

3.2 Rural Finance Barley Challenge - Dunkeld, Vic



Location:
Dunkeld Research Site

Funding:
This trial was sponsored by Rural Finance.

Researchers:
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Take home messages:

- The Wickliffe Hillbillies team are winners of the Rural Finance barley challenge at the Dunkeld site for the second year in succession with the highest margin of \$554/ha.
- Grain quality caused all the teams to have deductions off their grain price, with only the Wickliffe Hillbillies making a malt grade. This was the difference between them coming 1st rather than 2nd.
- The key to the yield and quality was the timing and amount of nitrogen they applied in conjunction with the fungicide strategy used to control mainly scald.
- The highest yielding crop was the Fairview grown by the Wickliffe Hillbillies team at 5.67t/ha
- The cheapest cost of production was the Gairdner grown by the Halo Agronomics at \$72/t

Trial information:

Trial design consisted of a replicated randomised block design using 2 paired plots replicated 4 times. This enables us to statistically analyse any differences between treatments and have more confidence in the conclusions reached. Plot lengths were 14 metres long and 1.45m wide.

Rainfall was highly variable throughout the season, with good early rain in April, a dry winter, then a wet August and September. Rainfall was then low during October with only 60% of the long term average followed by two weeks at the beginning of November with temperatures 4°C above the average and this also coinciding with grain fill.

Background/Aim:

When looking to maximize the profitability of growing barley, those who are successful have the ability to make the correct decisions, at the right time, and to deal with the various challenges that are thrown in your way throughout the season.

The Barley Challenge at Dunkeld was based on 10 teams, 7 from the Streatham branch who had been involved in the Wheat Challenge in 2008 and a further 3 new teams from the Hamilton branch. They had to decide on crop management decisions for their own crop of barley, which is sown as replicated trial plots to obtain accurate yield data. This year the teams included local farmers with years of experience, some young farmers with new ideas, researchers and members from the agricultural industry. The aim of the competition is to see which team produces the highest gross margin crop (not necessarily the highest yielding crop) against a background of uncertain input and grain prices and unknown growing season rainfall.

A major part of the challenge includes collectively making all of the growing season agronomic decisions from sowing until harvest as well as related grain marketing decisions. Initially teams were given one sowing date and the choice of four Barley varieties, two malt (Gairdner and Fairview)

and two feed varieties (Capstan and Hindmarsh). They then had to decide on seed treatment, sowing rate and what, if any, pre emergence herbicides they wanted to use.

Grain marketing was also available to all teams as another management option. From May 1st each team had the opportunity to market their crop.

All grain marketing quantities and decisions were based on a one hectare tonnage. In other words if your barley yields 5t/ha you had 5t to market. There were two marketing mechanisms available for teams in 2009, prices courtesy of Riordan Grain Services:

- Spot price published on the day of harvest (quality related)
- Forward pricing based on 0.5t lots. If grain tonnages are oversold on the day of harvest teams will have to buy back the relevant tonnage at prices equivalent to (1).

Prices were emailed to team captains every two weeks, on a Monday and were based on Malt and Feed grade quality.

Tillage type:

This trial was seeded with the SFS cone seeder using 2.5cm knife points.

Diseases:

Due to the wet conditions in August and September and the susceptibility to foliar disease of the Gairdner and Fairview, the two varieties being grown, the first signs of scald started to appear in September and became a serious issue through most of October.

Paddock History: 2008: Wheat

Soil Type: Clay loam

Soil Nutrients:

P = 33 mg/kg (Colwell)

PBI = 150 (Moderate)

K = 110 mg/kg

S = 17 mg/kg

pH (CaCl₂) = 4.4 Lime applied @ 2.5t/ha April 2008

Deep N test August: 0 - 30cm = 46 kg N/ha

Results and discussion:

The team captains supplied a worksheet at the start of the competition in May detailing variety choice, sowing rate, seed treatment and choice of sowing date. This sheet also included any seedbed fertiliser required and any herbicides to be either incorporated by sowing or applied post sowing pre emergence. A breakdown of these costs and the overall costs of production during the season are shown in table 1 below:

Table 1: Team Cost Analysis throughout the growing season (\$/ha)

