Organic Trust Australia –
Research and Education

Improving the measurement of the value of organic production in Australia

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1 Reason for report, and how it is structured

Reliable data are important for decision making in any industry, including organic agriculture. Good data show, for example, production and prices in the past, which can help producers decide what to grow in the future. Good data can aid input suppliers in decisions about investment in all kinds of goods such as feed for the dairy and poultry industries and services such as marketing, insurance and finance. In addition, public policy requires good data about the size and nature of the industry so that, for example, funding for research and development can be directed to where it is most effective.

However, in Australia reliable data have always been difficult to obtain, as no agency (government or otherwise) has regularly and systematically collected and published full sets of data. The Australian Quarantine Inspection Service (AQIS) collected data on numbers of organic operators and area under organic management from certifiers in the 2000s (see Section 2), but this agency no longer collects these data.

From the early 2000s, some studies were undertaken on the production value of the industry (see Section 3). From 2008 Australian Organic (AO)[1] published bi-annual reports on the state of the industry using data from its own surveys, supplemented with their own knowledge of the industry. For 2010-11, AO decided to commission the Australian Bureau of Statistics (ABS) to include some questions on organic agriculture in its census – presumably because past data were deemed not to be sufficiently accurate. This seemed an important milestone in the potential availability of data in this area, but methodological problems limited the use of these data. In Section 4 problems with the interpretation of the ABS data are explored, and some solutions are offered in Section 5. In summary, the main problems related to: organic price premium; discrepancy between share of organic area and share of organic production; and confusion between production and sales data. The conclusion is that it is unlikely that the analysis of those ABS data provided in Monk *et al.* (2012) gives an accurate picture of the value of organic production at the farm gate in 2010-11.

Even if proper analysis of the ABS data could have led to a good estimate of organic production in Australia, flaws in the analysis of the ABS data of 2010-11 (Section 6), and also in the estimates for 2014 (Section 7), make it unlikely that the data published in the recent AO-reports are accurate. Although the reports provide orders of magnitude, there are too many mistakes to provide reliable estimates in many cases. This makes calculations of growth rates particularly unreliable, especially where definitions of products and methodology have changed between the years (Section 8), with consequences for sensible decision-making.

How could data gathering and dissemination be done better than it has been done in the past? This is discussed in Section 9.

[1] Previously Biological Farmers of Australia (BFA).

2 Larger area - fewer producers: 2000 - 2014

From the early 1980s, some efforts were made to collect data on organic agriculture in Australia, especially on area and number of organic farmers (see Table 1) and, in later years, the value of the production at the farm gate (see Table 2).

Table 1: Area under organic management and numbers of organic producers (1982-2012)

Year	Hectares	% of total hectares	Number of producers
1982			<500
1990-a			950-1200
1990-b	372,371		1,260
1995	1,119,235		1,462
2001	5,293,732		
2002	6,201,195		
2003	11,249,212	2.5	1,730
2004	12,128,386	2.6	1,859
2005	11,766,768	2.7	1,894
2006	12,345,314	2.8	1,710
2007	11,988,044	2.7	1,776
2008	n.a.		n.a.
2009	12,001,724	2.9	2,129
2010-11	11,199,577	2.7	2,117
2014	18.34 million	4.1	1,707

Sources: 1982 and 1990-a: Conacher and Conacher (1991); 1990-b and 1995: Hassall and Associates 1995; 2001-2007: AQIS (adapted by author); 2009: AQIS (adapted by A. Mitchell *et.al.*); 2010-11: ABS (2014a) – as reported by Monk *et al*. (2012); 2014: AO (2014).

One of the early studies with data about producers and area under organic management was undertaken by Conacher and Conacher in the early 1980s, and updated in 1991. The number of organic farmers was reported as having increased from fewer than 500 in 1982 to between 950 and 1200 in 1990, although the numbers are not strictly comparable (Conacher and Conacher 1991). Hassall & Associates (1990) estimated that there were 1260 organic producers in 1990, and reported a rise in 1995 to 1462 (Hassall and Associates 1990; 1995).

Since the early 2000s, data were collected by AQIS, to which (almost) all certifiers undertook to supply data on certified enterprises (farmers, manufacturers, and traders). However, for those who chose not to participate (such as the Bio-Dynamic Research Institute), researchers needed to make assumptions to estimate the total values. In addition, these figures suffered (probably only slightly) from inaccuracies due to, for example, double-counting (where enterprises were certified by more than one certifier). These data, obtained from AQIS and supplemented by educated guesses by people working in the field, were the basis for much of the data used in Australia. They were also published in the yearly 'Statistics of Organic Agriculture'[2]. However, in more recent years AQIS stopped collating the data, and data were gathered either from certifiers and adjusted with industry

[2] These publications started in 1999 - with FIBL as lead organization.

knowledge (likely to be less accurate than that provided to AQIS), from surveying organic producers, or directly from the Australian Bureau of Statistics (ABS).

The general picture of these data is that real growth in area under organic management started around the early 2000s, with a dramatic increase from just over one million in the mid-1990s to over five million in 2001. In 2003 it jumped to over 11 million, a figure that has been reasonably stable since then. At present, there seems an enormous expansion of the extended grazing areas, which may well see the area under organic management doubling over the coming years.

