

RURAL INTELLIGENCE INSIGHTS

Why productivity is so important
in finding the right farm property
at the right price.

DAS

With support from



Rabobank

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NPP = Net Primary Production

As science and technology take land analysis to the next level, a collaboration between Rabobank and Digital Agriculture Services (DAS) reveals why and how buyers should take a closer look at the relationship between land prices and productivity to stay ahead in a fast-moving market.

The agricultural land market has seen significant change in the last five years. Australian agricultural land has appreciated at a faster rate than most other asset classes and farmers have faced increased competition in purchasing land from local and foreign investors.

With fewer properties on the market, and those that are up for sale variable in quality, the difficulty of finding the right property at the right price has increased.

The good news is we now have better indicators than just median price to find the best value.

Increasingly sophisticated rural intelligence which reveals productivity (as an indicator of yield) and seasonal variability is now key when comparing and evaluating potential properties for purchase.

BY DAS CO-FOUNDER & CEO, ANTHONY WILLMOTT
WITH SUPPORT FROM RABOBANK AGRICULTURAL
ANALYST WES LEFROY

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Prices at record highs, but median land price growth has cooled

First, if we look back over the last year, Rabobank’s Australian Agricultural Land Price Outlook 2020 shows while prices are at record highs, median land price growth has cooled. Land prices did increase in 2019, but at a slower rate than 2017 and 2018.

All states had reduced price growth year-on-year except Tasmania, and the negative impact from drought

was offset by fewer properties coming up for sale.

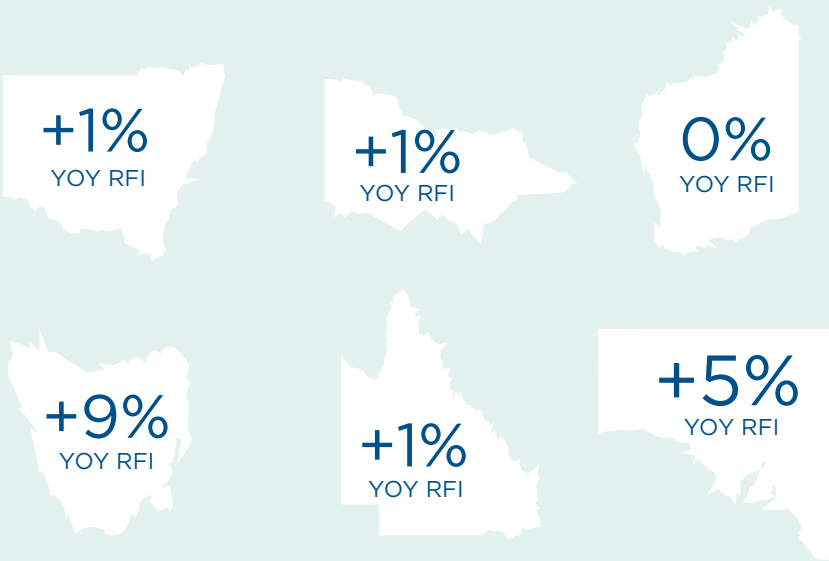
Prices increased, the number of properties on the market remained low, and opportunities to buy remained few.

Nevertheless, increased prices have placed a greater onus on farmers to use the best information at hand to support their purchase decisions.

In 2019, land price growth ‘cooled off’

+5% YOY Rabobank Farmland Index (RFI)

+8.8% 5-yr median price CAGR (to end of 2019)



“A New Phase” Australian Agricultural Land Price Outlook, Aug 2020

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High prices to stay, farmers look further afield as buying opportunities remain hard to find



Rabobank expects prices are likely to stay at record highs, but land price growth will likely slow in coming years.

Headwinds have already strengthened due to the global economic downturn, but some aspects of the weak macro-economic environment will support investor demand. For example, the relatively weak Australian dollar will increase purchasing power for offshore buyers, cost of funds remain low, and decreased returns and extreme price volatility in other types of assets could help support investment in agricultural land.

Prices of market segments will continue to move at different speeds, in different regions, ensuring that the complexity of buying the right property at the right price remains.

When deciding to invest, different buyers are looking for different things when purchasing agricultural land – and it’s all dependent on the type of farm.

