



Submission to the
ECONOMIC REGULATION AUTHORITY
Inquiry into Microeconomic Reforms
in Western Australia

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INTRODUCTION

The Pastoralists and Graziers Association of WA (Inc) (PGA) is a not for profit industry organisation established in 1907, which represents primary producers throughout Western Australia. The PGA Western Grain Growers Committee specifically represents the interests of PGA grain growing members who are major contributors to the annual Western Australian grain harvest.

The PGA Western Grain Growers Committee welcomes the opportunity to submit to the Economic Regulatory Authority's *Inquiry Into Microeconomic Reforms in Western Australia*, and in particular how such reforms would improve the efficiency, productivity and performance of the Western Australian grains industry.

In Western Australia approximately 90 per cent of all grain is exported in competition with other international exporting regions – in particular North America, South America, Europe and the Black Sea.

The buyers of grain in the international market are liquid and the price is a function of the global supply and demand. Australian grain exporters are “price takers” rather than “price makers” and the supply chain costs from farm to export affect the price at which marketers will sell bulk grain for export, which in turn affects the price that the marketers will pay to the growers.

Growers in Western Australia are required to pay, directly or indirectly, for the supply chain costs of moving grain from the point of production to the point of export (or domestic sale). Off farm supply chain costs (including farm to silo) represent up to 15% of growers' total operation cost of production and between 14% and 26% of the total sale value (SAHA *Review of Technical, Cost and Market Assumptions 2009* section 3.3.2).

Therefore efficiency gains in the grains industry logistics are dependent upon maximising competitiveness in transport, storage and handling by the State's major bulk handler Cooperative Bulk Handling (CBH).

“THOSE WHO WILL CANNOT. THOSE WHO CAN WILL NOT.”

This was the explanation provided by an astute observer of 16th century Spain on why the decline of the Spanish Empire was inevitable.

A similar dilemma confronts WA grain producers who can only watch in dismay as Cooperative Bulk Handling rejects every opportunity to take advantage of their 80 year incumbent monopoly to prepare the cooperative for serving their grower shareholders and customers in a competitive market.

Since deregulation of the wheat and coarse grain markets in 2008 Western Australian growers and the industry have experienced the benefits of buying competition for their product. Farm gate prices for wheat have been at least \$20/T higher than they would otherwise have been.

The PGA contends the advantages brought to the industry through competitive buying have not been complemented by comparable improvements in the provision of logistical services between farm-gate and port. Indeed some of the advantages of the increased global interest in the WA grains industry have been dissipated by the inefficiencies and costs in the logistics system.

Net farm gate returns are sensitive to logistics costs and farm profits even more so. CBH has provided the logistic services for the last 80 years for most of that time as a statutory monopoly and the last 20 years as a legacy monopoly. CBH also provides pool services and trades grain on its own account, as well as part owning Asian flour mills.

CBH is a non-trading cooperative. It does not distribute profits but retains them in the cooperative. CBH currently has about 4300 shareholders who each have a \$2 equity membership which forms the capital base for the company. The cooperative returns the \$2 when the member ceases to be an active grain supplier to the cooperative

It is a large business estimated to have a value between \$4-6 billion. It has 1000 permanent employees and uses a large number of casuals at harvest.

CBH claims to be the most efficient grain logistics operator in the world. There is no way of testing this claim directly, as CBH is a monopoly provider of these services and most of these services subject to bundled pricing. CBH claim that their services are much cheaper than similar services offered by comparable companies in other states of Australia.

This claim was challenged by The Australian Consumer and Competition Commission (ACCC) before the Australian Competition Tribunal, as an invalid comparison (p32cl139) following CBH's appeal against the ACCC's decision to revoke the Exclusive Dealing Notification over CBH's freight monopoly Grains Express.

CBH's key, and in our opinion futile business strategy, appears to be to preserve their legacy monopoly privileges at all costs and by any means. Restrictions to competition employed by CBH include their business rules, pricing structure and access fees. Their

inexplicable three-year legal contest of the ACCC'S revocation order is an example of their strategy at work.

