Stage 2 Research Project – 2014

RPA ☐ RPB ☒

School Assessment Cover Sheet for

➢ Assessment Type 2: Research Outcome

SACE Registration Number:

Research Question What are the long term monetary, health and production benefits of becoming a certified Organic or Biodynamic cereal producer in South Australia?

word count 2,178 (for written only)

S1 Research question clearly outlines the purpose and scope of the research.

PHOTO COURTESY OF CBC NEWS

Photo of wheat.
Image removed to protect copyright.

Common cereal crop in South Australia, Wheat

Reap the Rewards of Organic and Biodynamic Cereal Production

S3 Heading and introductory sentences clearly indicate purpose of article. Tone of a persuasive article established.

Organic and Biodynamic consumption is not just a fad that will eventually phase out into society, it is here to stay and there is no better time than now to convert your property! In fact with the growing demand and shortfall of certified grains in Australia[1] why not convert to Organic or Biodynamic cereal production and get ready to reap the rewards?

What does it mean to produce Organic products, and additionally, Biodynamic products? Organic production, as defined by IFOAM (The International Federation of Organic Agriculture Movements) involves working productively and efficiently with nature. Organic producer, Ross Carter, interprets Organic production as utilising natural methods, products and amendments whilst avoiding synthetic chemicals and tilisers. The next step from 'Biodynamics', Organic and cereal producer, L.E Neitschke, defines Biodynamics as the "...pinnacle of Organics." Biodynamics not only covers Organics, but has at its heart a philosophical element; the notion of working with the cycles of nature[2] and utilising a property as a whole ecological system[3]. Whilst beneficial, this method of farming isn't always suited to large scale cereal production, as summarised by Organic producer, John Schwarz.

S2 Sources acknowledged and quoted.

Before any 'rewards' of Organic or Biodynamic cereal production can be 'reaped', the certification process must firstly be addressed. From first-hand experience, Schwarz admitted that, "[yes], the conversion to Organic (was) the biggest hurdle, with no Organic prices for benefits and no conventional chemicals and fertilisers to boost yield." Alternatively, Carter expressed that "...the certification process (was) not that onerous," with Schwarz further admitting that, "...once though this period, the wait (was) worthwhile." Several organisations in Australia accredit certification under the National Standard for Organic and Biodynamic produce; AQIS (Australian Quarantine and Inspection Service)[4]. So what is the best way to go about certification? A primary producer must begin by researching organisations best suited to certify their property. In reference to the renowned quote, "...it's not about what you know... but who you know," producers will gain first-hand information by talking to Organic and Biodynamic producers about their experiences. It takes three years for a property to be 'certified'. Whilst the first year's product cannot be sold as 'Organic' or 'Biodynamic', produce can be sold as 'In Conversion' during the second and third years after conversion.[5] In the early stages of certification, various soil and crop samples are taken during inspections[6], ensuring the property is cleared of chemical residue. These inspections are compulsory and occur annually. J McGuire, producer of Organic cereals, agreed that the "...certification process is merely necessary and [of] no great inconvenience. The benefits of avoiding unnecessary and expensive damaging toxic chemicals will always be worth pursuing."

Images of logos removed to protect copyright.
S1 Alternative views acknowledged. Leads into discussion of process to certify. Appears to weigh up pros and cons, leading into final benefit of certifying.
S2 Sources cited to support the discussion.
S3 Persuasive tone and coherent argument.

LOGOS COURTESY OF DEPARTMENT OF AGRICULTURE

Stage 2 B – s response

Certifying Organisations, accredited by AQIS (Australian Quarantine and Inspection Service).

Structure used in paragraph shows evidence of insightful synthesis, is well substantiated and supports persuasive argument. Same structure used elsewhere.

S1 Key research question identified.

S2 Expert cited.

S1/2 Quotation to support.

S1/2 Cross referencing.

S1/3 Synthesis. Further devlopment of points.

S2 Source cited.

S1/2/3 Further supporting argument.

