Organic wheat farming in Australia: issues farmers face

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Abstract. Organic wheat farmers in Australia face a number of unique challenges, and an in-depth understanding of these challenges is an important first step for government agencies, universities and other groups interested in promoting organic agriculture. This research was designed to develop a qualitative understanding of the biggest transition, cultivation, market and other issues faced by organic wheat farmers in Australia. Data gathering was conducted with a series of one-to-one interviews. The top challenge identified was rain, water availability and soil moisture. This challenge places unique risks on organic farmers because of additional cultivation cycles and subsequent delayed seeding. A second key issue was weed management, with particularly tough issues found during the initial transition years. The third top issue was soil fertility, which together with weeds, was identified as a key factor limiting wheat yields. Top requests from organic wheat farmers were for more organic crop research centres, greater promotion and visibility for organic grain growing, and a small transition-to-organic subsidy.

Keywords: organic farming, survey, organic certification, wheat

Introduction

The worldwide market for organic wheat and other grains has grown strongly over the past years, and Australian exports of organic grains, pulses and oil seeds have seen compound annual growth rates (CAGR) of 51% from 1999 to 2003. In 2003, this category represented the largest portion (by net mass) of Australian organic exports (Halpin 2004).

Organic agriculture is also arguably more sustainable than conventional agriculture. Mader et al. (2002) report that while crop yields on organic farms were 20% lower than conventional farms, input of fertilizer and energy was reduced by 34-53% and pesticide input by 97%. Better soil fertility and higher biodiversity were also seen on organic farms. A recent study from Australia (Wood et al. 2006) came to a similar conclusion stating that, compared to conventional agriculture, organic farming can reduce total water, energy and greenhouse gases involved in food production.

Despite strong markets and potentially better long-term sustainability, organic wheat farmers in Australia face a number of unique challenges. These challenges include the transition from conventional agriculture to organic methods, managing weeds, insects and other pests, increasing soil fertility, and marketing and selling organic wheat.

An in-depth understanding of the challenges faced by organic wheat farmers is a critical first step in guiding agricultural policy by government agencies, universities and other groups interested in promoting organic agriculture. The focus of this research is to develop a qualitative understanding of the biggest transition, cultivation, market and other issues faced by organic wheat farmers in Australia.

Results of prior organic farmer surveys

Various surveys of organic farmers have been conducted in North America, Europe and Australia. Key summary items from these research projects are included below, and a comparison versus the results from this

Australian wheat farmer survey will be made later in the paper.

Top challenges: In a US survey by OFRF (2003), the top-ranked challenges identified by organic farmers included weather-related production losses, lack of organic networks, and production losses due to weeds, pests or diseases. In a separate study (Hanson et al. 2004), many US organic farmers stated that they faced the same weather-related challenges as conventional farmers, but some participants felt that their investments in soil quality and subsequent improvements in soil water-retention capabilities made their farms more drought-resistant than conventional farms. In Australia, Wynen (1994) noted farmers observed in dry years that organically grown crops are more drought-resistant than conventionally grown crops.

Transition to organic: Surveys worldwide consistently report that a major motivator for farmers to become organic is the health of farm workers and the farm family, together with concerns about exposure to agricultural chemicals (Wynen 2000, Hanson et al. 2004 and Midmore et al. 2001).

Consulting with other organic farmers was a key source of information in the transition phase (Hanson et al. 2004). In the UK, many farmers requested that government agricultural agencies do more to support the transition from conventional to organic, with more information and short-term financial subsidies (Midmore et al. 2001).

Cultivation: Hanson et al. (2004) report that most organic farmers used cultural methods to manage diseases, insects and weeds. Many have reintroduced livestock to their operations, and use animals to help manage the financial risk of crop failure or loss of crop quality.

A number of research projects worldwide have also looked at conventional versus organic grain yield, although these studies are typically empirical research instead of farmer surveys. On-farm research from Kitchen et al. (2003) concluded that South Australian organic wheat yields were 69%-79% of conventional yields in moderate rainfall areas, with lower results in drier areas.

Market issues: OFRF (2003) reported that nearly all organic farmers were getting premiums for organic produce, and that the majority see solid market growth for organic food. Some farmers formed cooperatives to give themselves more marketing power (Hanson et al. 2004).

Other issues: Hanson et al. (2004) identified both pesticide drift and GMO contamination as major concerns for organic farmers. Many farmers have actively taken steps to prevent GMO contamination (OFRF 2003).

