

# GRDC GRAINS INDUSTRY EDUCATION RESOURCES

## GRAIN FACTS FOR SCHOOLS: **WHEAT**



# About the GRDC

## The GRDC

The Grains Research and Development Corporation is a statutory authority established to plan and invest in research, development and extension (RD&E) for the Australian grains industry.

Its primary objective is to drive the discovery, development and delivery of world-class innovation to enhance the productivity, profitability and sustainability of Australian grain growers and benefit the industry and the wider community.

Its primary business activity is the allocation and management of investment in grains RD&E.

## GRDC Vision

A profitable and sustainable Australian grains industry, valued by the wider community.

## GRDC Mission

Create value by driving the discovery, development and delivery of world-class innovation in the Australian grains industry.

## GRDC Values

- We are committed and passionate about the Australian grains industry.
- We value creativity and innovation.
- We build strong relationships and partnerships based on mutual trust and respect.
- We act ethically and with integrity.
- We are transparent and accountable to our stakeholders.

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# 1.0 GRDC Grains Industry Education Resources

## Grain Facts for Schools: Wheat

Australia is a world leader in the production of quality, safe and clean wheat for both human and livestock consumption.

Australia produces about 24 million tonnes of wheat per year on 13 million hectares of land, which is 3.5 per cent of the world's annual production (ABARES 2016).

There are many different types, or varieties, of wheat grown throughout Australia. The specific quality traits of the grain type influence how they behave when kneaded, baked, cooked, boiled or fried. Wheat varieties with hard grains and high protein are used for baked breads and noodles. Softer grains with lower protein are used for weak doughs in biscuits, cakes and pastries.

### Australian Wheat in Global Demand

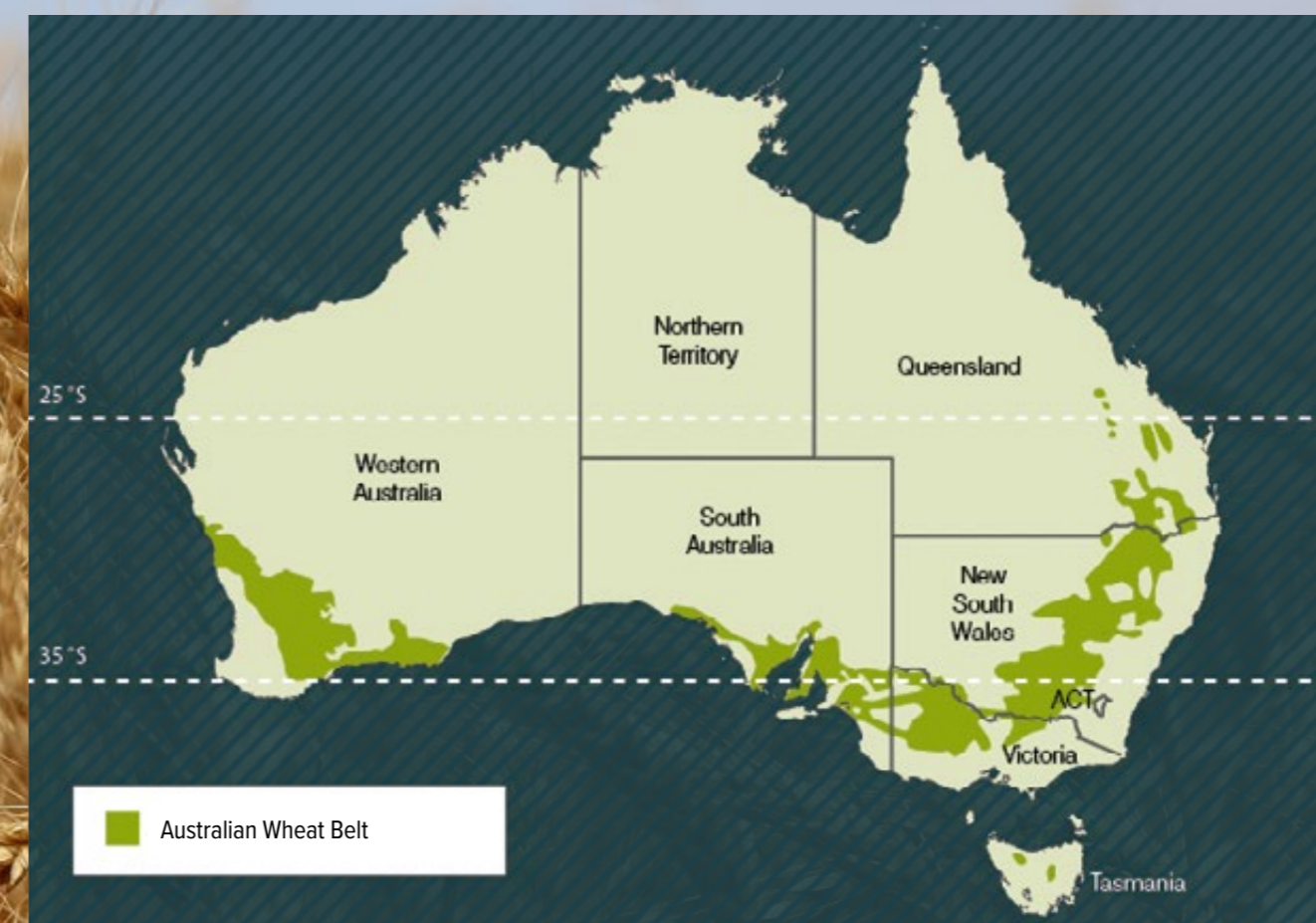
Australian wheat is in global demand. Around 80 per cent of Australia's annual wheat production is exported to over 50 countries, including Asia, Indonesia, Japan, Iran, Iraq, China, Malaysia, South Korea and Yemen. The remaining 20 per cent is used by the Australian market to make flour, breads, noodles, biscuits, cakes and pasta plus it can be used as livestock food.