The number of agricultural businesses certified as organic or in-conversion has also fluctuated over time, mostly increasing but possibly decreasing in more recent years (for more details, see Section 4.2). These fluctuations may have been due to several reasons, one of which being a change in measurements between the years. Another factor, which has become more pronounced in recent years also in other countries, is that the smaller farmers leave certification for reasons of increased complexity and cost of certification, while the number of larger farmers increases[3]. This means that, although the number of certified organic farms decreases, the area under certified organic management could still be increasing, in addition to an increase in non-certified organic farms and area.

3 Value of production: 2000 - 2014

Estimates of the number of holdings or area under organic management in Australia are not very meaningful because farm size can vary from 1 hectare to 1 million hectares or more, and productive capacity per unit area can vary enormously depending on location (influenced by factors such as soil type and rainfall). The value of production at the farm gate is a more useful indicator. From the early 2000s, some studies on that aspect of the industry were undertaken (see Table 2).

Table 2: Farm-gate value of organic industry in Australia – various years

	Year	Farm-gate		
		Total	**Beef as share of total**	**Fruit, vegetables and grain as share of total**
		$m	%	%
Wynen (2003)	2000-01	89	36.0	51.0
Halpin (2004)	2003	140	40.9	49.5
Kristiansen *et al.* (2008)	2007	231.5	13.7	57.7
Mitchell *et al*. (2010)	2009	223.2	15.4	58.2
Monk *et al.* (2012)	2010-11	300.6	24.2	47.4
AO (2014)	2014	440.4?	39.0?	36.9?

For 2014 see details in Section 7.

Wynen (2003), in an attempt to estimate the financial contributions (levies) from organic growers to Research & Development Corporations, used data from two major and some minor certifiers (who would have represented over 90 per cent of the total value), and added estimates of those that were not included. This resulted in the calculation of total returns to the industry at the farm gate of $89 million for 2000-1.

[3] Andre Leu, president IFOAM, pers. comm., 17 August 2015.

Most later studies were based on surveys, with low response rates - typically (considerably) less than 30 per cent. Industry knowledge then was used to compensate for the likely response bias. For 2003, Halpin (2004) estimated the total farm-gate receipts to be $140 million. For 2007 (Kristiansen *et al*. 2008) and 2009 (Mitchell *et al*. 2010), the figures were estimated – again with surveys supplemented with industry knowledge – at around $230 million. For 2010-11 the value was calculated with ABS data at $301 million (Monk *et al*. 2012) – for details see Section 6.

In 2014, AO brought out its fourth Market Report – for 2014 – with data gathered from wholesalers, retailers, manufacturers and processors, and inferences for the farm-gate sales and retail and export market (Section 7).

Direct comparisons with previous years are difficult to make, as categories are not strictly the same and additional categories have been included. The total value of food and beverages at the farm gate in 2014 is calculated at $476 million, but deducting wine and beverages (not included in the 2010-11 data) would bring it to $440 million. However, it is not clear that 'processed foods' ($59 million) should have been included, while there are products under 'other'– (such as flowers, teas, coffees, spices, herbs, nuts, honey, wool and cotton) that should perhaps have been included - and are not. Further comments on growth rates are made in Section 8.

The studies also showed some details of individual sectors. In the earlier studies, beef was estimated to be around 40 per cent of the total commodity values, but in the 2008 and 2010 studies these figures were considerably lower, at around 15 per cent, though there was an increase again in 2012. Fruit, vegetables and grain have consistently been at a high level, around 50 per cent or more. It is difficult to assign percentage growth to the 2014 data, with the total and some of the details in doubt (see Section 6-8).

4 ABS data 2010-11 and issues with interpretation

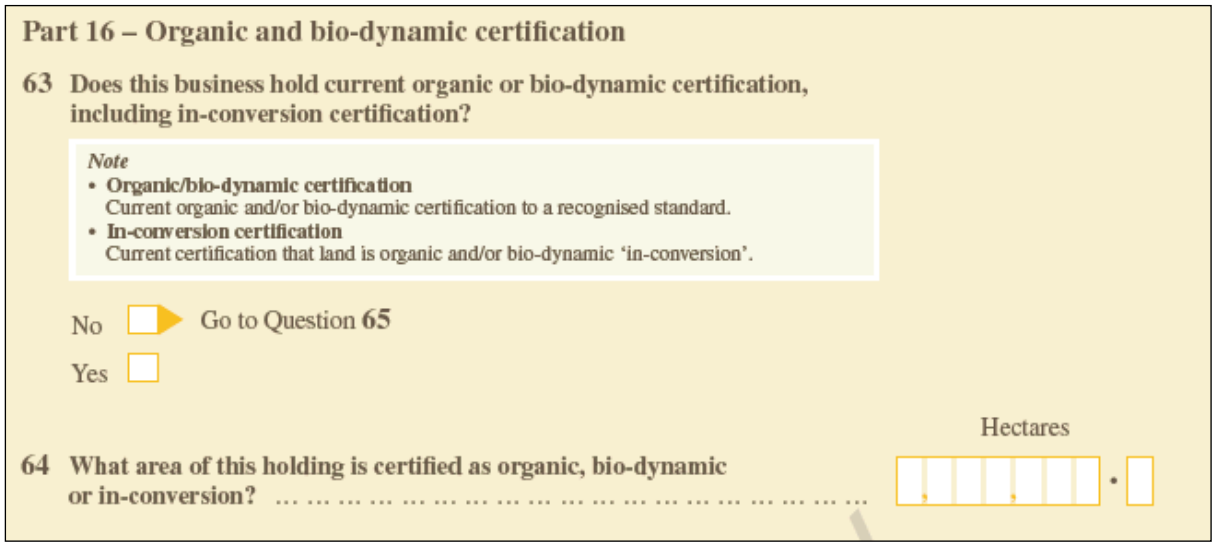
4.1 What is measured?

