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Australian Export Grains Innovation Centre

Oats' growing pains

A report to the Processed Oats Partnership (POP) Program

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Executive Summary

For many farmers, oats are a useful inclusion in the portfolio of crops grown. Oats are mostly not grown as the main cash crop but nonetheless offer agronomic and rotational advantages.

Whenever a grain like oats has food and feed uses it faces exposure to the market demand and supply forces that characterise each of those markets; feed and food. If large volumes are produced locally or by international competitors that saturate food markets, then an increased proportion of production spills over into feed markets, lowering prices. Feed markets invariably set the floor price for many grains, including grains like oats.

Farmers who produce oats that attract food and feed uses, constantly face a dilemma. If their industry is exposed to over-production', then unattractive prices mostly based on feed grain markets eventuate. But if production is constrained then higher prices, more influenced by food uses, are likely. This production dilemma is a feature especially of low volume crops like oats that are transitioning into a greater focus on food uses.

This 'thought piece' explores and unpacks some of the economic issues facing the growth in oat production. The key message reiterates the view that there is wisdom in enhancing the food-based demand for oats. It provides farmers with a greater likelihood of more frequent higher prices for oats as they continue to produce oats, providing, importantly, that the farmers' supply of oats does not unduly swamp that growing food oat demand.

A particular challenge for Australian oat producers is that as the international demand for food oats gradually increases, then prices received for Australian oats are conditional not only on the volume of Australian food oats available for export but also on the supply of food oats from key oat export competitors like Canada, France and Russia.

Background

To support the growth of the oat industry in Western Australia, both in value and volume, over the next 20 years, the State Government is providing $10.12m to the Western Australian Agricultural Authority (WAAA) to manage the industry-led Processed Oats Partnership (POP) Program.

This thought piece, although not a required output, is provided for POP discussion. It contributes to thinking within Output 2 of the AEGIC based POP activities within the project titled "Economic lens to capture increased market value for oats through industry innovation and better targeted industry investment". The purpose of the project is to provide the POP and in turn the Western Australian industry with a better understanding of how rates of growth in demand for oats and oat products, and the supply of local oats or oats from overseas competitors, affects local and export prices of Australian oats in local and emerging overseas markets. This knowledge will give useful market intelligence to oat marketers, oat producers, and oat processors to aid their strategic decision-making.

Introduction

There is an adage to encourage endeavour that says, 'fortune favours the brave'. The anticipated benefits are touted to stir into action those ambitious enough to invest or to be early adopters. But a more accurate wording of the saying is that 'good fortune may favour the brave' because experience reveals the exact opposite also is possible: 'bad fortune can visit the brave'. Unleashing an entrepreneurial spirit does not unambiguously lead to unquestioned benefit. The implication is that joining the vanguard of proponents is not always a guaranteed recipe for sizeable financial success. Conducting due diligence that establishes a clear understanding of the risks and opportunities ahead is a requirement for sober decisions.

Take the case of oats. Historically oats were primarily grown as an animal feed with a portion also used as a food, mostly a breakfast cereal. However, many decades ago the move away from literal farm horsepower that partly relied on oat-feeding of draught animals towards farm mechanisation and the emergence of other more competitive feed grains gradually eroded the feed grain market opportunities for oats. Also as the nation's sheep population dwindled and farms became increasingly crop dominant then the sheep industry's demand for supplementary oat feeding lessened.

Fortunately, over the last decade or so, the human health advantages of oat consumption have become more widely appreciated and new oat-based foods (oat milk, oat rice, oat noodles, oat-based snacks) have been developed. Gradually emerging through population growth and some dietary change is enhanced food consumption of oats, whilst feed uses of oats continue to face the strain of substitution by other feed grains like feed barley. These divergent market forces in feed and food markets place farmers in an unenviable position. Should they stand under the banner 'fortune favours the brave' and more strongly commit to oat production in the hope of a burgeoning food demand for oats; or is disappointment just around the corner?

Exploring oat food and feed markets

To show more clearly the oat industry's dilemma regarding a commitment to oats, the market interplay between oats as a feed or food is explained more fully below, using the Western Australian oats industry as an example.