Buyers may be able to purchase a property of greater value beyond their own region. As a result, farmers will increasingly be looking outside of their own area to expand.

This will have additional benefits, such as minimising climate risks.

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That Leaves the Question — Where to Buy?

So that leaves the question, where to buy to get the best value?

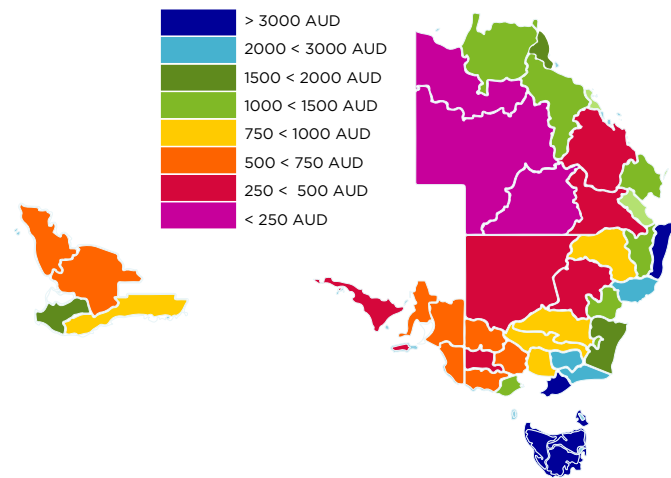
Science and technology now enable us to generate greater insights on value, in order to compare similar farm properties across regions, states and nationally.

Coarse analysis using median price/hectare property comparisons traditionally assume all sales have the same characteristics year to

year, but within a region and state, weighting of sales by location and production type vary significantly. Factors such as rainfall and lifestyle can cause yield and median price to deviate, and those deviations can be large – median price in some regions can be double or even triple that of other regions with similar productivity and variability.

As a result, the greatest value may not be where you expect.

2019 Median Farm Price, per Net Primary Productivity (kg/ha/day)
*missing regions had insufficient data available



Land prices can undershoot, or overshoot productivity

Over the past five years, median prices of grazing land with low production variability increased faster than land with medium and high seasonal variability. (see graph 7)

The median farm price per hectare for grazing land (represented by

circle size in graph 1) is more closely correlated with variability than productivity.

There are always exceptions, but typically, low variability grazing land, no matter how productive, can often be more valuable. (see graph 2).

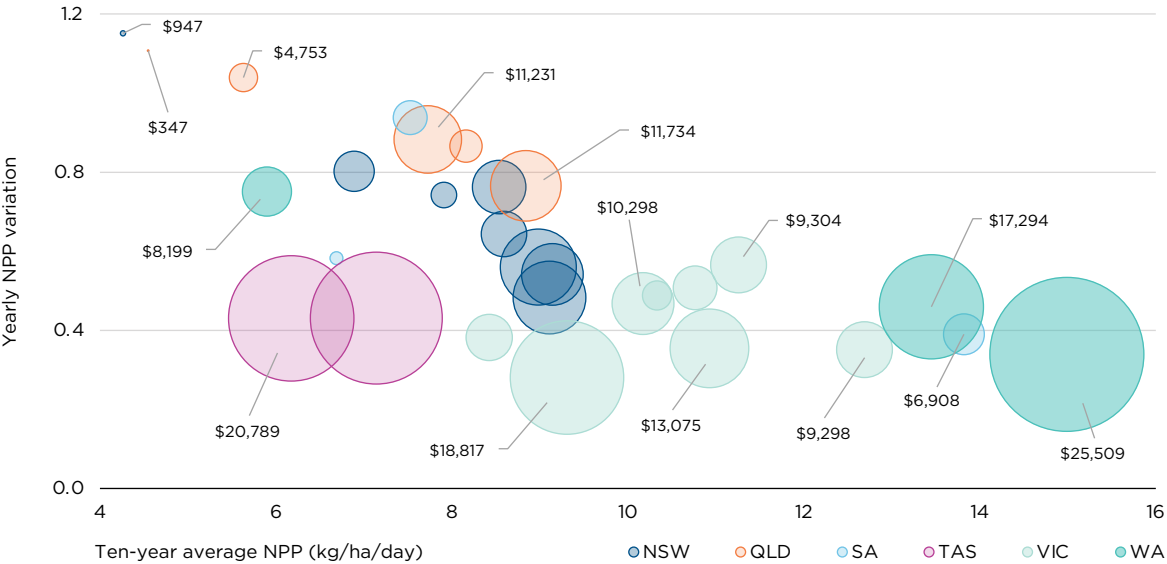
Graziers prefer lands with low production variability for 2 reasons – one, they may need supplementary feed to fill feed gaps, which can bring large costs, and two, the opportunity to alter their herd/flock size is limited, as it can take many