Research method

This qualitative research was conducted with series of one-on-one telephone interviews of approximately 30-60 minutes each. Participants all met the screening criteria of being Australian farmers (owners or cropping managers) who were actively growing wheat, either conversion to organic, or certified organic. Farmers interviewed for this survey were randomly selected from NASAA's Certified Organic website (www.nasaa.com.au).

NASAA's list was used because it has the largest list of organic wheat growers among the Australian organic certification organisations. On the website, 32 organic wheat growers were listed in April 2006. However when contacted by phone, six said they were no longer growing wheat, leaving a total of 26 listed organic wheat farmers.

The Australia Certified Organic (ACO) website listed nine organic wheat farmers, but one farmer was also on NASAA's list. The Bio-Dynamic Research Institute website listed one farmer, and the Organic Growers of Australia (OGA) website listed five farmers. Together with NASAA's farmers, a total of 40 organic wheat farmers were listed on Australia's certifying organization websites. There may be additional organic wheat farmers that have chosen not to be publicly listed on these websites.

As part of this research, 17 organic wheat farmers were interviewed, representing approximately 43% of the listed organic growers on all sites, and 65% of NASAA's organic wheat producers' list. To capture the diversity of regional experiences, farmers from five Australian states were interviewed,

and the land area of the farmers interviewed totaled approximately 84,000 hectares.

The interviews were conducted from April to May 2006.

Research limitations

The research conducted is qualitative, and can provide a directional understanding of the challenges faced by organic wheat farmers. This data cannot be used for quantitative extrapolation.

This research also focuses on the organic wheat farming challenges as seen by the farmers themselves. Other types of research on organic wheat farming challenges could independently test the perspectives of the farmers, for example soil tests could be undertaken, or paddock erosion risks could be independently checked, but these were not done as part of this research.

Respondent profile

Australian organic wheat farmers from five states were interviewed: Queensland, New South Wales, Victoria, South Australia and Western Australia. Of the 17 farmers interviewed, 14 were certified organic, and three were in conversion.

Most farms had two to three people working, while some of the larger farms had seven to twelve people actively working on the farm. Farming was the primary source of income for all but two of the farmers interviewed.

Most farmers had certified their entire farms, although a few chose to certify only a portion of their farms, and leave the remaining land under conventional management. Farm size ranged from 100 hectares to 26700 hectares, with an average size of approximately 5900 hectares. Total certified or conversion land varied between 100 and 25000 hectares, with an average size of 4950 hectares. Figure 1 shows the farm size per participant, broken into conventional and organic land area.

For almost all farmers, wheat production varied greatly from year to year depending on rainfall and crop rotation cycles. Typical land area planted per farm per year varied from 16 hectares to 3150 hectares, with an average of 510 hectares. For about 40% of the participants, wheat was the primary cash crop of the farm. For the remaining farmers, wheat was an important crop, but part of a rotation of crops that included oats, barley, linseed, chickpeas, hay and others. Figure 2 displays the typical wheat area planted per participant.

All participants except one had livestock on their properties (Table 1). Sheep and cattle were the most common, with almost all farmers having one or the other, or both. Some farmers ran pigs, goats and pigeons. For most farmers, these animals were a vital part of their farm operations, and were actively grazed on wheat cropping areas to gain more value from stubble as well as to control weeds, physically trample organic matter and increase soil fertility with their manure.

Top issues related to growing organic wheat

This section summarises the top challenges reported by organic wheat farmers in this study. Some of these challenges are discussed in more detail in later sections.

Rain, water availability and soil moisture: The biggest issue identified by organic wheat farmers was getting enough rainfall, flood water and soil moisture to plant on time. The challenge of water is one shared by conventional wheat farmers, but some participants pointed out that organic grain farmers face greater risks here. The extra cultivation cycles used to manage weed growth can dry out soil to a greater degree than conventional farmers using no-till methods, and the extra cultivation cycles can cause planting time delays of one to four weeks beyond conventional farmers. The extra cultivation cycles and delayed seeding can also mean planting in soils that are drier than farmers would prefer.

Weeds: The second biggest issue faced by organic wheat farmers in this survey was weeds. Weeds compete with crops for resources reducing yields. Key weeds mentioned were *Lolium rigidum* (annual ryegrass) and *Avena* sp. (wild oats), together with *Raphanus* sp. (wild radish) and *Chondrilla juncea* (skeleton weed). Some farmers reported that reduction of herbicide usage following the transition from

conventional to organic resulted in substantial weed problems in the first few years, although crop rotations and cultivation reduced seed banks and weed issues in subsequent years.

