Tasmania's future with irrigation

High level scoping study, December 2013

Rabobank Food and Agribusiness Research & Advisory

Rabobank

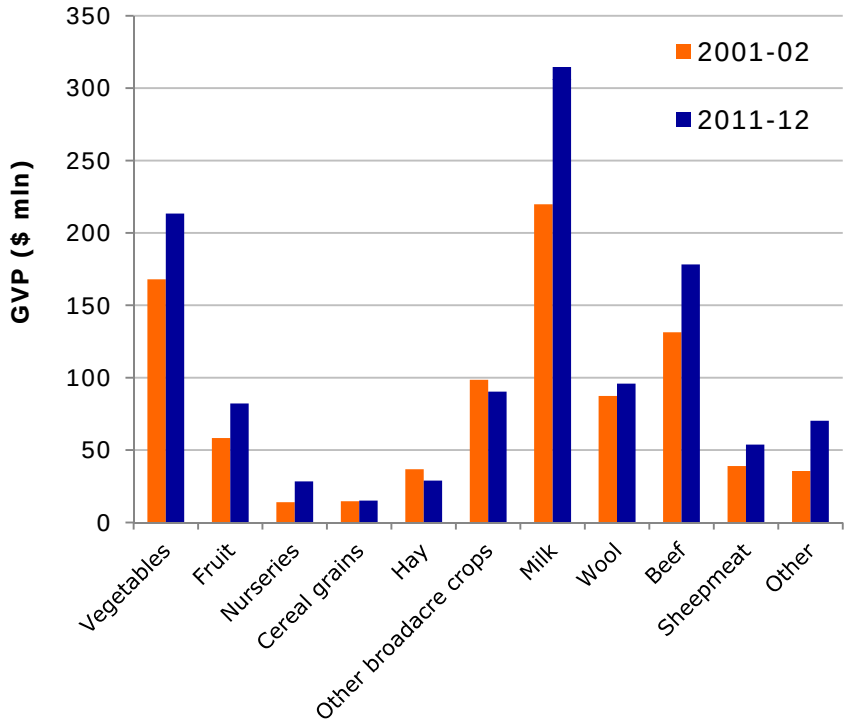
Contents

Introduction: Snapshot of Tasmanian Agriculture

Tasmania's considerable investment in irrigation infrastructure will naturally both help to improve the reliability and productivity of existing production systems, as well as to unlock the significant unmet potential of the state's food and agriculture sector.

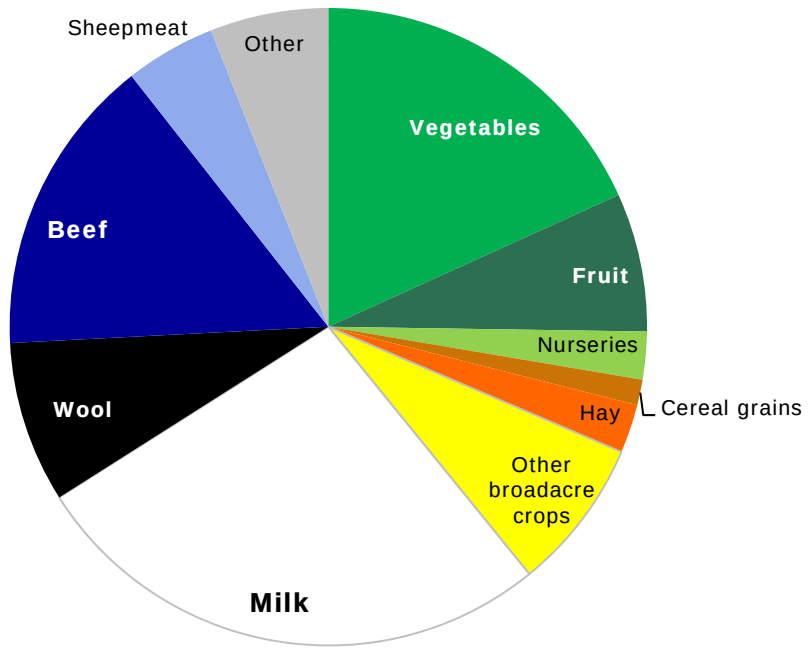
The organic growth in the sector over the past decade has already been significant, but this is expected to accelerate in coming years as existing producers pursue greater scale economies and demand continues to grow for many of the products which Tasmania can competitively supply. In fact, over two-thirds of Tasmania's gross value of food and agriculture production as it stands today can benefit from greater access to irrigation water.

Sub-sector growth – Last 10 years



Source: ABS & Rabobank, 2013

Gross Value of Production by product ($1.17 bn) in 2011/12



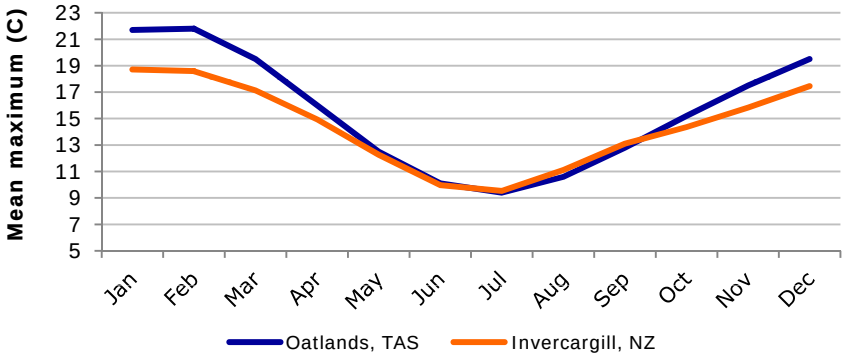
Source: ABS & Rabobank, 2013

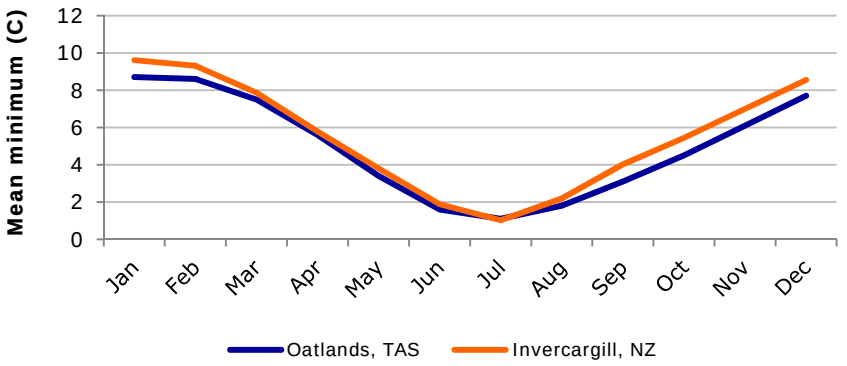
Introduction: Global climate comparisons

Intensive agriculture is relatively untested in many parts of Tasmania's key agricultural zones. A case in point is the Midlands region where low-input broadacre farming has dominated the landscape for generations, and only now are new farming models being explored with greater intent.

While Tasmania's Midlands are unique in an Australian context, global comparisons can be made to other productive agricultural regions. For example, temperature averages for Oatlands compare closely to Invercargill in New Zealand, but with half the annual rainfall farmers can now supplement rainfall as and when needed. At the same time, different microclimates exist in close proximity which can feasibly support a more diverse range of agriculture.

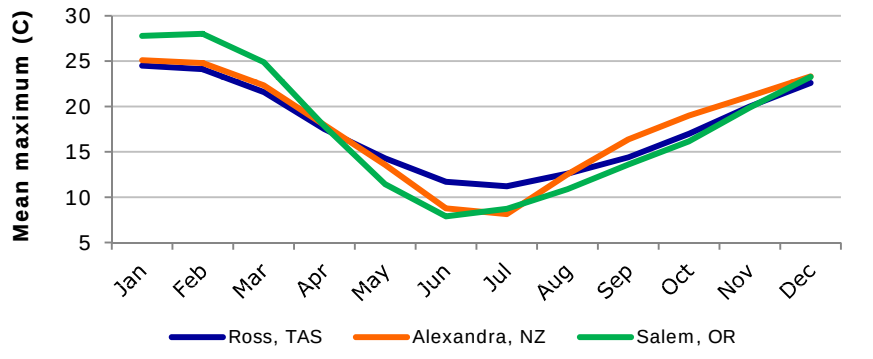
Oatlands, TAS

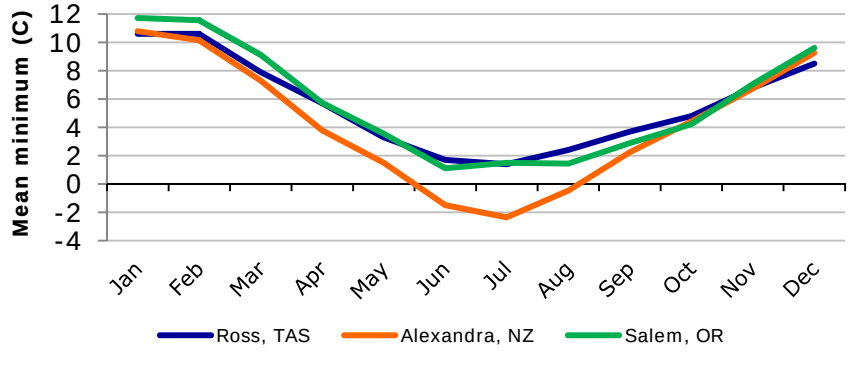




Source: Australian BOM, NZ NIWA & Rabobank, 2013

Ross, TAS





Source: Australian BOM, NZ NIWA, US National Weather Service & Rabobank, 2013

Sizing up Tasmania's opportunity in dairy

The dairy industry is Australia's 3rd largest rural industry, behind wheat and beef, with a gross value of $4 billion.