Australian wheat is sought after due to its high quality and the fact it's produced in a clean and green environment. The industry is thriving - so much so Australia is now the fourth largest exporter of wheat in the world!

### Growing Wheat

Wheat is grown throughout the wheat belt (figure 1) and is reliant on rainfall and favourable weather events to maximise production. The main producing states are Western Australia, New South Wales, South Australia, Victoria and Queensland.

In Australia wheat is sown between April and July and grows through the winter months. Towards the end of their six month growing cycle, wheat ripens, and the grain is then ready for harvest (depending on seasonal conditions) in spring and summer.



Source: Australian Centre for International Agricultural Research, Australian Government, 2011



## 2.0 The Wheat Plant

The average wheat plant grows to around 1 meter in height. Each plant has a single main stem plus 2-3 tillers (or secondary stems). At the top of each tiller is a 'spike'. A spike usually has 35-50 grains (or kernels).

The wheat plant has a range of factors which are important to ensure the production of healthy grains. This includes:

- Strong stems: The stem provides support and strength to the wheat plant helping to keep it upright. As the stem grows its function changes from support to storing carbohydrates and nutrients for grain fill.
- Healthy leaves: the green leaves job is to photosynthesise and produce their own food! In the process, plants absorb sunlight and carbon dioxide from the air and convert this into glucose and oxygen. The glucose is transported around the plant and used as energy – and the oxygen is released into the air.