years to rebuild stock numbers which clearly impacts profits.

In short, graziers have fewer options than crop farmers to mitigate against the impact of seasonal variability in the short term.

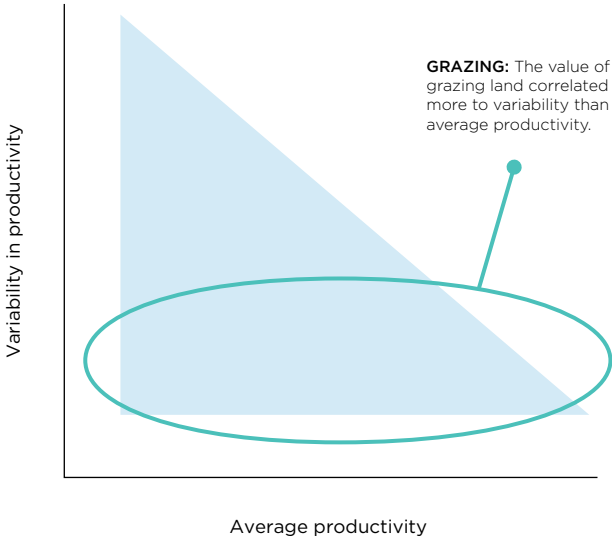
Graph 1: Farm prices of grazing lands

Regional 2019 median farm price per hectare (bubble size), according to productivity and productivity variability for sales of grazing lands



Source: Digital Agriculture Services, Rabobank 2020

Graph 2



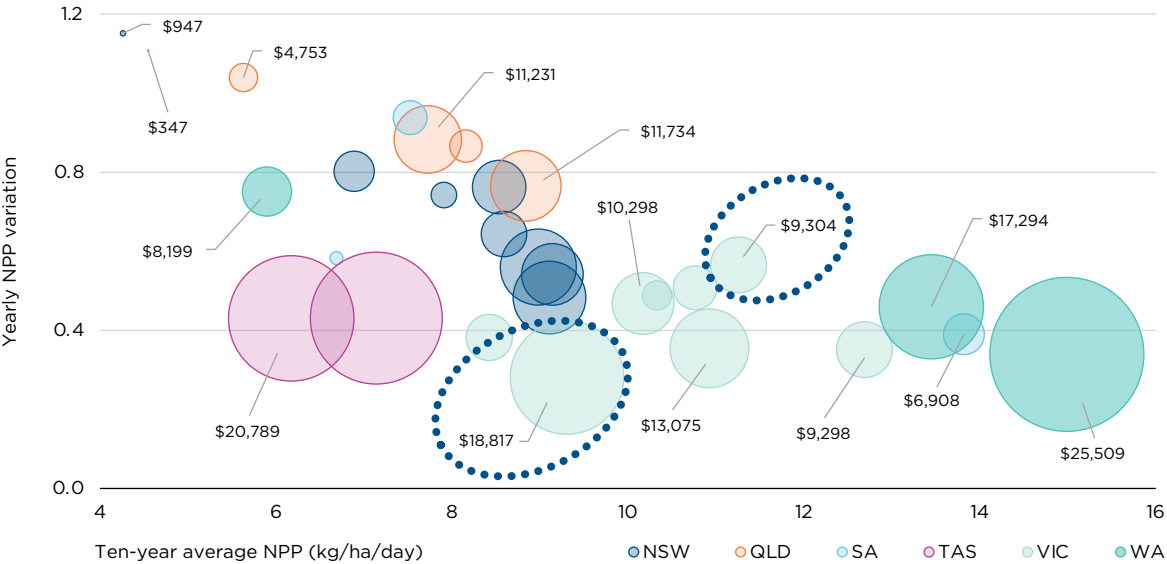
Source: Dr Randall O'Donohue, CSIRO Senior Research Scientist, 2020

Case Study

For example in Victoria (gold circles in graph 3), regions with lower productivity and lower variability can have a higher median price than those with higher variability, but higher productivity.

