



# Constraints, opportunities and risks for the Australian Wheat Industry

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## Outline



- Introduction to the industry today
- Constraints (risks) and opportunities:
  - climate
  - soils
  - biotic stresses
  - global prices and competition
  - farmer management skills
  - government policy

## Australian Grains Industry 03/04 to 05/06

Source ABARE (2006)



	Wheat	Other grain crops	Livestock	Comments
<b>Total size</b>	31,000 farms managing 60 m ha, almost entirely rainfed			Number of farms decreasing
<b>Size of each major activity</b>	13 m ha	9 m ha	70 m sheep equivalents	Crop increasing slowly at expense of livestock, yet only 37% area cropped
<b>Production</b>	25 m t	18 m t	210 m kg wool 1.2 m t meat <sup>1</sup>	< 5% of world's wheat
<b>Yield</b>	1.9 t/ha	2.0 t/ha	5.5 kg wool/ha 32 kg meat/ha	Grain yields increasing; livestock yield based on non-crop area.

## Australian Grains Industry 03/04 to 05/06

Source ABARE (2006)



	Wheat	Other grain crops	Livestock	Comments
<b>Value of production</b>	\$4.5 b	\$2.2 b	\$0.9 b(wool) \$2.4 b(meat)	Value adding multiplies these numbers
<b>Exports</b>	74 %	57 %	98 % (wool) about 50 % (meat)	Growing internal use of grain as feed
<b>Subsidy level</b>	In 2005 Australian farmers received 5% of gross income in subsidies			NZ 3%, USA 16%, EU 32%, Japan 56% (OECD, 2006)
<b>Productivity increase</b>	Total factor productivity rising at 2.7% pa (1977-78 to 2003-04)			cf. livestock specialist farms rising at <1% pa.

## Averages for the Australian grain farm 03/04 to 05/06 (Source ABARE, 2006)



		Comments
Area operated, ha	1965 ha	Increasing
Area wheat	407 ha	Increasing
Area other cereals	187 ha	75% barley
Area pulses	56 ha	Pulse area barely increasing
Area oilseeds	44 ha	Canola area decreasing
Sheep equivalents	2163	70% sheep, rest cattle
Farm gross income	\$408,000	
Farm cash income	\$101,000	
Labour	Operator family + hired (14 weeks)	
Farm business profit	\$18,400	Allows for imputed operator/ family labour plus depreciation
Return on capital at full equity <sup>1</sup> pa	2.2%	Allowing for capital (land) appreciation would add another 5-8%

## The Challenge of Climate, Soils and Pests: lifting the attainable yield through research



- **Water-limited yield with best economic management (currently about 4000kg/ha from ET of 300mm)**
- **Plant breeding:**
  - traditionally wheat yield doing 0.5 to 1.0 % pa
  - prospects to continue for 20 years good (new genetic variation, ideotypes and models, MAS, NVT)
  - maintenance/improvement of disease resistance
  - improve grain quality
  - GM wheat: agronomic traits ✓  
nutritional traits ✓  
drought resistance ?
  - better rotation-crop and pasture varieties

## The Challenge of Climate, Soils and Pests: lifting the attainable yield through research



- **Crop management or agronomy:**
  - Assuming good rotations (incl phase farming), soil fertility management (testing, fertilizers, legumes, lime), conservation tillage, and judicious use herbicides, what next?
- **Yield enhancing:**
  - seeding date ✓
  - using better forecasts ?
  - exploiting subsoil water better ✓
  - biofertilizers ?
  - better pastures ✓

## The Challenge of Climate, Soils and Pests: lifting the attainable yield through research



- **Crop agronomy and management (continued):**
- **Input and cost reducing:**
  - integrated weed management
  - better legume systems to maximize N fixation
  - precision guidance and variable rate technology
  - further automation and robotics
  - smart livestock guidance
- **Management of exotic pests, a special issue.**

## The Challenge of Climate, Soils and Pests: lifting the attainable yield through research



- **Two other issues:**
- **Research investment:**
  - how much, who controls ?
  - who does it: public, private, farmer, overseas ?
- **Environment in this research agenda?**
  - profit the driver, but much is E positive
  - some tradeoffs related to water and plant residue
  - complete tradeoff between trees and grain?

## Global prices and influences



- **As free trader and exporter, world prices rule for us.**
- **Real grain prices have long trended down.**
- **IMPACT model on cereal trade and future prices:**
  - demand growth for food slowing, for feed increasing, overall 1.3% pa
  - supply growth: mostly yield growth (influenced R and D, irrigation, trade and rural policy, etc)
  - baseline predicts dev'ing countries cereal imports up from 110mt to 210 mt in 2030, prices down
  - more pessimistic development scenarios increase price, and misery.

