

## FUN FACTS

- > While training, Gladiators of the Roman Empire ate barley due to its nutritional reputation for building strength. Barley was so important to the Gladiators that they were known as 'hordearii' or 'barley-men'.
- > Look closely at a chickpea grain ... its name comes from the small peak that resembles a chicken's beak!
- > Peas are a legume (pulse) crop. They have the unique ability to improve the amount of nitrogen in the soil. Nitrogen is essential for plant growth and development. Growing pulse crops is a great way to naturally increase soil nitrogen levels!
- > Rolled oats are oat grains that have been rolled flat and steam treated so they are softer and easier to eat and digest.
- > Wheat was brought to Australia in 1788 by first fleet colonists and was first planted in experimental plots at the Sydney Botanic Gardens. These varieties performed poorly because they were not adapted to the harsh Australian growing conditions and so the young colony nearly starved.

## USEFUL RESOURCES

**There is a great range of curriculum-linked teaching resources which explore the role of science in agriculture. Agriculture can be used to teach science, geography and maths in context. Visit the links provided below or throughout this fact sheet for more information:**

- > Art4Agriculture:  
[www.art4agriculture.com.au](http://www.art4agriculture.com.au)
- > AusAgventures:  
<http://ausagventures.com>
- > Career Harvest:  
[www.careerharvest.com.au](http://www.careerharvest.com.au)
- > National Farmers' Federation:  
[www.nff.org.au](http://www.nff.org.au)
- > Primary Industries Education Foundation:  
[www.primaryindustrieseducation.com.au](http://www.primaryindustrieseducation.com.au)
- > Primary Industries Centre for Science Education:  
[www.picse.net](http://www.picse.net)

# FOOD, FARMING AND FUTURES IN THE AUSTRALIAN GRAINS INDUSTRY

**Here's some food for thought ... behind every meal, there's a farmer. In fact, throughout Australia, we are lucky to have about 134,000 farm businesses that work to produce high quality fruit, vegetables, grains, livestock and fibres.**

It has been estimated that each Australian farmer produces enough food to feed about 600 people. Of these, 150 live in Australia and 450 live overseas. That's right – Australian farmers produce food which helps feed people all over the world.

But it's not just farmers involved in producing our food. The food production sector is a vibrant and thriving industry. Research scientists, agronomists, agribusiness experts, engineers, food technicians, communicators, logistic teams and many others work to get food from the farmer's paddock to your plate. There's room for you in this industry – with more than 1.6 million jobs in the sector, we are sure you can find one to suit you!

**For more industry relevant information visit the National Farmers' Federation website at:** [www.nff.org.au](http://www.nff.org.au)

## MORE INFORMATION

**The GRDC is currently investing in developing a range of grains-based education resources for schools and community members. If you would like to find out more please contact:**

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## WE LOVE GRAIN ...

**The Grains Research and Development Corporation (GRDC) is focused on grain crops. These include cereal crops (wheat, barley, oats, millet and rye), pulses and legumes (peas, beans, chickpeas and soybeans) and oilseeds (canola, sunflower, safflower and linseed).**

The grains industry is important for Australia. According to the Australian Bureau of Statistics, the gross value of these Australian crops is about \$25 billion per year.

The challenge for the grains industry is to continually produce more grain from the same area of land by being more productive. Each year the GRDC invests \$110 million into research, development

and extension to benefit the Australian grains industry. There are approximately 1300 research projects on the go! The GRDC's investment helps increase food production and quality, on-farm sustainability and It ensures producers remain productive, sustainable and profitable.

**For research information visit** [www.grdc.com.au](http://www.grdc.com.au)



# INDUSTRY SNAPSHOTS

The Australian grains industry is a high-tech industry which uses research and development to improve productivity and sustainability. Here are some examples of science at work in the industry.



## PRECISION AGRICULTURE

**Many farmers use precision agriculture. South Australian farmer James Barr uses autosteer to drive his tractor while seeding.**

Autosteer uses a series of satellites to guide the tractor up and down the paddock, creating rows which are perfectly spaced and in perfectly straight lines. This minimises overlapping rows where more seed and fertiliser are sown unnecessarily, reducing waste. This adds up because his farm is more than 1500 hectares in size – that could fit 20,000

houses! Precise steering also allows him to sow this year's crops in the row between last year's stubble – providing a 'shelterbelt' for the new seedlings.

