valuable in agriculture. Previous research (Kilpatrick & Fulton, 2003; Kilpatrick & Johns, 2003; Vanclay, 2004; Wenger, 2000) has shown that farmers are social learners, and most of their learning is 'done on the job' and through informal training. It might be assumed that advisers' preferences for training are different to those of farmers; however, this assumption has not been confirmed for the Australian grains industry.

Three main frameworks are widely used to evaluate extension programmes: i) Bennett's hierarchy, ii) Wisemann's six steps, iii) the MERI (Monitoring, Evaluating, Reporting and Improving) framework (Crisp, 2010; Fulton *et al.,* 2003; Keogh & Julian, 2014; Roberts & Coutts, 2011). Evaluations designed from these frameworks can be designed before the program to help set the priorities and the resources required, or after the program to assess the impact (Keogh & Julian, 2014; Maredia, 2009) However, none are suitable for evaluating informal training such as field days, because they are designed for formal learning activities where baseline standards have been determined so that the

amount of change can be measured (Llewellyn *et al.,* 2006). A common strategy used in the extension industry to evaluate informal learning is the internal reference strategy developed by Haccoun & Hamtiaux (1994) This measures the knowledge levels of participants before and after a training event (Salas & Cannon-Bowers, 2001).

Thus, in assessing the effectiveness of extension activities, for example field schools, participants' knowledge should be tested before and after training, and in some cases behaviour change monitored. Glaze & Ahola (2010) monitored participants' change in knowledge in a training program by asking them to self-evaluate before and after training using a Likert Scale (Likert, 1932). However, (Schmitt *et al.,* 2000) found that participants' education level influenced their perception of their knowledge before a training course; those with higher education levels generally self-ranked lower than those with lower education levels.

METHODOLOGY

This paper reports on part of a larger project examining the training needs of farmers and advisers in the Australian grains industry in relation to pest and diseases in their crops (Wright, 2017).

For this study, a farmer was defined as a person who lives and farms land to produce grain crops and an adviser was defined as a person employed by grain farmers to provide technical information and advice for grain crop production (Wright *et al.,* 2016).

Approval for this work was obtained from the Human Research Ethics Committee of the University of Western Australia (RA/4/1/6607).

Data were collected using three different methods: 1) surveys of farmers and advisers in the Australian grains industry to determine what types of training they preferred to attend; 2) evaluation of field days and workshops using questionnaires and semi-structured interviews; 3) contemporaneous field notes of observations of activities and participants at field days and workshops.

Surveys: This paper reports only on the data from the identical sections of the surveys (one for farmers and one for advisers) (see Appendix A), allowing comparisons to be made between the two groups. These sections covered: what type of training they had attended, including field days, workshops, grower group meetings, webinars and seminars (questions 7, 11, 20), what barriers prevented them from attending training events (8, 14), what they liked about the training they had attended (9, 12, 22) and how could it be improved (10, 13, 23), whether they belonged to a grower group (15), how often they attended the meetings (17), and what they liked and disliked about the meetings (18, 19). The final section collected demographic information (39–44).

The questions were designed to be simple and easy to understand and provide reliable and valid measures (Fowler (2009); Dillman *et al.,* 2009)). The surveys were tested with colleagues and farmers before distribution (Wright *et al.,* 2016)). The surveys were distributed (i) as a link to an online survey (on the Qualtrics platform) sent out via newsletters, (ii) on paper at regional meetings during March 2014 and (iii) posted to farmers and advisers from the Birchip Cropping Group (Wright *et al*., 2016). Seven hundred paper surveys were distributed by routes 2 and 3. It was not possible to accurately determine the number of people who received the online request, as the link was distributed via newsletters but the Qualtrics data records show that 264 surveys were started and 50% were completed.

Questionnaires and interviews: Data were collected via (i) questionnaires (Appendix B) and (ii) interviews (Appendix C) with participants attending three field days (Esperance Downs Research Station (EDRS), the Liebe Group Field Day and West Midlands) held in Western Australia in September 2014. These locations were selected as they cover a range of cropping systems and low to high rainfall zones. These field days are very popular with farmers and advisers in those regions and more than a hundred people attended each event. Data were also collected from participants in three workshops in Victoria.

To evaluate change in knowledge, a one-page questionnaire (Appendix B) was administered during the events. Participants were asked to self-rate their knowledge using a Likert scale of 1-5; to rate their level of satisfaction with the event (1-5) and how they planned to use their new knowledge (an open answer question). Demographic information was also collected. The questionnaires were designed to be quick and simple for participants to fill in. Approximately 200 questionnaires were handed out at the three field days and 30 at the workshops. A total of 124 questionnaires was returned. The interviews were semi-structured, and designed to be casual and 'chatty', so that participants did not feel threatened and were happy to answer the

questions. The questions were designed to complement the questionnaire. Participants were asked: i) what they hoped to learn, ii) what was the most useful thing they had learned, iii) what was the least useful, iv) what was the most engaging element of the event and (v) how would they use the information learned. Thirty-two people were interviewed; participants were approached at random by the lead researcher (DW) as she walked around at the field days. Consent to participate was recorded verbally. The interviews were recorded on a hand-held digital recorder.

Field notes: At each of the field days the lead researcher (DW) recorded notes on the format of the field day, the approximate number of people present, and how participants interacted during the different sessions.

Data Analysis

Types of training survey: The quantitative data were analysed using SPSS23 (IBM, 2016) using cross tabulation and Pearson's Chi-Square (X2) to determine the influence of occupation, age, sex, education and location on the types of training attended by participants, and barriers to attending training. If Pearson's Chi-Square failed the assumption that more than 20% of the cells had a frequency count of less than 5, then the Likelihood ratio statistic test was used in its place. This test is preferred when samples are small and still uses a chi-square distribution (Field, 2013, p. 724).