	Tatyoona	Woorndoo	Bald Hill Boys	Wickliffe Hillbillies	Baby Boom 2	WAGS	NVNG	Halo Agrons	Barley Tasters	Liq Allsorts
Variety	Gairdner	Fairview	Gairdner	Fairview	Gairdner	Gairdner	Fairview	Gairdner	Gairdner	Gairdner
SEED	81	108	115	108	115	104	108	92	92	92
Seed Treatment	11	15	15	14	5	5	4	4	12	12
Seedbed FERT	99	66	82	82	66	82	82	82	82	66
Nitrogen FERT	45	68	45	32			77		45	90
Trace elements	7		5			4				
Pre Em HERB	17		31			14	24	34	12	17
Post Em HERB		13		7	13	20			12	11
FUNGICIDE	12	15	20	30			12		10	19
MACHINERY	177	156	166	166	135	145	167	135	166	166
TOTAL COSTS	449	441	479	439	334	374	474	347	431	473

Seed and Seed Treatments:

There was some variation across the teams in terms of sowing rate used with the Tatyoona team choosing the lowest rate for Gairdner at 70kg/ha up to 100kg/ha for Bald Hill Boys and Baby Boom 2. This actually saved the Tatyoona team \$34/ha without impacting on their yield. All the teams that grew Fairview sowed at the same rate – 90kg/ha.

Six teams chose to apply an insecticide with their seed treatment and of these four were statistically higher yielding than those teams who hadn't applied an insecticide. There was some visual evidence in other trials of BYDV seen at this site in 2009.

Fertiliser:

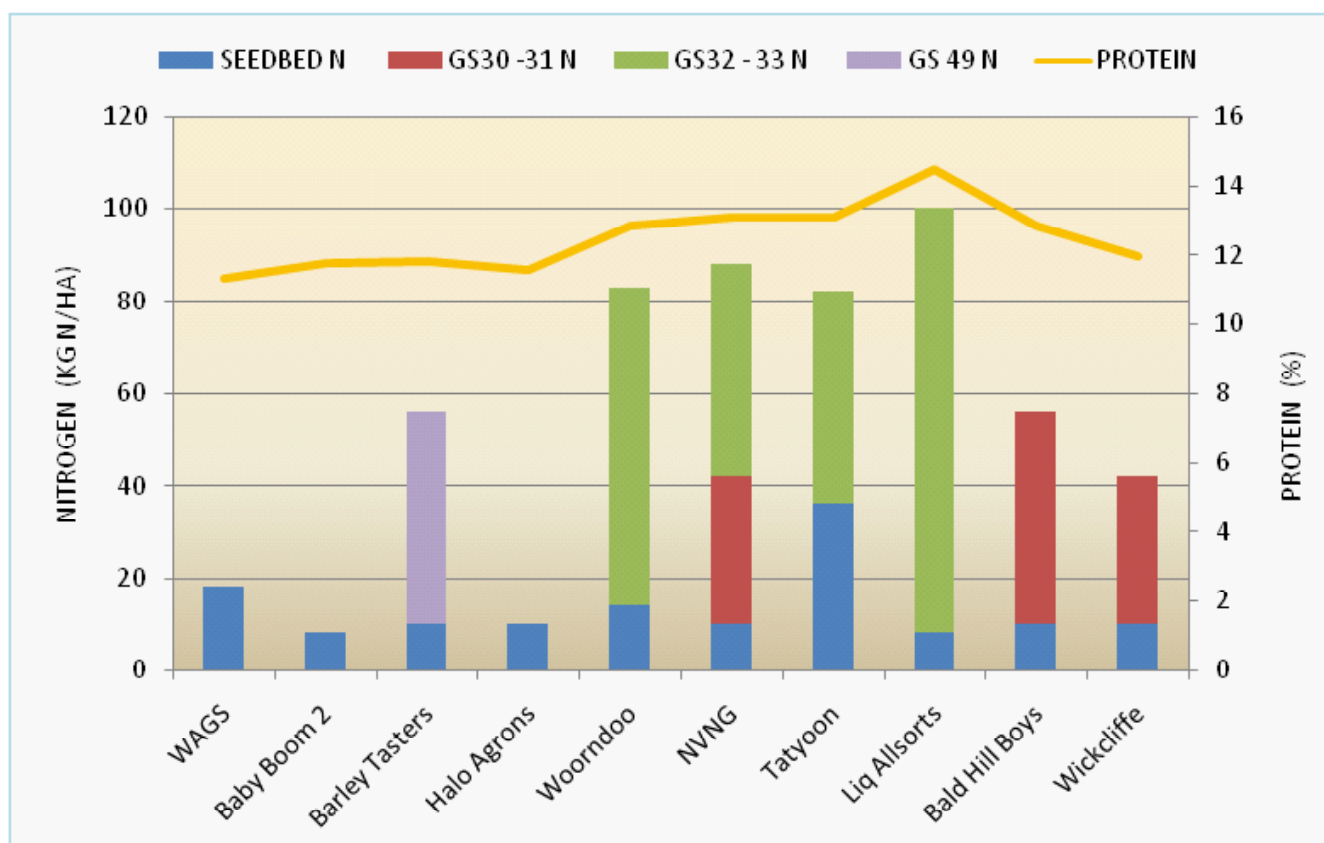
All teams applied MAP at 80 or 100kg/ha except for two teams who applied DAP at similar rates. With a soil