Every five years, ABS conducts an Agricultural Census in Australia, where all landholders meeting certain criteria are obliged to fill out a questionnaire. Between two census years ABS conducts surveys, where approximately 35,000 landholders are assessed. In its 2010-11 census, ABS included a question on organic agriculture (including in-conversion)[4], as seen in Figure 1, and in 2012-13 it included a similar question in its survey of that year.

The ABS census includes agricultural producers with an income from agricultural activities of over $5,000, and should therefore be able to provide considerably more reliable estimates for the organic industry than industry surveys, especially those with low response rates as carried out in the later part of the 2000s. However, this is the case only if the data can be interpreted with confidence. We first look at the results of the gathered data, then discuss the limitations with the data, and lastly look for solutions to problems.

[4] The then BFA (now AO) paid for the inclusion of the question in the 2010-11 census.

Figure 1: ABS question on organic agriculture: 2010-11



Part 16 – Organic and bio-dynamic certification

63 Does this business hold current organic or bio-dynamic certification, including in-conversion certification?

Note
- **Organic/bio-dynamic certification**
  Current organic and/or bio-dynamic certification to a recognised standard.
- **In-conversion certification**
  Current certification that land is organic and/or bio-dynamic 'in-conversion'.

No → Go to Question 65

Yes

64 What area of this holding is certified as organic, bio-dynamic or in-conversion? ... Hectares

Apart from the number of landholders and quantities of commodities produced, ABS also publishes data on the value of agricultural commodities produced (VACP). These are available for the different agricultural commodities for Australia as a whole, and also for the individual states. These figures are freely available for the whole agricultural sector in Australia but – if data specifically for organic agriculture are required – these need to be extracted specifically, and payment is required for the data.

4.2 Area, number of producers and differences in measurements

For 2010-11, Monk *et al*. (2012) estimated from ABS data the organic certification area as 11.2 million hectares. This compares with 12.0 million hectares in 2009 (Mitchell *et al*. 2010) – obtained via AQIS (see Table 1). The total area of holdings in Australia in 2010-11 was 409.7 million hectares, which meant that 2.73 per cent of that area was under management with organic certification. This was a bit lower than in 2009, when it was 2.9 per cent of a total of 417.3 million hectares (FAOSTAT 2011).

The number of agricultural businesses certified as organic or in conversion in 2010-11 was estimated by Monk *et al.* (2012) to be 2,117 (1,520 identified by ABS, and 597 identified from other sources) out of a total number of 135,447 – making up 1.6 per cent of total holdings. This is similar to the estimate of 2,129 in 2009 reported by Mitchell *et al*. (2010). However, AO (2014) reports 1,707 agricultural producers for 2014, much closer to the ABS figure for 2010-11.

The difference in numbers between sources is somewhat of a concern, but it is possibly at least partly due to two different methods of measurement. There are limitations with both methods of data collection – that by the certifiers (and AQIS), and that by ABS.

In the AQIS/certifiers data at least two sources of potential inaccuracies are present. The first limitation arises when (some of the) certifiers are not willing to provide data. This has meant that, in the past, a small part of the total values was based on assumptions, instead of the figures originating from the certifier. The second limitation is the possibility that some producers were certified by

more than one certifier. Thus, double counting may have occurred especially in the years before 2009.

On the other hand, the ABS census – which takes place only every five years – may suffer from some individual landholders just not returning the questionnaire (it should be noted that the 2010-11 census had a response rate of 88 per cent). In addition, ABS counts only those primary producers[5] with an estimated value of agricultural operations (EVAO)[6] of more than $5,000 per year. That is, some certified producers may not have an Australian Business Number, and some certified organic farmers – who could be seen perhaps more as 'hobby-farmers' and could be counted under the AQIS scheme – are not counted in the ABS census. Although this last issue may make a difference in number of organic farmers – boosting the AQIS figure due to inclusion of small farmers – it is not likely to change the area under organic management greatly, as the excluded farmers are – by definition – small. For example, assuming that the 597 holdings added by Monk *et al.* (2012) to the ABS data reported for 2010-11 (1,520) would add an average of five hectares per holding (in many cases – for example for herb growers – a large over-estimation), this would increase the total by 2,985 hectares, less than 0.03 per cent.

Another factor, mentioned earlier – that smaller farmers leave certification and the number of larger farms increases – may explain some of the fall in numbers of organic producers in later years.

4.3 Value of agricultural commodities produced (VACP)

4.3.1 VACP measured on organic holdings

Apart from the area under organic production and the number of organic farms, the size of the organic agricultural sector in terms of its value of production is of great interest to governments and private investors alike. The value of agricultural commodities produced (VACP), that is, the value at the farm gate of the conventional agricultural sector is available from ABS data. The value on holdings with at least some part under organic certification in 2010-11 was estimated to be $432.2 million (see Table 3).

According to these data, by far the largest value (just over half of the total value of the products) originated from enterprises producing livestock and livestock products (milk, eggs, wool), with one third of the value from 'fruit and vegetables'. The VACP from 'grain and oilseed'-producers contributed just over seven per cent of the total market. However, these data are rather problematic for several reasons.

[5] According to the Australian Taxation Office 'A primary producer is an individual, trust or company carrying on a primary production business.' Holdings without an Australian Business Number would not qualify.