The response rate for the survey is estimated to be 26%; it was not possible to determine the exact number of requests disseminated online. Forty-seven surveys with incomplete demographic data, such as no postcode, were not included in the analysis. Due to the low number of returns from Queensland, NSW, Victoria and South Australia, the data collected from these states were combined as "Eastern Australia" (EA) which is used in the corresponding cross tabulation and Pearson's Chi-Square analysis (Wright *et al.,* 2016).

The demographic data formed the variables used in the data analysis: Age (≤30 years, 31-50 years, ≥ 51 years); Education level (school, vocational education training (VET), University); Occupation (grower, agronomist); Location (Western or Eastern Australia) and Sex (male, female).

Evaluation questionnaires and interviews: The questionnaire data were split into groups based on whether they came from workshops or field days and which state they were held in. The quantitative data were anyalsed using a Wilcoxon Signed Rank test to compare participants' knowledge before and after training. A Kruskal-Wallis test was used to examine the influence of occupations and length of working on knowledge and on the amount of learning participants felt they received. If the result from the Kruskal-Wallis test was significant, a means test was conducted to determine the median levels of each category. This was followed up with a Mann-Whitney U-test to determine if there were any significant differences between the categories. A Bonferonni adjustment was done on each Mann- Whitney U-test to reduce the type 1 errors.

The qualitative data (the open responses from the questionnaire and the interview data) were themed using an inductive approach informed by previous research and developed incrementally (Fereday & Muir-Cochrane, 2006). Frequency counts were used to determine what participants liked about the training they attended, how the training could be improved and what topics they would like training on. The interview transcripts were analysed using NVivo11 (NVivo 2016). A cross-coding check on six interviews was completed using the coding template; a match of 82% was achieved. In the following discussion, the interview data are identified thus: the first two letters refer to the location of the training event e.g. WA indicates Western Australia, 'F' indicates a farmer and 'A' an adviser, and the number refers to the interview number.

RESULTS

Field day attendance: Field days are attended by farmers and advisers. They are held on farms to provide information and demonstrate results from field experiments associated with growing crops, new varieties released, and new cropping practices. In Australia, they are held in conjunction with grower groups and local state departments of agriculture and have specialised speakers based on pertinent topics for that area. Participants who attended these days were: farmers (62%), advisers (13%), other occupations (11%), government (8%), sales (4%) and university (2%). Participants had been working from less than one year to more than 31 years.

Participants came to field days for a variety of reasons, ranging from compulsion (work-related), wanting a better and deeper understanding on a range of subjects, networking with other farmers, colleagues and specialists, to gaining knowledge and improving skills:

We're new to the area yeah we wanted to know a bit more about agriculture in the least high rainfall areas. WAF6

Many participants described field days as informative (22%), interactive (19%), visual (13%) and providing an opportunity for networking (13%).

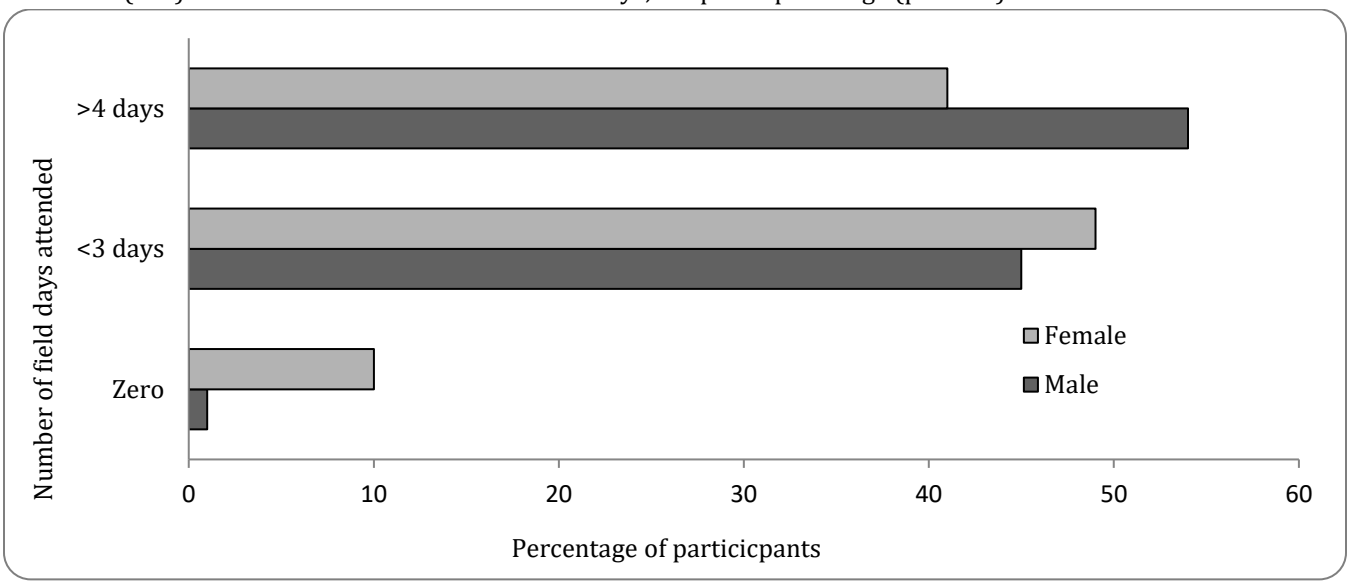
"Lets you keep up to speed with anything that's happening in the area" WAF3.

