

The Committee will inquire into and report on:

The opportunities and impediments to the primary production sectors realising their ambition to achieve a combined \$100 billion value of production by 2030.

Submission by:

Adjunct Professor John Hamblin; B.Sc. Ag.Bot., Ph.D., FAATSE, FAIA.

SuperSeed Technologies Pty. Ltd.

69 Olive Street, Subiaco, Western Australia 6008. [REDACTED]

Personal background:

For over 50 years I have been involved in agricultural research, development and extension in public and private organisations. Over much of the period I have focused on major broad scale agricultural crops both in Australia and overseas. Of late I have taken an interest in more small scale and specialist crops. My wife for many years was a broadacre grain and sheep farmer in the Northern Agricultural area of Western Australia and she kept me grounded on major agricultural crop production issues. More recently I have been interested in crop pollination and horticulture. I make no claims to have any expertise in animal production.

Submission: Introduction

Contributions of different types of enterprises to the \$66 billion total value of agricultural production in 2017/18 were: crops (32%); animal production (45%); fruit and vegetables 13% (1, Figure 3). The difference from 100% is forestry and fish. The major Australian broad acre farm products have long been and still are cereals, wool, meat and dairy. All these products trade in world markets and prices are set by the production and quality by our competitors. Prices fluctuate significantly depending on world production levels.

There is almost certainly potential to increase the value of the animal industries but as with the major crops, we are already competing in export markets so production will be close to world's best practice within the environmental constraints in which we operate.

Broad acre grain crops

One option available to Australian growers is to produce higher value crops that have not been traditionally grown here or identify specific high value niches in current crops. Yield and area of novel crops in Australia have expanded over time (Table 1 using 5 year averages to smooth seasonal effects since the year of their data reporting to FAO and current production; data source 2). Yields of these crops have increased with time and areas have expanded dramatically There is potential for these higher value crops to expand further with improved agronomy and varieties whilst providing break-crops for following cereals.

Also, within broad commodity markets there are specialist niches where extra value can be obtained e.g. for larger Kabuli chickpeas and exemplified by the current discussions on vegetable protein meat substitutes and cheese names.

To retain our position within bulk crops the key issues are likely to be: managing the impact of climate change on production; minimising and preferably reversing soil degradation; and reducing production costs. Major production improvements will only come from breakthroughs in water use efficiency and improved photosynthesis. Should these occur they are unlikely to be used on a wide scale by 2030.

Table 1: Novel Crops

| | Canola | Area | yield | Chickpeas | Area | Yield |
|-----------------------------|----------------|-------------|--------------|------------------|-------------|--------------|
| | | Ha | t/ha | | ha | t/ha |
| | 1968-72 | 42259 | 0.61 | 1983-7 | 31694 | 1.07 |
| | 2013-17 | 2732298 | 1.37 | 2013-17 | 650529 | 1.43 |
| Multiple increase over time | | 65 | 2.25 | | 21 | 1.33 |
| | Lentils | Area | yield | Lupins | area | Yield |
| | | Ha | t/ha | | ha | t/ha |
| | 1988-92 | 3200 | 0.93 | 1961-65 | 1264 | 0.35 |
| | 2013-17 | 190313 | 1.12 | 2013-17 | 465876 | 1.42 |
| Multiple increase over time | | 59 | 1.20 | | 369 | 4.03 |

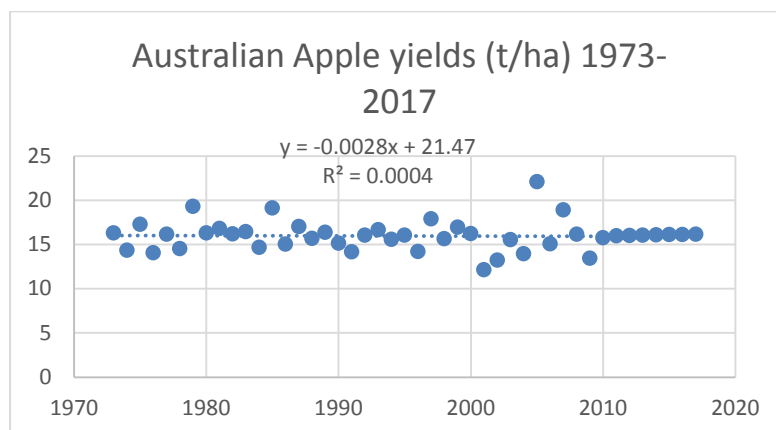
Horticulture

Horticulture accounts for 13% of the \$66 billion production in 2017 or some \$8.58 billion (1, Table 3). Exports are valued at \$1.4 billion (3). Fruits are dominated by Citrus (272,9000t), Table Grapes (114,000t), melons (20,000t) and Peaches & Nectarines (12,000t); everything else is less than 10,000t (3; p6). For vegetables carrot exports were 111,000t, potatoes 37,000t and onions 32,000t; everything else was less than 10,000t (3, p24).