Colwell of 33mg/kg and a PBI of 150 there was going to be a reasonable response to applying adequate levels of P and so at these rates the teams applied 16 – 22kg P/ha against a final off take of approx 15 -16kg P, given final yields.

The management decisions taken by the teams in relation to their Nitrogen management had a significant affect in both the yield of their plots but also the grain quality.

As all the teams chose to grow either Gairdner or Fairview, for the malt barley market, they wanted to maximize yield but also achieve grain proteins between 9% and a maximum of 12%. Seven teams grew Gairdner and only the Wickliffe Hillbillies, Woorndoo and the NVNG team chose Fairview; these were all sown on 12th June.

Details of the teams' nitrogen timings are shown in Table 2.

Table 2: Nitrogen timings and quantities applied, including seedbed and post emergence applications

All the teams initially supplied a small quantity of N at sowing except for the Tatyoon team who applied an additional 60kg/ha of Urea immediately post sowing. The next application timing was at GS30/31 when the Wickcliffe Hillbillies and the NVNG teams applied Urea at 70kg/ha and the Bald Hill Boys applied 100kg/ha of Urea. This timing was to prove extremely important in the final yield outcome.

The main timing for the rest of the teams that applied N, was at the end of September. This was around GS32/33. Rates varied from 100kg/ha by the Tatyoon and NVNG teams, both topping up a previous application, to 150kg/ha for the Woorndoo team and finally 200kg/ha for the Liquorice Allsorts team. Only the Barley Tasters team applied any N after this timing putting 100kg/ha Urea at Awn Emergence. The Halo Agronomics, Baby Boom 2 and WAGS teams applied no N other than starter N at sowing.

Points of interest regarding in crop Nitrogen:

- The application of 100kg/ha of Urea by the Barley Tasters at GS49 made no significant difference to their yield compared to the three teams who applied no N post emergence. This application also had no impact on grain protein suggesting that little or none of the \$45/ha application was used by the plant at all!
- The 200kg/ha of Urea applied by the Liquorice Allsorts at GS32 was based purely on maximising yield. At that stage they had forward sold nothing and so had no quality issues to worry about. This resulted in nearly the highest yield in the competition but with the changes in the weather at the beginning of November maximum yield potential wasn't achieved.
- The best utilisation of applied Nitrogen came from the application at GS30/31 by the Wickcliffe Hillbillies and the Bald Hill Boys. Both these teams achieved the top yields of the competition at 5.67t/ha and 5.55t/ha respectively with 11.98% and 12.85% protein. The other team to follow this strategy was the NVNG team but unfortunately at GS32/33 they applied a further 100 kg/ha Urea which didn't improve their yield compared to the other two teams but left their grain protein at 13%.



Barley Challenge - Dunkeld Captains

Herbicides:

The total spent by teams on herbicides varied between \$7/ha, by the Wickliffe Hillbillies for applying only Dual Gold PSPE, up to \$34/ha by the Halo Agronomics and WAGs teams.