Soil fertility: A third major challenge reported by the wheat farmers in this survey was managing soil fertility. Soil nitrogen was seen as a key factor, together with weeds, that limited yields. Getting enough soil nitrogen through green manure was highlighted as a challenge, especially with low rainfall levels that limit green manure crop establishment and growth. A related issue was preventing soil erosion with the higher cultivation cycles under organic methods.

Other challenges: Getting full information on organic farming techniques suitable for their particular area was also highlighted as a concern by many farmers, and the low levels of university and government-funded organic research was noted. There was also a high degree of concern around pesticide drift from neighboring farms and the potential GMO contamination of crops, although only a minority of farmers interviewed was having any current issues with this. Market demand for organic wheat was seen as robust by all farmers, but getting enough consistent supply to meet this demand was reported as a difficult challenge.

Transition to organic

During the interviews, farmers were asked a number of questions about their experiences transitioning to organic production methods. Included were questions about the wheat farmers' motivations for going organic, their ability to get the information they needed, issues around certification, and impact of the conversion to organic on their crop yields and farm incomes. The various sections below describe these transition to organic experiences.

Motivations for becoming organic: Among the wheat farmers surveyed, the top reason for converting to organic agriculture was farmer and family health. Many farmers were uncomfortable with the safety and health impacts of agrochemicals, and for some there was an almost visceral hatred of chemicals, with comments about toxicity, smell, and a suspicion that the chemicals were unhealthier for humans than currently known. Three participants out of the 17 interviewed had personal stories about the health impacts of pesticides and fertilizer exposure.

A second major reason to convert to organic methods was economic, either to gain higher market premiums from niche markets, or to reduce input costs, or both. Although most participants cited health as their primary motivating factor to become organic, for some farmers economic reasons were the key driver.

Getting the information needed: The majority of farmers reported that their primary source of information during conversion from conventional to organic was other organic farmers. In particular, local area organic farmers were seen as a solid source of information on farming with local soil conditions and climate. Many farmers in conversion were surrounded by conventional farmers with no nearby organic farms, creating a sense of isolation and making this type of local advice difficult to get.

Organic specialists in state agricultural agencies were singled out by farmers interviewed as providing especially good advice, in particular Victoria and Western Australia.

Other important sources of information were seminars and publications from organic certification organisations, and the internet. While farmers felt they could learn from all these sources, they still felt they made many mistakes as they tried to adapt organic farming methods to local conditions. On-the-job training and mistakes were seen as a useful, albeit painful, method for learning how to farm organically.

Certification: Almost all farmers had no issues getting certified. Most felt the process was straight-forward, with certification agencies providing good information and advice.

Yield, income, and other transition issues: For farmers using chemical fertilizers and pesticides prior to converting to organics, yields dropped during transition years. With farmers using organic methods prior to conversion, yields typically stayed the same since farming methods were unaltered.

Counter-balancing yield drops were lower input costs and higher market premiums for in-conversion grain. For many of those interviewed, the net result was a higher income during transition years. For a smaller number of farmers however, income dropped during transition years, largely because of weeds and soil fertility issues.

Farmers reported that a reduction in herbicide usage often resulted in substantial weed problems in the initial years after conversion to organic agriculture. During the first year, paddocks may still be clean from prior herbicide usage, but in following years, weed problems may be intense until high weed seed banks carried over from conventional farming are reduced through cultivation, grazing and crop rotations.

Increasing soil fertility was also pinpointed as a key transition (and on-going) challenge. Organic methods typically use crop rotations and green manure crops to increase soil nutrient levels, organic matter and microbial populations. Farmers just converting to organic production have not yet established crop rotations to provide this fertility, and the result can be declining yields as prior super-phosphate and nitrogen fertilizers are depleted from the soil.

Cultivation

Beyond transition issues, participants in this research were asked questions about their methods and challenges growing organic wheat. Questions were asked about sourcing seeds, managing soil fertility, controlling erosion, and managing weeds and other pests. Farmers were also asked about their post-transition wheat yields compared to conventional farmers in their area.

Sourcing seeds: Almost all participants of this research saved their own wheat seed, and when farmers needed new varieties, they typically purchased the seed from neighboring organic farms.

Managing soil fertility: All farmers reported using crop rotations to manage soil health. Actual rotations varied greatly, and farmers were often opportunistic when deciding rotations. Rainfall, weather patterns and market conditions all influenced crop rotation decisions. Rotations typically included wheat, lengthy fallow and pasture periods, and various combinations of oats, oil seeds, sorghum, chickpeas, lucerne, medics and other legumes.