Horticulture operates in a more managed situation than grain crops, particularly as regards available water for the crop and the markets targeted by the crop. Here I compare and contrast 2 horticultural crops that illustrate issues affecting production and export potential: apples and carrots.

Apples

On 1.1.1973 the UK joined the common market. This had a devastating effect on Australian apple growers and the industry halved (4). Since that date there has been no change in the yield of apple trees in Australia. Today, just 1–2 percent of marketable production of apples is exported. A large proportion is opportunistic, sourced by consolidators rather than a **planned export program** (5).



The yield of apples from countries that have cool wet winters and warm to hot summers with little or no effective rain are very different (Table 2). What is apparent is the large increase in yields in New Zealand and South Africa and the much smaller changes in Australia and Israel.

Table 2
Australia v competitors with +/- similar climates
Apple yield /t/ha

| Data from FAO (2) | 1961 | 2017 | % increase |
|-------------------|------|------|------------|
| Australia | 11 | 16 | 45 |
| Israel | 27 | 38 | 41 |
| New Zealand | 22 | 57 | 159 |
| South Africa | 14 | 39 | 179 |

Both New Zealand and South Africa export significant quantities of apples and to remain competitive have significantly improved their production system as shown by their high yields. Whereas Australia and Israel are opportunistic exporters of local surplus. In the case of Australia yields had increased by some 50% between 1961 and 1972, but have not increased since exports ceased. Note that New Zealand has one of the highest yields in the world, 3 times Australia and South twice ours here despite starting off a very similar base to Australia.

Carrots

In 1961 Australia's carrot yields average some 25t/ha and are now double that (Table 3, data source 2). This was twice the rate of yield increase than that of the world as a whole. Over 90% of exports come from Western Australia competing on the world market for both price and quality.

Table 3

| Carrot yield (t/ha) | 1961 | 2017 | % increase |
|---------------------|------|------|------------|
| World average | 17 | 26 | 53 |
| Australia | 25 | 49 | 96 |

What advantages do carrots have that apples do not?

- 1 They are an annual crop, and therefore can be produced at maximum levels in the first year that they are planted. Whereas perennial tree crops take several years to reach maximum yield.
- 2 Mechanical harvesting is very straight forward for carrots and much less labour intensive than for many fruit crops including apples.
- 3 Changing varieties is easy and can be accomplished in a single year whereas with tree crops this is a costly and slow process.

Some conclusions:

Broad acre crops are the major driver of direct plant-based returns to primary production. The key threat is adaptation to climate change with increasing temperatures, particularly in spring and lower rainfall that both have the potential to lower yields. Protecting current yield potential and adaptation to change should be the major area for R and D in this space.

Other key grain crops issues are sustainability and input cost reduction.

Horticulture is the area of greatest potential for increasing its proportion of returns from primary crop production. A focus on exports will drive industry efficiencies that allow it to compete in world markets both in terms of yield and quality.

With a few notable exceptions most horticultural crops are not seriously engaged in exports.

Current local production meets Australian requirements during its particular crops growing season. A captured local market does not lead to rapid innovation and improvement in the way that international competition does.

Policy settings need to encourage exports and ensure efficient use of resources, particularly water. The Murray Darling Basin's assistance in improving the efficiency of water use provides a precedent for assistance here.

Changed policy settings and increased R and D at the production level will lead to higher yields per unit area and better water use efficiency going a long way towards providing the commercial incentives to export produce.

Industries need to develop strategic plans for both production and the marketing chain for exports.

The easiest short-term returns will come from annual rather than perennial crops.

Annual crops provide more flexibility than perennials allowing growers to change species and/or variety should market requirements change.

If the committee would like further input please feel free to contact me.

1. <http://www.agriculture.gov.au/abares/publications/insights/snapshot-of-australian-agriculture#agricultural-production-is-growing>
2. <http://www.fao.org/faostat/en/#data/QC>
3. [https://www.ftalliance.com.au/data/news_attachments/1808%20aheia%20statistics\[363944\].pdf](https://www.ftalliance.com.au/data/news_attachments/1808%20aheia%20statistics[363944].pdf)
4. https://www.utas.edu.au/library/companion_to_tasmanian_history/A/Apple%20industry.htm
5. <https://apal.org.au/exporter/>
6. <https://www.horticulturetrade.com.au/vegetable-news/carrot>