"50-50 get it in the paper, read it and here you pick up a lot of visual" WAF1.

The demographics of the participants influenced their attendance at field days.

Men participated in four or more field days compared to women (X2 (n= 245), 2, = 9.356, p ≤ 0.05) (Figure 1A). A greater proportion of participants from Western Australia (WA) attended more than four field days, whilst a greater proportion of Eastern Australia (EA) participants attended between one and three field days (Likelihood ratio X2 (n= 241),

2, = 9.289, p ≤ 0.05) (Figure 1B). Participants who had completed higher education were more likely to attend field days than those without high-level qualifications (Likelihood ratio X2 (n= 248), 2, = 10.746, p ≤ 0.05) (Figure 1C). Only 12% of advisers surveyed did not attend any field days while 56% attended 4 or more field days during the season (Likelihood ratio X2 (n= 248), 2, = 14.386, p ≤ 0.001) (Figure 1D). The only demographic variable that did not influence attendance was participants' age (p > 0.05).



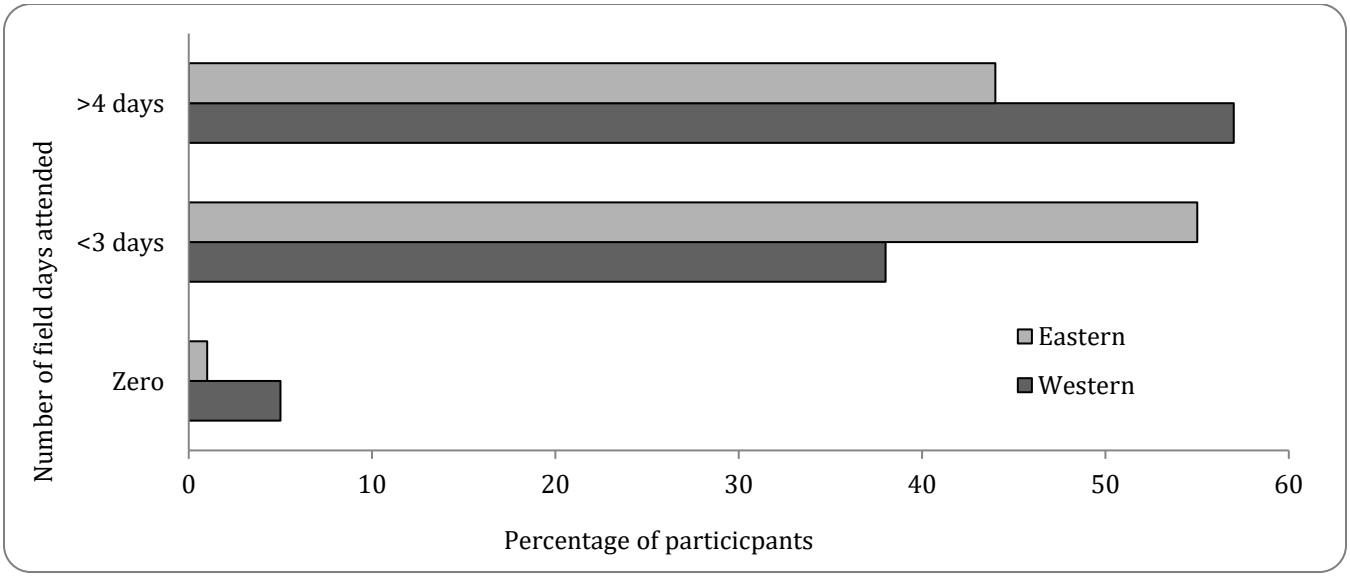


Figure 1a. Demographic influences on numbers of field days attended. A) Sex, B) Location (Eastern Australia or Western Australia).

