

7th International Acid Sulfate Soil Conference

Vaasa, Finland

August 2012

Integrated Practices for an Improved Sustainable,
Sugarcane Industry in ASS soil

Presented by

Robert Quirk

Cane Grower from New South Wales

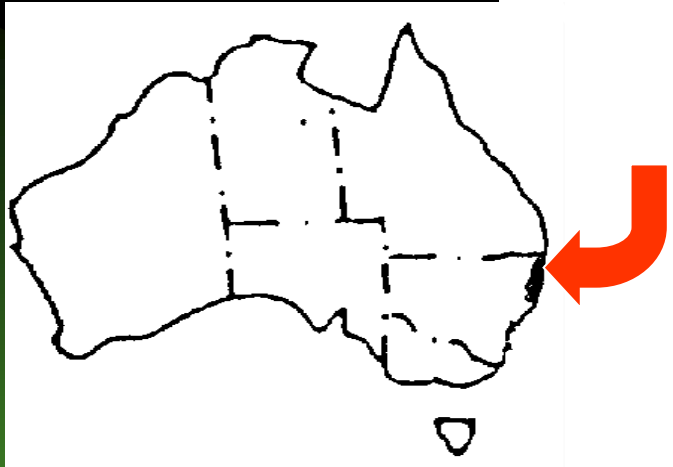
Australia



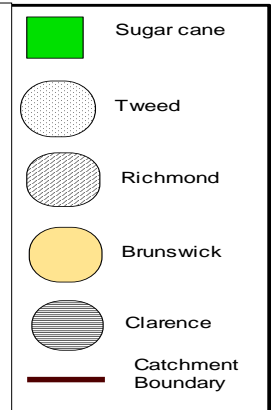
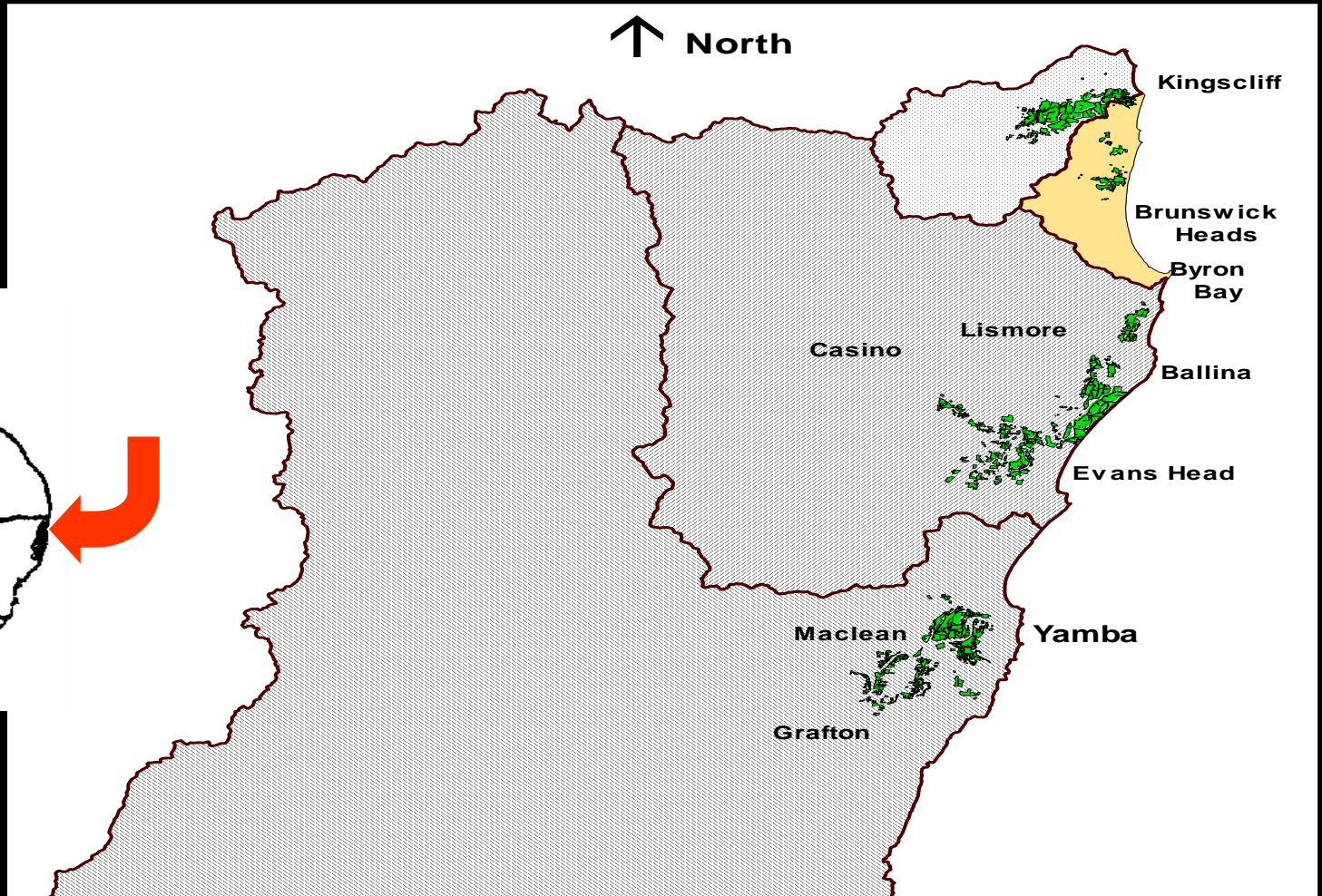
The Problem