[6] The ABS classifies each farm business to an industry (ANZSIC) based on that business's EVAO (estimated value of agricultural operations). EVAO is calculated from 'valuing' area and production of crops and number of livestock, using a three-year averaged price map. It provides a measure of the extent of any agricultural activity undertaken on the farm. Industry is assigned according to the activity, or group of activities that have the greatest EVAO 'value'. In this way, a single industry code is assigned to each business which reflects the predominant activity undertaken on the farm holding. For example, holdings that are classified as 'grain' properties would have the majority of their EVAO derived from the production of grains. However, they might also have EVAO derived from other crops, such as horticulture, or other enterprises, such as livestock (ABS 2014b).

Table 3: VACP on holdings with organic certification by commodity (2010-11)

	$m	% of total
Livestock	152.5	35.3
Livestock products (milk, eggs, wool)	64.7	15.0
Cereals for grain	28.5	6.6
Oilseed	3.0	0.7
Vegetables	56.6	13.1
Fruit	86.8	20.1
Hay	6.7	1.6
Nurseries, cutflowers, cultivated turf	8.3	1.9
Other crops	25.0	5.8
TOTAL	**432.2**	**100**

Based on ABS (2014a)

First, the ABS data of the VACP for the organic industry are likely to be under-estimates because the product prices used by the ABS to calculate the VACP do not include an organic price premium. Second, not all holdings with organic certification are certified for their total area – and it is difficult, if not impossible, to determine the relationship between the percentage of area under organic management and percentage of receipts from organic farming. A last issue is that no account can be taken of the fact that not all organic produce is marketed as organic. These issues are further discussed below.

4.3.2 Issue 1: Organic price premiums ignored

The ABS describes its data on the VACP as follows:

*'**1** The value estimates …. are derived by the multiplication of price and quantity estimates of agricultural commodities.*

*'**2** Price information refers to the average unit value of a given commodity realised in the market place. Price information for livestock slaughterings and wool is obtained from Australian Bureau of Statistics (ABS) collections. Price information for other commodities is obtained from non-ABS sources, including marketing authorities and industry sources.*

*'**3** Quantity data for most crops have been collected from the 2011 Agricultural Census. Remaining commodity data (livestock disposals and livestock products excluding eggs) are obtained from other ABS collections, with some information from non-ABS sources, and continue to be comparable across time.' (ABS 2014a).*

This process means that once the data on quantity of production have been collected, it is then multiplied by an average price in the (conventional) market to calculate the value. In practice, prices for organic produce are often higher (and sometimes considerably higher) than those received in the conventional market. In other words, the values used by the ABS to calculate the VACP of the organic products are almost certainly lower than they actually are in the market.

4.3.3 Issue 2: Organic VACP – area under organic certification

The second methodological issue stems from the fact that not all the area on certified farms needs to be under organic management. This can be due to several reasons. One is that the area under the more valuable enterprise, such as vegetables, is certified and an area with a different enterprise, such as livestock, is not. The vegetable area could be a small part of the total property – although still delivering most of the receipts of that farm from just that enterprise. Another possibility is that non-arable areas may not be certified, although the total of the receipt from farming are from organic products.

When all land is under organic management, all products can be classified as organic. But when not all of the area is under organic management, some of the VACP is likely to be from conventionally-grown products. The crucial question is: how much.

The ABS tried to get a measure of the degree of participation in the organic sector by asking question 64: 'What area of this holding is certified under organic, bio-dynamic or in conversion?' However, the percentage of value of organic products is not necessarily the same as the percentage of certified area. Where it is not, calculating the VACP on that basis would lead to misleading answers.

An example of the problem may be helpful. It is entirely possible that, on a vegetable farm, only a small part of the farm, say two of a total of 50 hectare (that is, four per cent of the farm), is devoted to organic vegetable growing, with an VACP of, say $80,000. This leaves 96 per cent under extensive beef grazing – an enterprise that generally has a considerably lower return per hectare than vegetables. Let's assume that the beef was sold for, say, $20,000. Equating the area under organic management with the VACP for organic production would mean that this farm would receive $3,200 for organic vegetable production (4 per cent of $80,000) and $800 for organic beef production (4 per cent of $20,000), totalling $4,000. This is a rather distorted picture from the real situation, both for the individual enterprises and for the total.

4.3.4 Issue 3: Organic sales – value of organic production

The last issue is that not all products produced as organic are sold in the organic market. This is true in particular for livestock on mixed-enterprise farms, as it may be difficult to find a certified abattoir within a commercially reasonable distance from the farm when numbers of animals are low. The question is then what is reported, the production or sales of organic produce? The ABS data reflect the total production value. The different reports quoted in this paper are not explicit about it, but may well sometimes refer to sales in the organic market.

5 Solutions to interpreting ABS data for organic agriculture

Given the problems regarding the nature of the ABS data, is it feasible to produce better estimates of the organic market with ABS data than those that have been produced so far?

5.1 Include organic price premium

Organic products are typically sold at a premium. In Monk *et al.* (2012) no adjustments were made to address this problem for 2010-11, leading to underestimation of the size of organic market. However, it is difficult to obtain an estimate of the premium, which may differ between products, areas and seasons. Certification bodies collect farm-level data from producers, and this may provide a better source of information about premiums at the farm-gate level. Another option is, of course, to assume a premium for the different commodities.