Grazing during pasture phases and also after crop harvests was very common, and farmers talked about the beneficial effects of manure plus the physical trampling of organic matter into the soil.

Most farmers were adding rock phosphate to their soils, as well as lime, gypsum, dolomite, sulfur and basalt sand as needed. A portion of the farmers interviewed were adding microbes to their soils in the form of seed inoculants, compost teas or other biological applications. A few farmers reported that the purchase of phosphate and other soil enhancers was limited by cash flow, especially during conversion years.

A few farmers were using green manure rotations, however not all farmers were planting legumes as cover crops to increase soil nitrogen. In areas of low rainfall, a few farmers reported that lucerne and other legumes would not establish well.

Some farmers were adding compost to their paddocks, and this compost was either purchased externally or made on the farm. Some participants commented that the high volumes of compost needed by broadacre farmers, plus the lack of on-farm composting materials and high transportation costs made this method less practical.

Most farmers felt their soil organic matter was increasing or staying the same, and many were managing their paddocks in ways to increase organic content, such as adding compost, incorporating stubble and less nitrogen addition. Compared to surrounding conventional farms, many farmers felt their own soils had higher organic matter, sometimes double or triple that of conventional farms.

Crop rotations, improving soil health and livestock grazing were seen by the farmers in this research as key to managing farm risks. Livestock were often used as a drought-resistant income source, and many farmers noted that improving soil health increased the resilience of their farms to weed and disease infestations.

Soil erosion: In the interviews, most farmers expressed concern over soil erosion, with higher risks associated with wind rather than water. An exception to this general pattern was the farmers in Queensland who noted that monsoonal rains can trigger water erosion. One farmer noted that with higher cultivation rates, organic farms can be at greater risk to erosion than conventional farms.

All farmers said they were taking active steps to reduce erosion risk. Most farmers were very careful to retain high amounts of crop stubble and other soil cover, and were actively avoiding bare paddocks. Tree planting and retention of natural areas around the perimeter of paddocks were used by many farmers to slow wind speed and control erosion.

Managing weeds: Farmers interviewed were split on the seriousness of their weed problems, with some feeling that weeds in their paddocks were manageable and under control, while others seeing weeds as an on-going challenge reducing their yields. Two key weeds species mentioned were *Lolium rigidum* (annual ryegrass) and *Avena* sp. (wild oats).

Key weed control techniques were a combination of cultivation, grazing, crop rotations and higher crop densities. Cultivation was the primary weed control technique, with most farmers doing two to three passes prior to seeding. These extra cultivation cycles typically meant delayed seeding for organic farmers compared to conventional farmers in their area. A few farmers noted that the extra cultivation cycles to reduce weeds dry out the soil compared to conventional no-till methods, making organic wheat farming less drought-tolerant and more risky than conventional farming.

Almost all farmers used their livestock to help manage weeds. Some farmers aggressively used sheep and cattle to control weeds, with rotational grazing, carefully planned timing and smaller paddocks with electric fences.

Crop rotations, including pasture phases were another widely used weed management tool. Crops like barley were seen as being more competitive with certain weeds than wheat, and rotations of these crops offer a chance to reduce weed seed banks. Some farmers were slashing their pastures prior to weed seed set to reduce seed production.

Another tactic used by some farmers was planting at higher than normal seeding rates. This was done to increase the competitiveness of wheat relative to *Lolium rigidum* (annual ryegrass) and other weeds.

Disease and insect pests: A few farmers commented that in prior years they had troubles with *Puccinia striiformis* f. sp. *tritici* (wheat stripe rust), which shriveled seeds, increased screenings and reduced overall yield. The main tool for fighting rust was to plant rust-resistant varieties.

The most commonly mentioned insect pest was *Sitophilus oryzae* (weevils) infesting stored wheat. The main control technique for weevils was storage in sealed silos with food-grade CO_2 injections, or dry ice.

Yields: All participants were asked to compare their yields to local area conventional farms, or compare them to prior yields if the farm had been conventionally managed. The organic farmers gave a range of wheat yields from “half” to “same” when asked this question, and for all the participants a rough average was 75%.

Participants who were farming conventionally prior to becoming organic noted a decline in yields, although this was not always apparent in the first year, and showed improvements in the fourth and fifth years. Some farmers who were using largely organic methods prior to certification did not see a drop in yields. The farmers interviewed suggested that the drop in yields was due to the combined impact of lower nutrient inputs and higher weed competition.