In Figure 1 is shown the market characteristics of oats when used for feed. The feed demand for oats is what economists call a price elastic demand response. This means that a large increase in the oats price will greatly reduce the willingness of buyers to purchase oats, as usually other substitute feed grains are available. Conversely, if a substantial lowering of the oats price occurs then buyers will be keen to increase their purchases of oats.

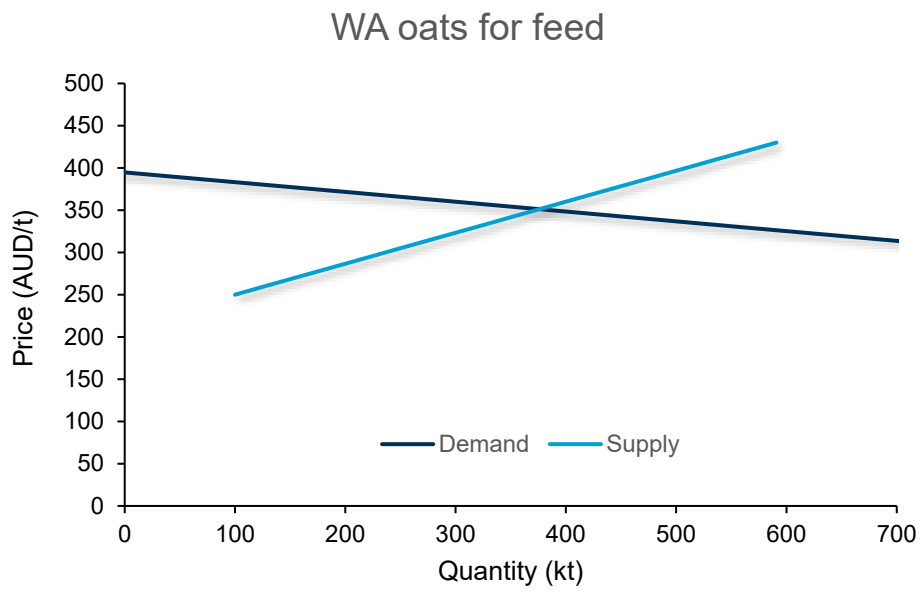

Figure 1: The demand and supply conditions for oats as a feed grain in Western Australia

But what of the case regarding oats for food? Figure 2 outlines this situation when oats are used for food. The food demand for oats is more akin to what economists call a price inelastic demand response. This means that a large increase in the oats price will reduce the willingness of buyers to purchase oats, but not hugely as there are fewer close grain substitutes for oat-based food products (i.e. grain-based substitutes for porridge or oat milk). Conversely, if a substantial lowering of the oats price occurs then buyers will be keen to increase their purchases of oats, but not hugely as per capita consumption of oat-based foods tends to change slowly and is driven by habit and culture. In addition, consumption of oat-based foods is via oat processing, and processing plants are often restricted in their capacity to rapidly and substantially flex up and down in response to available supplies of affordable oats. By contrast feed grain users can often easily switch between grains and more easily accommodate an influx of oats if they are sufficiently cheap.