Many monetary myths are pread by conventional cereal producers, ssuming that Organic and Biodynamic roduction is hard work with little profit; urely from observation alone. From first-hand experience, all surveyed South Australian Organic and Biodynamic producers agreed that the premiums paid for Organic and Biodynamic produce offset the production costs. As reported by Carter, no added expense is needed r chemicals as they are not permitted r Organic and Biodynamic production. he producer continued to explain how, "...conventional farming requires more intervention as one treatment leads to other corrective treatments, resulting in a weakened and chemically damaged crop." Furthermore, Schwarz admits that "...production costs are less than half that conventional growers," as many dles can be avoided with good Organic agronomy, timing and machinery. Just like all market commodities, Organic and Biodynamic rain, hay and straw prices are etermined by supply and demand. As eported by *Biological Farmers of ustralia*, (2012), the demand for Organic rains for domestic human consumption as increased recently, along with the demand for Organic cereal products for the expanding Organic livestock industry. Similarily, the source continued to report that Organic hay cut from cereal crops remains significantly undersupplied in Australia. Surprisingly, whilst there is a rtfall of Organic cereal products in tralia with imports needed to meet mand, there is also a strong and highly valued export market overseas, reported by *Biological Farmers of Australia*, (2012). Schwarz explained that wheat production returns, per tonne, are almost doul that of conventional farmers and a gate price is paid for certified grain no extra transport and handling costs. Correspondingly, Organic and Biodynamic producer at Four Leaf Milling stated "...a premium is always paid for certi grain, *how much* depends on the availabilty and demand." Consequ the myth can end, as not only are the production costs for certified Organic and Biodynamic grain less than that of conventional farmers; there will always be a market for the produce, whether locally or to export, with premiums offseting production costs.

S1/2 Expert cited.

S1/2 Cross referencing.

S1 Rebuffing myth

Quality and quantity are significant production factors to be considered, however, is it possible for both to go 'hand in hand'? A major setback of growing Organic and Biodynamic cereal crops is the restriction of conventionally used fertilisers to boost growth. As admitted by Schwarz, "...yields vary dramatically from 25-85% of conventional crops, averaging around 60%." However, Carter explained that "...on occasions best crops have yields equal to conventional farmers." Whilst yields of Organic and Biodynamic cereal produce may not size up to conventional crops, the production benefits may just win in the long run, as quality must be taken into consideration. From experience, Schwarz explained how the protein of conventional grain was not high enough to sell into the local flour mill. To his surprise, protein levels of organically produced grains unexpectedly increased by 1.5-2% without added nitrogen and were accepted. Results regarding quality, were outlined in survey responses from first-hand experience of Organic and Biodynamic producers, with critical observations such as, "...definite vement to crop quality...,"and that "...the grain (was) never insect infected."

Sustainability is a major factor in the Australian agriculture industry; in the past, the present and for the future. However, The Australian Government Department of Sustainabilty, Environment, Water, Population and Communities, (2006) reports that whilst approximately half the total agricultural area in Australia has topsoils marginally acidic or worse, Organic farming systems restore soils for productive cropland and secure the future of Australian agriculture. Furthermore, Organic production maintains and increases long term fertility of soils, encouraging and enhancing microorganisms, soil flora and fauna, inviting the return of native plants and animals[7]. In theory, Organic production proves to be beneficial to the sustainability of Australian agricultural. Putting this into practice, various Organic and Biodynamic producers observed that in comparison to conventional properties, the soil is softer and more fertile, filled with earth worms and living organisms, with considerable microbe activity and less weed and insect problems. An increase in birdlife was observed by Schwarz, as a result of the plantation of tree lines, preventing chemical drift from surrounding properties. In the harsh and unpredictable Australian environment, it is reported that Organic farms have a greater resilience in times of drought, supported by a 21 year trial by the Rodale Institute; a non-profit organisation dedicated to pioneering Organic farming through research and outreach[8]. In regards to Organic and Biodynamic production, quality of produce and long term sustainability bears more importance than crop quantities, working efficiently for the future of Australia agriculture.

PHOTO COURTESY OF MINDFULL>ORG.

S1/3 Currency of information in sources cited and used in reference to current trends in diets.