Marketing and selling wheat

Farmers interviewed as part of this survey were asked a number of questions around marketing and selling organic wheat. These questions included queries on demand and supply, pricing and the impact of converting to organic methods on overall farm income.

Demand and supply: Nearly all farmers reported very strong demand for organic wheat. Many farmers regularly talked to organic wheat buyers, stating “they come to

us" or "they come chasing me" or "they call almost every week." Much of the wheat from the participants' farms was being exported, in particular to Europe for breads and to Japan for noodles. Some of the farmers had taken international trips to meet these buyers, or had overseas buyers on their farms for inspections and discussions. Some grain, especially lower quality wheat, was being sold to organic dairies or organic egg farms.

Farmers reported that supply is the single biggest constraint to expanding sales of organic wheat. Most farmers stated that they could sell much more wheat than they are able to grow. A number of farmers have joined regional organic farmer cooperatives in order to better market their grains, as well as to ensure consistent supply in order to retain their best customers. Some farmer cooperatives have tried to recruit new members to increase organic wheat supply, but they reported difficulties finding farmers willing to convert from conventional to organic.

Pricing: All those interviewed said that they were getting price premiums for their organic or conversion wheat, with price premiums of 67% to 200% above conventionally grown grain. Most farmers also reported high wheat quality, with protein levels averaging 13% and ranging from 10% to 16%.

Farmers also stated that they can typically receive higher prices if they are able to store wheat for four months or longer. Some local buyers do not have enough storage capacity at harvest time to accept high volumes, and some of the farmers interviewed were storing buyers' grain on site for a fee. At the same time, many farmers struggled with getting enough on-farm storage so that they could sell at later dates when prices were higher. Lack of sealed storage was also an issue, with weevil infestations common. One farmer was using a large plastic tube product for sealed storage of his grain.

Income: With lower yields after converting to organic methods but higher market premiums, farmers were asked if they felt their overall income had gone up, stayed the same, or gone down compared to income prior to becoming organic.

Most farmers stated that their income had gone up after becoming certified organic, while a few felt their income had stayed the same. A small number of farmers found this a tough question because recent drought conditions made comparisons difficult. No farmers reported that their income had dropped after becoming organic, and two of the farmers stated that becoming organic had allowed them to keep their farms. These two farmers felt they would have gone out of business had they still been farming conventionally.

Other issues

A variety of other questions were asked to understand the full spectrum of issues and opportunities faced by organic wheat farmers in Australia. Government programs and research were discussed, together with issues around GMOs and pesticide contamination.

Government programs and research: Farmers commented that they found the organic research centers (especially Victoria Department of Primary Industries, Rutherglen) and government organic specialists (notably Victoria and Western Australia) to be very helpful. Research results, on-farm trials, newsletters and publications, personal visits and consulting were all noted as being especially useful.

The farmers interviewed were asked if they had requests for government agencies or other groups involved in managing agriculture in Australia. Their highest priority request was more funding for organic crop research, in particular participants requested state organic crop research centers (similar to what already exists in Victoria).

A second and related request was for government agencies and universities to recognize the importance and longer-term sustainability of organic agriculture, and achieve a better balance between organic and conventional government programs. One farmer commented that there were multiple government programs and seminars supporting conventional no-till agriculture, with its high chemical use, but there were no corresponding programs promoting organic agriculture.

A further request was made for a one to four year subsidy for conventional farmers converting to organic production.

Participants noted that even a small subsidy could be very helpful.

GMOs: All farmers interviewed expressed concerns about genetically modified organisms (GMOs), and many were extremely concerned. Three of the farmers interviewed were already taking steps to prevent GMO contamination. All three were no longer growing canola, and one was actively removing any volunteer canola that appeared on this land.

Pesticide drift and contamination: While some farmers had organic neighbors, the majority of participants were surrounded by conventional farms. Most farmers have not had issues with spray drift or contamination. All farmers had discussed their organic status with their conventional neighbors, and most said their neighbors were very supportive and careful in their own spraying. Many organic farmers felt they had adequate buffers around their farms, including roads, natural bush areas, firebreaks and hills. Some had posted signs around their properties, see plate 1.

A few farmers interviewed had experienced contamination issues. One farmer reported errant crop dusting planes passing over his property, and another farmer had spray drift from a neighbor and was forced to quarantine 160 hectares for a year.

Comparisons with prior organic farmer surveys

Earlier in this paper, the results of prior research on organic farmers in North America, Europe and Australia were outlined. This section will discuss the similarities and differences between these prior studies and this current research on the challenges Australian wheat farmers face.