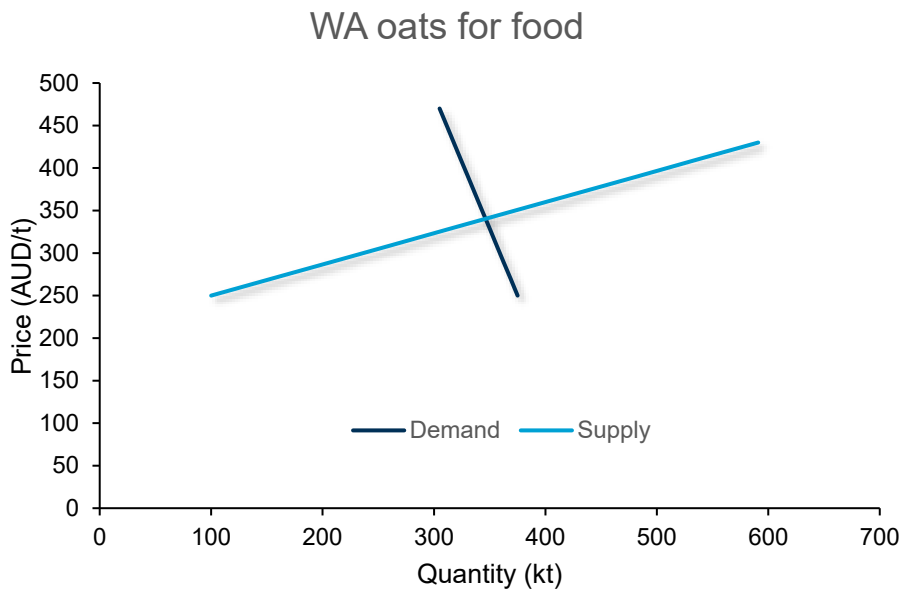

Figure 2: The demand and supply conditions for oats as a food grain in Western Australia

Apart from the special case of producing oats for oaten hay, most farmers plant oats and, depending on the quality of those oats at harvest, their oats are sold into feed or food markets. Assuming oats are grown of adequate quality to enable them to be sold in either the food or feed market then the price received by a farmer for their oats is a function of the whole industry's production of oats and the economy-wide demand for oats, including export market opportunities. The combination of the feed and food demand for oats determines the nature of the economy-wide demand for oats as shown in Figure 3. The kink in the demand curve arises from the fact that if ever oats of sufficient quality are in scarce supply, then the higher price of those oats will cause those oats to flow to the food market rather than the feed market; as in the feed market other feed grains will substitute for oats, due to the expense of oats. The intersection of the supply and demand curves identifies the market-clearing conditions (i.e. the observed price in the market at which sellers and buyers express their aggregate willingness to buy and sell quantities of oats for feed and food).

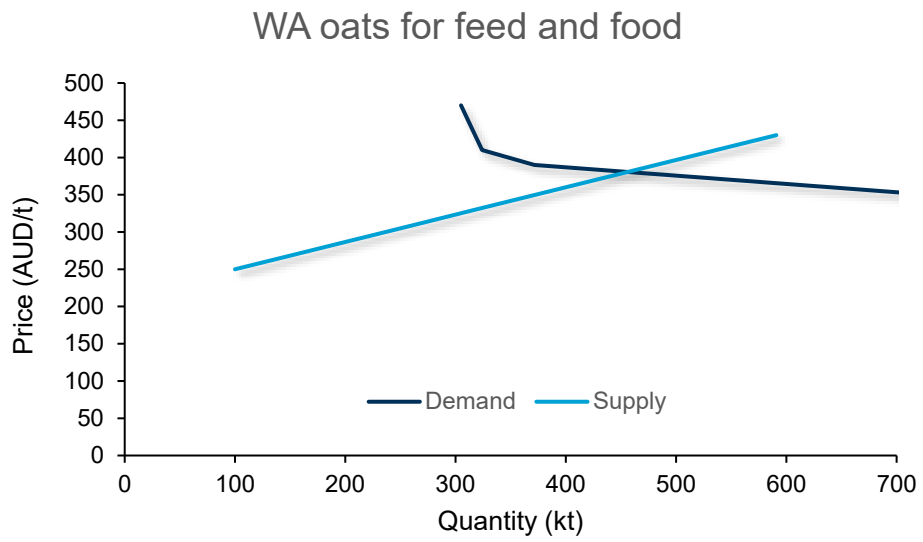

Figure 3: The demand and supply conditions for oats as a food and feed grain in Western Australia

The kink in the demand curve comes into play whenever oat production is curtailed, for example, when drought occurs or farmers plant only a small area to oats. This situation is portrayed in Figure 4 as shown by the leftwards shift in the usual supply response. That shift moves the market-clearing conditions into the kinked, more strongly upward sloping part of the demand curve, triggering a strong upward movement in the oat price. If oats are known to be scarce then oat-based food manufacturers will be willing to pay higher prices to secure their oat supplies as there is no substitute for oats in oat-based foods.