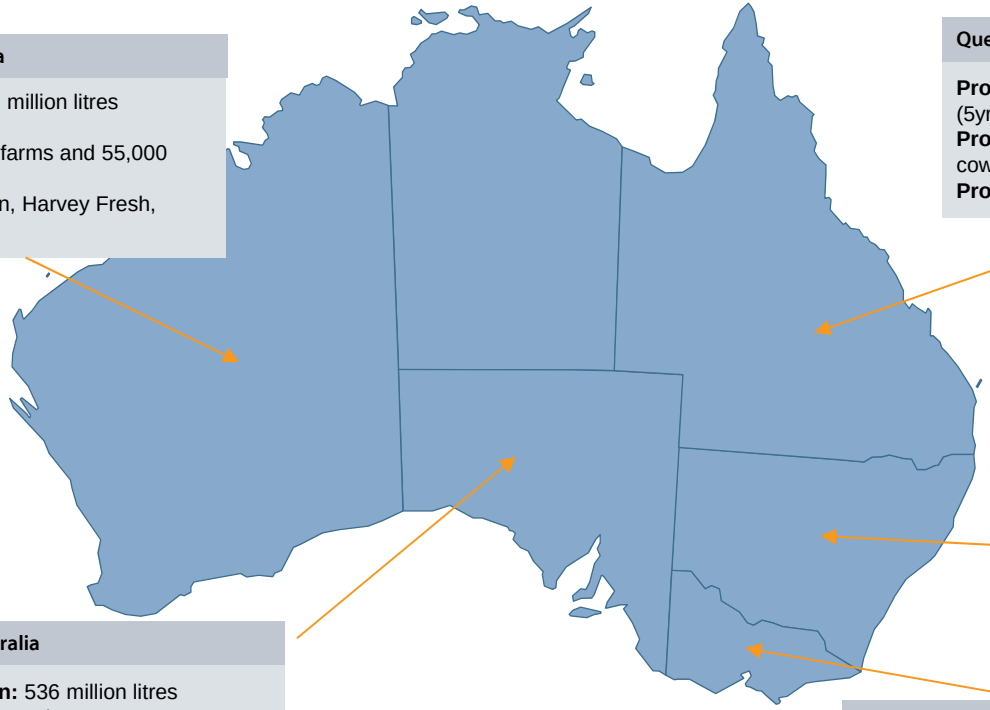
Australia is a relatively small producer of milk, but the world's 4th largest dairy exporter.

The dairy industry is concentrated in the south-east; where Victoria is the largest production state.

Milk production systems vary across the country due to differing climatic conditions, market requirements and the cost of inputs.

Since deregulation in 2001, the industry has undergone significant change and rationalization.

Australia's milk production, processing and wholesale sector by state (2012/13)



Western Australia

Production: 337 million litres (5yr CAGR 1%)
Producers: 162 farms and 55,000 cows
Processors: Lion, Harvey Fresh, Brownes

Queensland

Production: 458 million litres (5yr CAGR -1%)
Producers: 555 farms and 96,000 cows
Processors: Lion, Parmalat

New South Wales

Production: 1.071 billion litres (5yr CAGR 0.4%)
Producers: 778 farms and 198,000 cows
Processors: Lion, Parmalat, Bega, Murray Goulburn, Norco and Hastings

South Australia

Production: 536 million litres (5yr CAGR -2%)
Producers: 275 farms and 77,000 cows
Processors: Lion, Parmalat, UDP, WCB, Murray Goulburn

Tasmania

Production: 760 million litres (5yr CAGR 3%)
Producers: 444 farms and 146,000 cows
Processors: Lion, Fonterra, TDP, Betta Milk, Ashgrove, Cadbury

Victoria

Production: 6.039 billion litres (5yr CAGR -0.1%)
Producers: 4,556 farms and 1.059 million cows
Processors: Murray Goulburn, WCB, Bega Group, UDP, Lion, Fonterra, Burra, Longwarry

Source: Dairy Australia, Various sources, 2013

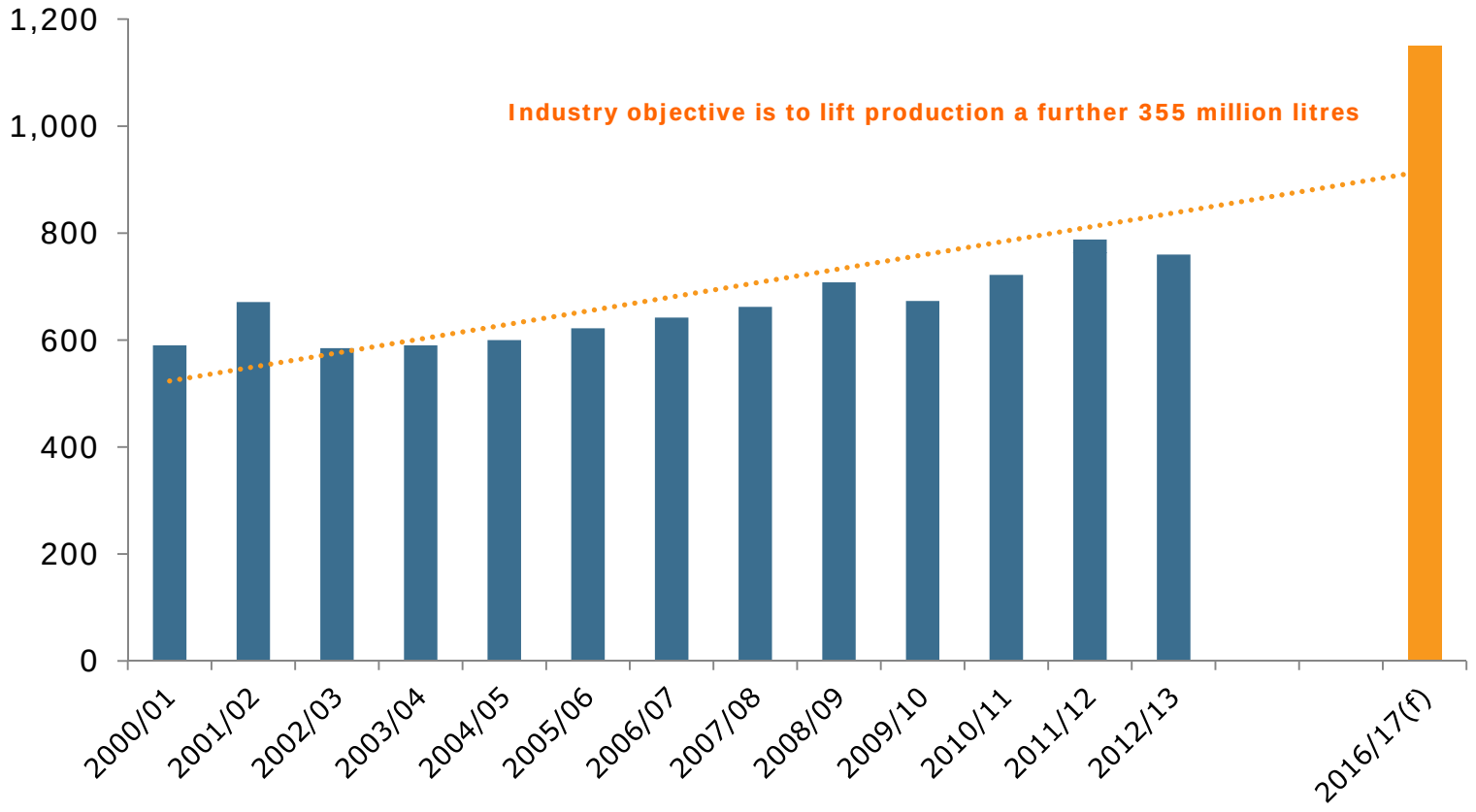
Tasmania's expanding milk pool creates export opportunities

Tasmania has a vibrant dairy sector and is one of the nation's quickest growing milk pools.