According to our findings, the Victorian region with an \$18,817 median price per hectare has lower net primary productivity (NPP – see more in section 4) of 9 kg/ha/day and lower variability compared to the second region on the right in the same state (\$9,304 median price per hectare) which has a higher NPP of 11 kg/ha/day.

Graph 3: Victoria – Price and Productivity



Source: Digital Agriculture Services, Rabobank 2020

The value of cropping land has a “sweet spot” in moderate productivity, moderate variability land (10-12 kg/day) – value drops off as both productivity drops and variability increases. (see graphs 4 and 5)

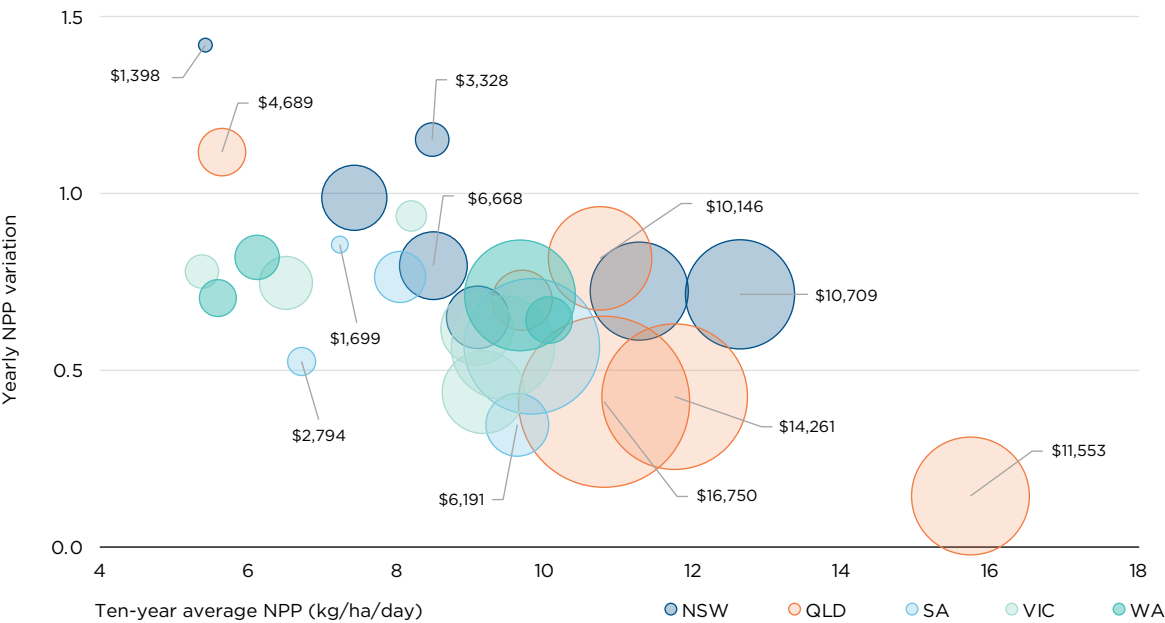
- Improved agronomy and decision-support tools have accelerated prices of low-production cropping land, while improved soil practices and genetics have enabled crops to survive long periods of low rainfall.
- The price per unit of production is lower, relative to high-production regions, which has made land more affordable.
- Farmers in low-production regions may feel they need to continue to achieve economies of scale faster than farmers in high-

rainfall regions, and therefore are expanding at a faster rate.

The most valuable land is usually seen as high productivity with low variability, but when we look at production type, our analysis shows different correlations for cropping and grazing land.