CBH runs a cost plus business; and they intend to keep it that way. As a response to their loss in the Federal Court CBH has introduced new rules to discourage competition by independent transporters. Producers wishing to take advantage of better deals with transporters other than CBH must nominate their transporter soon after delivery which then precludes the producer (shareholder) from participating in CBH's virtual blending facility,

CBH have also increased their outturn charge from \$8.50 to \$9.90 and have increased their FOB charges, which no one can avoid as CBH has exclusive control of the bulk grain terminals. CBH has then reduced receival fees so that it appears that costs are being reduced when in fact the extra costs are hidden in the grain merchants' reduced FIS offer.

Overall CBH has increased deductions from farmers' returns by 3%. This is due to the structure of CBH's fees where excessively high FOB costs and outturn fees have discouraged investment in both up country storage and transport. From a growers perspective CBH's 'fortress strategy' is counterproductive as the industry needs commitment to investment in long term infrastructure projects that can improve supply chain efficiency, lower costs to growers, and increase international competitiveness.

In adopting this defensive strategy CBH have completely discounted the challenges coming its way, namely competition. CBH has not relayed to its producer shareholders any plans to reduce costs, retain the business of the 20% of the growers who produce the majority of grain in Western Australia, or return value to growers other than by rebating funds accrued through overcharging, reducing the fulltime employment ratio, reducing, through efficiency gains, the threshold tonnage at which they break even or even how they are going to achieve this at the same time as they retain a universal service charge and net -work pricing. In fact CBH will not even respond to requests for basic information about their financials from shareholders.

In the PGA'S view there is a growing disconnect between the CBH Board, management and its grower shareholders as the Board sets about pursuing its own objectives cavalierly ignoring the interests of its producer shareholders (See Attachment 1).

The Board is reluctant to accept that a large number of their shareholders are hanging on to their farms by their fingernails. The number of members of CBH has halved in the last 12 years to 4300, yet the Board stands aside with unconcern as even more shareholders look as though they will be the recipients of \$2 in payment for their extinguished share.

An informal survey of the financial institutions conducted by the PGA to ascertain the level of stress in grain growing areas was told that WA grain farms were undercapitalized by around \$4 billion, yet CBH doesn't seem to have a strategy to reduce costs or recognise shareholders contribution to the wealth created in CBH.

As explained earlier, CBH's strategy seems to be to defend their capacity to run a cost plus operation as though it were a divine right. Simultaneously they are using 'their' balance sheet to underwrite investments that increase growers' risks without any means of rewarding the shareholders even if the investments were successful.

The PGA contends that CBH's resistance to improve its performance in accordance with commercial criteria is undermining the profitability of farming in WA. This is having far reaching consequences such as compromising the production potential of WA farmland by neglecting the impact of unnecessarily high logistic costs.

For example, a recent environmental condition report by the Department of Agriculture & Food WA highlighted that the soil on large areas of farmland were becoming increasingly acidic, thus posing a major threat to crop production (See attachment 2).

Farmers are able to treat this condition through the application of lime, however they lack the financial resources to do so, and by necessity farm for the short term.

RECOMMENDATION

CBH has, and continues to enjoy a privileged history as an exclusive provider of services to the grain industry under legislation. *The Bulk Handling Act 1967* confers special privileges and powers on CBH including the exclusive control of the bulk terminals and upcountry storage facilities.

This Act, as well as its cooperative structure has permitted CBH to remain immune from external market disciplines and shareholder accountability as is found within full profit businesses. The Act has permitted CBH to be exempt from paying income tax, payroll tax and local government rates, while allowing them to continually request tax payer funding for upgrades to upcountry loading facilities, unprofitable rail lines, and port improvements.

In 2009 the Commissioner of Taxation issued a private ruling removing CBH's tax exemption status under section 50-1 of the *Income Tax Assessment Act 1997* (Cth) (ITAA 1997).

According to the ITAA a tax exempt body's principal, dominant or main purpose must be for the purpose of 'promoting the development' of agricultural resources. The Commissioner submitted that this was not the principal purpose of CBH, and that its purposes were wholly commercial, and that CBH was not established for the purpose of promoting the development of Australian agricultural resources and that CBH was carried on for profit or gain.

Following an exhaustive appeal by CBH the court upheld the appeal and CBH maintained its tax-exempt status. The Court held that because CBH was 'a society or association', since it was incorporated in 1933 as a cooperative company, its principal, dominant or main purpose was and remains to promote the development of Australian agricultural resources by promoting the development of the grain growing industry of Western Australia.