5.2 Refine relationship organic area – production value

The issue of adjusting the VACP to the area under organic certification is also difficult to address for the analyst. One way to do this is to assume that the percentage of total receipts of organic products is equal to the percentage of the certified organic area to the total area of the farm. For example, if the landholder reports that half of the area is certified it is then assumed that half of the VACP is derived from organic products. We have already seen above that this can be misleading, as the different commodities are not of equal value, and the productivity of the land is not equal over the farm (such as scrub, with little or no financial return, may be left out of the certification). ABS data cannot solve this problem because it doesn't ask what percentage of total receipts is from organic production – sold in the organic market or not.

If the researcher still wants to estimate production value by using area under organic management as a proxy, there are different problems. Although the ABS collects detailed data about the share of a property devoted to organic production, confidentiality concerns prevent it from providing data about individual holdings. In other words, the researcher doesn't know the percentage of the area of each farm under organic management, and so can't calculate the total VACP for the organic sector by using those data – even if percentage of area equated with percentage receipts. Several options are available, such as to assume that all holdings earn a share of their VACP from organic production, such as half. This would make the total VACP of the organic farmers to be half of that in Table 3.

There are many combinations of calculations that may make the VACP estimates more accurate. One solution is to divide the total group of organic farmers into smaller categories, such as:
Category 1: holdings with less than 50 per cent of the land area under certification.
Category 2: holdings with between 50 and 95 per cent under certification.
Category 3: holdings with 95 per cent or more of the land under certification.

In Table 4 the total VACP of organic holdings is shown as in Table 3, but this time divided into three categories according to area under organic management. Category 1 consists of holdings with less than 50 per cent organic certified area, category 2 of those from 50 to 95 per cent; and category 3 of those from 95 per cent or more. Taking the approximate midpoint would mean calculating the VACP to organic agriculture from all growers in category 1 at 25 per cent, and from those in category 2 it

would be 75 per cent (approximately). In category 3, where over 95 per cent of their property is recorded as certified organic, it can be assumed that the whole of the VACP is derived from organic production.

Table 4: VACP on holdings with different percentages of organic certification (2010-11)

	Category 1: less than 50% of holding certified organic		**Category 2:** from 50% to less than 95% of holding certified organic		**Category 3:** 95% or more of holding certified organic		**TOTAL ABS** (Table 3)	**TOTAL ABS** mid-point
Industry	**Total $m**	**25% of total $m**	**Total $m**	**75% of total $m**	**Total $m**	**100 % of total $m**	**$m**	**$m**
Livestock	34.1	**8.5**	18.1	**13.5**	100.3	**100.3**	152.5	**122.3**
Livestock products	5.3	**1.3**	14.3	**10.7**	45.1	**45.1**	64.7	**57.2**
Cereals for grain	14.1	**3.5**	4.0	**3.0**	10.5	**10.5**	28.5	**17.0**
Oilseed	1.5	**0.4**	0.7	**0.5**	0.9	**0.9**	3.0	**1.7**
Vegetables	32.8	**8.2**	3.3	**2.4**	20.5	**20.5**	56.6	**31.2**
Fruit	53.2	**13.3**	16.8	**12.6**	16.8	**16.8**	86.8	**42.6**
Hay	1.3	**0.3**	1.0	**0.7**	4.5	**4.5**	6.7	**5.5**
Nurseries, cutflowers, cultivated turf	2.0	**0.5**	2.7	**2.0**	3.6	**3.6**	8.3	**6.1**
Other crops	4.7	**1.2**	18.4	**13.8**	2.0	**2.0**	25.0	**16.9**
TOTAL	149.1	**37.3**	79.1	**59.3**	204.1	**204.1**	432.2	**300.6**

Source: based on ABS (2014a).

In Table 4, each of the categories is divided in two. The first column of each category is that part of the total in Table 3 that can be contributed to the particular category, and the second column (in bold) is the same figure but taken as the mid-point of category 1 and 2. The last two columns in the table are the totals. The next last column is equal to the total in Table 3, and the last is the total of the mentioned percentages of each category. To be precise, the total calculated in this way is $300,637,412.88.

In conclusion, although it is interesting to try to estimate receipts from organic production by looking at the area under organic management, there are problems with this approach. The main reasons are that the productivity of the land is not equal over the farm and that different crops are not of equal value. If the researcher wanted to proceed with this method of analysis, then a realistic relationship between the VACP apportioned to organic production and the proportion of organic certified area on the holding will need to be established to assure that the VACP estimate for certified organic produce is close to the actual situation.

6 Production values for 2010-11: how are they estimated and what are the results?

The approach as described in Section 5.2 was taken in Monk *et al.* (2012), as it reports that the 'Total farm-gate value of certified organic products in Australia in 2011 was estimated to be $300,637,412…' (p.7.

In Table 5 the VACPs for different commodities are shown as calculated from ABS data (first column), taken as the midpoint of the first two categories of the ABS (second column) and as calculated by Monk *et al.* (2012, p.21). Although this last publication shows exactly the same total as obtained