Top challenges: Most of the findings in this research mirror the findings from earlier studies in the US and Britain, and prior research in Australia, with minor exceptions.

In the North American OFRF 2003 survey, the top ranked challenges show strong similarity with the findings in this research. Weather-related production losses were high on the list of the OFRF study, and likewise the top issue from this Australian survey of organic wheat farmers was getting enough rainfall, water and soil moisture to plant on time. However, in the US study by Hanson et al. (2004), research participants felt that their investments in soil quality and subsequent improvements in soil water retention capabilities made them more drought-resistant than their conventional neighbors. Wynen (1994) made a similar conclusion from surveys of Australian farmers who felt organic farming methods made their paddocks more drought-resistant. The opposite was found to be true in this study. While Australian organic wheat farmers were making diligent efforts to improve soil fertility and soil organic matter, efforts which in turn increase water retention capacity, the extra cultivation cycles and subsequent delayed planting put Australian organic farmers at greater risk of drought than their conventional neighbors. Empirical research comparing conventional versus organic wheat farming in South Australia (Kitchen et al. 2003), supports this conclusion, with lower yields versus conventional farming in drier agricultural areas relative to the same comparison in wetter areas.

Weed-related production losses were also identified in the OFRF study, and in a similar fashion the participants of this Australian research identified this same issue as their number two concern.

The lack of organic networks was noted in the OFRF study as a top issue, and many of the participants in this Australian research felt isolated, and surrounded by conventional farmers, with long distances to the nearest organic farm.

Transition to organic: Surveys worldwide conclude that a major motivation for transitioning to organic farming methods is farm worker and farm family health. In this Australian research, this same reason was given by wheat farmers as their top motivator for moving toward organics. Also Hanson et al. 2004 identified “consulting with other organic farmers” as a top information source in the transition to organic agriculture, and likewise this survey identified other organic farmers as the most important information source for Australian farmers.

In the UK study (Midmore et al. 2001), participants requested government agencies to do more to support the transition from conventional to organic, with more

information and short-term financial subsidies. Likewise the Australian farmers in this survey put as their highest priority request more government research and information on organic agriculture, and some farmers also requested financial help during the transition phase.

Cultivation: Techniques for managing weeds, diseases and insect pests in the US (Hanson et al. 2004) are very similar to findings in this study, with cultivations, crop rotations and grazing used as key elements. The US study noted that many farmers were reintroducing livestock on farm operations to help control weeds, and were using livestock to help moderate the financial risks of crop loss. The Australian farmers in this survey almost all used livestock to manage weeds, although these animals were not "reintroduced" since most farms have always had livestock. Diversifying income sources and risk were also noted by Australian farmers as important reasons to keep cattle and sheep.

In past Australian research (Kitchen et al. 2003), organic wheat yields were reported to be 69-79% of conventional yields in wetter areas, and lower comparative yields in drier areas. In this organic wheat farmer survey, the results were similar, with a rough average of the responses suggesting yields approximately 75% of conventional farms.

Market issues: Like prior US studies, participants in this research reported strong demand for organic produce, and all were getting market premiums for their wheat. In the US, Hanson et al. (2004) report that many farmers have formed cooperatives for greater marketing clout, and this same pattern was found among Australian organic wheat farmers.

Other issues: GMOs were a key concern in US studies, and many farmers had actively taken steps to avoid contamination. Likewise among Australian organic wheat farmers, concerns about GMOs were high, and many were taking proactive steps to avoid contamination. Pesticide drift was identified as a key concern in the US research, and findings in Australia were similar.

Recommendations

Market data suggest a robust and growing worldwide market for organic wheat. In this research, the organic farmers interviewed all reported experiencing this strong demand, and talked about frequent calls from organic wheat buyers. Most report that they could sell far more organic wheat than they can consistently produce, and some have tried to recruit new farmers into their cooperatives to help ensure a greater and more consistent supply to meet this growing demand.

In parallel, new research (Mader et al. 2002 and Wood et al. 2006) is showing that organic farms are arguably more sustainable than conventional farms, with lower fertilizer, pesticide and energy use, and better soil fertility and higher biodiversity.

Given this combination of strong local and worldwide demand for organic wheat, and the probability of better long-term sustainability of organic methods, state and national agriculture agencies in Australia may want to consider stepping up their support of organic grain production.