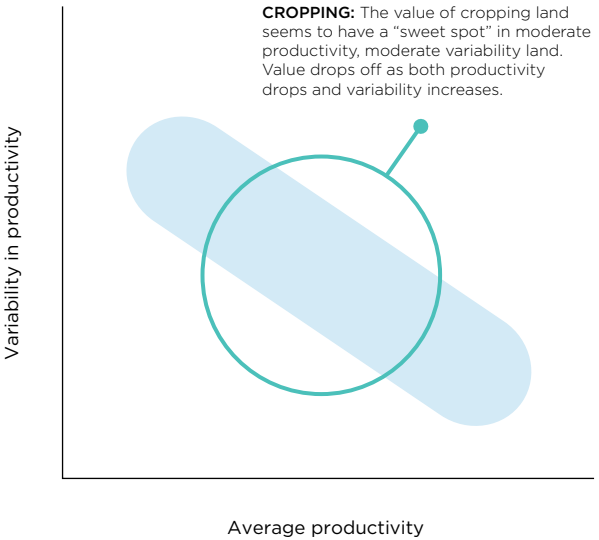
Graph 4: Farm prices of cropping lands

Regional 2019 median farm price per hectare (bubble size), according to productivity and productivity variability for sales of cropping lands



Source: Digital Agriculture Services, Rabobank 2020

Graph 5



Source: Dr Randall O'Donohue, CSIRO Senior Research Scientist, 2020

Over the past 5 years, land price growth of cropping lands was more closely correlated with productivity (See graph 6). Prices for low productive cropping lands have increased faster than medium and high productive cropping lands. (see graph 4 above).

Yet land price growth of grazing lands over the past 5 years correlated more with variability than average productivity (see graph 7). With these varying drivers of price growth, it's little surprise that farm prices of grazing and cropping lands have overshoot and undershot productivity.

To summarise, here's two things we knew but couldn't prove before we had productivity data:

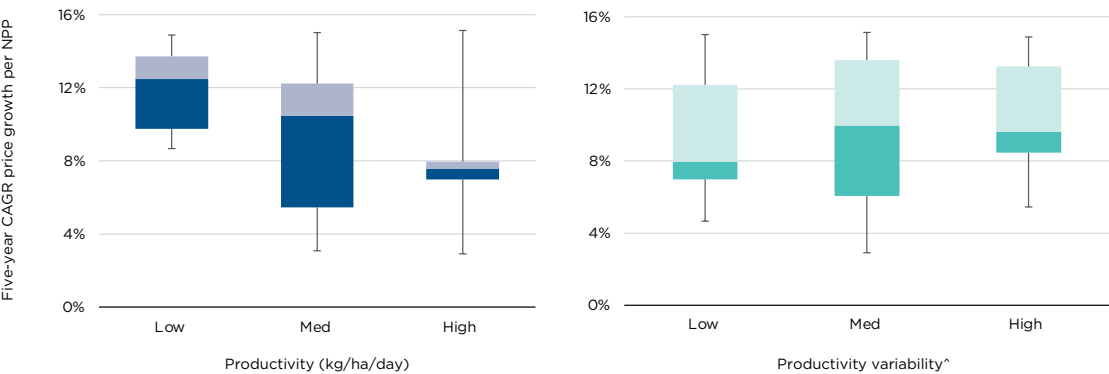
1. The relationship between land prices, variability and productivity can vary by production type

- Median prices of regions with the same productivity can be up to 2 to 3 times different in price

What we've now proven through the combined power of digital, data and science, is that productivity is a better indicator of potential yield than median price.

Graph 6: Crop land price growth correlates with productivity

Over the past five years, crop land price growth was correlated with productivity. Range of regional crop land price growth, according to absolute productivity (left) and variability (right)*