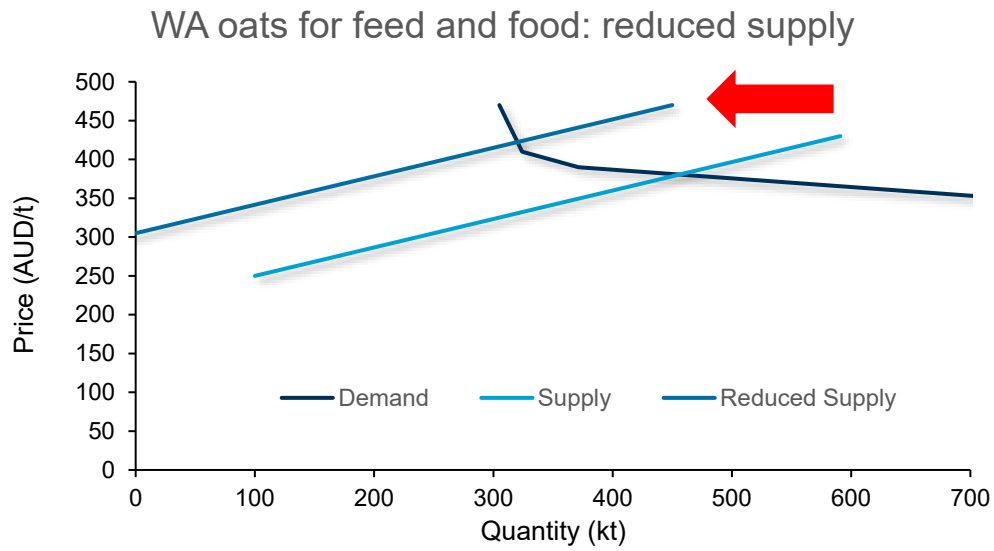

Figure 4: The impact of reduced oat supply on the oat price in Western Australia

Another cause of higher prices for oats can come via greater overseas market access or market development. Developing dietary-appropriate oat-based foods like oat rice, oat noodles or oat crisps may stimulate the demand for oats in some large overseas human food markets. The impact of the enlarged demand for oats as a food is shown in Figure 5, and it leads to higher oat prices.

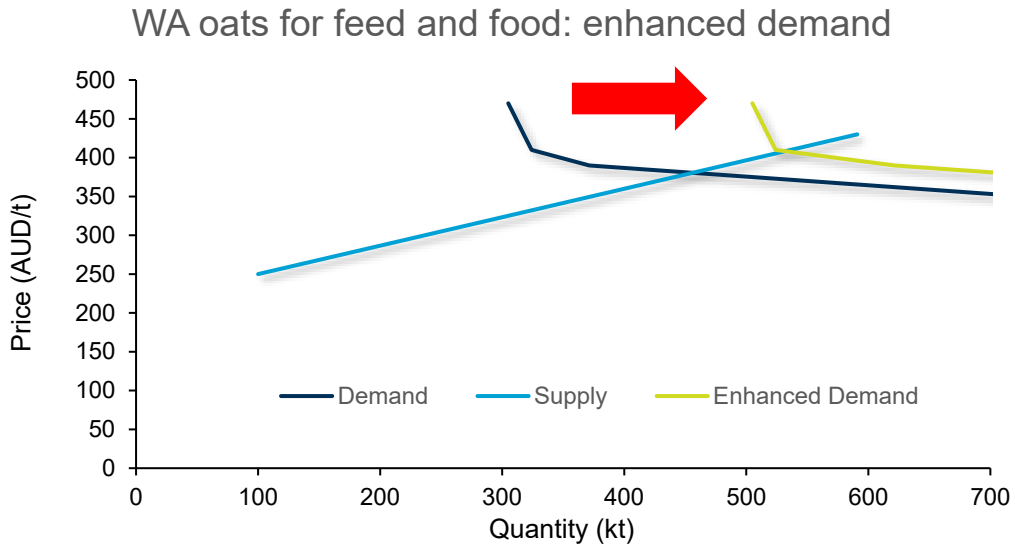

Figure 5: The impact of enhanced oat demand on the oat price in Western Australia

When farmers experience a high price for a grain they produce, then often farmers respond by increasing their production of that grain. What occurs when the industry supply of oats increases, when more farmers are attracted into growing oats or farmers embrace new varieties, or superior crop establishment techniques? The ramifications are revealed in Figure 6.