The court also found that CBH **does not** conduct its activities principally for the commercial benefit of its members, particularly since it engages in several important activities (such as Quality Assurance Accreditation) at a loss. In addition, its fees are set with a view to its members' capacity and the industry conditions.

CBH was incorporated in 1933 with the principal object of establishing, maintaining and conducting schemes or systems for handling wheat and /or other grain in bulk. As the bulk

handling of wheat and other grains had been shown to be to the advantage of the farmers involved, the government subsequently enacted the *Bulk Handling Act 1935 (WA)* (the BHA 1935) to regulate the business of CBH so that 'proper service was given to the growers of wheat and to merchants and millers and all other persons concerned in its marketing and disposal'.

CBH was thus granted an effective monopoly on bulk wheat handling for, in the first instance, 20 years, and subsequently this continued by legislative amendment. In addition CBH extended its operations to dealing with the bulk handling of barley and oats. The BHA 1935 was repealed and replaced with the *Bulk Handling Act 1967 (WA)* (the BHA 1967), with the monopoly extended to 1985.

Prior to 1972 CBH had been taxed as a cooperative under the *Income Tax Assessment Act 1936 (Cth)* (ITAA 1936). CBH submitted that it was exempt from taxation under section 23(h) of the ITAA 1936 in mid-March 1971, and this was enacted in the BHA 1967 by amendment.

The BHA 1967 was amended not only to reflect the release from taxation obligations, but also by adding section 35A to make CBH a nonprofit enterprise. Section 35A(a) required that all income and property of CBH was to be applied towards its objects and not otherwise.

In 1996, CBH proposed amendments to its Articles of Association to include provisions that would preserve its nonprofit status, by preventing the distribution of profits to members. An application was also made to the Commissioner for a private ruling to determine the continuation of the section 23(h) tax exemption for CBH.

The Commissioner ruled that the exemption would continue provided that the members formally adopted the proposed amendments to the Memorandum and Articles of Association, and that the BHA 1967 continued to apply. Following this ruling, the Articles of Association were amended to reflect the nonprofit status.

In 2002, the BHA 1967 was substantially amended to remove some restrictive provisions and to facilitate a merger for Grain Pool Pty Ltd with CBH. As a result of this merger CBH is now a very large enterprise with multiple functions and several subsidiaries which carry on business in their own right, and which contribute dividends to CBH as part of its income.

In its appeal to the Australian Competition Tribunal over the ACCC's revocation of the Grains Express Exclusive Dealing Notification, CBH submitted that one of the mechanisms by which it returns value to its grower members is by having lower fees for both storage and handling and for port services, and that benchmarking demonstrates that the storage and handling and port charges levied by CBH are significantly less than its peers in other states and territories.

CBH measures how well it is returning value to growers through a performance indicator called "grower value return on capital". CBH sets its fees in such a way as to ensure that the total revenue from all operations is sufficient to fund the operational expenses and capital expenditure of the business as a whole. The fees are not determined on an activity cost basis, but do, to a certain extent, reflect the costs of providing the service.

Yet the ownership base and co-operative structure of CBH restricts any questioning or testing of CBH's claims as the only information available for scrutiny is the CBH annual report, and grower shareholders are denied access to analyst reports or management presentations, which they would be provided with if CBH was a publicly listed company. (See Appendix A).

Under the BH Act 1967 and the *Bulk Handling Regulations 1967 (WA)* (BH Regs) CBH must receive all grain tendered to it that meets the requisite standards and deliver the grain to the receival point or port in Western Australia as required by the person who is entitled to the grain under a warrant issued the *Bulk Handling Act 1967* and the performance of CBH under the legislation.

Under Section 19 Of the BHA 1967 CBH must allow "a person, on payment of the prescribed charges, the use of any bulk handling facilities and equipment controlled by it at ports in the State."

Following the assent of the *Wheat Export Marketing Amendment Bill 2012 (Cth)* access to bulk grain export port facilities are handled under a mandatory Industry Code of Conduct, under the control of the ACCC.

As a consequence of the full deregulation of the Australian grains industry, the *Bulk Handling Act 1967* is redundant and only serves to protect the monopolistic practices of CBH, and limit the potential productivity gains of the Western Australian Grains Industry.