The farmers in this survey provided clear guidance for the best places for government agencies to provide more support. The highest priority identified by organic wheat growers in this survey was for more state and nationally sponsored organic farming research. Establishing additional organic crop research centers in Western Australia, South Australia, New South Wales and Queensland, similar to the Victoria Department of Primary Industries organic research center in Rutherglen, would be a strong first step in supporting the needs of organic grain growers. These state research centers would be able to provide organic farmers with advice on the best crop varieties, soil management practices and weed and disease control methods tuned to local farming conditions. Consistent and continued funding for existing organic research at universities and other organisations would also provide strong help to Australia's organic grain growers.

A second and related important step that state and national governments could consider is raising the visibility of organic agriculture through seminars, workshops and road shows. Many farmers in this study expressed concern that organic agriculture was not recognized or valued by state or

national governments, and that agriculture programs could be better balanced between conventional and organic methods. Raising the visibility of organic agriculture in farm seminars and workshops may also help increase the number of organic farmers over time, and may help Australian farmers meet and take advantage of the strong and growing worldwide demand for organic grains.

A third step state and national agricultural agencies could consider is a small subsidy for farmers converting their land from conventional to organic. As this study found, many farmers struggle during transition years. Crop rotations are not yet established, soil fertility needs improvement and large weed seed banks, remaining from conventional farming, cause yield losses. A small state or nationally sponsored subsidy, similar to what is found in some European countries and some US states, could provide significant help to farmers in the first few years as they transition from conventional to organic methods. Alternatively, subsidies could be provided more broadly to both conventional and organic farmers making the transition to more sustainable methods.

Conclusions

This research was designed to gain a qualitative understanding of the biggest transition, cultivation, market and other issues faced by organic wheat growers in Australia. Telephone interviews were conducted with organic wheat producers across five Australian states in order to gain an in-depth understanding of the challenges as seen from the farmer's perspective.

The top challenge identified was rain, water availability, soil moisture and the ability to plant on time. While all Australian farmers share this challenge, organic farmers face unique risk because of the additional cultivation cycles used to manage weeds, and subsequent delayed seeding.

The second and related challenge identified was weed management, with particular mention of *Lolium rigidum* (annual ryegrass) and *Avena* species (wild oats). Farmers were split on the seriousness of weeds, with some feeling that weeds in their paddocks were manageable, with other seeing weeds as an on-going challenge reducing their yields. During the transition from conventional to organic production, farmers often face their most difficult weed challenges with high weed seed banks remaining from conventional years, and crop rotations, cultivation cycles and grazing patterns not fully set-up to manage these weeds.

A third issue identified was the management of soil fertility. Soil nitrogen was seen, together with weeds, as a key limiting factor reducing wheat yields. Also similar to weeds, soil fertility was a key transition challenge. Organic methods typically use crop rotations, legumes and green manure crops to increase soil nutrient and organic matter levels, but in the initial transition to organic years, these crop rotations are not yet established.

Farmers interviewed as part of this research all saw high and growing demand for their organic wheat, with a key limiting factor being able to grow a consistent supply to meet this demand. Most felt their farm incomes had gone up after becoming organic, although some farmers saw a dip in their income during the initial transition years.

The top requests from these organic wheat farmers to government agriculture agencies was for more organic crop research centers, greater visibility and promotion of organic agriculture, and a small subsidy for farmers converting from conventional to organic methods. With strong market demand and potentially better long-term sustainability of organic farming, these requests could be used to help guide state and national agricultural agencies as they work to support Australian organic wheat farmers.

Acknowledgements

Special thanks to Christopher Morgan, Senior Lecturer in Business Management at Charles Sturt University for his help and consultation throughout this project.