Image of plants in field.
Image removed to protect copyright.
S2 Substantiation of finding through visual representation.

Comparison of Biodynamic soil (A) and conventional soil (B), of a wheat crop.

Producing Organic and Biodynamic cereal products includes a range of health benefits for many involved. Both Schwarz and Carter agreed that workers on a certified Organic/Biodynamic farm are 'better off', as they aren't subjected to toxic chemicals that require protective clothing and were previously deemed safe. These toxic chemicals are found in artificial fertilisers and pesticides such as herbicides, insecticides and fungicides, all allowed on conventional cereal properties, as reported by National Institute of Environmental Health Sciences, (2013). From this widespread use of chemicals in conventional farming products, the source continued to explain how farmers can experience increases in headaches, fatigue, insomnia, dizziness, hand tremors and other neurological symptoms. Many farms are family orientated, with children regularly spending time outside, however children are vulnerable to adverse effects such as neurodevelopmental implications, from pesticide exposure, as further reported by the source. As stated by McGuire, "...those who believe chemicals to be harmless, or necessary, are deluding themselves."

Whilst fads like 'superfoods' and paleo diets generally phase out over time, Organic and Biodynamic consumption will continue to expand through public awareness. Organic and Biodynamic cereal products, such as oats, flour, pasta and bread have health benefits to consumers, whilst avoiding chemicals carried through

A significant benefit to consumers, as agreed by *Australian Certified Organic*, (2013) and surveyed producers, is that Organic produce has more nutritional density. The *Australian Certified Organic*, (2013) reports that over 100 studies show that the nutritional premium of Organic plant-based food averages 25% higher than

S2 Statistics used to support argument.

nilarly, d grown without artificial stimulus (referring to artificial fertilisers) has more nutrient density, has a higher brix reading and is able to resist disease and insects better." According to High Brix Gardens (2005-2013), a 'brix reading' refers to the measure of the carbohydrate level in plant juices, resulting in food with greater mineral and carbohydrate density, better taste and greater resistance to insects and disease. These health benefits of Organic and Biodynamic produce result in food with approximately one third more cancer fighting antioxidants when compared to conventional produce, as reported by Benbrok, (2005). Unmistakably, in the past few years there has been an increase in the amount of people who are 'gluten intolerant.' This is the intolerance to the protein 'gluten' found in cereal products[9]. From various observations, Schwartz explained how he believes

Fresh off the Farm

Cereal producer John Schwarz, shares his firsthand experience of converting to Organic production after being told by his doctor, "...the farm was killing (him)."

Previously, Schwarz practiced conventional farming methods for many years, explaining how, "...we converted to Organic production after I was told by my doctor I would have to get off of the farm. We realised that the chemicals were the problem and not the farm." After hearing Organic producers share their experiences, along with much research, John and his wife Jenny, decided to adopt an Organic approach to farming. Schwarz explained how, "...several agronomists advised us to try in a small way first, but because my health was at stake we decided we didn't have that option." In a short space of time they gave all chemicals on the property, and addressed the certification requirements for NAASA (Nat Agri prob beca farming again, with the benefits of Organic production, "...once through the certification period, the wait (was) worthwhile." However, John explained how his, "...own health plummets if and when (he) is caught in a spray drift scenario, whether minor or major." From his knowledge and personal experience, John explained how chemicals accumulate in our bodies through exposure and it takes a lot of effort to detoxify and maintain optimum health." Many farmers believe they can't afford to farm organically because of high debt structures.

I believe they can't afford *not to,* for health reasons not only for themselves but for the whole community."

S2 Substantiation of research. Reasons why to certify.
S3 Use of a personal voice to support certifying. Powerful way to support argument.

PHOTO COURTESY OF AG EXCELLENT ALLIANCE

Image of farmer.
Image removed to protect copyright.
S3 Photo supports personal voice and adds to the persuasive tone used.

Organic cereal producer, John Schwarz.

Image of graph removed to protect copyright.
S2 Use of graphs to substantiate findings. Appropriately referenced and acknowledged.
S3 Adds to coherence of discussion as another method of supporting assertions.