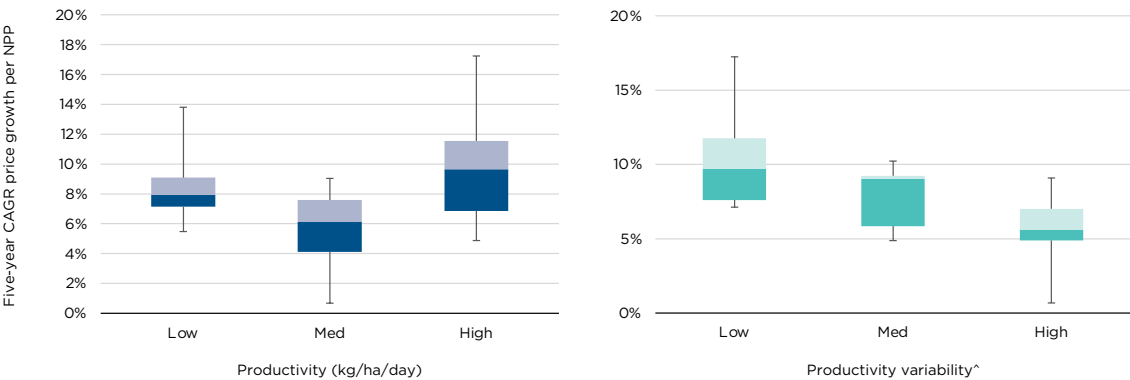


* Ten-year variability=(90th percentile yearly NPP - 10th percentile yearly NPP)/50th percentile yearly NPP

Source: Digital Agriculture Services, Rabobank 2020

Graph 7: Grazing land price growth correlates with productivity variability

Over the past five years, grazing land price growth was correlated with productivity variability. Range of regional grazing land price growth, according to absolute productivity (left) and variability (right)*



* Ten-year variability=(90th percentile yearly NPP - 10th percentile yearly NPP)/50th percentile yearly NPP

Source: Digital Agriculture Services, Rabobank 2020

By incorporating CSIRO science, the search for value has been transformed. In particular, DAS rural intelligence has proven the relationship between (a) productivity, (b) productivity variability and (c) price at farm, regional, state and continental scale – whatever’s needed.

By digitising 20 years’ worth of property-level data for every farm in Australia, and updating it every 16 days, we can generate a score for every farm based on variability/productivity.

By integrating this knowledge with sales and property data, it’s

now possible to deliver a strong indication of what’s undervalued and overvalued so investors can make more informed, accurate property comparisons.

For instance, we can see where the same kind of land is cheaper, more productive, or simply better value. We can ask specific questions such as: “What is the productivity of this area?”; “How does this property compare to best in class properties in this region – or other regions?”; “Is productivity improving or declining?” and “Is some land within this area more productive than others?”

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Smart buyers today are still assessing their business needs and location first, but now they can use price, productivity and variability in unison to make their purchasing decision.

Decisions can now be based on all the data – buyers might still choose higher priced land because it’s been judged on other factors along with productivity and variability (for example, it’s only 4 hours from a capital city; it’s right next door to a property already owned by the buyer; or near amenities such as a hospital).

For farmers, for lenders, for investors - the exciting development is that today’s data-backed assessments of value for property A or B, or region A or B, don’t rely on price growth alone. Buying a farm should be determined by its ability to produce now and into the future, not just median price per hectare.

In other words, it goes way beyond face value (or in this case, price).

DAS has unlocked the ability to assess productivity at a paddock, farm and regional level.

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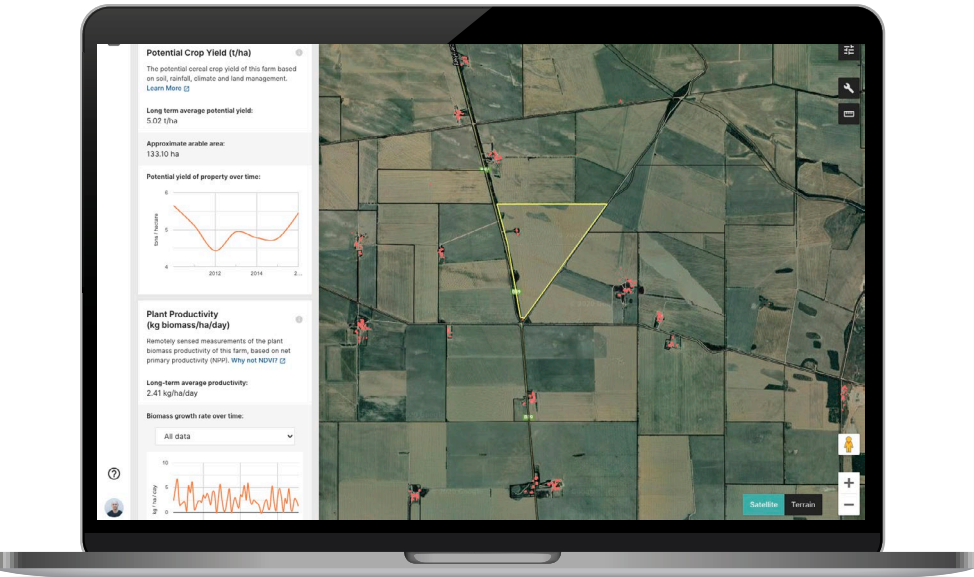
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Backing Decisions with Science – A New Approach to Measuring Productivity