It is the recommendation of the PGA that the Economic Regulatory Authority conduct a cost benefit analysis of the *Bulk Handling Act 1967* and the effect that it is having on increasing the productivity and performance of the Western Australian grains industry.

Particular reference needs to be made as to the validity of:

- CBH's grower value return on capital indicator;
- CBH's benchmarking on competitiveness, including overseas competitors;
- CBH's methodology of setting fees.
- CBH claims that any market power is constrained by the countervailing power of its customers, and the growers.

John Snook
PGA Western Graingrowers Chairman

Attachment 1


4 June 2013

Mr N Wandel
Chairman
CBH
Gayfer House, 30 Delhi Street
West Perth
WA 6005

Dear Neil

Thanks for your letter of May 2013 supporting the view on the cooperative model of CBH Group.

I do recognise the effort CBH is making in containing costs, etc however it would be appreciated if you could indicate why you consider your storage and handling fees are \$14/t lower than the other best provider in Australia i.e. the current comparison would be useful?

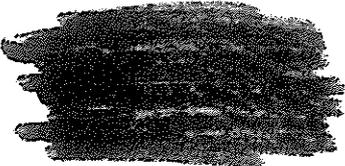
It is interesting to note your \$100m invested in capital works per annum which is obviously a substantial amount of money equates to something like up to \$10/t of grain delivered to CBH which is fundamentally the profit being made and being reinvested in the company on grower's behalf which is building a capital value of CBH.

This further highlights the need to openly debate the issue of the value of CBH and who owns it and when should growers be allowed access to this capital when they leave the industry or for other reasons?

The other issue I did raise with you once verbally was the accounts which I have always struggled with to really understand where the monies are being made in the CBH Group, as they are amalgamated together which makes it difficult to analyse the group and parts thereof properly.

Look forward to discussion on this.

Yours sincerely


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This letter was sent to Mr Wandell on 4th June. Six weeks subsequent to that Mr Wandell was contacted that he had not replied and there has been no reply since. The writer is a representative of shareholders who produces a significant amount of grain.

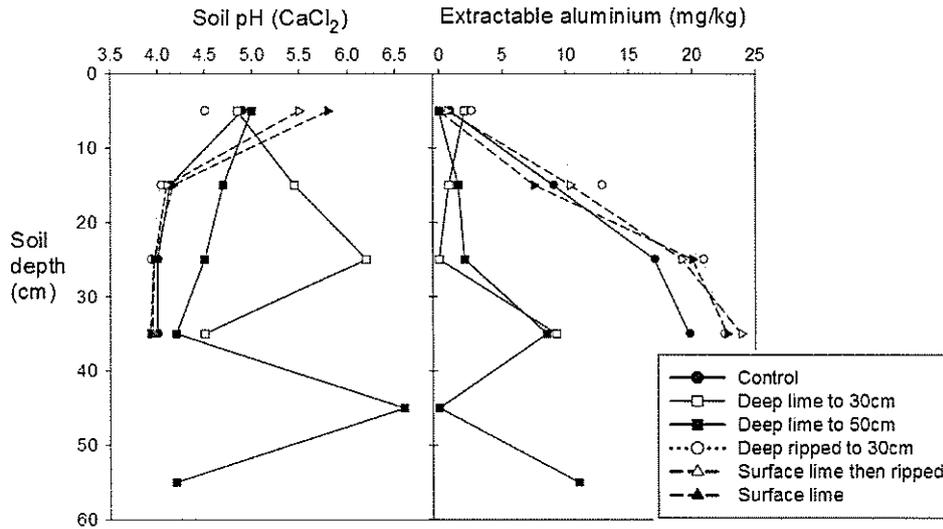


Figure 2 Soil pH and extractable aluminium (0.01M CaCl₂) from core samples collected 31/07/08. Data from deep lime and deep ripped treatments were collected on the rip line.

Wheat root abundance

The most obvious and biggest effect on root abundance at the time of measurement was from deep ripping with preferential root growth down the deep rip lines (Table 1). There was no measurable impact of lime on root growth at this growth stage. Where there was no deep ripping root abundance was considerably lower beyond a depth of 15 cm, with roots either absent below this depth or at very low density (Table 1). At 30–40 cm for example, 90% of the observations in the rip lines contained roots compared with only 14% of the observations where there was no deep ripping (Table 1). The 15–30 cm depth where root abundance declines in the absence of deep ripping corresponds to the peak in soil strength as a result of compaction (Figure 1) and also a strongly acid subsoil with an average pH = of 4.1 (Figure 2).