FIGURE COURTESY OF AUSTRALIAN CERTIFIED ORGANIC.

Retail growth value of Organic (and Biodynamic) industry in Australia, 1990-2012,

Image of cows in field.
Image removed to protect copyright.
S1/3 Caption adds a supporting argument.

PHOTO COURTESY OF BC AGRICULURE

The expanding Organic livestock industry in Australia promotes the demand for Organic cereal products: grain and hay.

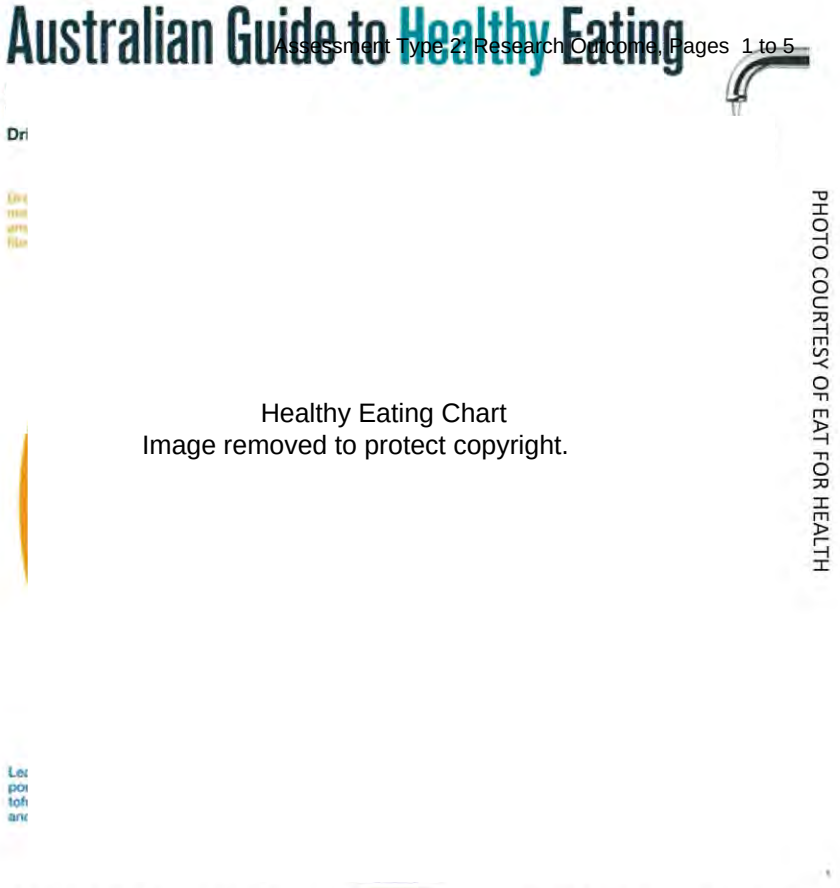
chemicals are triggering more and more people to develop such food intolerances. Continuing to report how a local consumer, intolerant to wheat products, was able to consume Organic wheat without adverse effects. Whilst this theory is from observation only, the Dietitians Association of Australia , (n.d.) similarily reports that, "people who have food intolerance react to chemicals (...) added to foods during processing". Once ingested through food, chemicals accumulate in the fatty tissue of consumers, with both humans and livestock; this is known as bioaccumulation.[10] Humans ingest chemicals directly through food products, and indirectly by being next in line through the food chain. As Schwarz explained, livestock is affected by chemicals and become carriers through the food chain to consumers. Organic and Biodynamic production is not just about, 'what's in it' but more about 'what's not in it'. Organic and Biodynamic production is a logical way to avoiding chemicals in food products and ensuring the health of farm workers and families.

Organic and Biodynamic production incorporates monetary, production and health benefits, for producers, consumers and for the future of Australian agriculture. Just remember, there is no better time than the present to reap the rewards of Organic and Biodynamic cereal production and consumption. **AOP**

S3 Summary iterates the benefits.