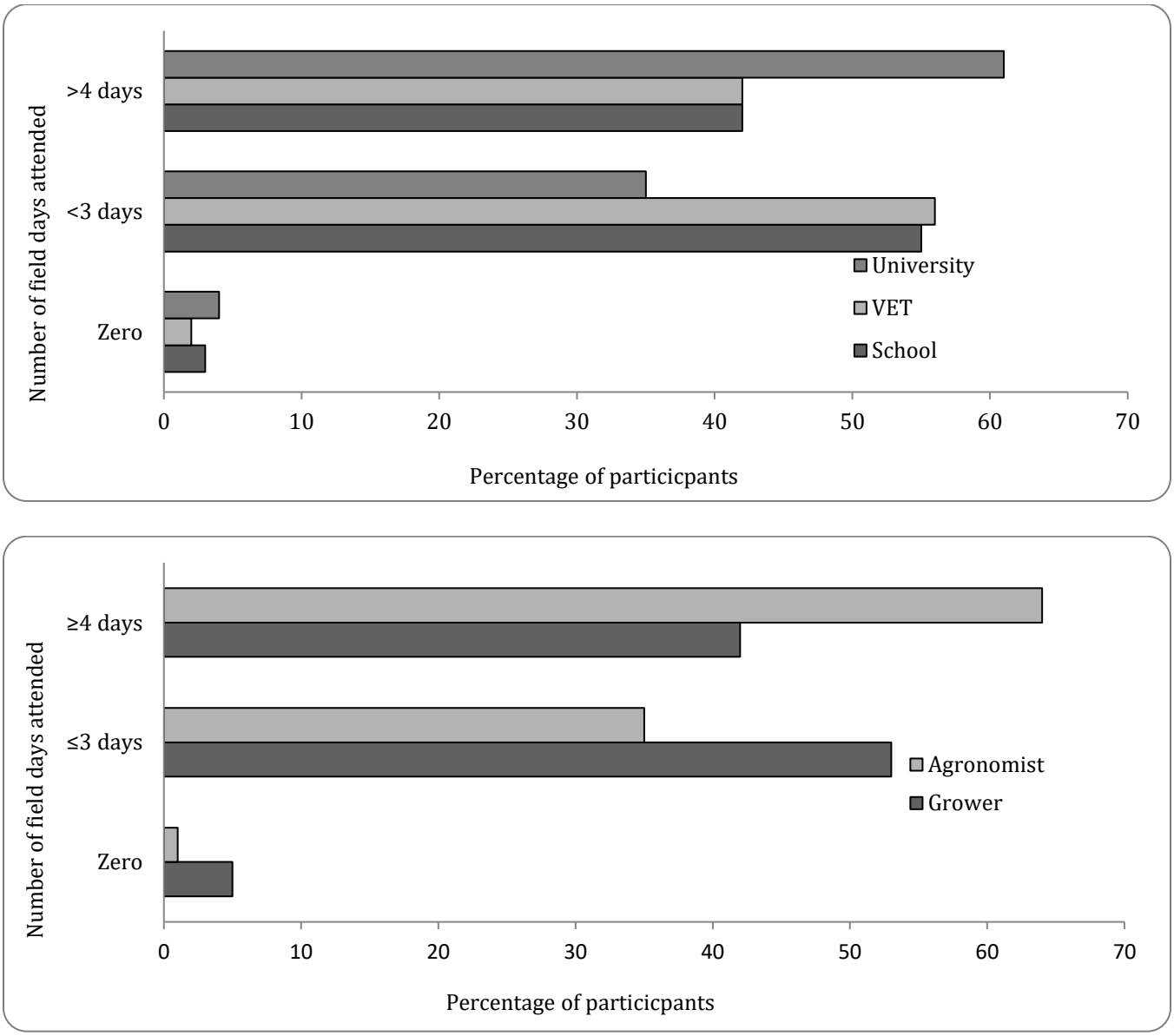


Figure 1b. Demographic influences on numbers of field days attended. C) Education level D) Occupation,

Field notes of participants at field days showed a number of similarities:

1. Some participants tended to stand to one side, only interacting amongst themselves or with speakers after the talks. They did not interact with other farmers.
2. Where speakers did not have a microphone, or a loud voice, only those who were standing directly in front of the speaker were able to hear what was being communicated. In these situations, participants towards the back tended to form small groups speaking to each other rather than listening.
3. Speakers were able to catch the attention of the participants by using props, having a loud voice, or being enthusiastic about what they were showing and talking about.

Participants expressed a range of views about what they hoped to learn, ranging from broadening knowledge to gaining new ideas and techniques:

The major barrier to attending field days was lack of time (16%). Some participants did not find field days useful (7%) and some felt the topics were irrelevant (7%).

Location had a significant negative impact on attendance; participants in EA experienced this more than those in WA.