## Global prices and influences

IFPRI IMPACT model projections 2004 (von Braun et al 2005)



IMPACT, baseline and pessimistic scenarios		1997	2030	Growth rate, % pa
Net cereal exports to developing countries, million tons	Baseline	100	210	2.3
	Scenario 2	100	130	0.8
	Scenario 3	100	160	1.4
World maize price, \$/ton (constant 1995 USD)	Baseline	103	96	-0.2
	Scenario 2	103	108	0.1
	Scenario 3	103	170	1.5

## Global prices and influences

IFPRI IMPACT model predictions 2005 (personal comm.)



IMPACT Baseline		2005	2025	Growth rate, % pa
World price, \$/ton (constant 1995 USD)	Wheat	130	117	-0.5
	Rice	285	230	-1.0
	Maize	106	102	-0.2
World yield, t/ha	Wheat	2.82	3.35	0.9
	Rice	2.81	3.44	1.0
	Maize	4.65	5.76	1.1

## Global prices and influences



- **Model predictions uncertain but best bet from IFPRI (and FAO) is slight grain price decline. However :**
- **Higher-quality higher-priced grain deserving of R and D, but not easy.**
- **Scarce water and land will squeeze wheat planting in irrigated and favoured lands (so would faster trade reform),**
  - **while wheat (and barley, pulses) will always have comparative advantage in semi-arid rainfed lands;**
  - **add advantages of integration with ruminants and you have a profitable Australian grains industry.**

## Closing the yield gap

Source: ABARE (2006)



<b>Mallee agroecological zone, 2002/3 to 2004/5</b>	<b>Top 25% on rate</b>	<b>Bottom 25% of return</b>
<b>Farm net cash income</b>	<b>\$262,000</b>	<b>-\$30,000</b>
<b>Area operated</b>	<b>2590 ha</b>	<b>1749 ha</b>
<b>Cash receipts per ha operated from crops</b>	<b>\$161</b>	<b>\$60</b>
<b>Cash receipts per ha operated from livestock</b>	<b>\$32</b>	<b>\$32</b>
<b>Cash costs per ha operated</b>	<b>\$114</b>	<b>\$119</b>
<b>Net income per ha operated</b>	<b>\$101</b>	<b>-\$13</b>
<b>Gross income per ha per 100mm district rain</b>	<b>\$75</b>	<b>\$40</b>

## Closing the yield gap

ABARE (2006)



- **Factors associated with better return (Mallee study):**
  - larger farm size
  - higher cropping intensity
  - higher crop and livestock yields and prices
  - higher crop chemical use/ min tillage
  - lower labour costs
  - younger farmers
- **Speculate that better credit access, higher education levels and corporate ownership also involved.**

## Closing the yield gap



- **At least ABARE now corrects for moisture supply.**
- **But we can do better in measuring/understanding the gap: role for more/better farm comparisons, aided by simulation modelling like Yield Prophet.**
- **Closing the gap, also role for:**
  - state extension, rising private consultants and farmer groups ✓
  - improved communications, including internet ✓
  - decision support systems ?
- **Prospects reasonable as younger smarter farmers take over, but favourable credit will be critical.**

## Australian Government Policies



- Many areas impacted, including the environment, and changing as rural vote declines.
- Some key policies for grain industry:
  - support for R and D, remaining strong, some complications.
  - native vegetation management, costs farmers.
  - health and safety, another cost.
  - drought relief, misdirected?
  - GM crops, a potential cost?
- E legislation can be win-win or can bring a tradeoff, who pays?

## Policies, farming and environment



- Can we learn from USA and Europe (Cooper et al 2006)?
- Subsidy:
  - eg CRP retires crop land for about 300 USD/ha
  - eg EU support for E sound farming
- Cross compliance:
  - eg No US support payments w/o conservation
- Regulation:
  - eg EU regulate N and manure use
- Preservation:
  - eg EU support for marginal farming landscapes.

## Policies, farming and environment



- US and EU claim and have achieved “green box” exemption under WTO.
- Why cannot Australia do same?
  - agriculture is equally small part of GDP (2-3%), but
  - population per ha arable much lower (0.4 vs 2-5)
  - rural population per ha arable even lower
  - extensive farming and export orientation
- Still stewardship payments for E protection must be explored in Australia.
- Besides E management may be driven by global trade policy one day.

## Conclusions



- Most Australian grain farms are viable.
- Productivity increase through research, better management and scale will continue,
- giving resilience in face of downside risks (climate, pest invasion, terms of trade).
- Policy is another risk, especially environment policy.
- E policy tradeoffs could be replaced by stewardship payments.

- With acknowledgement to Francis Bacon:

“It’s a poor punter who thinks that when there is only drought, there will be no flood”.

Surviving grain farmers are inveterate punters,

- but they will need ongoing research advances, and the odd grain price spike that can be taken advantage of. They see sustaining the soil as part of survival; trees are nice to have, but.....