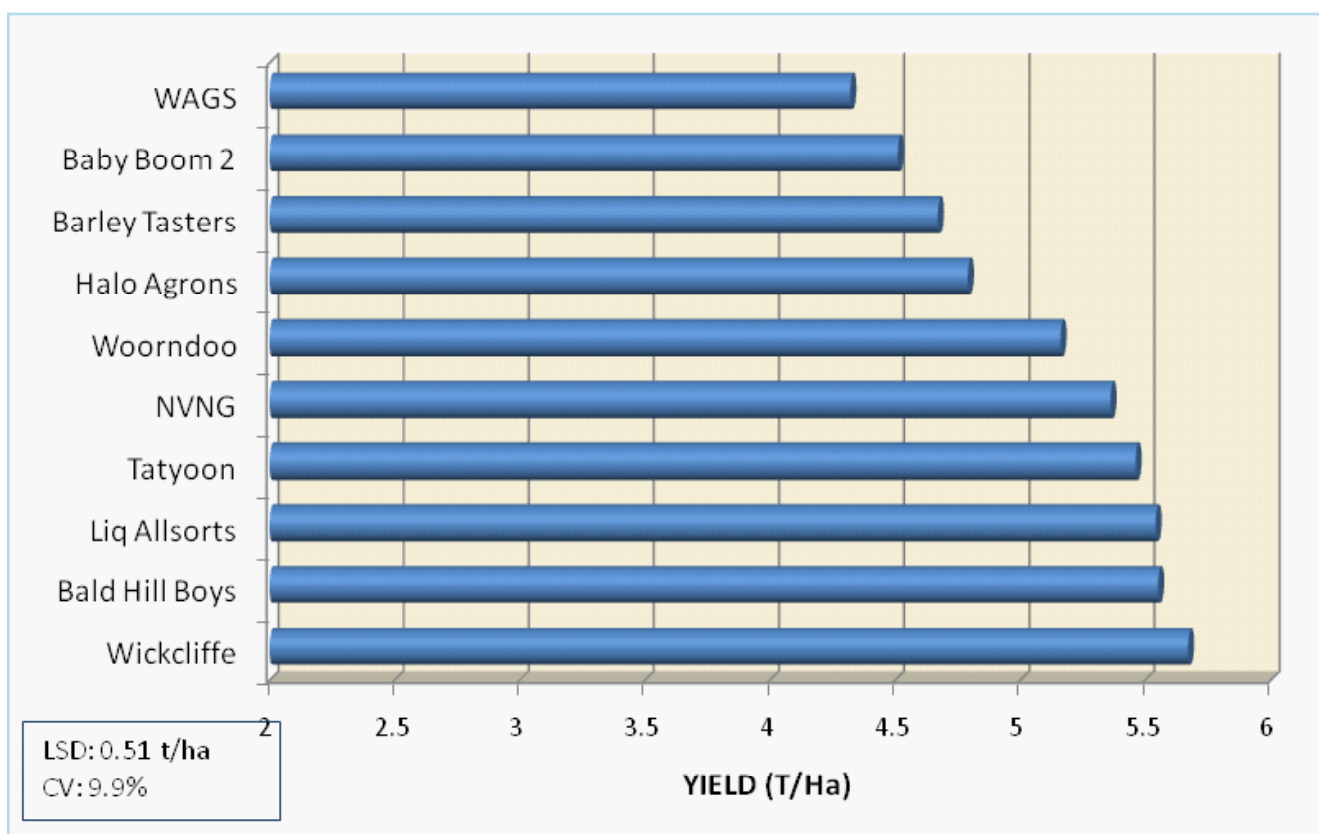
Seven of the ten teams chose to use a pre emergence herbicide, incorporated by sowing, and of these only three teams returned with a post emergence herbicide. The three teams that applied no pre emergence herbicide all applied a cheap PSPE herbicide, costing between \$7 and \$13/ha which provided good levels of control. What was interesting were the tactics the teams employed as a result of a change of site from Mininera the previous year. The previous site had a high ryegrass pressure with some known resistance whereas the Dunkeld site had only been cropped for two years and the teams that reacted to this reduction in grass weed pressure made some good savings on their herbicide costs.