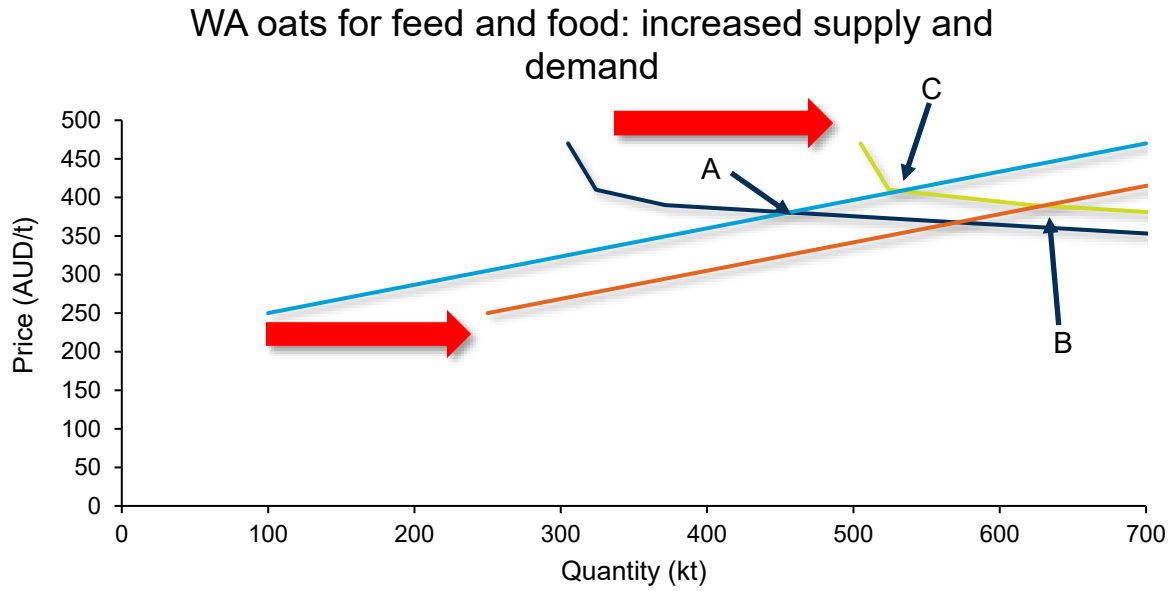

Figure 6: The impact of enhanced oat demand and supply on the oat price in Western Australia

As revealed in Figure 6 the increase in supply of oats (the move from the light blue line to the orange line), when combined with the enhanced demand (the move from the dark blue line to the light green line), leads to a market outcome of the oat price being almost unchanged. The market-clearing points are initially A and then subsequently B in Figure 6.

Figure 6 encapsulates the growing pains for oats. If investments are solely made in oat product innovation and market development, then this will likely lead to an enhanced demand for oats. In response, if farmers as a whole do *not alter* their strategic supply of oats

(i.e. the supply response is solely the light blue line), then the market price for oats will increase to point C from point A, and farmers' revenues from oat production will increase. However, if growers *shift* their oat supply response (from the light blue line to the orange line), in anticipation of receiving much higher food-based prices for their oats, they risk saturating the food market and instead expose more of their enhanced volume to sale in feed markets, placing downward pressure on the oat price. The end result as shown in Figure 6 is virtually no change in the oat price received by farmers; that is, point B compared to point A. Further, if the increase in oat production is due to more farmers planting more oats or adopting newer varieties, then although farmers will receive more revenue from a greater volume of oat production, they will also forgo revenue from the other grain that ordinarily would have been planted on those hectares now additionally planted to oats. In short, farmers may not be much better off at all.

Hence, the future of oats is in delicate balance as farmers' production of oats needs to be tailored to the gradual increase in the food grain demand for oats. If farmers jump in too early and more farmers increase their production of oats, viewing favourably the food-based future of oats, they risk being swept along by the adage that 'fortune favours the brave'. Yet, as revealed in the series of charts above, although 'good fortune may favour the brave' the opposite can also be sometimes true that: 'bad or limited fortune can visit the brave'.