Table 1 Average root abundance scores (McDonald et al. 1990) and proportion of observations containing roots on soil pit face overlain by a 10 cm² grid for Wyalkatchem wheat measured 64 days after sowing. Observations were made in the deep ripping lines (Rip), on the edge of the rip lines (Edge of Rip) and in-between (No Rip) the rip lines. Data are the means of both limed and not-limed rip lines as no significant difference in root growth was observed at this time

Depth (cm)	Average root abundance scores			Proportion of observations containing roots (%)		
	No Rip	Edge of Rip	Rip	No Rip	Edge of Rip	Rip
0–10	3.3	3.3	3.8	100	100	100
10–20	1.7	2.2	2.8	92	100	100
20–30	0.6	1.2	1.9	54	92	100
30–40	0.2	0.4	0.9	14	38	90

Wheat yield, yield components and grain quality

The only significant grain yield response in 2008 was for the deep ripping and deep liming to 50 cm treatment which yielded 36% (880 kg/ha) more than the untreated control (Table 2). The deep lime to 50 cm treatment had lower protein than some of the other deep ripping and lime treatments due to dilution of the grain protein as a consequence of the higher grain yield although it was not significantly different from the control (Table 2). Screenings tended to be lower and hectolitre weight higher for the deep lime to 50 cm treatment (Table 2) despite the higher yield, which may be indicative of the

improved access to subsoil moisture with this treatment. There was a trend towards higher yields with the deep placed lime to 30 cm treatment and the deep ripping to 50 cm treatment. Deep placement of nutrients in 2005 in addition to lime showed no additional yield advantage (Table 2). Estimates of 2005 liming costs, both surface applied and deep banded were determined and amortised over 5-years. This is a conservative time frame for expected treatment responses given that surface applied lime has been shown to provide a benefit for 12 or more years (Davies et al. 2008). These costs were added to the other variable costs. On this basis the combination of deep ripping and deep lime to 50 cm to overcome the subsoil acidity and compaction constraints is highly profitable with an estimated gross margin benefit of \$159/ha more than the control. Surface applied lime with and without deep ripping is yet to show any benefit at this site which highlights how difficult it can be to ameliorate severe subsoil acidity with surface lime applications (Gazey et al. 2009 Crop Updates Paper).

Table 2 Impact of various deep ripping and deep lime treatments applied in 2005 on machine harvest grain yield, quality and returns of Wyalkatchem wheat, harvested 27/11/08

2005 Treatment	Yield (t/ha)	Protein (%)	Screenings (%)	Hectolitre weight (kg/hL)	Gross return ¹ (\$/ha)	Variable costs ² (\$/ha)	Gross margin (\$/ha)
Control	2.46	10.9	2.4	81	612	95	516
2.5 t/ha surface lime	1.85	11.6	3.7	77	457	114	343
2.5 t/ha surface lime then ripped to 30 cm	2.35	11.5	3.1	79	588	123	465
Deep ripped to 30 cm	2.58	11.5	2.5	80	645	104	541
2.5 t/ha deep lime to 30 cm	2.73	11.6	2.8	80	683	123	560
2.5 t/ha deep lime and deep nutrients to 30 cm	2.45	11.2	2.8	79	609	123	486
Deep ripped to 50 cm	2.77	10.9	2.4	80	689	113	575
5 t/ha deep lime to 50 cm	3.34	10.7	1.6	82	825	150	675
<i>l.s.d. (0.05)</i>	<i>0.65</i>	<i>0.7</i>	<i>1.1</i>	<i>2</i>			

¹ Based on Estimated Pool Return on 31/12/08 for APW2 of \$338/tonne (AWB Western Pool No. 1) less estimated wheat selling costs.

² Includes fertiliser and herbicide costs based on 2008 prices and also includes estimated 2005 liming and deep ripping costs (using Optlime v2008-1.4) amortised over 5 years.