Table 5: VACP as derived from ABS (2014a) and Monk *et al.* (2012) for 2010-11

	ABS (2014a)	ABS (2014a) mid-point	Monk *et al.*, (2012)
	$m	$m	$m
Cereals for grain	28.5	17.0	
- Wheat	18.1	10.9	
- Oats	2.3	1.5	
- Barley	3.7	2.0	
- Sorghum	0.4	0.2	
- Maize	1.0	0.6	
- Rice	1.9	0.8	
- Triticale	0.3	0.2	
- Other	0.8	0.7	
Oilseed	3.0	1.7	
- Canola	1.2	0.3	
- Other oilseeds	1.8	1.4	
TOTAL CEREALS AND OILSEED	**31.6**	**18.7**	**17.0**
VEGETABLES	**56.6**	**31.2**	**60.6**
FRUIT	**86.8**	**42.6**	**61.6**
- Nuts	3.4	1.9	3.4
- Grapes: for wine	24.3	11.0	
- Grapes: total	25.1	11.7	4.9
NURSERIES, CUTFLOWERS, CULTIVATED TURF	**8.3**	**6.1**	**3.6**
PASTURE, CEREAL & OTHER CROPS CUT FOR HAY	**6.7**	**5.5**	**5.5**
OTHER CROP - TOTAL	**25.0**	**16.9**	
TOTAL VALUE CROPS	**215.0**	**121.1**	**142.6**
TOTAL LIVESTOCK PRODUCTS	**64.7**	**57.2**	**33.6**
- Eggs	3.0	2.7	4.4
- Wool	29.9	25.4	25.4
- Milk	31.8	29.2	29.2
TOTAL LIVESTOCK	**152.5**	**122.3**	**105.9**
- Pigs	3.6	1.2	0.4
- Goats	2.2	2.1	1.9
- Beef	87.5	75.5	72.8
- Sheep	23.5	19.6	18.6
- Poultry	35.6	23.9	17.7
ESSENTIAL OILS			**1.4**
HONEY			**5.0**
MISCELLANEOUS			**3.6**
TOTAL CROPS and LIVESTOCK	**432.2**	**300.6**	**288.5**

Notes:

1. Based on ABS (2014a): includes nuts and grapes in fruit.
2. Monk *et al.* (2012):
   - excludes wool, goats, fodder and miscellaneous from organic sales.
   - 'Vegetables' is vegetables and herbs, and 'Nurseries' is included in vegetables and herbs
   - 'Grapes' is included in fruit total. 'Nuts' is a separate item.

with this second method, that is, $300.6 million on p.20, the totals of the entries in its Figure 10 (p.21) – as replicated in Table 5 – add up to only $288.5 million.

There are other puzzling issues about the data. For some products the report shows exactly the values of the mid-value method, and for others it adopts the full value as shown in the first column – without explanation. Or it uses totally different figures from those shown in the two first columns.

Examples of the first (the same as ABS mid-point) in Monk *et al.* (2012) are wool, milk and pasture – and also 'grain and oilseed', although the oilseed seems to have been left out of the calculation. An example of the second case, adopting the full ABS data, is fruit - where the $61.6 million in Monk *et al.* (2012) is equal to $86.8 million minus the total value of grapes ($25.1 million), although the figure includes the authors' estimate of grapes ($4.9 million). 'Nuts' was also assumed to be the value of the full ABS data, and was added separately, though the ABS data include it in the fruit category. Other additions are essential oils and honey, while wool and goats are deducted, and nurseries are assumed to be part of 'vegetables', but added separately in the ABS data. Figures for the total of vegetables are almost twice as high as the ABS mid-point data – and more than the total of the ABS data – though not as much more as the total of 'nurseries'.

It seems therefore remarkable that, despite all these differences, the total value as shown in Monk *et al.* (2012) is exactly the same as that of the ABS mid-value data, to (almost!) the last dollar. That is, there are question marks hanging over the methodology used by Monk *et al.* (2012) to explain data published for 2010-11.

7 Production values for 2014: how are they estimated and what are the results

In 2014 ABS could not provide data in a timely manner for inclusion in the MR 2014 and data in this report were obtained by interviewing roughly a quarter of the wholesalers, retailers, manufacturers and processors[7]. The farm-gate production data were then obtained by multiplying the processing data by 0.4286, that is, assuming that the value of the processed goods was 133 per cent higher than the farm-gate value of production. On the other side of the food value chain, the retail and export sector together were shown as being 1.4286 times the estimated value of the processing sector – that is, 43 per cent higher than the value of the goods after processing. The exception of this method of calculation was the fruit and vegetables section. This was, for some reason, assumed to have the same farm-gate value in 2014 as in 2010-11. The added value of processing was then calculated at 15 per cent, and for retail and export at 66 per cent (no reasons provided). The results for the value of the farm-gate sales are shown in Table 6.

When there is a lack of data, it is quite valid to try to estimate data at different levels of the production chain. However, it would have been appropriate if the report had mentioned that, especially because these multipliers '…are not standardised ones in the marketing field'[8]. The underlying assumption here is that the processing margin (133 per cent of the farm-gate value), and the retail and export margin (43 percent over the processing value) are constant across a range of products. This is obviously a strong assumption, and not likely to be reasonable. It is also assuming

[7] Barry O'Mahony, Swinburne University, pers. comm., October 2015.
[8] Antonio Lobo, Swinburne University, pers. comm., February 2016.

that exported goods are exported in the shape of processed goods even at the level of retail. That is not necessarily realistic – for example, one would expect most of the grain to be exported as grain, and not as a processed good such as flour, in bulk or as packaged in one-kilogram bags.

Table 6: Farm-gate data of selected agricultural commodities (2014)

	AO 2014
	$m
Grain	39.9[1]
Oil crops	3.2[1]
Fruit and vegetables	122.2[1]
Eggs	4.5[2]
Milk	113.5[1]
Pigs	4.7[2]
Beef	198.2[2]
Sheep	n.r.
Poultry meat	26.0[2]
TOTAL	**508**

Source: AO (2014) and author's calculations based on ABS (2014a). The total is not the sum of the components.