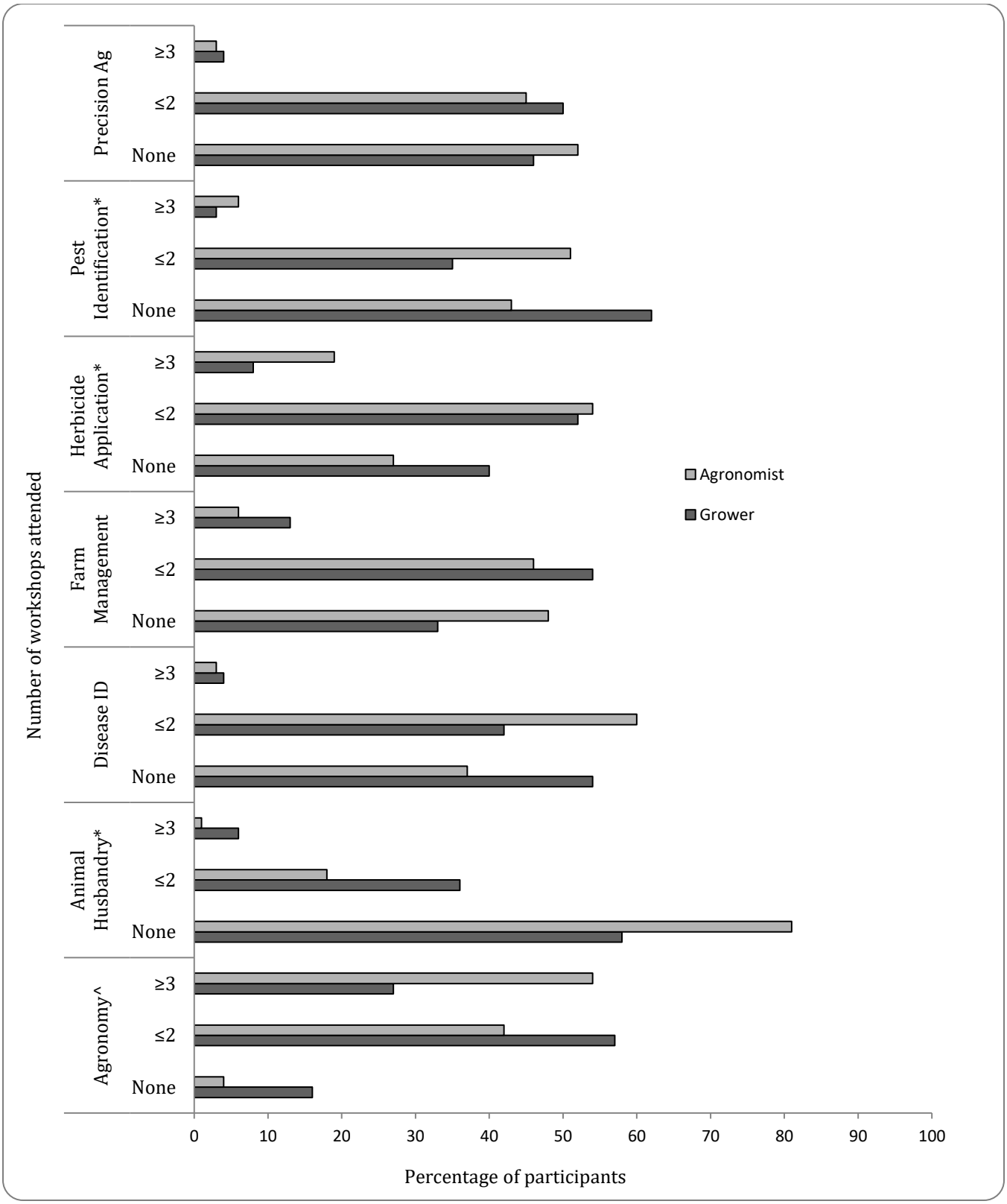


Figure 2. Percentage of farmers and advisers and the number of formal workshops attended between January 2013 and June 2014. Significant differences were seen between farmers and advisers at ^p ≤ 0.001 or * p ≤ 0.05.

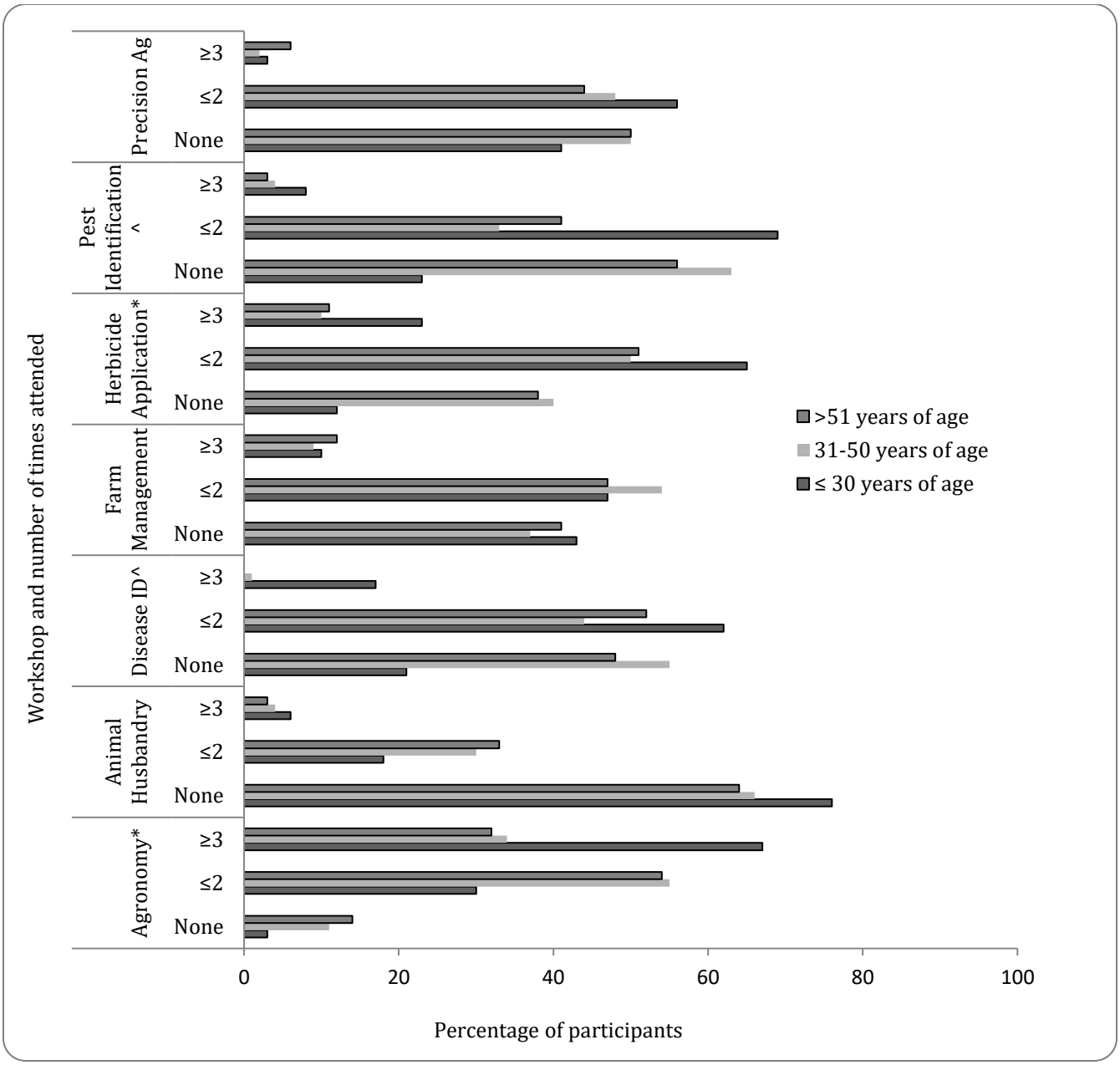


Figure 3. Influence of age on participation of farmers and advisers in workshops between January 2013 and June 2014. There was a significant difference between age groups at ^p ≤ 0.001 or * p ≤ 0.05.