James also uses his autosteer on his header to remove any overlap when he harvests his grain, which saves fuel and reduces operator fatigue. The autosteer also taps into satellites and can pinpoint the yields in exact locations in a paddock. This means James knows which parts of the paddock had the highest and lowest yields and he can make a yield map. With the map, he can work out why

some areas are better by looking at the topography, soil types and make better decisions on seed, fertiliser and weed and pest control throughout the year.

Precision ag makes it possible for farmers like James to manage their expensive inputs like fertiliser and seed on a very small scale, not just on whole paddocks. In fact, he can match inputs to the productive capability of each square metre.

**You can find out more about precision agriculture at:** [www.grdc.com.au/uploads/documents/GRDC\\_PA\\_FS\\_6pp.pdf](http://www.grdc.com.au/uploads/documents/GRDC_PA_FS_6pp.pdf)

## AGRICULTURAL ENGINEERING

**Agricultural engineers and farmers are working to develop new technologies which help manage weeds without chemicals.**

Weeds compete with crops, taking valuable soil moisture and nutrients. A new machine called the Harrington Seed Destructor has been developed

to destroy weed seeds collected in chaff during harvest.

As the grain is harvested, the seed destructor sifts the grain from smaller weed seeds. The weed seeds are channelled to a high speed rotor which crushes and destroys them so they cannot germinate. This reduces the number

of weed seeds in the soil, called the seedbank, and reduces the potential for weed growth, which can compete with crops.

**Find out more about careers like agricultural engineers at:** [www.careerharvest.com.au/possibilities/engineer/](http://www.careerharvest.com.au/possibilities/engineer/)

## AGRONOMISTS DRIVE CHANGE



**To grow great grains, farmers must protect and manage their land which many do using a no-till cropping system.**

Bill Long is an agronomist who has helped farmers set up no-till farming systems. No-till means that growers do not disturb the soil by ploughing, also called tillage. This is particularly important in countries like Australia where large areas of land used to grow grain have a soil structure that can be damaged by tillage. A no-till system can retain the rows of stubble from

last year's crop and plants the new season's crop in-between the rows using tractors with autosteer. They are extremely accurate and can plant rows within 2cm of the previous year's crop. Retaining stubble prevents soil erosion and the new seeds are planted in a furrow which increases the amount of water which filters down to the grain. The stubble eventually rots and returns organic matter in the soil.

**There are a great range of agricultural activities for schools at** [www.primezone.edu.au](http://www.primezone.edu.au)

## UNDERSTANDING PLANT GENES

**Did you know there are about 30,000 genes in barley but humans only have about 24,000 genes!**

Cereal crops have a gene for everything – its height, the angle the leaf faces the sun, dealing with frost and even producing sugar for food. There is even a gene for producing cell walls!

Associate Professor Rachel Burton is a molecular biologist who is working to understand how plant genes operate. Her main role is understanding the genes involved in cell wall development.

"The cell wall not only holds the cell together but it gives the plant its strength," Rachel said. "It acts as a barrier, controlling what goes in and out of the cell, such as water or sugar. Not much is understood about cell walls so my area of research is new and exciting. After 15 years of research, I discovered the gene for beta-glucan. This is a special form of dietary fibre, which has many health benefits for both humans and animals."

**Learn more about plant breeding at** Get into Genes [www.getintogenes.com](http://www.getintogenes.com) or [www.plantcellwalls.org.au/](http://www.plantcellwalls.org.au/)



## GRAINS TASTE GREAT

**Grains – particularly whole grains – are extremely nutritious.**

Cereal grains are high in carbohydrates, low in fat, good sources of protein and contain fibre, vitamins and minerals. The amounts vary depending on the grain.

The Grains & Legumes Nutrition Council works with a team of scientists who investigate the nutritional content of grains, legumes, pulses and oilseeds. The team then works to provide scientific and evidence-based dietary advice for students, teachers and the community.

**To learn more about grain nutrition research visit** [www.glnc.org.au](http://www.glnc.org.au)