In recent times there has been significant investment by dairy processors, but more investment on-farm is needed in the medium-term to optimise processing capacity.

To this end, the sector has a stated strategy to lift production by 355 million litres to 1.1 billion litres by 2016/17, which equates to 190 new farms and 67,500 cows based on Tasmania's average dairy profile.

Tasmanian milk production (million litres)



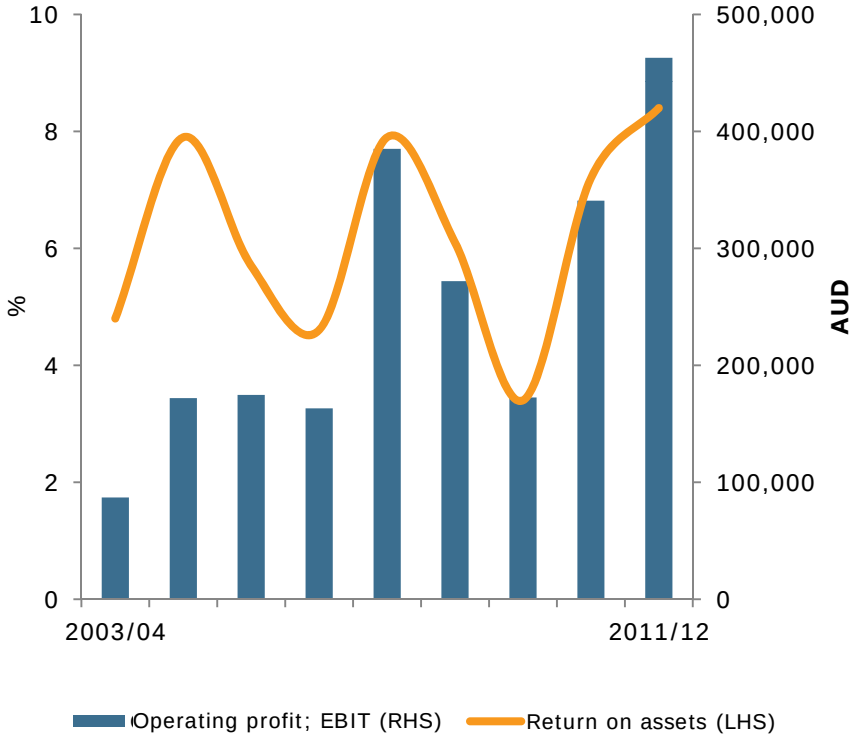
Source: Dairy Australia & Rabobank, 2013

Dairying is a complex and volatile operating environment

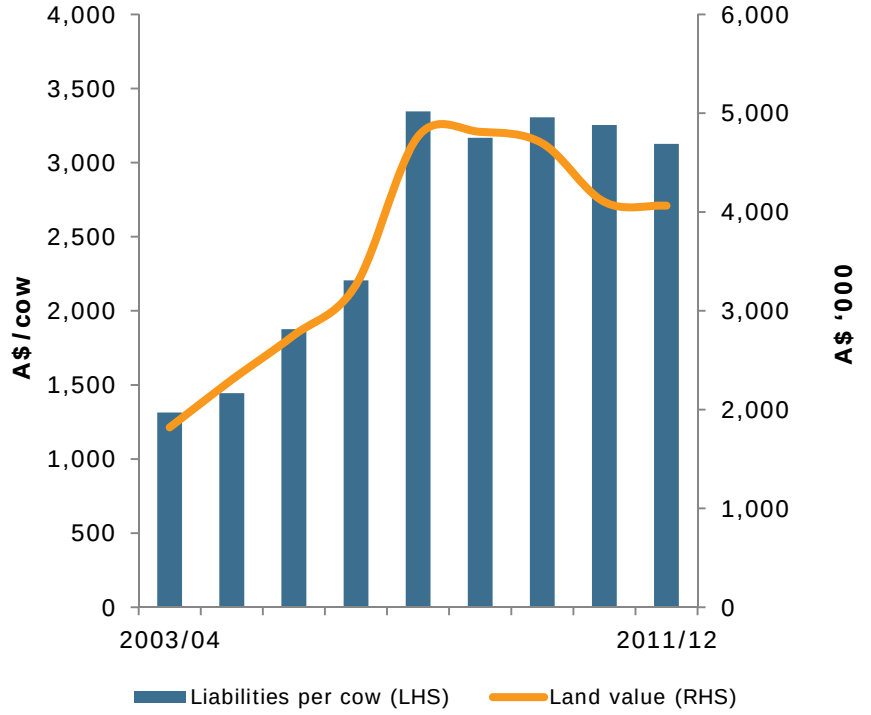
The Australian dairy sector operates in a volatile global commodity market. This volatility is felt across all parts of the value chain, but especially at the farm gate. As a result, dairy farming is a complex business with a challenging operating environment and has seen profitability fluctuate widely, and the return on investment remain quite low compared to other investment streams.

While Tasmania dairy land values have fallen from recent peaks, prices remain historically high. As dairy farmer average debt levels have risen sharply in recent years, this has tied up much more capital on-farm and underpins the need for alternative capital streams to inject liquidity into the sector.

Tasmania average dairy financial benchmarks



Tasmania dairy land values and debt levels



Source: 2013 ANZ Dairy Business of the Year Award

Global growth matrix reveals enormous upside in Asia

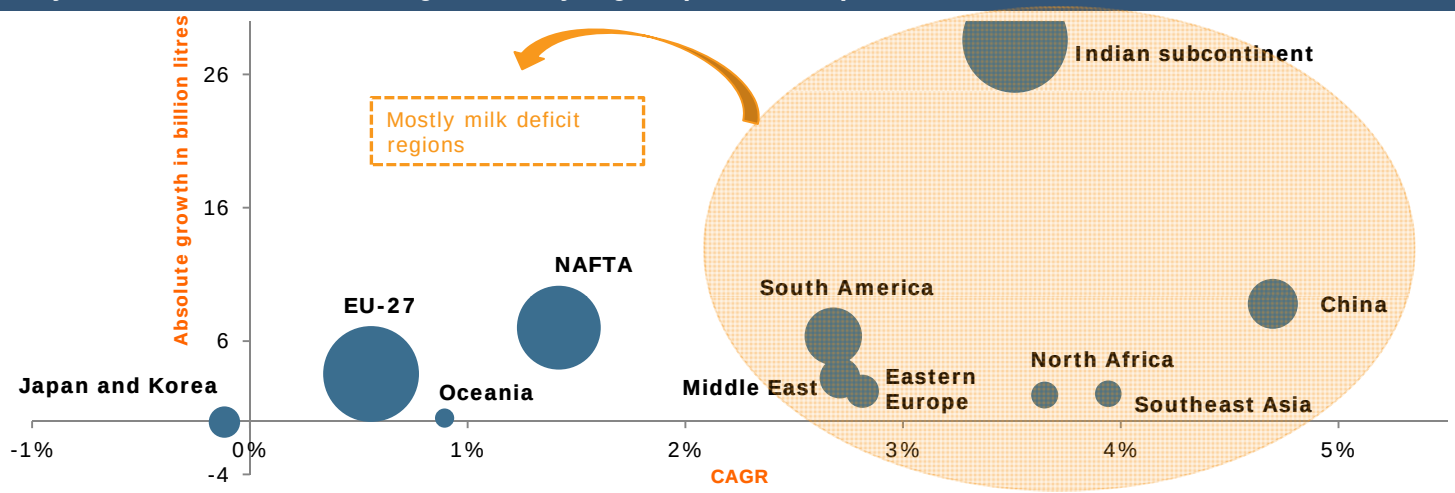
A number of demographic and economic factors are driving dairy demand growth in developing economies.

There are divergent growth prospects between the developed economies and emerging economies.