Formal workshop attendance: Workshops are formal training events, with set learning outcomes and generally focussed on a specific topic and led by topic specialists. Workshop formats include lectures and practical sessions. Participants liked workshops that were informative (40%), interactive (12%) and local (12%). The attendance of farmers and advisers at formal workshops varied significantly (Figure 2); a higher proportion of advisers (54%) attended three or more workshops on agronomy compared to 27% of farmers attending this many workshop (X2 (n= 216), 2, = 19.15, p ≤ 0.001). Only 4% of advisers did not attend any workshops on agronomy, compared to 16% of farmers. For every other topic at least 37% or more did not attend any workshops, indicating that agronomy workshops were most highly valued.

The most frequent reasons given for not attending workshops were: (i) lack of time (60%), (ii) distance from venue (35%) and (iii) perceived irrelevance of topics (31%).

Participants' age had a significant influence on the number and type of workshops attended (Figure 3). Farmers and advisers who were less than 30 years of age attended workshops more frequently than other participants.

The number of years a participant had been working had a significant influence on attendance at the disease identification (Likelihood ratio X2 (n=188 (6), = 16.308, $p \leq 0.05$), farm management (Likelihood ratio X2 (n= 196 (6), = 15.967 $p \leq 0.05$) and pest identification workshops (Likelihood ratio: X2 (n= 200 (6), = 18.875, $p \leq 0.05$). Three workshops in Victoria were examined in detail by observation and interviews with participants. These workshops were formal training events using lectures and practical exercises to teach advisers about soil testing, interpreting results from soil testing and understanding fertiliser regulations. Participants in the course were either in sales (63%) or were advisers (37%); no farmers attended these courses. The majority of participants came to these workshops because it was compulsory:

> *My branch manager thought it was a good idea for me to come. And then obviously when he explained what it was I thought it was a good idea as well. Just basically to broaden my knowledge on the whole fertiliser soil aspect of the job which I am currently working in. BPA3*

Participants hoped for a variety of outcomes, from broadening knowledge, to achieving accreditation, to learning new ideas and techniques:

> *I hoped to learn about soil science but also to gain the accreditation of being Fert. Care accredited. BPA7.*
>
> *I wanted to come away with a lot more understanding of fertilisers, soil testing, and all that sort of thing which I think I have a good base knowledge now. I need to go away and put a little bit more of that into practice, working with [name] the economist at work. BPA9.*

Many of the participants said the information or new skill they learnt at these workshops would be used every day at work, or applied to the farms for which they were consultants. Some felt that they had become more aware of issues or had a greater understanding of issues faced by their clients:

> *Hopefully it will make it a bit more useful for the farmer, hopefully he will get more useful information out of me rather than just hand ball it over to somebody else that deals with it. BPA.2*

The majority of participants at the workshops thought it helped to increase their knowledge, especially in how to solve problems such as controlling weeds and pests in crops, and that they could use this new knowledge to improve crop growth.

Grower group meetings: Participants liked attending grower groups because they are local (26%), interactive (17%) and informative (17%). Some participants (15%) said that they enjoyed networking in these groups. There was a significant difference between farmers and advisers in their membership of grower groups: the majority of farmers (82%) who responded to the survey belonged to a grower group, while only 52% of advisers did (X 2 (n=242 (1) = 24.93 $p \leq 0.001$).

The age of the participants influenced membership of a grower group. A smaller proportion of participants (51%) who were less than 31 years of age belonged to a grower group, compared to a larger proportion (73%) of those that were older than 31 (X 2 (n=242 (2) = 7.786 $p \leq 0.05$).

Place of residence of the participant also influenced membership; a smaller proportion (23%) of WA participants belonged to a group compared to 41% of participants from EA (X 2 (n=235 (1) = 9.35 $p \leq 0.05$). Place of residence also influenced the frequency of attending the grower group meetings; 42% of participants located in EA attended at least 25% of the meetings, while only 22% of those located in WA attended 25% or more of the meetings. Thirty-four per cent of participants from WA attended at least 75% of the meetings while only 19% of participants from EA attended 75% of the meetings (X 2 (n=162 (4) = 12.73 $p \leq 0.05$).

Some participants (29%) said that time constraints prevented them from attending grower group meetings. Others (12%) noted that the distance they had to travel had a strong impact on their ability to attend; some meetings were more than 100km from where they lived. Some participants (12%) would like to see more structure provided in the meetings, while 5% felt that the invited speakers needed to improve their presentation skills. A frequent comment made in the open responses was that participants felt that the meetings tended to be repetitive.

Other training events: The other types of training events attended by participants included; (i) meetings (9%), (ii) updates (regional and agribusiness) (32%),

(iii) seminars (23%), (iv) informal workshops (23%) and (v) webinars (14%). These events were mostly attended by advisers (71%) rather than farmers (44%) (X2 (n=242 (1) = 18.07 p ≤ 0.001).

The majority of participants found these types of training to be informative (55%). Some (21%) liked the fact they were held close to home and so required less travel (or for webinars, no travel at all). A small proportion (7%) enjoyed the opportunity for interaction and networking.

The level of education influenced attendance; only 39% of those who had secondary school as their highest level of education attended other events compared to 64% of university-educated participants (X2 (n=242 (2) = 10.896 p ≤ 0.05).

Change in knowledge levels at field days: A Wilcoxon Signed Rank Test showed a significant increase in participants' knowledge levels after participating in field days (z = -7.64 p ≤ 0 with a large effect size (0.40)). The 25th percentile of participants' knowledge increased from 'some knowledge' (Md = 2) to 'moderate knowledge' (Md = 3). The 50th and 75th percentiles stayed the same, at moderate and considerable respectively (Figure 4).