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Appendix

Figure 1: Participants' farm size, with organic and conventional split

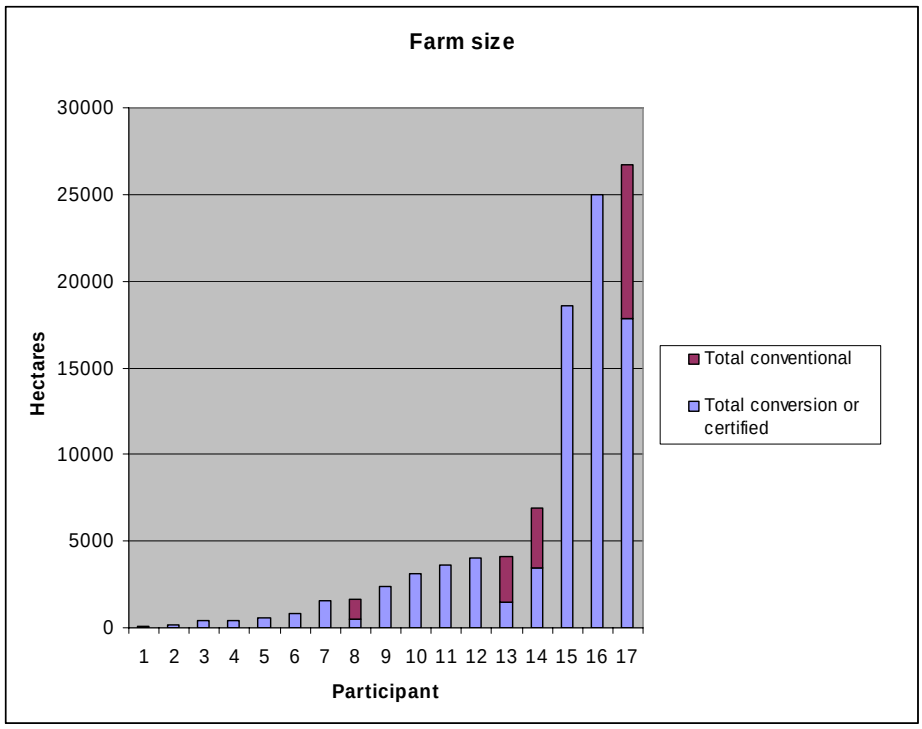

Figure 2: Typical wheat cropping area planted per year

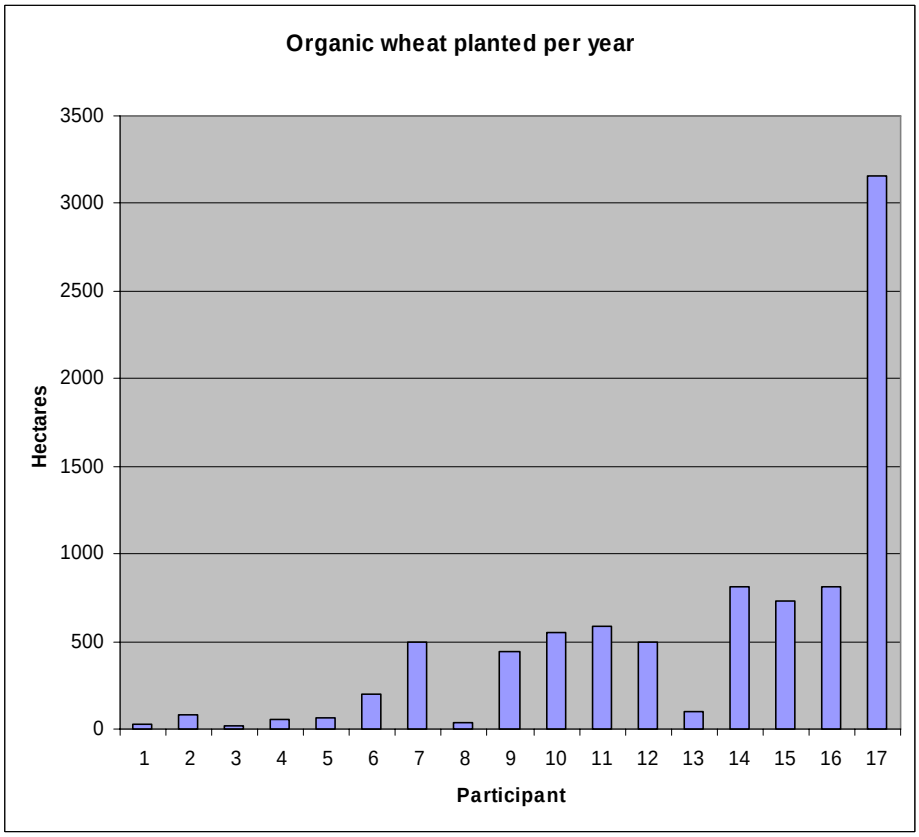

Table 1: Livestock and other animals

Participant	Cattle	Sheep	Goats	Pigs	Pigeons	No animals
1	♦	♦				
2	♦	♦				
3	♦				♦	
4	♦					
5	♦	♦				
6	♦					
7		♦				
8	♦					
9	♦	♦				
10	♦	♦				
11	♦	♦				
12		♦				
13						♦
14	♦					
15		♦	♦			
16	♦					
17		♦		♦		

Plate 1: Sign at the border of an organic wheat farm, stating “chemical usage prohibited”