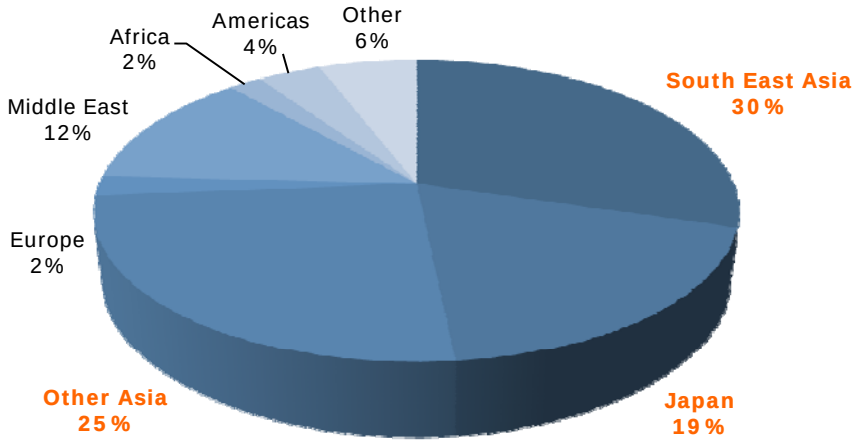
Importantly, growth will be the fastest in markets which will be unable to produce enough milk locally.

Over recent years Australia has exported around 40–45% of its milk production, destined mostly for Asia, where Japan continues to be the single most important export market.

Dairy market size and forecast growth - by region (2010-2020)



Australian dairy exports by region, 2011/12



Source: Dairy Australia & Rabobank, 2013

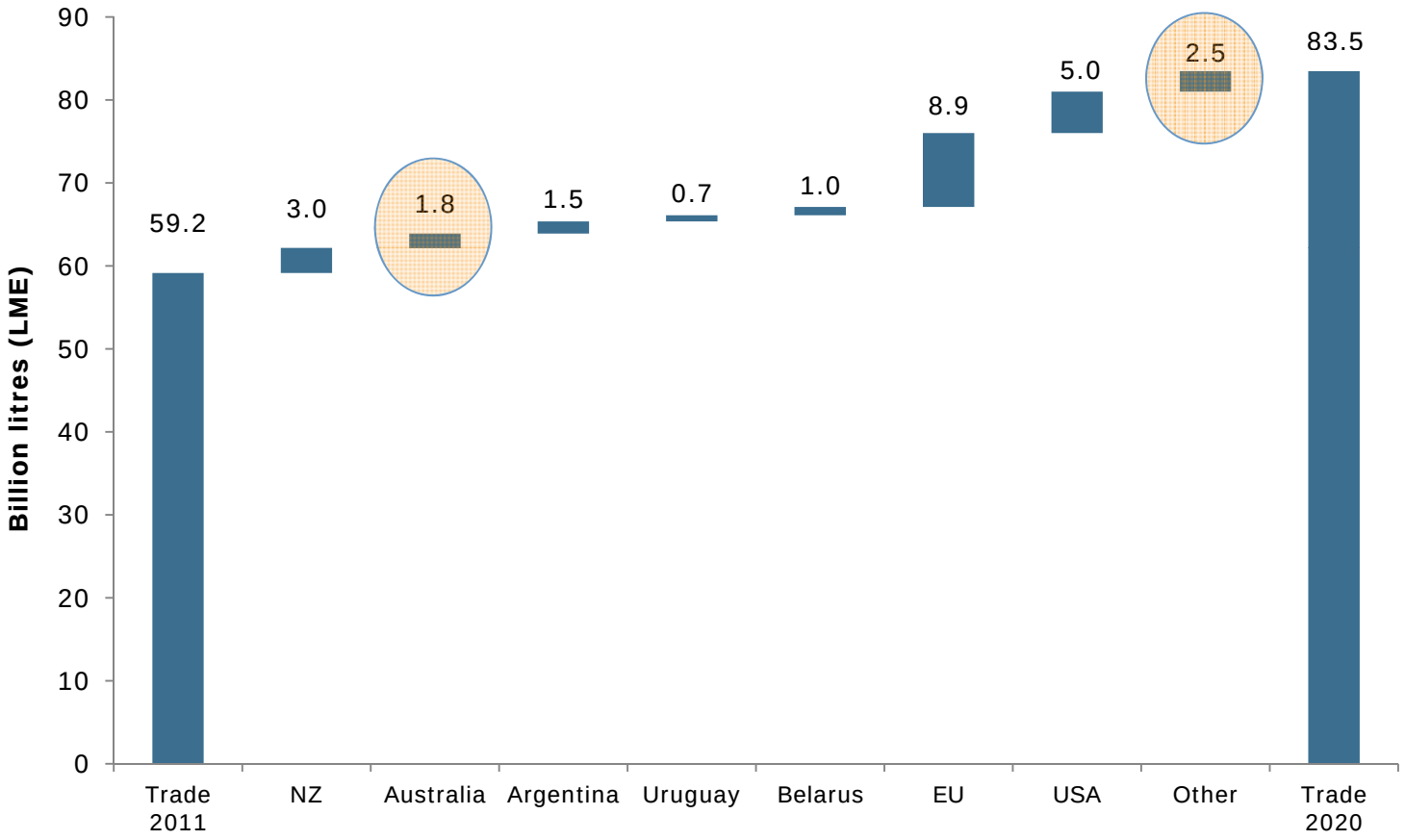
The bridge to meet forecast future global dairy demand

Looking ahead to 2020, it is apparent that low cost regions can't balance the market alone as exports fall short of market needs.

EU/US may fulfill most of the additional requirements, but investment will be heavily price dependent.

But even given the growth potential of the world's major suppliers, a looming shortfall exists in global supply to meet global dairy demand.

Trade growth: 2011 to 2020 (assuming 3.9% CAGR)



Source: Rabobank, 2012

Tasmania has a clear comparative advantage in dairy

Global milk production costs have converged between exporting countries as traditionally low-cost milk producers have seen their production costs increase.

The cost of producing milk has become more volatile due to increased volatility in global feed prices and the increased use of these feeds in traditional pasture-based regions.

High labour costs and rising energy costs are a challenge for milk producers in Australia to manage their future costs.

Farmers are increasingly relying on improving efficiencies downstream in the supply chain to maintain global competitiveness.

Strengths

- On farm production is globally competitive
- Growing footprint of major processors
- Efficient access to growing export markets in Asia
- High quality & safe food producer

Weakness

- Resource constraints (cows, labour)
- Limited on-farm access to capital
- Lack of scale across the value chain
- Port infrastructure

Opportunities

- Access to more reliable and efficient production systems with irrigation water
- Scale producers & limited industry baggage
- Brand 'Tasmania' & the promotion of sustainable production/product traceability/environmental stewardship

Threats

- Rising costs across the value chain
- Environmental checks and balances
- Tariff disparities with competitors in offshore markets

The growth of dairying in New Zealand's South Island

Over the past decade New Zealand milk production has increased by more than 50%.

Dairy farmers enjoyed a run of good returns, increased capital investment and strong asset growth, which have fuelled significant development of new dairy farms and processing facilities.

Much of the growth has taken place in the South Island. Flat or rolling land previously used for finishing lambs or cropping was easily converted for grazing and milking dairy cows, assisted by the increased utilisation of irrigation in Canterbury.

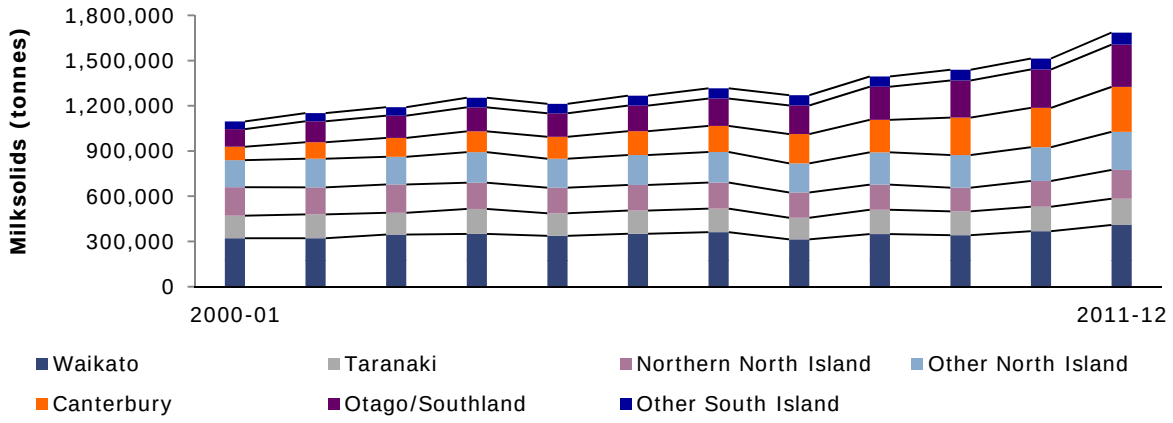
For farmers, the attraction to dairying versus sheep or cropping was twofold:

1) The increased cash flow from dairy operations.