Whatever the rural property or farming region, we need accurate data on productivity, and how we measure that is changing. It's all about **putting science into the hands of decision-makers** – that is, backing buying decisions with science.

Australia is highly climate dependent, with higher variability in rainfall than similar commodity producing markets such as the United States. ABARES says that as a result, Australian agriculture has more revenue volatility than almost any other country in the world.

The huge and imminent challenges of climate change thus add even greater impetus to how Australian agribusinesses can measure and mitigate the impact of climate

variability, and how to measure current and future productivity.

DAS (in conjunction with CSIRO) uses a standardised measure of plant productivity based on NPP (net primary productivity), not just the more commonly used NDVI (normalised difference vegetation index). **NPP uses NDVI and other measurements to produce a more accurate picture of land potential.**

Why is that so important? NPP is a particularly powerful measure in terms of looking at the efficiency of rainfall, so in markets like Australia with great variability in seasons, it allows comparison of different locations for value when searching for similar types of land.

In future, above ground carbon assessments will be possible

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To briefly explain the science, NPP is an excellent proxy for the rate of plant growth – in fact, it's the best science we have right now. It measures biomass accumulation and is a leading indicator of potential yield. NPP can be compared to previous years to determine if yield is likely to be above or below the final yield. It is a more reliable indicator of potential yield than NDVI which is a measure of greenness (rather than biomass). NPP does not saturate at high biomass, a common problem with NDVI.

NDVI can be a good predictor for a specific location, but it is a broadly poor predictor for comparing locations and properties.

Using NPP, we have a generic measure of plant growth (kg/ha/day), which means we can compare like farms growing different crops, in different places around Australia, over many years. This quantitative

assessment and benchmarking of the productive value of agricultural land in different regions delivers a crucial picture of how the productive capacity of land has changed over time.

That's why NPP is extremely important to landowners and investors as buying patterns change and we see more inter-regional purchases. For instance, we're seeing farmers buying companion properties as mitigation against climate risk, purchasing in higher rainfall areas during times of drought. Out of region sales are also growing due to lack of purchase opportunities in the local area, for lifestyle factors, and as a way for farmers to increase return on capital invested in land.

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Striking the Right Deal at the Right Price

All kinds of buyers should be using NPP as a measure of productivity - because just as the rural sales outlook is different in every state of Australia (see State by State Trends in Land Prices from Rabobank's Australian Agricultural Land Price Outlook 2020), so is every farm property and portfolio.

There is no single right decision. It always comes back to different needs for different buyers. That's why data differentiation in the form of NPP is key for farm buyers and investors when assessing and comparing potential value of like properties.

NPP is crucial to striking the right deal at the right price.

As investors in any asset class are always cautioned, "past performance may not be indicative of future results."

But in the case of agricultural land, rural intelligence and analytics today provide a lot more answers about productivity and variability than ever before - answers that are backed by science and thus key to more efficient and value-driven decision-making when buying properties.

DAS is working to create productivity, sustainability and above ground carbon measures for every farm, starting in Australia

State by state trends in land prices

For more information, see Rabobank “A New Phase: Australian Agricultural Land Price Outlook”, Aug 2020, supported by Digital Agriculture Services



NEW SOUTH WALES

Cautiously optimistic

Low supply and stable demand for quality properties continued to fuel median land price growth in NSW during 2019. But 2021 will be a year of consolidation in the NSW land market. We expect only a marginal increase in median prices in 2021, if any growth at all. The impact of drought will continue to affect demand as farms rebuild balance sheets following three tough years.

We expect the number of farmers looking for opportunities to expand will continue to outweigh supply. Productivity is a premium in the Northern and Central Tablelands.