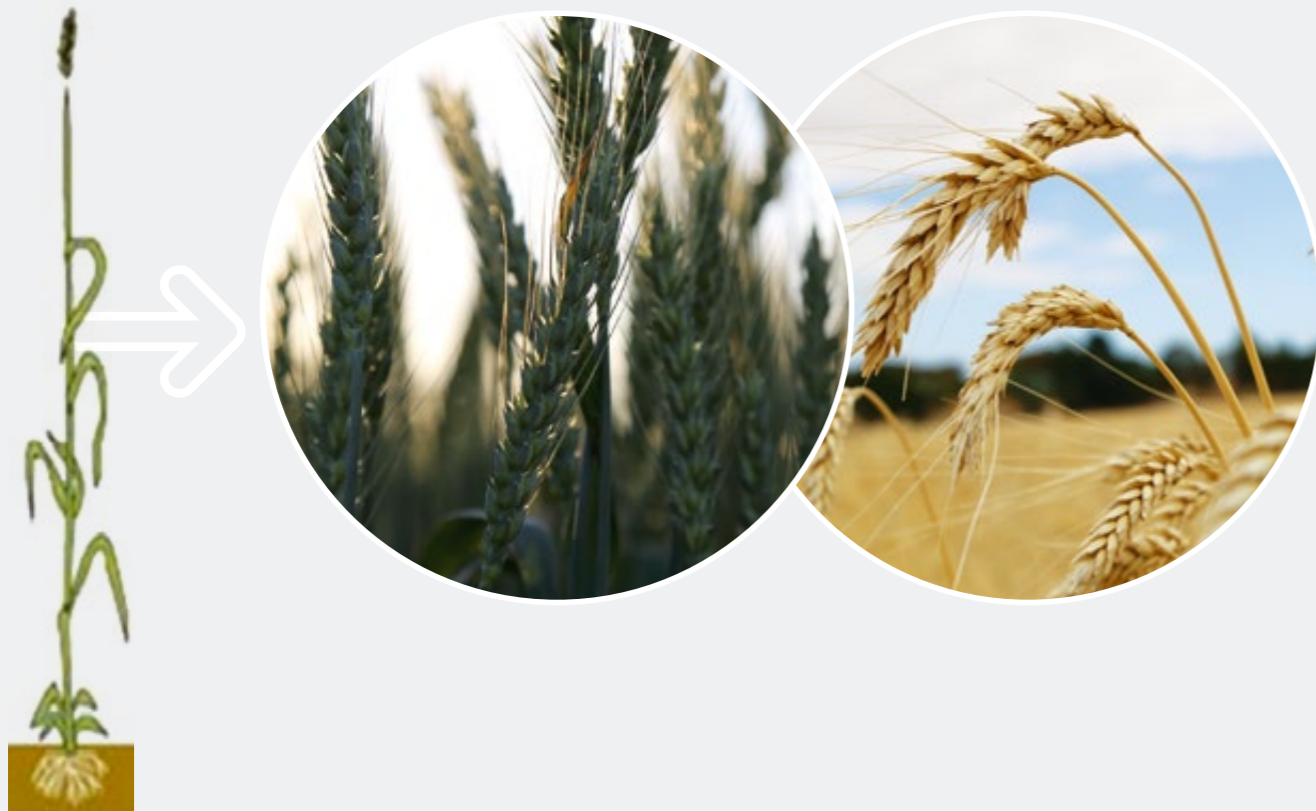
- A good root system: Wheat has primary and secondary root system. Which not only support the plant but work to take up water and nutrients from the soil.

For the wheat grains to fill and be high quality, the plant must be in top working order! Change to dot points:

It needs the following conditions:

- Be free from diseases; which can affect the roots, stems and leaves
- The right amount of nutrients; such as nitrogen and potassium
- Plenty of water
- The right climatic conditions; with no frosts, hot winds or drought

In most seasons in Australia, farmers are able to produce high quality grain.