Notes:

1. Data as shown by AO (2014) Table 1 'Key data', p.4.
2. Data as shown by AO (2014) individual sectors – where no or different data in Table 1.
3. n.r. = not recorded.

Showing results to the last dollar (as was done in the market reports) is perhaps also not a good idea under these circumstances, giving the impression of considerably more accuracy than the assumptions justify.

Apart from these issues, at least some of the data must be queried. The figures in Table 1 ('Key Data') do not always reflect the data discussed in the text. The most obvious one is the farm-gate value of 'meat', which is recorded as $82.2 million in Table 1, while the text mentions $198.2 million for beef alone – with more for lamb (post farm-gate values are quoted as $11million) and presumably pork and chicken.

Another – very obvious – problem with the data is that of the value of dairy at the farm gate, showing almost four times the 2010-11 value (an increase from $29.2 million to $113.5million). Without any obvious spectacular growth in either number of dairy farms or expansion of area per farm between these two years, this is not likely to be the case. However, this figure can probably be explained by the fact that one processor imported a lot of milk powder from New Zealand to be processed for export to China – in which case it is a good example of how the methodology employed by AO (2014) can lead to considerable mistakes regarding farm-gate values.

A third example – but there are many more – is the vegetables and fruit sector, reported at exactly the same value as in 2010-11 ($122,226,971), which is rather unlikely to be the case. With a reported growth rate of 44 per cent between the two years it is clear that something must be very wrong.

8 Growth rates: 2010-2011 to 2014

8.1 Need to compare like with like

To calculate growth rates between two years, collection methods between the years of comparison should be comparable. The data for 2010-11 were gathered via (ABS) census with actual data from farmers, while for 2014 data were gathered by contacting (part of) the retailers, wholesalers, manufacturers and processors and assuming farm-gate values to be a certain percentage of the values estimated for the first-named sectors. That is, methods of data collection were vastly different between 2011-12 and 2014.

In addition, the farm-gate values taken from ABS-data are those of organic production valued at conventional prices. The 2014 data, on the other hand, are values that include organic price premiums.

Other issues of concern regarding the accuracy of the value of organic production measured by the ABS-methods and interpreted by AO (2014) – as described in Section 5 (percentage of farm under organic management and organic sales versus organic production) – would all contribute to making comparisons between the two years a real problem.

A last issue is the difference in definition of a holding between the two studies. For 2010-11, ABS had a lower limit acceptance of landholders with more than $5,000 receipts from agriculture. In 2014 all farm production was included, irrespective of size of farm.

What has this meant for the reporting of growth rate in Australian organic agriculture in the recent past?

8.2 Estimated growth rates are questionable

Growth rates for a number of commodities from 2010-11 to 2014 are shown in Table 7. The first three columns are the same as in Table 5 – for main commodities. Columns 4 and 5 show the farm-gate values used by AO (2014) to calculate the growth rate – column 4 shows the values for 2010-11 (but sometimes different from the figures published in its 2012 report (Monk *et al*. 2012) as shown in column 3). Column 5 shows the values for 2014. The sixth column then shows the average growth rate since 2010-11 as calculated by AO (2014) (which should be the growth between column 4 and 5). The last column shows that growth rate calculated by actually using data in columns 4 and 5.

There are several sources of confusion in the data. One is that column 3 (AO's own estimate of farm-gate production for 2010-11) and column 4 (the 2010-11 figure used by AO (2014) to calculate the growth rate) are not the same. Only fruit and vegetables, and milk are shown to be so.

A second source of confusion is that some of the base data (for 2010-11) used by AO (2014) are taken from the ABS total data for the commodities (column 1; see eggs, pigs, beef and poultry), while it should have been from the mid-range (column 2).

A third source of confusion is that for some commodities the percentages of growth seem to be not related to the figures actually shown in the report for the comparison. Columns 6 and 7 should be the same – but are so only for pigs, poultry and beef[9].

Table 7: Growth rates of farm-gate values of selected agricultural commodities (2010-11 to 2014)

	ABS	ABS mid-point	Monk *et al* (2012)	AO sales 2010-11 used in AO 2014	AO 2014	AO farm-gate growth rate	Actual farm-gate growth rate
Year of data	**2010-11**	**2010-11**	**2010-11**	**2010-11**	**2014**	**2010-11 to 2014**	**2010-11 to 2014**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	$m	$m	$m	$m	$m	%	%
Cereals for grain	28.5	17.0	n.r.	n.r.	39.9	n.r	134.4[1]
Fruit and vegetables	143.4	73.8	122.2	122.2	122.2	44.0	0.0
Eggs	3.0	2.7	4.4	3.0	4.5	48.0	48.2
Milk	31.8	29.2	29.2	29.2	113.5	n.r.	288.9
Pigs	3.6	1.2	0.4	3.6	4.7	29.5	29.5
Beef	87.5	75.5	72.8	87.5	198.2	127.0	127.0
Sheep	23.5	19.6	18.6	n.r.	n.r.	64.0	–
Poultry	35.6	23.9	17.7	35.6	26.0	-27.0	-27.0
TOTAL	432.2	300.6	300.6	432.2	508	18	69

Source: AO (2014) and author's calculations based on ABS (2014a). The totals are not the sum of the components.