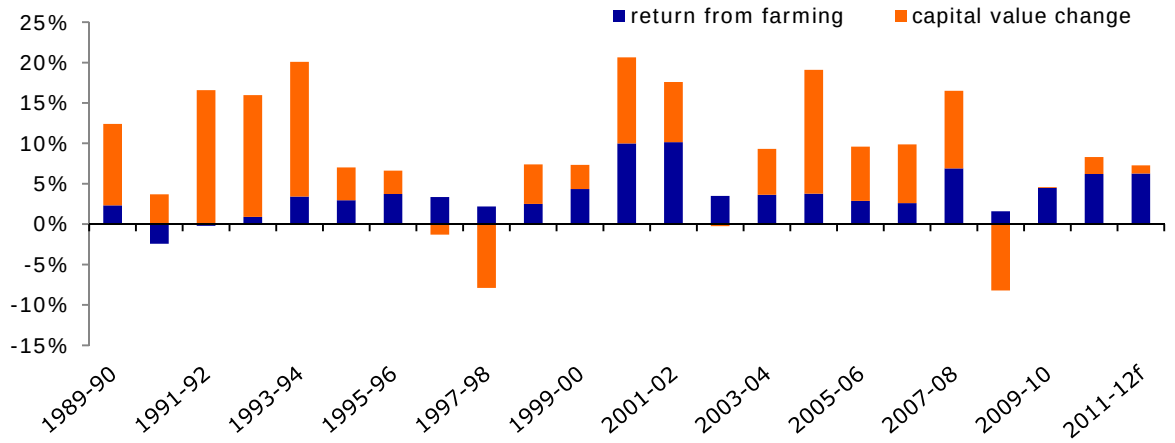
2) The uplift in land values which typically outweighed the capital outlay required to covert.

Milk production in the Canterbury and Otago / Southland regions surged by 150%, assisted by the addition of 1.4 million cows!

New Zealand milk solids production by region, 2000/01 – 2010/11



New Zealand dairy operating profit and total return on assets



Source: Dairy NZ & Rabobank, 2012

NZ dairy conversions & the environment

Constraints to further milk production growth are now starting to bite particularly as environmental regulations tighten and higher input costs become embedded in farming systems.

To overcome feed limitation, the options are either:

- growing more feed on existing land
- purchasing/renting more land or
- buying supplementary feed

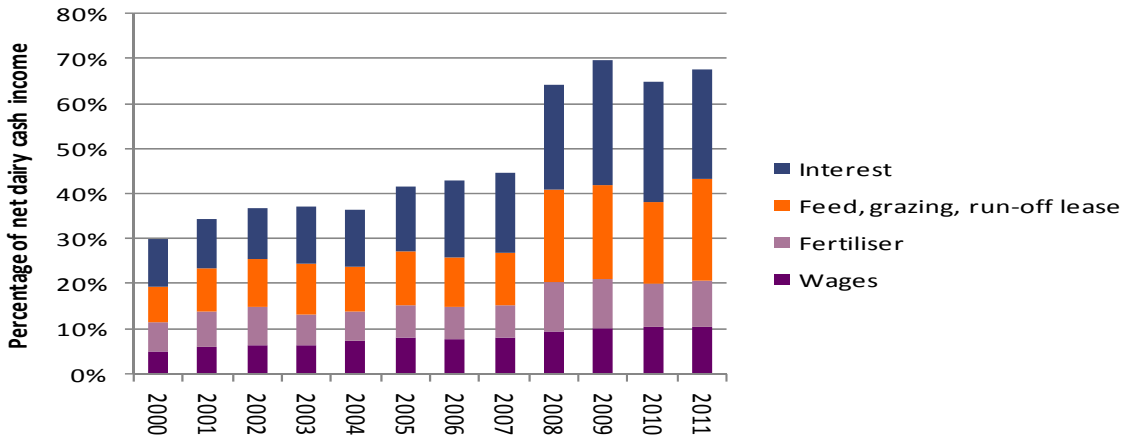
Major issues with water resources include:

- Pollution
- Over allocation
- Inefficient usage

In response, local governments have promoted reforms, including:

- The (voluntary) use of management practices
- Mandating specific performance standards
- Imposing command-and-control requirements
- Pricing nutrient loss and/or water usage

The industry has also accumulated considerable debt



Source: Dairy Economic Survey, Rabobank 2012

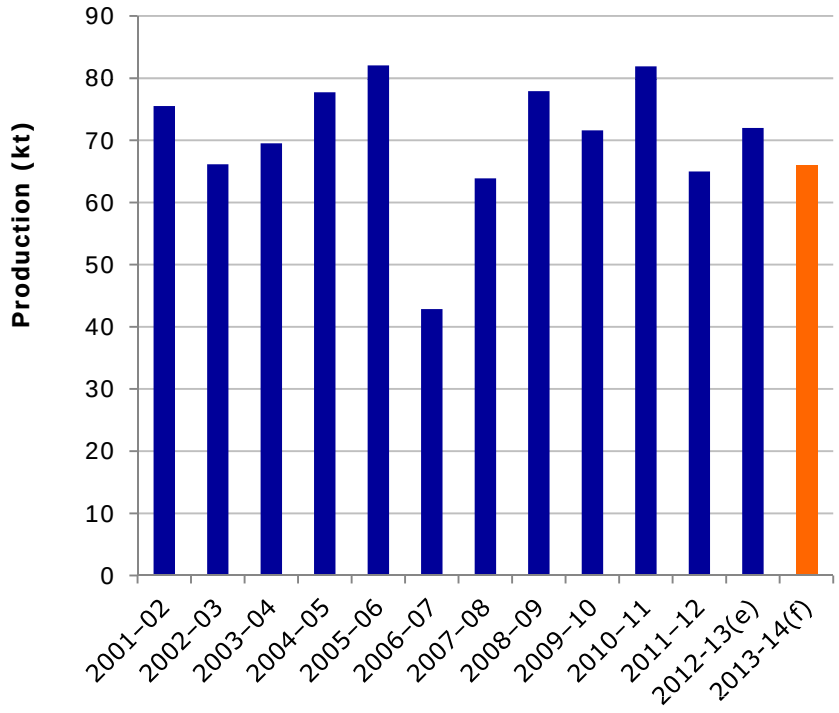
Environmental constraints to play a role in future growth

Feed grains – Fuel for dairy growth

Winter grains production in Tasmania has been stagnant for a long time, with little comparative advantage relative to larger scale mainland producers and only limited demand for inputs from local livestock industries and value-added food processors.

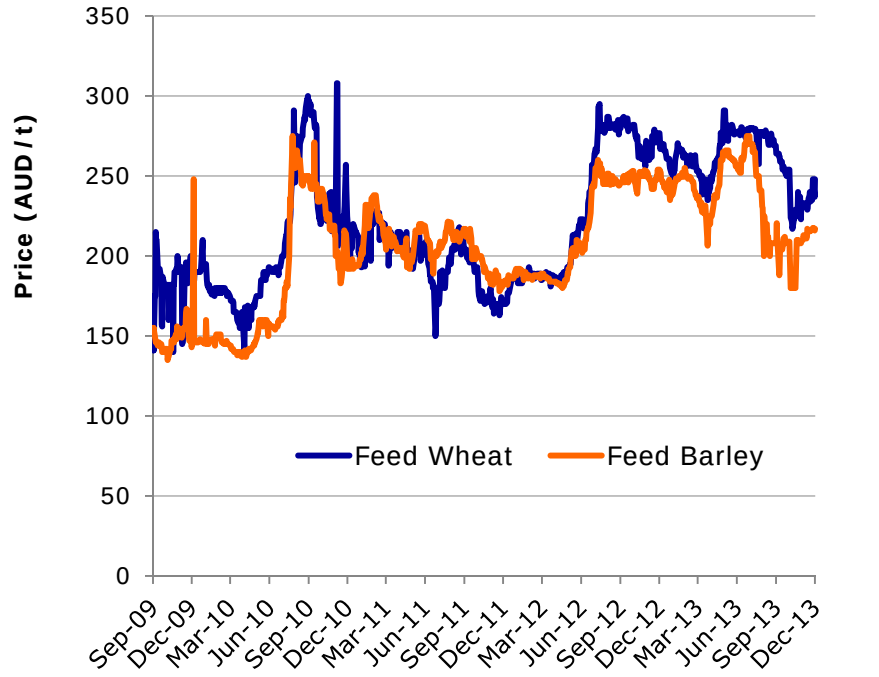
But with a growing dairy industry and the ability to boost the reliability and productivity of grains production, there is likely to be more scope for dairy operations to require more feed and pursue integrated production systems to reduce existing exposures to inherently volatile feed grains markets.