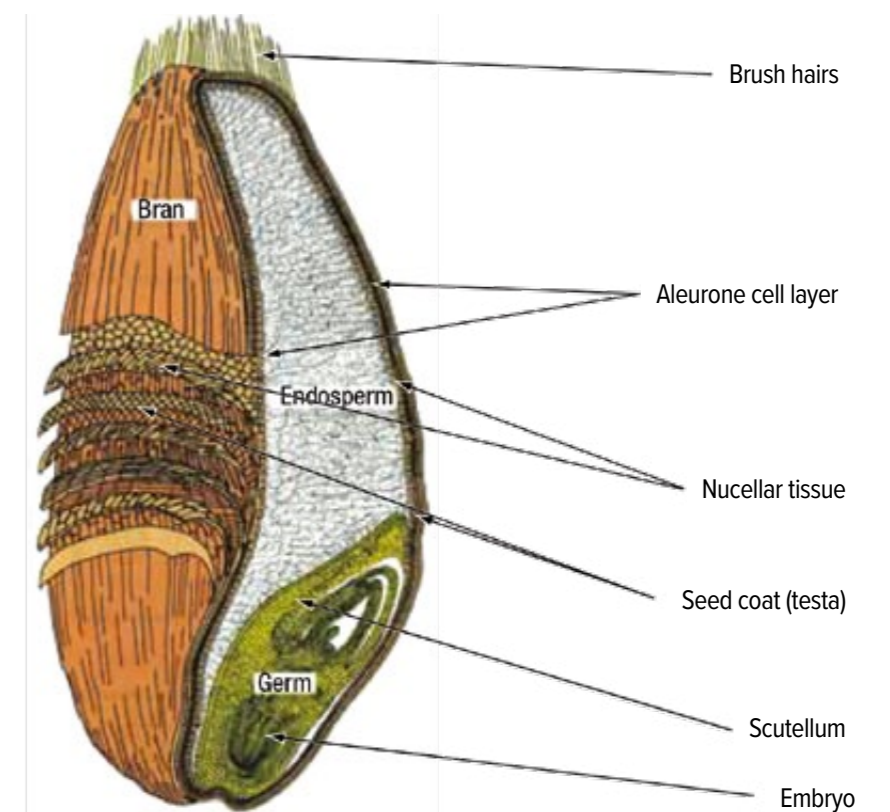
## 3.0 The Wheat Grain

The wheat grain is the reproductive unit of the wheat plant as well as the product we use to make flour. An individual grain of wheat is referred to a kernel.

The average wheat kernel has three distinct parts. The seed coat (which makes up around 14 per cent of the grain), the endosperm (which makes up around 83 per cent of the grain) and the embryo which makes up 3 per cent.

- The endosperm is mostly made of starch. It contains 8 to 16 per cent protein and a small amount of vitamins and minerals.
- The bran is the outer layer which contains antioxidants, B vitamins and fibre.
- The germ is the embryo, which means it has the potential to germinate and form a new plant. It contains B vitamins, protein, minerals and healthy fats.

Figure 1: The wheat grain showing the bran, germ and endosperm.



(Reproduced with permission: Wheat Food Council, Canada)