[1] Australian Certified Organic, (n.d)
[2] Australian Certified Organic, (n.d)
[3] Organic Federation of Australia, (2014)
[4] Australian Certified Organic, (2013)
[5] Organic Federation of Australia, (2014)
[6] National Resources Management and Environmental Department, (1998)
[7] Rodale Institute, (n.d.)
[8] Mayo Clini Staff, (1998-2014)
[10] United States Environmental Protection Agency, (2000)

S2 In-text referencing using footnotes substantiate findings appropriately.



Healthy Eating Chart
Image removed to protect copyright.

The Australia guide to healthy eating; representing cereal products as the largest and most significant food group.

S1 Synthesis of knowledge - supports reference to Dietitians Association of Australia in adjoining paragraph.
S3 Chart adds credibility to argument that dieticians support eating grain.

S1 Synthesis of knowledge and ideas can be seen in the structure of the analysis in each paragraph. Key areas of research are identified at the beginning of each paragraph. Discussion of issues for and against are raised. Conclusions are drawn to support argument.
S2 Substantiation of research findings are in a variety of ways - in text referencing and quotations, footnotes, visual photos, diagrams and charts. All are appropriately placed and sourced.
S3 The arguments for using organic and bio-dynamic farming techniques are explained in a well structured article, using clear and coherent expression. Interest is maintained through such things as the magazine style of writing, the photos/charts and graphs to support the text, and the reference to individual experiences.

References

S2 Substantiation of sources used.

Biological Farmers of Australia, 2012. *Australian Organic Market Report,* s.l.: BFA.

Anon., 2013. *Consumer Standards.* [Online]
Available at: http://austorganic.com/wp-content/uploads/2013/09/Consumer_Standards_Final_21.pdf
[Accessed 8 August 2014].

Australian Certified Organic, 2013. *Consumer Standards.* [Online]
Available at: http://austorganic.com/wp-content/uploads/2013/09/Consumer_Standards_Final_21.pdf
[Accessed 8 August 2014].

Australian Certified Organic, No Date. *ORGANIC & BIODYNAMIC FARMING, LIVESTOCK, WILD HARVEST, GROWERS GROUPS.* [Online]
Available at: http://www.aco.net.au/index.php/farming
[Accessed 8 August 2014].

Australian Government Department of Sustainabilty, Environment, Water, Population and Communities, 2006. *Department of the Environment and Water Resources annual report 2006–07,* Canberra: s.n.

Dietitians Association of Australia , n.d. *Food Intolerance and Sensitivity.* [Online]
Available at: http://daa.asn.au/for-the-public/smart-eating-for-you/nutrition-a-z/food-intolerance-and-sensitivity/
[Accessed 19 September 2014].

High Brix Gardens, 2005-2013. *What is Brix?.* [Online]
Available at: http://www.highbrixgardens.com/what-is-brix.html
[Accessed 8 September 2014].

Mayo Clini Staff, 1998-2014. *Gluten-free diet: What's allowed, what's not.* [Online]
Available at: http://www.mayoclinic.org/healthy-living/nutrition-and-healthy-eating/in-depth/gluten-free-diet/art-20048530
[Accessed 18 September 2014].

National Institute of Environmental Health Sciences, 2013. *Pesticides.* [Online]
Available at: http://www.niehs.nih.gov/health/topics/agents/pesticides/
[Accessed 8 September 2014].

National Resources Management and Environmental Department, 1998. *Evaluating the Potential Contribution of Organic Agriculture to Sustainability.* [Online]
Available at: http://www.fao.org/docrep/003/AC116E/ac116e00.htm#Toc
[Accessed 8 August 2014].

Organic Federation of Australia, 2014. *Becoming Certified.* [Online]
Available at: http://www.ofa.org.au/becoming_certified
[Accessed 8 August 2014].

Rodal Institute, n.d. *Research, Soil Health.* [Online]
Available at: http://rodaleinstitute.org/
[Accessed 17 September 2014].

United States Environmental Protection Agency, 2000. *Bioaccumulation Testing and Interpretation.* [Online]
Available at: http://water.epa.gov/polwaste/sediments/cs/biotesting_index.cfm
[Accessed 15 September 2014].