Winter crop production in Tasmania



Source: ABS & Rabobank, 2013

Feed grain prices (ex. Geelong)



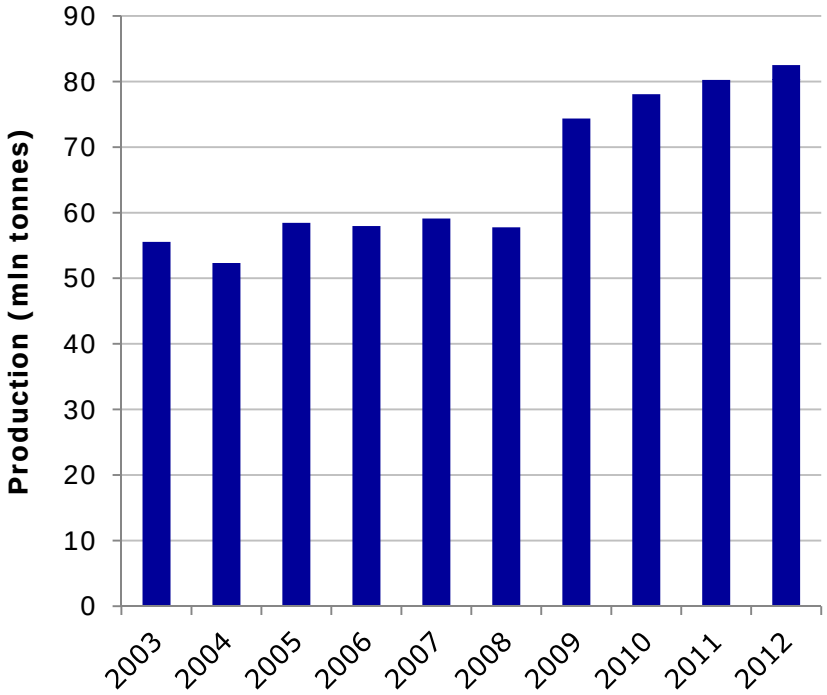
Source: Bloomberg & Rabobank, 2013

Specialty grains – Is Quinoa at home in Tasmania?

While there is only limited scope to compete with the scale and cost efficiencies of mainland grains producers, there are nevertheless growing opportunities for Tasmania to explore the production of higher value specialty grains that are growing in popularity in the household diet.

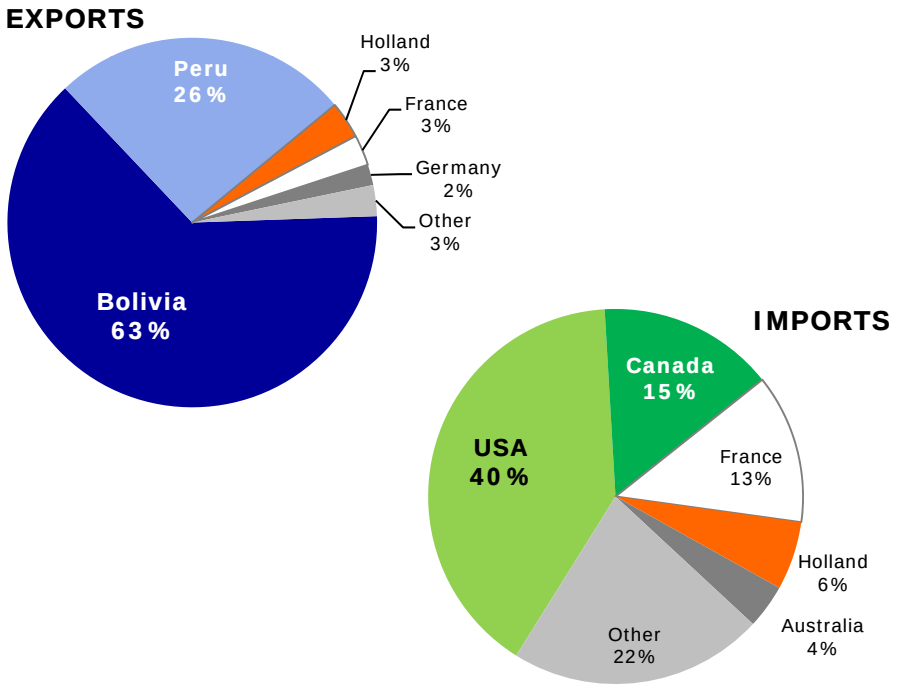
Of particular note is Quinoa, an ancient grain of South American origin that has been hailed as a 'superfood' due to it being gluten-free, very high in protein and rich in trace nutrients. Demand for Quinoa is steadily rising in developed markets, to the extent that the traditional production base in Bolivia and Peru is struggling to keep pace and global prices have increased strongly in recent years.

Quinoa – Historical global production



Source: UN & Rabobank, 2013

World trade in Quinoa, 2012



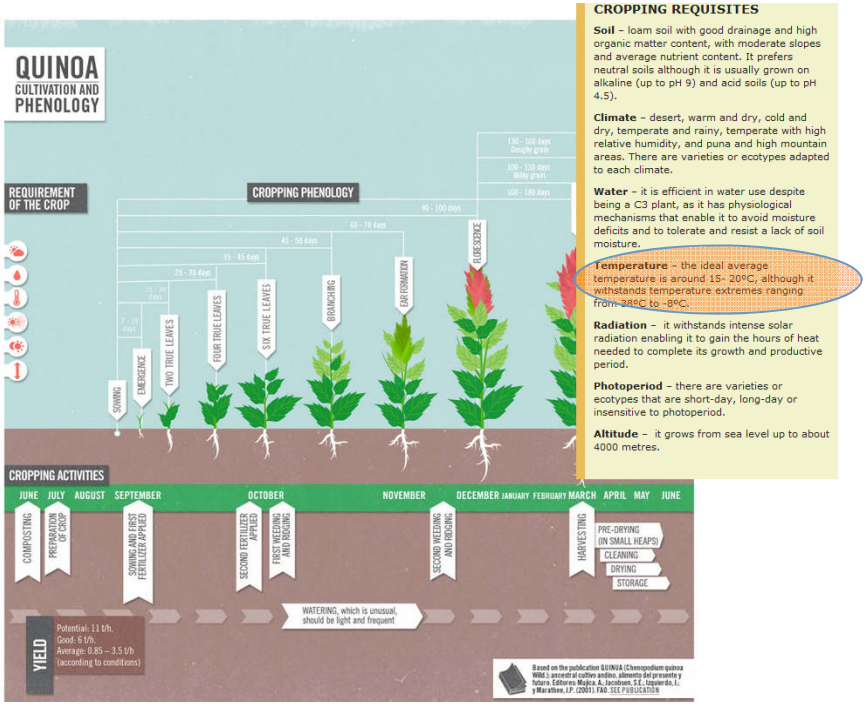
Source: UN Comtrade, 2013

Specialty grains – Is Quinoa at home in Tasmania?

What makes quinoa particularly interesting for Tasmania is that it grows under climatic conditions that are very different from that of more staple grains in the diet. In fact, quinoa thrives in a mostly arid and cool climate, with the ideal growing temperature ranging from 15-20°C. In fact, Quinoa is currently being successfully grown in Tasmania, albeit on a very limited scale.

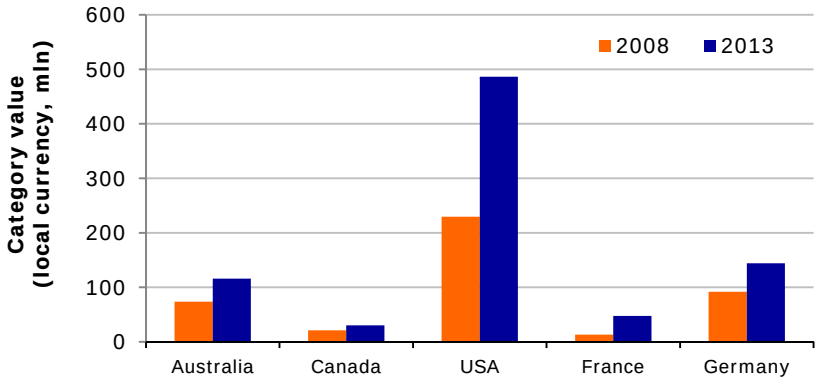
From a demand perspective, as individuals in western countries increasingly expand their understanding of dietary health and food intolerances, restaurants and food manufacturers are tailoring more and more products to meet these growing needs.