Fungicides:

Given the very high disease pressure at the Dunkeld site in 2009 it is surprising that three teams applied no fungicide during the season. The same three teams; Baby Boom 2, WAGs and Halo Agronomics also applied no in crop Nitrogen either. All the other teams applied one fungicide at around GS32 apart from the Wickliffe Hillbillies and the Bald Hill Boys who applied this early application but then followed up with an additional fungicide at GS49 (awns emerging). With no two teams following a similar nitrogen or fungicide regime it's not easy to tease out the benefits of one approach versus another. However what we can say is that:

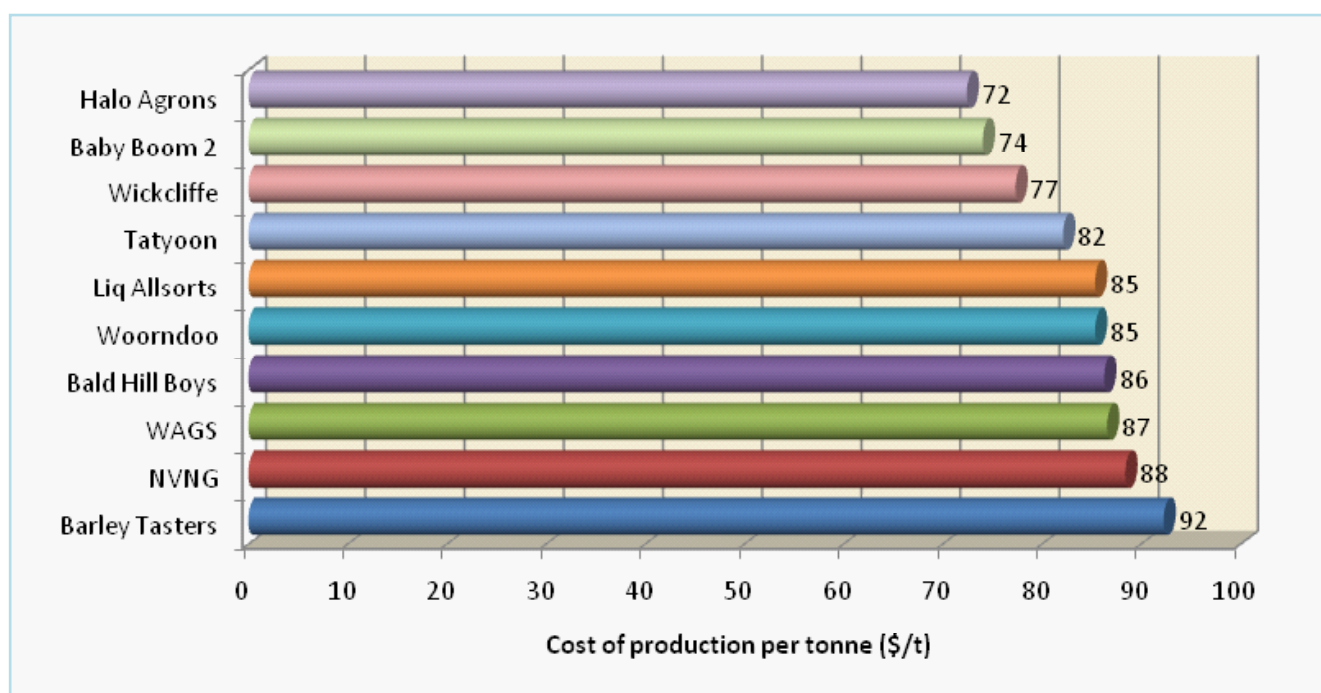
- The Wickliffe Hillbilly team's Fairview yielded significantly ($P < 0.05$) higher than the Woorndoo Warrior's Fairview and the key difference was a second and follow up fungicide at GS49.
- The two top yielding teams both used two fungicides and of these the Wickliffe Hillbillies, who used Prosaro at 0.15l/ha + Hasten 1% at both timings, were the only team to produce a malting sample, albeit grade 3. The difference between making this grade as against a feed grade, like all the other teams, was the difference between coming first in the Barley Challenge and not second!

Table 4: Grain Yields (T/Ha) for Dunkeld teams



Having looked at the yields each team produced in the table above it is interesting to then look at what it cost each team to produce a tonne of barley without the influence, at this stage, of either grain quality or marketing; this is shown in table 5 below.