Notes:

1. Actual growth rate calculated from ABS-midpoint
2. 'n.r.' = not recorded.

There are other calculations that seem strange, and are not explained – such as the growth rate of grain; identical farm-gate values for fruit and vegetables in 2010-11 and 2014, while recording a 44 per cent growth rate; sheep (lamb) growth rates. For dairy, Monk *et al.* (2012) estimated a farm-gate value for 2010-11 to be $29.2 million – AO (2014) estimates a value of $113.5 million in 2014. The growth rate was not recorded. One might suspect that that is because the growth rate of 289 per cent seemed too high to report, without an obviously large expansion in the number of dairy farmers or in the size of existing dairy farms.

For the total, it isn't clear what has been included in the farm-gate value (see Section 3), but it is reported as $508 million (AO 2014, p.9). If this were compared with the value reported in 2012 for 2010-11, the growth rate would have been 69 per cent. However, AO (2014) reports the figure as 18 per cent, which means that it was compared with the full value calculated for the 2010-11 ABS data (column 4 instead of column 3).

Apart from all these issues, the difference between exclusion of price premiums in 2010-11 and inclusion of premiums in 2014 seems not to have been taken into account. If this had been done, the

[9] The figure for farm-gate value for beef in this table is probably wrong, as the total farm-gate value for meat reported by AO (2014) p.4 (Key Data) is $82.2million. It is therefore likely that the $198.2million quoted in the section on beef (AO 2014, p.14) is for the total market value of beef, not the farm-gate value. The growth rate (between 2010-11 and 2014) would then also be considerably lower than indicated here.

growth rate in general would have been reported as being considerably lower than in the 2014 report. If assuming a blanket premium of 50 per cent for all commodities in 2010-11 (which is not necessarily realistic) on the mid-range values of data from 2010-11 some commodities (grain, pigs and beef) would have recorded growth between the two years, while others (fruit and vegetables; eggs and poultry) would have shown no or negative growth.

9 The solution lies with the certifiers

Despite the fact that the ABS has collected a wealth of data on the organic industry, there seem to be several problems in using the data to obtain a satisfactory estimate of the size of the organic industry in Australia.

Estimates of the farm-gate value of organic production in Australia in 2010-11 and 2014 are likely to be significantly distorted for two reasons. The first, relevant to the 2012 report, is due to serious methodological problems, of which the main ones relate to: (i) absence of organic price premiums; (ii) discrepancies between organic area and organic production; and (iii) confusion between production and sales data. The second reason is that calculations are not always accurate nor are unlikely assumptions explained or defended. For 2014, and for the growth rates between 2010-11 and 2014, many of the data were incomplete, misleading, and/or contradictory.

Adjusting the data by estimating premium prices would improve the quality for the purposes of estimating the size of the organic sector. However, the issue of estimating receipts from organic production on those properties that report being not fully certified presents a real challenge, and could be of significance for getting a reasonable picture of organic production.

As it is, calculations of VACP of organic products with ABS data available in 2010-11 are likely to be a considerable underestimate on the grounds of no price premium and assumptions of percentage receipts from organic production, alone. Assuming that all organic production is sold in the organic market would lead to overestimation of the organic market.

Furthermore, calculating growth rates is difficult when one cannot be sure about the errors in calculating the levels in particular years. If 2010-11 had been adjusted for the factors mentioned above, and if the data for 2014 were correct – which must be considered, at least in some cases, to be questionable – the growth rate between that year and 2014 would have been smaller than reported now, and may even have been negative.

Is there a better way in which to measure the size of the organic farm-gate sales in Australia? Using actual census data from the organic industry – as opposed to including extra questions in the present census data on conventional farming as done for the 2010-11 market report – should improve the estimates on the size of the organic industry. However, it is not likely that the ABS is going to have two parallel censuses for the agricultural sectors – one for the conventional and one for the organic sector – in the near future if at all.

Another possibility is for an organisation such as the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) to do a survey of organic farmers. Although their expertise in designing surveys, interviewing farmers, analysing the data and writing a report on the outcomes

would provide a great confidence in the results, the costs would no doubt be beyond the means of the organic sector. This would be the case even if only basic data were to be collected.

How do others do it? In other countries data are widely gathered by the private sector or by government organisations '… and are mostly based on data of the certifiers' (Willer and Lernoud 2014, pp.122-124). This is the case at least for basic data, such as area, production, livestock numbers and operators, whereas farm-gate sales data are available only for a few countries, Germany being one of them. Government data collection systems are often linked to regulations, such as the European regulations on organic farming, under which it is even mandatory for the Member States to deliver their data to Eurostat, the statistical office of the European Union.

In Australia, most if not all of the certifiers have some sort of data collection system. Details about agricultural holdings are collected in a farm inspection report, gathered for the purpose of enabling the certifier to decide on the organic status of the farm. The detail of the information varies between certifiers. The most common details gathered would be the total area of the holding, and percentage of organic and conventional area. Sometimes, it includes the areas under certain crops or livestock. Production and farm-gate sales are less often recorded.

So, in order to get reliable (census-like) data on organic production and farm-gate sales (both quantity and value), the simplest solution would be to collect data from the certifiers and agree upon the analysis and publication. Changes will need to be made in the data collection system of the certifiers, both in questionnaires and in storage of the data. Independent analysis can then be published to the benefit to the whole organic community.

However, such a system will take some time – and other resources – to set up. Meanwhile, it would be a good idea to analyse the ABS data properly for 2015-16, and compare with earlier years to get reasonable growth rates. In that way those who invest in organic agriculture in the future, such as growers, input providers and marketing agencies, can be assured that their decisions are based on the best possible estimates.

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