Higher grain yield for the deep lime to 50 cm treatment is a consequence of 20% more heads than the untreated control as determined by maturity cuts (Table 3). This implies that the deep ripping and deep placement of lime improved growth early in the growing season with better access to water and/or nitrogen. Total shoot dry weight for the deep lime to 50 cm treatment was 25% (1.3 t/ha) greater than the untreated control (Table 3) for the hand cuts.

Table 3 Impact of various deep ripping and deep lime treatments applied in 2005 on total shoot dry weight (DW), head number, total head DW, grain DW and harvest index of Wyalkatchem wheat from harvest index hand cuts taken 26/11/08

2005 Treatment	Shoot DW (t/ha)	Head number (heads/m ²)	Head DW (t/ha)	Grain DW (t/ha)	Harvest Index
Control	5.2	234	3.3	2.5	0.47
2.5 t/ha surface lime	4.2	215	2.7	1.9	0.46
2.5 t/ha surface lime + ripped to 30 cm	4.8	220	3.1	2.3	0.48
Deep ripped to 30 cm	5.4	237	3.5	2.6	0.47
2.5 t/ha deep lime to 30 cm	5.4	241	3.5	2.5	0.47
2.5 t/ha deep lime and nutrients to 30 cm	4.9	229	3.1	2.3	0.46
Deep ripped to 50 cm	5.4	258	3.5	2.6	0.48
5 t/ha deep lime to 50 cm	6.5	280	4.1	3.0	0.46
<i>l.s.d. (0.10)</i>	<i>1.1</i>	<i>36</i>	<i>0.6</i>	<i>0.5</i>	<i>ns</i>

CONCLUSION

The 2008 result is very similar to that achieved in 2005, the year the experiment commenced in which both the deep ripping to 50 cm with lime and without lime yielding 3.3 t/ha compared to 2.5 t/ha for the control, a yield increase of 800 kg/ha (Gazey and Gartner 2006). This suggests that in reasonable seasons, the benefits from this deep (50 cm) lime treatment are robust. Surface applied lime treatments and deep placed lime to 30 cm treatments together with those which included deep placed nutrients have not shown a significant yield advantage in either 2005 or 2008.

Grain yield responses to deep ripping and lime at this site in 2008 were dependent on the depth of amelioration with the biggest response when the soil was deep ripped and limed to 50 cm rather than 30 cm. The non-ripped soil at the site is compacted to a depth of 30 cm but strongly acidic to depths of 40 cm or more, hence the need for deeper amelioration. This suggests that for some sites affected by subsoil acidity and compaction, a greater depth of the profile needs to be ameliorated before large productivity responses are seen. This is both technically difficult and expensive. The shallow leading tyne ripper used in this trial has several tynes operating at shallower depths ahead of and in line with the main ripping tyne which can significantly reduce draft compared to a normal ripper (Hamza and Riethmuller 2005).

Significant yield responses to applications of surface lime and deep ripping to 30 or 40 cm have been measured at other sites so using test strips to test responsiveness of a particular soil to these treatments is a good option. The best strategy remains to prevent subsoil acidity with regular liming at sufficient quantities to maintain topsoil pH at or above 5.5 (Gazey et al. 2009) and minimise compaction by using a controlled traffic (tramline) farming system where possible. Penetrometer results from this site demonstrated the benefits of tramline farming for preventing re-compaction of ripped soil and confining compaction to the tramline. These benefits from ameliorating both the compacted hardpan and subsoil acidity are likely to continue to be present into the future.

KEY WORDS

subsoil acidity, compacted hardpan, lime, root abundance, controlled traffic, deep ripping, grain yield

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REFERENCES

- Davies S, Gazey C, Gartner D, Clune A (2008) Surface lime still increasing yields after 12 years. Northern Agricultural Region Trial and Demo Book 2008. WA Department of Agriculture and Food. www.agric.wa.gov.au
- Gazey C, Gartner D (2006) Deep ripping and deep placement of lime. Local Research and Development Results 2006. Liebe Group.
- Gazey C, Andrew J, Pearse R (2009) Case study of a 17 year old lime trial. Agribusiness Crop Updates, 24–25 February 2009. WA Department of Agriculture and Food. www.agric.wa.gov.au
- Hamza M, Riethmuller G (2005) Reducing the cost of ripping compacted soils. Farmnote 55/2005. WA Department of Agriculture and Food. www.agric.wa.gov.au
- McDonald RC, Isbell RF, Speight JG, Walker J, Hopkins MS (1990). Australian Soil and Land Survey. Field Handbook, Second edition. Inkata Press.
- Webb B, Blackwell P, Riethmuller G, Lemon J (2004) Tramline farming systems: technical manual. Bulletin 4607. WA Department of Agriculture and Food. www.agric.wa.gov.au