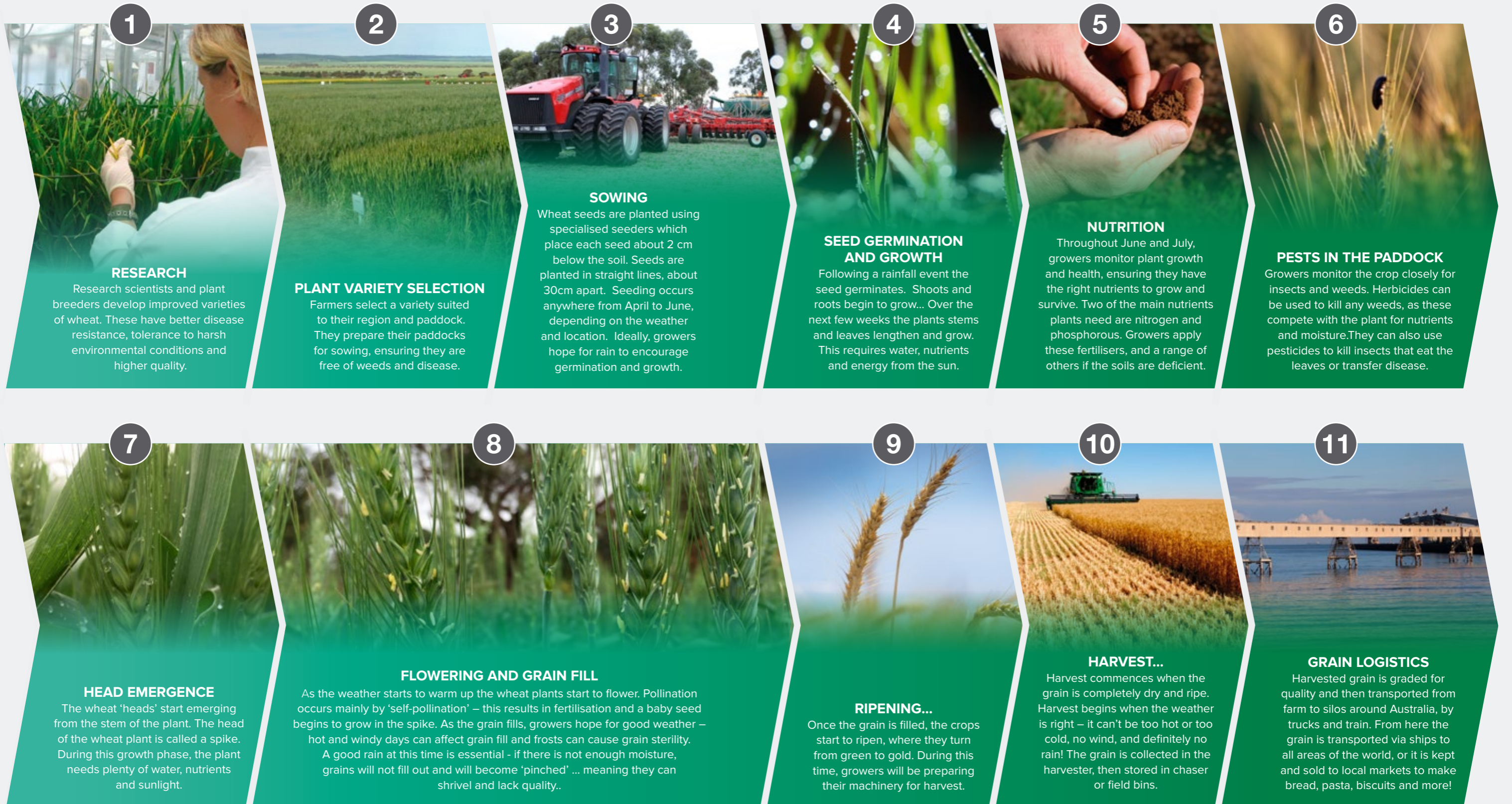
### Did you know?

- The endosperm serves as the food supply for the germinating seedling.
- The endosperm is used to make white flour.





# 4.0 How does wheat get from a farmers paddock to your plate?





# 5.0 The Wheat Industry Snapshot



THE AUSTRALIAN WHEAT INDUSTRY EXPORTS WHEAT TO MORE THAN **50 COUNTRIES.**

ALMOST 30,000 AUSTRALIAN



FARMERS GROW WHEAT.



BREAD AND PASTA ARE MADE FROM DIFFERENT TYPES OF WHEAT.

THE GROSS ANNUAL VALUE OF WHEAT PRODUCTION IS

 **\$5.5 BILLION.**  
(ABARES, 2016)



AUSTRALIAN FARMERS PRODUCE ABOUT 24 MILLION TONNES OF WHEAT PER YEAR.



WHEAT IS NUTRITIOUS.... the 'whole grain' is low in fat and sodium and high in carbohydrates, B group vitamins (such as folate, riboflavin and thiamine), protein, and potassium.

WHEAT IS AN ANNUAL PLANT

belonging to the genus *Triticum* which includes common bread wheat (*Triticum aestivum*) and durum (*Triticum turgidum*).

BREAD-EATING

Australians consume more than 53 kilograms per year.



WESTERN AUSTRALIA IS THE WORLD'S MAJOR SUPPLIER OF WHEAT FOR JAPANESE WHITE SALTED UDON NOODLES.



AUSTRALIAN SCIENTISTS WORK

to breed improved wheat varieties to suit a range of growing conditions throughout Australia while meeting the quality and nutritional requirements of global consumers.

A 500-GRAM PACKET OF PASTA REQUIRES ABOUT 17,400 GRAINS OF DURUM WHEAT.



WHEAT WAS BROUGHT TO AUSTRALIA IN 1788 BY BRITISH COLONISTS

and was first planted in experimental plots at the Sydney Botanic Gardens.

THERE ARE ABOUT **16,800 KERNELS** OF WHEAT IN ONE STANDARD LOAF OF BREAD.

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