Quinoa – Agronomic profile



Source: UN FAO (http://www.fao.org/quinoa-2013/what-is-quinoa/cultivation/en/), 2013

Sales of gluten free grocery products by market, 2008-2013e



Source: Euromonitor, Freedom Foods & Rabobank, 2013

Poppies – Capturing growth in Tasmania

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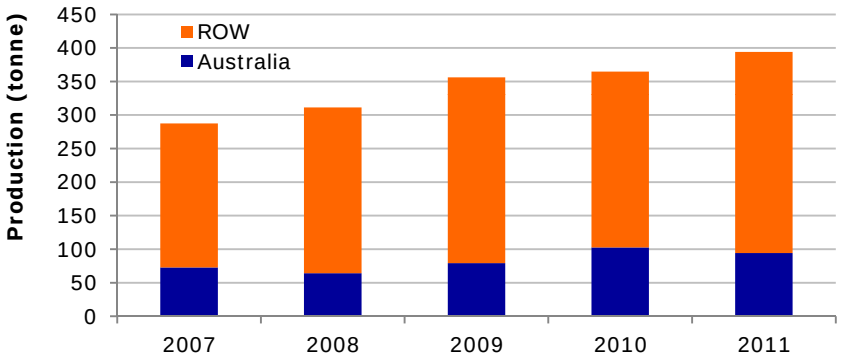
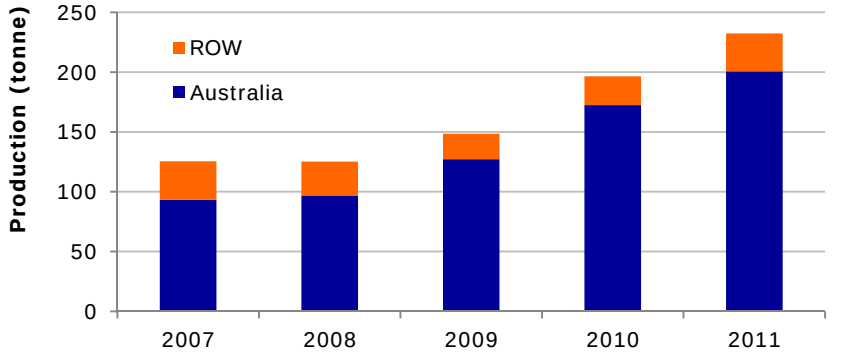
Global demand for natural alkaloids for medical and scientific purposes has maintained a steady upward trajectory over recent years. Tasmania's position as one of the world's most significant production locations of these products has also increased, but more recently processors have begun to explore beyond Tasmania to the Australian mainland to more effectively manage their supply risk and secure additional supplies to fuel demand.

The demand for natural alkaloids looks set to continue increasing as income levels rise and western medicine takes root in less developed countries. The consumption of morphine, for example, has risen by more than four fold over the past two decades, but remains concentrated in high-income countries.

Global production of Anhydrous Morphine Alkaloids

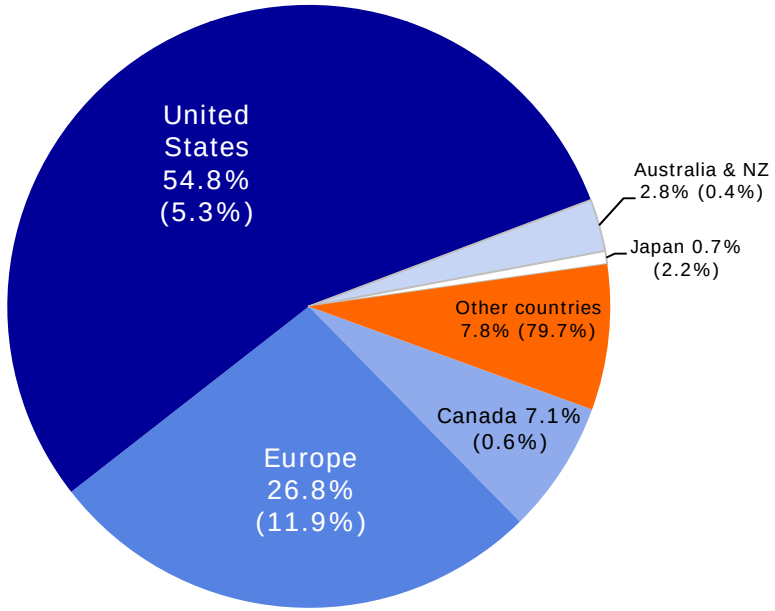


Global production of Anhydrous Thebaine Alkaloids



Global distribution of Morphine consumption

NB: Percentages in parentheses represent respective share of the global population



Source: INCB 2012 NDR, 2013

Pyrethrum industry – Banking on consistency

Kenya once supplied more than 70% of the world's pyrethrum requirements, but in the space of just a decade, gross mismanagement has invited Tasmanian suppliers (under the direction of Botanical Resources Australia) to supply global insecticide manufacturers with a much more reliable product.

As demand remains strong, insecticide manufacturers have realised a need to sure-up supply lines beyond Australia. The task to restore the badly broken supply chain in Africa is considerable, but has the potential to limit some of the growth that will otherwise be available to Tasmanian growers in coming years. Nevertheless, consistent supply out of Tasmania will remain in demand for the vast majority of end-buyers who value surety of supply.

Kenya's demise has been Tassie's prize

Source: PGK c/o PGA & Rabobank

The African supply chain is badly broken, can it be repaired?

Source: SC Johnson & Business Daily http://www.businessdailyafrica.com/Pyrethrum-farmers-export-first-load-after-State-bailout/-/539552/2094946/-/m24buc/-/index.html

Vegetable industry – An opportunity to scale up

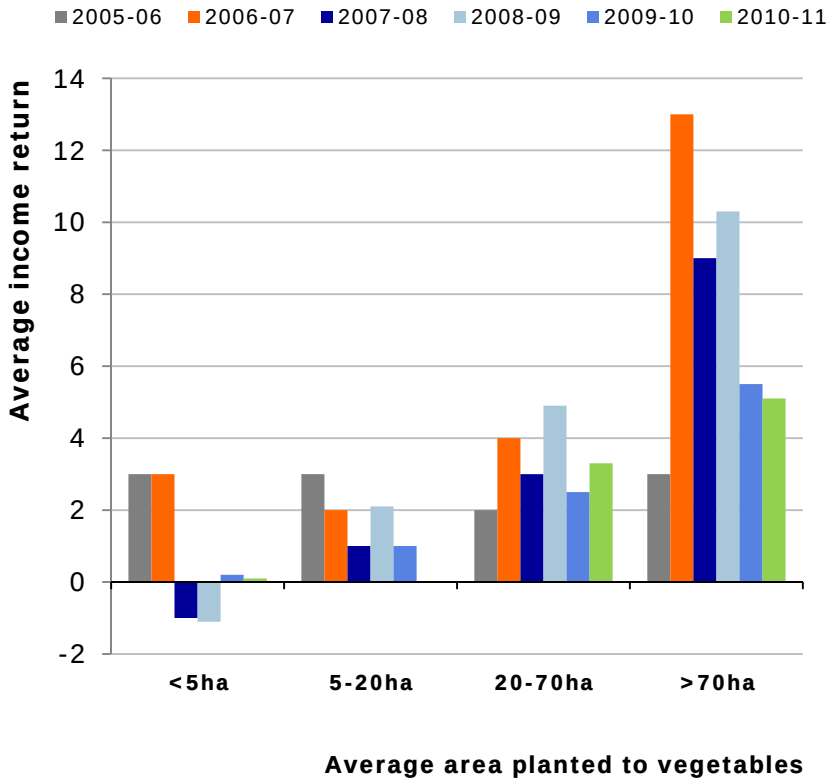
The Tasmanian vegetable industry has suffered its share of setbacks in recent years as local processors have sought to consolidate operations offshore in a lower cost environment and the high Australian dollar has crimped export earnings. However, with greater access to irrigation comes the opportunity for growers of fresh and processed vegetables alike to achieve greater economies of scale and restore their competitiveness.

Scale is widely recognised as a profit driver in vegetable production, and while the average Tasmanian farmer is close to being the most productive and highest quality producer in Australia, they remain one of the smallest in Australia. Access to greater scale would act to boost their competitiveness.