Project No.: UWA00081 'Managing Hostile Subsoils WA' and DAW00014

Paper reviewed by: Bill Bowden

Table 2 Summary of the key messages for the agricultural industries

Theme	Livestock industry	Grains industry	Irrigated agriculture industry
Soil acidity	Soil acidity is a major constraint to pasture production, and needs more investigation by this industry.	Soil acidity is a major constraint and there is significant opportunity to increase lime use to bring pH within target levels.	Managing soil acidity is usually a minor input cost and the issue is generally well managed.
Wind erosion	The critical issue for the livestock and grains industries is maintaining sufficient, stable soil cover throughout the year. This may be difficult in a variable and generally drying climate.	Wind erosion is generally not an issue and cover levels are generally maintained at satisfactory levels. Sandblasting of seedlings can be an issue on the Swan Coastal Plain.	
Water erosion	Water erosion hazard, during the growing season, has diminished due to declining winter rains and more sustainable management practices. Water erosion events are mainly caused by intense, localised summer storms, and these are likely to increase with changing climate. Maintaining sufficient soil cover to prevent water erosion is not always possible in grazing systems.	Water erosion may be an issue where soil management practices fail to keep run-off volumes and velocities at safe levels.	
Soil organic carbon	A warming and generally drying climate associated with lower organic matter inputs could limit future sequestration of organic carbon in soils used for livestock and grains production. Farming systems that increase biomass production and minimise processes such as wind and water erosion are required to maintain and improve soil carbon levels.	Management that increases biomass production and conserves and applies organic material should improve soil organic carbon levels and productivity.	
Soil compaction	Soil compaction is likely to be a major, but unquantified, constraint for all the agricultural industries. Land management that limits, prevents or treats soil compaction is likely to improve productivity. Further work is required to quantify the extent and severity of this constraint.		
Water repellence	The average annual opportunity cost of lost agricultural production in the south-west of WA from water repellence is estimated at \$251 million. Water repellence also increases the risk of wind and water erosion, off-site nutrient transport and possibly soil acidification through increased nitrate leaching. The extent and severity of water repellence appears to be increasing as cropping increases together with early sowing, minimum tillage and reduced break of season rainfall. More baseline data is needed to carry out a quantitative assessment.		

Summary

This report card summarises our current knowledge of the status and trend in the natural resource base in the agricultural areas of the south-west of Western Australia (WA) and provides a discussion of the implications for agricultural industries.

The condition of our natural resources is a complex interaction of numerous processes. In simple terms however, the performance of the land is driven by three primary factors: climate, land characteristics and land management. The first two factors are largely out of the control of land managers, and in a drying and variable climate, land management practices need to be able to respond quickly to changing conditions.

Although this report deals with several natural resource themes individually, it is important to note that the processes within these themes are often linked, and any land management response needs to consider the system as a whole, and how this integrated system may respond to a given management action. In the absence of a systems approach to management, an action to solve one problem may lead to another.

The situation and outlook for our natural resources is mixed. Although we have made progress in some areas, such as managing wind and water erosion, the status and trend in many indicators of resource condition is adverse. The overall status and trend in resource condition across the entire agricultural area of the south-west of WA is summarised in Table 1 and key messages are summarised in Table 2.

Table 1 Resource status and trend summary for the south-west of WA

Theme	Summary	Condition and trend					Confidence	
		Very poor	Poor	Fair	Good	Very good	In condition	In trend
Soil acidity	Severe and widespread and a major risk to production due to insufficient use of agricultural lime. In most areas, condition of the soil profile is declining.							
Water repellence	Widespread and often severe on sandy soils and can be a major limitation to production under current land management systems.							
		Very deficient	Deficient	Optimal	Excess	Well in excess		
Nutrient status (P)	In most areas, more phosphorus (P) than is required to optimise production is stored in many agricultural soils.							