This opportunity or dilemma for the oats industry is essentially a Goldilocks problem where production growth needs to be 'just right'; not 'too hot' nor 'too cold'. It is possible to determine mathematically the 'just right' growth rate in production. It is a growth rate that delivers a market equilibrium where the oat price is consistently likely to be above the feed oat price (i.e. at or above the kink in the demand curve for oats). Such a market equilibrium price allows farmers to consistently achieve a price more influenced by the food demand for oats. This higher price raises farmers' gross margins of oat production and makes oats an economically more attractive crop option. In an appendix is shown the mathematical determination of a 'just right' growth path.

However, in practice the market equilibrium price for oats constantly changes in response to oat supply and demand balance sheet conditions. The 'just right' growth in production is itself influenced by the magnitude and pace of enlargement in the local and international food demand for oats and the international supply of oats.

For example, oat production in Canada, France and Russia can influence the volume of oats available to international markets. Also exchange rate relativities affect the attractiveness of purchasing oats from different origins. By illustration, over the last decade the Russian rouble has depreciated by 62 per cent against the US dollar, making Russian oats currently more price attractive to international buyers than Australian oats.

Appendix: Exploring the 'just right' growth rate

A Mathematical Example

To illustrate the magnitude of a 'just right' growth rate and the factors affecting that rate, the following linear approximations of demand and supply responses are used in the various calculations below.

The international feed demand for oats sets an assumed floor price of AUD275 per tonne.

$$P = 275$$

Local oat feed demand is:

$$Q = 3411 - 8.636P$$

Local and overseas oat food demand (currently) is:

$$Q = 455 - 0.3182P$$

Domestic supply of oats is:

$$Q = 2.727P - 582$$

If we assume that the local and international food demand for oats will increase through time, and for simplicity we also assume the floor price of feed demand for oats is fixed, then the demand for food oats through time can be expressed as:

$Q = 455e^{bt} - 0.3182P$ where b is the demand shifter (e.g. due to new markets becoming available) and t is the year.

It is also feasible that the domestic supply of oats could be subject to annual growth. In this case, the supply of oats through time can be expressed as:

$Q = 2.727P - 582e^{-at}$ where a is the supply shifter (e.g. due to more growers undertaking oat production) and t is the year.

Mathematically, at market equilibrium where supply and demand levels equate,

$2.727P - 582e^{(-at)} = 455e^{(bt)} - 0.3182P$

For various levels of P, t and b, solutions can be found for levels of *a* that generate the equilibrium conditions. Solution examples are listed in Table 1.

Table 1: Optimal growth rates in supply of oats

Market price of oats (P) in AUD per tonne	Annual growth in food oat demand (b)	Number of years (t)	Optimal annual growth in oat supply (a)
300	2%	10	5%
300	5%	10	13%
350	2%	5	1%
350	5%	5	4%
350	8%	5	7%
350	10%	5	12%

350	2%	10	1%
350	5%	10	6%
350	8%	10	17%
400	8%	5	1%
400	10%	5	4%
400	13%	5	9%
400	15%	5	17%
400	4%	10	1%
400	6%	10	4%
400	8%	10	8%
400	9%	10	18%
450	15%	5	7%
450	18%	5	15%
450	20%	5	29%

Drawing on the results in Table 1 a few observations are worth noting. To achieve market price outcomes that are slightly above the international feed oat price of AUD275 per tonne, and assuming only modest annual growth over a decade in the demand for food oats, then the optimal annual growth in oat supply ranges from 5% to 13%. However, if relatively attractive market prices for oats are to be achieved (i.e. at least AUD400 per tonne), and assuming a range of successful demand growth rates for food oats (i.e. 4% to 20%), then the optimal annual growth in oat supply ranges from 1% to 29%. To sustain higher market equilibrium prices for oats invariably requires higher growth rates in demand for food oats. Hence, the wisdom of investing in creation of food-based demand for oats is a sensible strategy as it more readily and quickly provides farmers with a greater likelihood of more frequent higher prices for oats, providing that the supply of oats does not swamp the food oat demand.