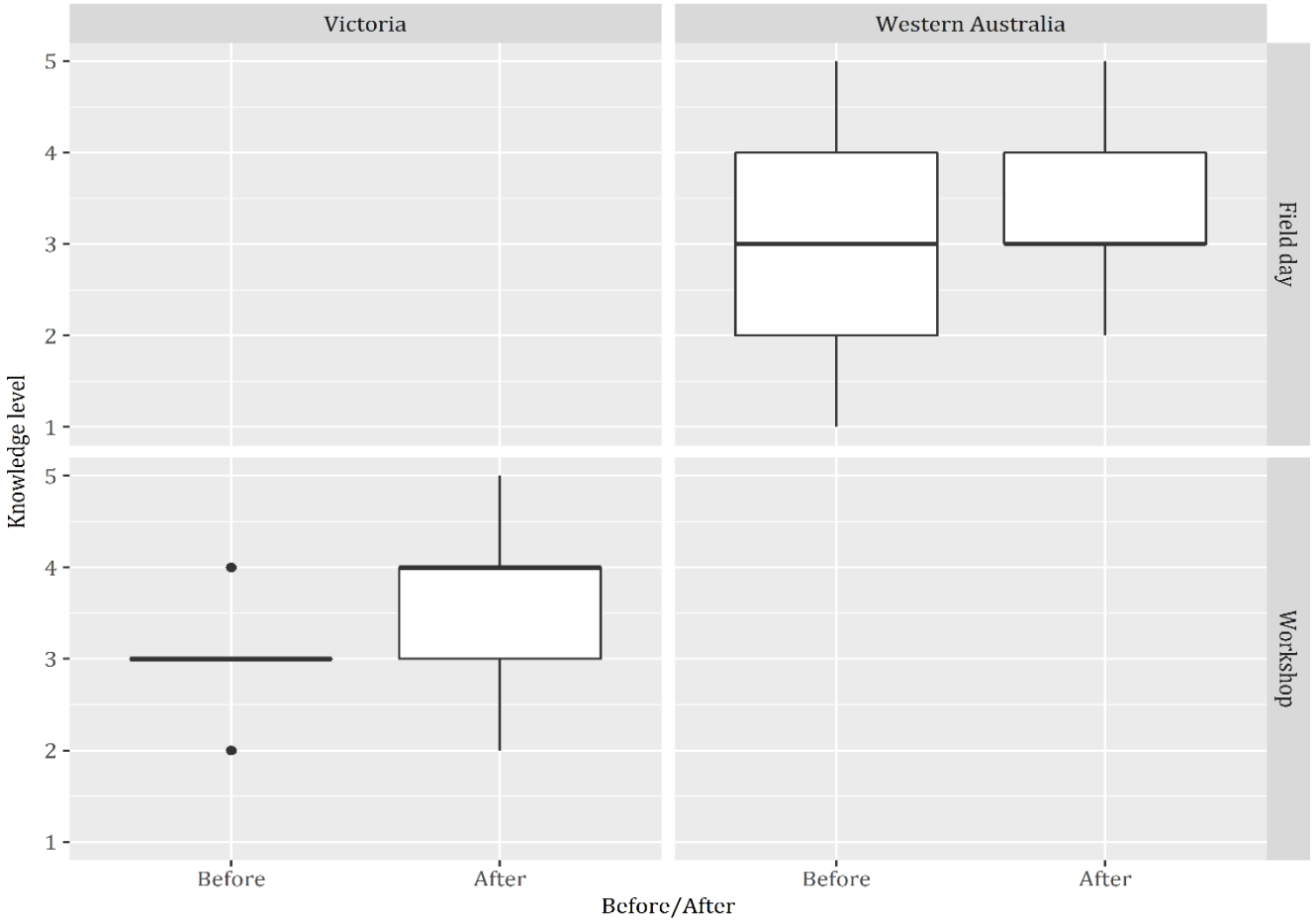


Figure 4. Knowledge levels of participants before and after training events (field days and workshops) held in different locations. Each box corresponds to the 25th and 75th percentile of scores while the bar within the box represents the median (50th percentile score). Whiskers on each box indicate the range of scores (1.5* inter-quartile range). Circles denote outliers.

A Kruskal-Wallis test showed that occupation significantly influenced change in knowledge before and after field days. (Knowledge before X2 (n= 116), 5 = 15.80 p ≤ 0.05); knowledge after X2 (n= 116), 5 = 14.21 p ≤ 0.05)). Government employees ranked the lowest for knowledge after the field day; their median score was the same as those who identified as farmers (Md = 2, moderate level).

Advisers and sales people had a median knowledge of 3 (considerable) while university participants had a

knowledge level of 2.5. Advisers had a significantly higher median score than government participants (Mann-Whitney U –test, U = 27.5, z = -3.04, p = 0.007, Bonferroni adjustment = 0.01). There were non-significant differences between government participants and other occupations.

The effect of education was not significant. University participants (mainly students) ranked themselves lowest in knowledge before the field day; their median knowledge was 1.5 (a little knowledge) compared to all other occupations, which had a median knowledge of 2 (some knowledge). However, a Mann-Whitney U test conducted on this showed that the differences between university participants and other occupations were not significant ($p > 0.01$ with the Bonferroni adjustment).

The length of time working had a significant influence on knowledge (Kruskal-Wallis test ($X2$ (n= 110), 4 = 11.06 $p \leq 0.05$)). Participants who had worked for 11 to 20 years had a higher mean rank than the other participants, however, the Mann Whitney U test conducted showed that there were no significant differences ($p> 0.012$, Bonferroni adjustment) between this group and other groups.