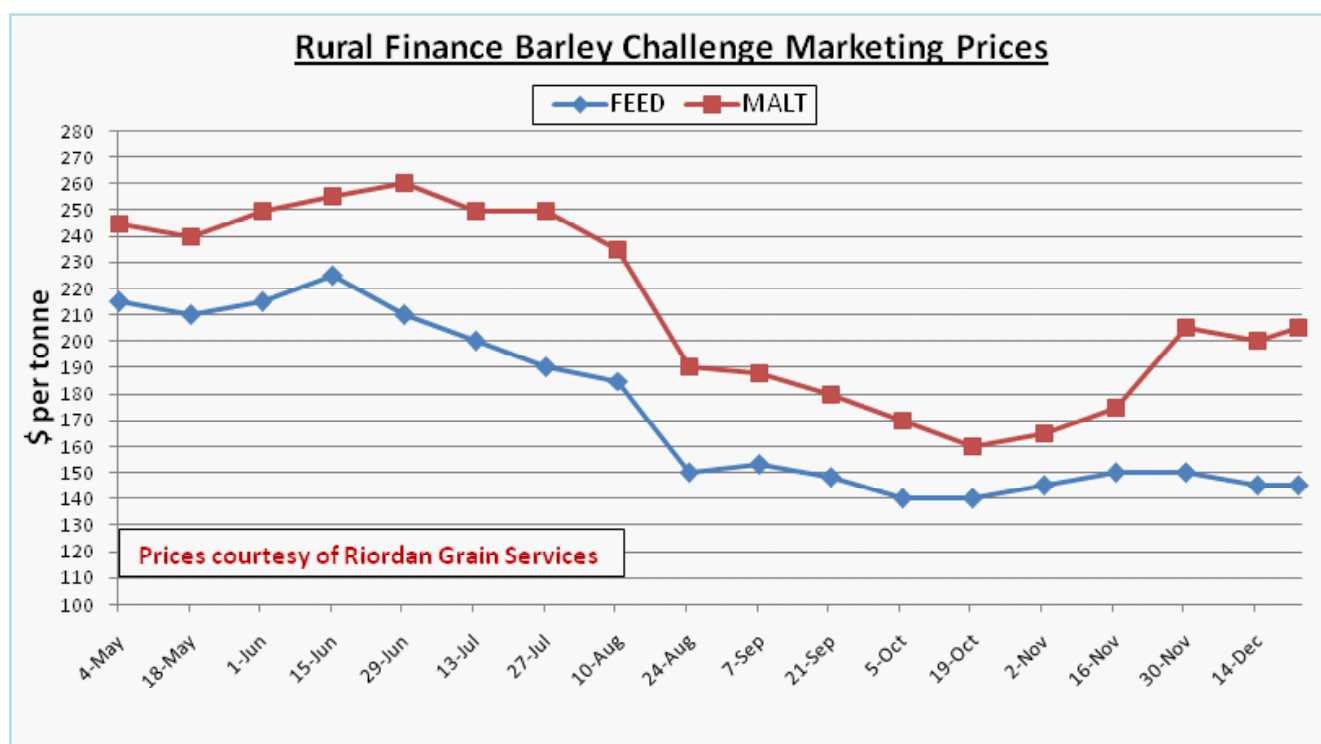
The Halo Agronomics team spent the least amount of dollars per hectare to produce a tonne of barley even though they only had the seventh highest yield. Their approach reflects their very low input level for the season against the output they achieved. Conversely the Barley Tasters whose yield was almost the same spent nearly \$85/ha more to achieve the same result. Their cost of production was \$92/t.

Table 5: Cost of Production (\$/t)**Grain Marketing:**

The final management option available to all teams was marketing their grain with the first prices being available from May 1st.

All grain marketing quantities and decisions were based on a one hectare tonnage. In other words if your barley yields 4.5t/ha you had 4.5t to market. There were two marketing mechanisms available for teams in 2009, prices courtesy of Riordan Grain Services:

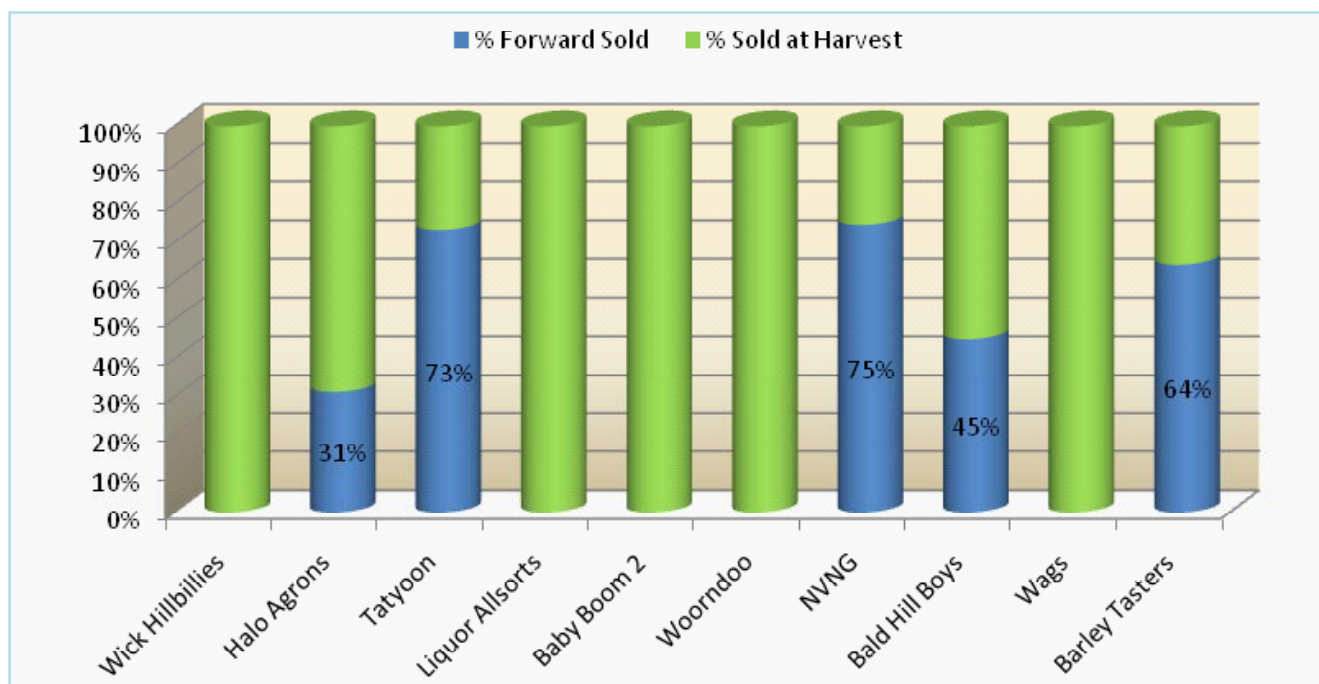
- Spot price published on the day of harvest (quality related)
- Forward pricing based on 0.5t lots. If tonnages are oversold, on the day of harvest teams have to buy back the relevant tonnage at prices equivalent to (1).

Table 6: Grain prices (\$/t) for malt & feed grade barley from May 1st 2009 until December 22nd.

Prices for malt barley at the start of the competition were at \$245/t and went to a season high of \$260/t on 29th June. After some early activity by three of the ten teams only five teams used the forward marketing option. As the market began to fall the Bald Hill Boys, Barley Tasters and the NVNG team sold tonnages for Malt which turned out to be of significance for them as their harvest quality would end up costing them penalties. In contrast the Tatyoon team sold four tonne as feed barley for \$150/t which gave them a \$5/t advantage over the final harvest price.

Even with the lessons that were learnt last year when over 60% of the teams didn't use forward marketing from the Mininera teams, there was only a marginal increase to 50% of the teams selling forward for 2009. The following chart shows what percentage of their final yield each team sold during the competition.

Table 7: Percentage of final yield sold forward against harvest sale



Was it worth the risk of forward selling any of the crop forward? Of the five teams that sold crop forward in the Dunkeld competition, two teams came out in front, one team was no worse off than doing nothing and two teams lost margin as they sold tonnage at the bottom of the market at the end of October.