Average farm area planted to vegetables by state, 2010-11

Average production cost of potatoes by state, 2010-11

Average income return to vegetable growers



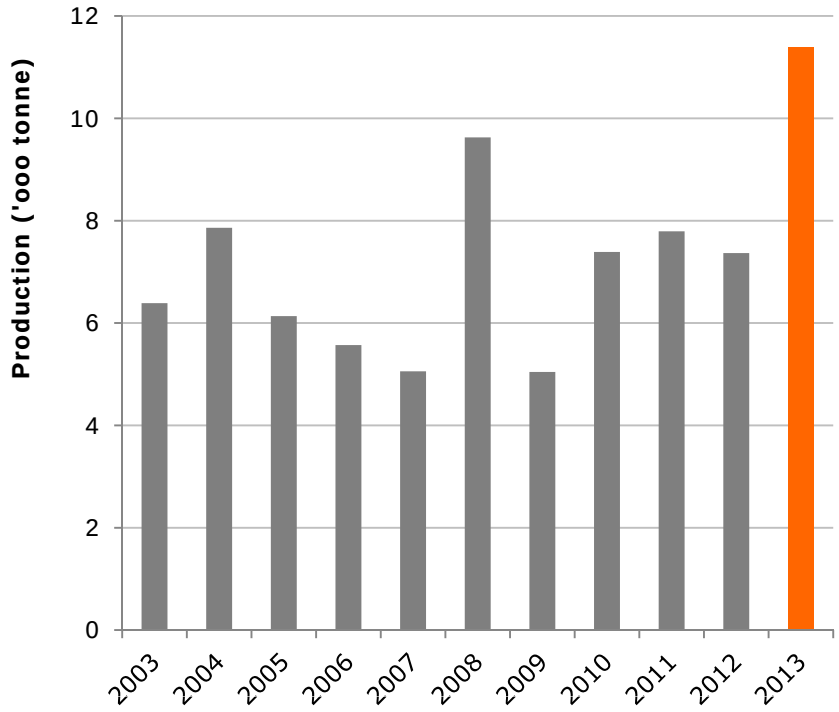
Source: ABARES & Rabobank, 2013

Wine industry – The growth paradox

Tasmanian wine production jumped in 2013 to a record 11.4 thousand tonne, which equates to less than 1% of the Australian crush and just over 3% of the New Zealand crush. An industry debate over the ideal growth trajectory of the industry has been underway in recent years, but it seems apparent that significant yet sustainable growth is in fact possible from this low base, and would in fact help to gain some level of critical mass in existing regions.

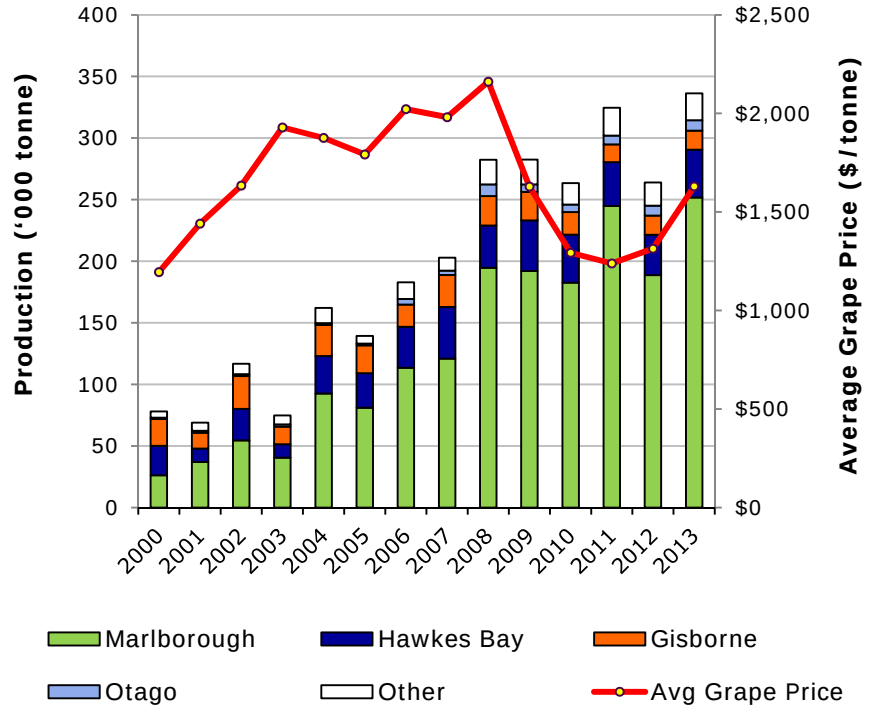
Comparisons are often drawn to the recently mixed experiences of the New Zealand wine industry. While it is doubtful that this scale of growth would ever be possible given the resources available in Tasmania, a balanced growth trajectory and high-value focus are definitely in order.

Tasmanian wine production, 2003-2013



Source: Wine Tasmania, 2013

New Zealand wine production



Source: Winegrowers NZ & Rabobank, 2013

Final takeaways – Supporting initiatives to foster growth

From this high level study it is clearly apparent that significant growth opportunities exist on the back of the investments made in the State's irrigation infrastructure. However, how to best foster and manage this growth remains the next burning question.

To this end, the ability to better inform investors and remove a degree of risk from investment decisions is of vital importance to encourage investment from within the State and beyond. Initiatives to achieve this aim could include the development of detailed economic models for key crops and regions of interest, and partnering with universities to direct more research towards ground testing crops or production systems in various irrigation districts.

Cool climate crop research in Canada

Agriculture and Agri-Food Canada

Atlantic Cool Climate Crop Research Centre

St. John's, Newfoundland and Labrador

The Atlantic Cool Climate Crop Research Centre (ACCCRC) is one of Agriculture and Agri-Food Canada's (AAFC) national network of 19 research centres. The centre is located in St. John's, the provincial capital of Newfoundland and Labrador and is recognized as a center of excellence among the province's agricultural communities. In 1829 the land now occupied by the research centre became one of the first 500 acre agricultural grants made by the governor of the time as a means of stimulating large scale agricultural production in the colony.

Though the ACCCRC is the smallest of AAFC's research centres, it plays a vital role in the development of agriculture for the Region. Over the past 7 decades staff at the centre have developed and introduced 8 commercially-important potato cultivars, which remain important to production on the Island.

The centre undertakes research in two areas:

- Primary Production Agriculture with a focus on berries suitable for production in the boreal ecosystem, and on forage, and cereal crops that support the regional dairy value chain;
- Environmental stewardship through the improved performance of the agricultural production systems in the fragile boreal environment.

Facts, Figures and Facilities

- 5 research scientists and a total staff of 37
- 61 hectares at the headquarters site and 14 hectares at the Avondale field research location
- Climate-controlled growth chambers, greenhouses and crop drying facilities
- Soil and analytical chemistry lab
- Micropropagation lab and molecular biology lab
- Entomology lab
- Co-located at the Centre are:
  - Agriculture and Agri-Food Canada Regional Office
  - Provincial (NL) Department of Natural Resources - Agrifoods Branch and Department of Environment and Conservation - Wildlife Division
  - NL Federation of Agriculture
  - NL Horticulture Producers Council
  - Chicken Farmers

Source: Government of Canada http://www.agr.gc.ca/eng/science-and-innovation/research-centres/atlantic-provinces/atlantic-cool-climate-crop-research-centre/?id=1180547153109

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Matt Costello, Analyst (Animal Proteins)

Lloyd Setter, Analyst

About the Rabobank Group

With over 110 years of banking experience, Rabobank is the world's leading specialist in food and agribusiness banking. Founded in the Netherlands in 1898, by farmers for farmers, Rabobank retains its cooperative structure and founding principles while operating in 42 countries around the world.

Rabobank is among the 30 largest financial institutions in the world based on Tier 1 Capital, with a continuing and growing presence in Australia and New Zealand. With 93 branches located throughout all major agricultural regions in Australia and New Zealand, Rabobank Australia and Rabobank New Zealand are leading rural lenders that take pride reinvesting back into the local agricultural community. Rabobank understands the cyclical nature of agribusiness and takes a long-term view of the industry, using its established network of strategically located branches across Australia and New Zealand to service rural clients.

As well as global knowledge and local market expertise, Rabobank rural managers have a genuine understanding of their clients' businesses. This unique approach provides a real value-adding resource to help clients achieve their short and long-term business goals.

For more information on Rabobank products and services click on the links below:

www.rabobank.com.au **www.rabobank.co.nz**