DISCUSSION

This research demonstrates that farmers and advisers value training events for the opportunity they offer for interaction with other farmers, specialists and advisers, and as a space to gain new knowledge that they can take back to the farm or workplace. Field days are known to be an effective route for learning, providing opportunities for farmers, advisers and other people in rural communities to assess new technologies, including crop varieties and farm equipment suitable for use in their area (Amudavi *et al.*, 2009; Wortmann, Glewen, & Williams, 2011). Miller & Cox (2006) argue that field days and workshops are the best methods for transferring information to farmers. However, this research shows that farmers prefer interactive events, such as field days, to formal workshops. Field days are also very popular with advisers, with the majority attending four or more a year. Farmers have been characterised as social learners, who prefer informal methods of learning that use a 'hands on' approach, and interacting with other farmers and researchers (Anil *et al*., 2015; Franz, Piercy, Donaldson, Westbrook, & Richard, 2010; Kilpatrick & Johns, 2003; Wenger, 2000). Such informal interaction allows them to compare views and values before making a change on their farm (Eckert & Bell, 2006; Kilpatrick & Johns, 2003).

Absolutely, we're doing it all now but just wanted confirmation what we're doing is the right thing that we're doing. WAF5

Miller & Cox (2006) showed that farmers thought field days that demonstrated small plot field experiments (e.g. those held in research stations) were not indicative of what might occur on their own farms but if these same experiments were held on a farm, other farmers were more interested in the results.

Farmers thought that workshops were redundant because of when they were held and tended to carefully choose which they attended. Farmers preferred workshops in which they could interact with other farmers (Miller & Cox, 2006), and attending specific workshops may not provide this desired interaction. This supports the findings of Miller & Cox (2006)); farmers placed a higher value on agronomy workshops (84% attendance) compared to workshops on pest and disease identification, herbicide application, and other topics (63% attendance). This may be related to the relationship between advisers and farmers; in the Australian grains industry, advisers are generally employed in relation to the cropping phase of the farm system, providing advice to farmers about specific issues such as pest and diseases in crops and the use of herbicides. Farmers may feel they have no need to attend workshops on these specific topics because the advisers they employ provide this knowledge.

These observations demonstrated most participants preferred informal interaction amongst themselves or with the speakers rather than the formal knowledge transfer that would be used in a workshop.

Kilpatrick (1997) suggested that attending training, and planning to attend training, is related to participants' education level, arguing that people with a lower level of education generally do not see a need to attend formal training, which could be due to their lack of confidence and lower literacy levels (Kilpatrick, 2000). This research shows education level had no influence on participation in formal workshops. However, those with a university education were more likely to attend webinars. Such technology-mediated events can support people spread across a large geographical area but they do not allow the informal networking opportunities that farmers prefer (Anil *et al.*, 2015; Wenger, 2000).

This research has uncovered new data on the influence of participants' age, education levels, occupation and

location on the likelihood of them belonging to a grower group. Grower groups can be considered a community of practice (Anil *et al.*, 2015; Gianatti & Carmody, 2007; Wenger, 2000, 2009) that provides an effective learning opportunity (Kilpatrick & Johns, 2003). Membership of grower groups is very popular, as they create a network of like-minded people who might be facing the same or similar problems on their farms. The interactions at grower groups thus offer an opportunity for reassurance that a participant's farming practices are correct. Gianatti & Carmody (2007)) found that many farmers in WA belong to more than one group; they may belong to a small local group, a larger, regionally-focused group and a state-wide group. Anil *et al.* (2015) found the proportion of farmers who actively participated in the groups varied but was related to where the farmer lived, and whether the grower group was a large state-wide group with a very widely dispersed membership or an active local group. Lack of time and having to travel a long distance certainly constrain attendance but grower groups, especially local groups, are valued for the interaction with other members and the informal exchange of information.

Coutts & Roberts (2011) capacity-building model places high importance on using training to increase farmers' skills and knowledge but there is little research on capacity-building for advisers, and no evaluation of knowledge gain or how advisers intend to use new knowledge after training. It is clear that Coutts & Roberts (2011) based their deductions on formal training events, with set curricula and specific learning objectives, whereas informal learning events are flexible in their content and objectives (Malcolm, Hodkinson, & Colley, 2003; Marsick & Watkins, 2001; Merriam, 2001). Most participants preferred informal interaction amongst themselves or with the speakers, rather than the formal knowledge transfer that would be used in a workshop. Kilpatrick & Johns (2003)) argue that farmers use a variety of informal learning to educate themselves and increase their capacity and skills. Australian field days very much fit into this informal learning pattern and both farmers and advisers who attended informal events showed an increase in knowledge. The knowledge gained during training benefits participants in some way, whether on the farm or at work, for example to improve crop production or control weeds but there are also benefits in simply having time to think and ponder the issues they face. Further research is needed to determine if participants did subsequently use their new knowledge in the ways they planned but it is clear that informal training events should form part of the capacity-building ladder.

CONCLUSION AND RECOMMENDATION

This research is the first study to evaluate the impact of training events such as field days and workshops on the knowledge levels of farmers and advisers in the Australian grains industry. Farmers and advisers see training as engaging, useful and important for capacity-building. Participants' knowledge increased after attending training and most participants feel they will be able to use their new knowledge on their farm or in their consultancy.

Training events can be categorised as formal (e.g. workshops) or informal (e.g. field days). Preferences for training types and topics vary considerably between farmers and advisers. Farmers prefer to attend informal, interactive events such as field days, which represent conditions similar to those on their farm. Such informal interaction allows farmers to compare their new knowledge to existing values and beliefs. Advisers are more likely than farmers to attend formal workshops that offer them an opportunity to network with colleagues, researchers, specialists and farmers.

Demographic characteristics such as sex, location, occupation and length of working life affect participation in training. Greater understanding of the influence of demographic characteristics and preferences for type of event should be used to improve the design and relevance of training events.

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