Table 8: Gross margins per hectare

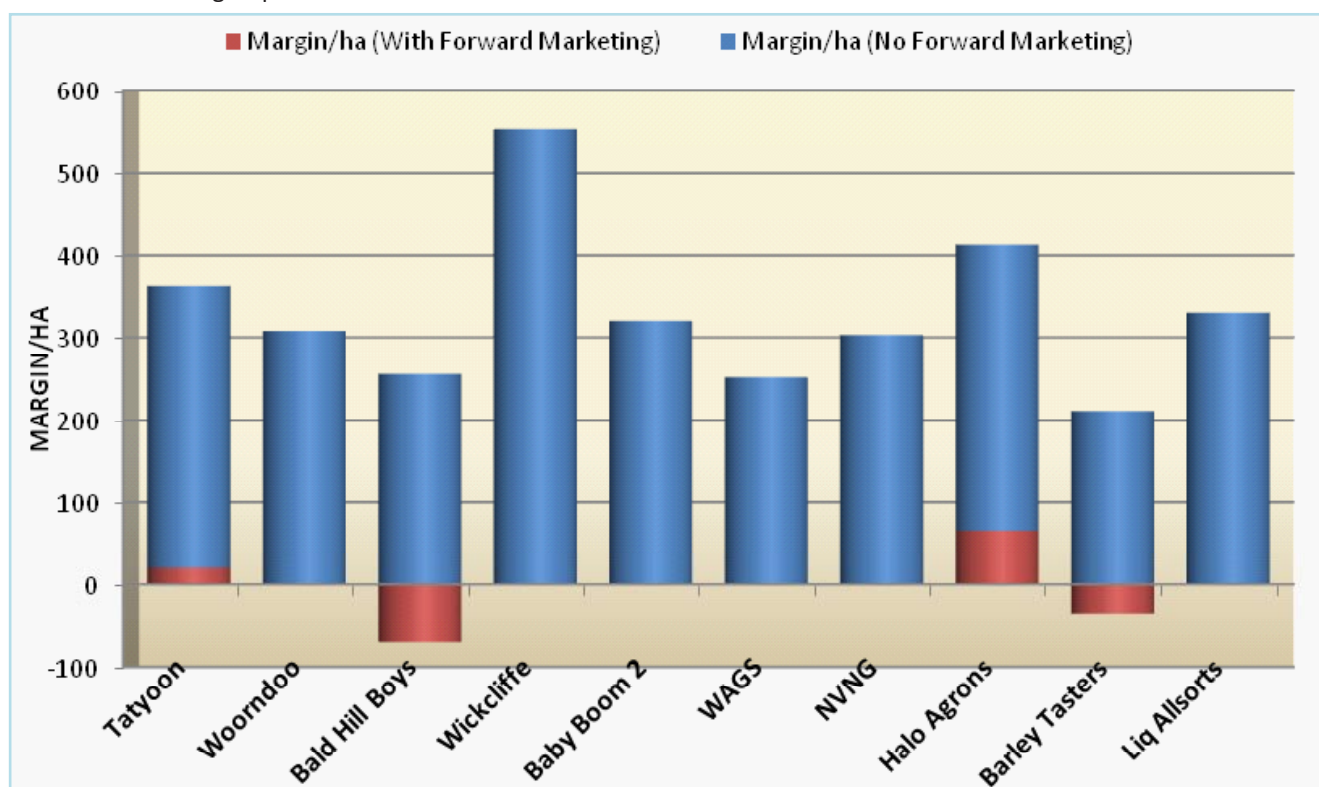


Table 9: Grain Quality and price adjustments

TEAM	TEST WT	RETENTION	SCREENINGS	PROT %	DEDUCTIONS	QUALITY	PRICE (\$/t)
Wickliffe Hillbillies	66.4	60.5	4	11.98	Retention > 58 Retention < 62	Grade 3	175.0
Bald Hill Boys	64.3	41.8	13.4	12.85	Protein > 12% Retention < 58 Screenings >10 \$60/t reduction	Feed	132.4
Liquor Allsorts	63.9	36.4	17	14.45	Protein > 12% Retention < 58 Screenings > 10 \$60/t reduction	Feed	145.0
Tatyoan	64.2	41.4	13.1	13.08	Protein > 12% Retention < 58 Screenings > 10	Feed	148.7
NVNG	65.2	53.5	10.5	13.10	Protein > 12% Retention < 58 Screenings > 10 \$60/t reduction	Feed	145.0
Woorndoo	65.3	49.3	8.4	12.84	Protein > 12% Retention < 58	Feed	145.0
Halo Agrons	64.8	43.3	14.9	11.59	Retention < 58 Screenings > 10 \$60/t reduction	Feed	158.6
Barley Tasters	65.3	43.9	13.8	11.83	Retention < 58 Screenings > 10 \$60/t reduction	Feed	137.5
Baby Boom 2	63.7	34	22.4	11.78	Retention < 58 Screenings > 10	Feed	145.0
WAGs	64.9	47.9	15.5	11.33	Retention < 58 Screenings > 10	Feed	145.0