TASMANIA

A tight market will keep price growth strong

On a productivity basis, prices of grazing lands trended upwards over the past five years.

Corporate investment, both local and foreign, continued to be attracted to Tasmania with its reliable rainfall, water for irrigation and diverse range of production opportunities. This influx of demand, together with a very limited amount of properties on the market, supported median prices.

Demand from corporate and mainland buyers will continue to support land price growth during 2021. Small blocks will continue to see demand from family farms looking for add-on blocks.

Tasmania is also looking to roll out further irrigation schemes, which will further underpin demand.



QUEENSLAND

Land price growth has peaked

Low borrowing costs, strong commodity prices and improved seasonal conditions supported higher land prices during 2019, which made for a strong bounce into 2020.

The low cost of borrowing gave many producers the incentive needed to purchase land, rather than lease land or agist cattle.

As parts of Queensland emerge from drought, we expect farmers will consolidate businesses and direct investment to re-stocking and infrastructure spend. This will temper the recovery in demand for property purchases, with seasonal conditions a major factor in the speed of this demand recovery.



VICTORIA

Price growth will remain low in 2021

Prices have continued to increase on a productivity basis. After a run of strong years, median price growth stabilised across Victoria during 2019. Increased demand and positive macro-fundamentals will ensure land prices continue to rise, albeit at a much slower rate than in 2017 and 2018.

The improvement in seasonal conditions will continue to support demand, and that will outweigh an expected marginal increase in supply. Demand for cropping land in particular will continue to strengthen. Some crop farmers are purchasing traditional grazing land, and given the very limited supply of properties, we expect this trend will continue, especially in high rainfall regions.



SOUTH AUSTRALIA

Modest Growth Ahead

Prices per productivity unit have increased. Land prices will continue to rise across the state during 2021, albeit at a more modest rate than in the last three years.

Supply will remain tight, in line with previous years. A string of average years will ensure demand will remain lower than what we saw during 2017 and 2018. As a result, we do not expect the same large price increases.

In south-eastern regions, price growth will remain strong as buyers from outside the region continue to scout purchases - attracted by reliable rainfall, land use possibilities and water availability.



WESTERN AUSTRALIA

Prices will rise, but at a low rate

WA land markets cooled during 2019, with median prices mostly steady year-on-year. The one exception was the South East Coastal region (up 21% YOY), where farmers continued to pay a productivity premium for high rainfall land with scale.

Although the below-average season meant fewer farmers had purchase intentions, the percentage of farmers looking to buy is the highest of any state in the country.

Opportunities to buy at scale remain very difficult to come by. Strong land price growth will be supported across Western Australia during 2021. Fuelled by a run of strong profit years, farmer demand will remain robust, outstripping the number of properties on the market.

CSIRO-backed Digital Agriculture services (DAS) caters to the growing appetite for rural, agri, and climate-risk intelligence that puts science in the hands of decision makers – including rural real estate, investors, lenders, insurers, commodity traders, farmers and rural suppliers.

Founded in 2017, the company is offering greater access to data-driven insights, backed by science, that can build the prosperity and sustainability of Australian and global agriculture.

DAS has 25 direct team members, supported by some of the world’s leading scientists in climate, agriculture, land, and water.

Digital Agriculture Services (DAS) delivers rural intelligence at farm, regional and national scale. The company’s powerful software helps take land analysis to the next level with essential, science supported rural, agri and climate intelligence.

To discuss how the science and rural intelligence canvassed here can benefit your business, please reach out to any DAS team member or get in touch at customersuccess@dasintel.io.

Rabobank Australia & New Zealand Group is one of Australasia’s leading agricultural lenders and a significant provider of business and corporate banking and financial services to the region’s food and agribusiness sector.

To contact Rabobank about the findings of “A New Phase”: Australian Agricultural Land Price Outlook”, August 2020, please contact your nearest Rabobank branch.

Sources

Rabobank: “A New Phase”: Australian Agricultural Land Price Outlook 2020
Wes Lefroy, Agricultural Analyst, Rabobank RaboResearch Food & Agribusiness
Sam Holt, Data Analyst, Digital Agriculture Services (DAS)
Anthony Willmott, co-founder & CEO, Digital Agriculture Services (DAS)
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