- What we did to solve it.
- The Results
- Our Responsibility to develop practices in the first world





**-50% of NSW cane lands
underlain by acid sulfate
soils**



Quirk Farm History

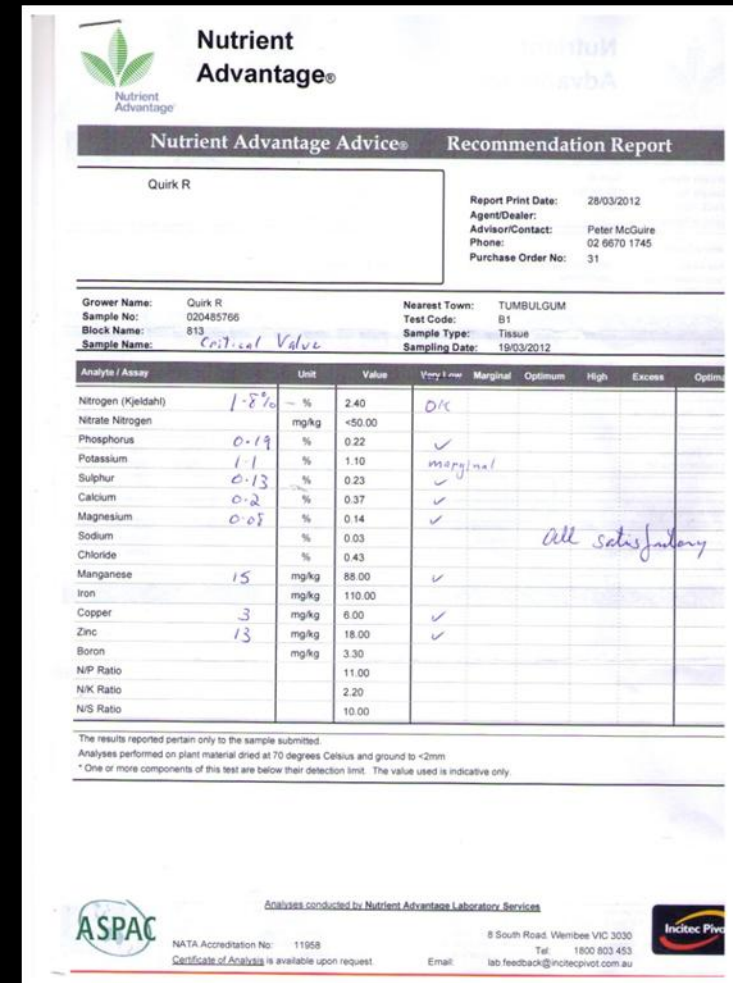
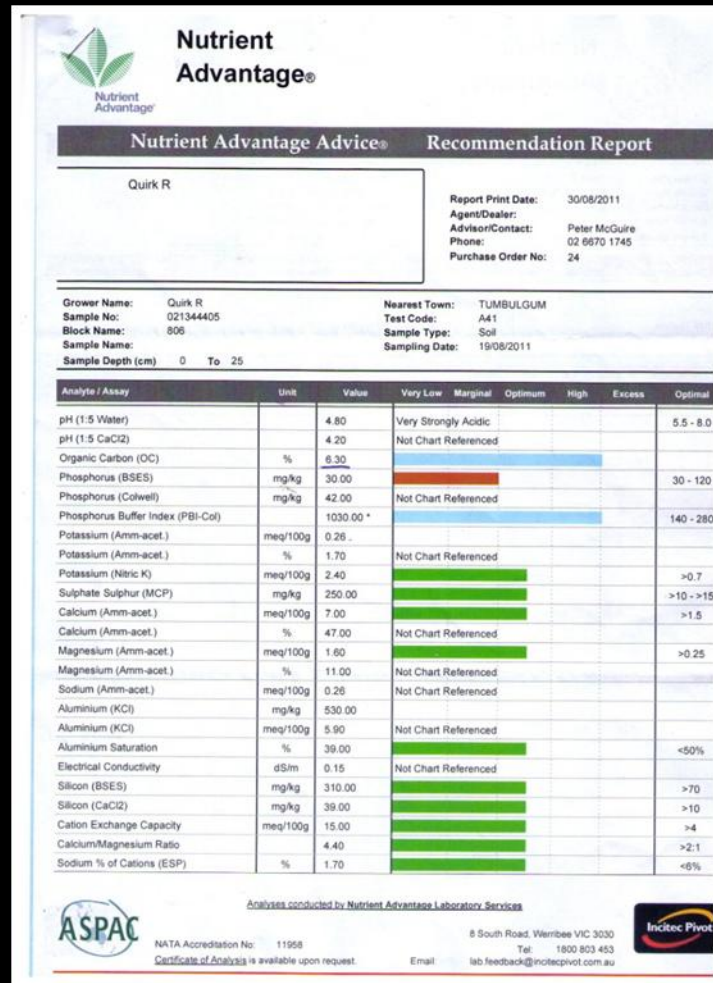
- Held in Family for 100 Years
- Growing Sugar for 70 Years
- “Full Circle” 1949 Green Cane Harvesting to Green Cane Harvesting Today



100% farmers have an acid drainage plan



Organic carbon levels



GHG Emissions

Emissions

Total

	Total	Area	Scope 1	Scope 2	Scope 3	Scope 1	Scope 2	Scope 3	Total
Diesel	18600	108	0.003			55.8	0	0	55.80
									0.00
Nitrogen	90	108	3.9		6.2	60.264	0	37.908	98.17
		108							0.00
Phosphorus	23	108	0.714					1.773576	1.77
		108							0.00
Pottassium	43	108	1.61					7.47684	7.48
		108							0.00
Electricity	3920		0.89		0.13		3.4888	0.5096	4.00
Total									167.22

Sequestration

Nitrogen Avoidance 59kg/ha over avearge

Nitrogen	59	108	3.9		6.2	37.908	0	60.264	98.17
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Plant Stones 400kg/C/year
 Plant stones CO2 688
 Plant stones co2 74.304
 over property

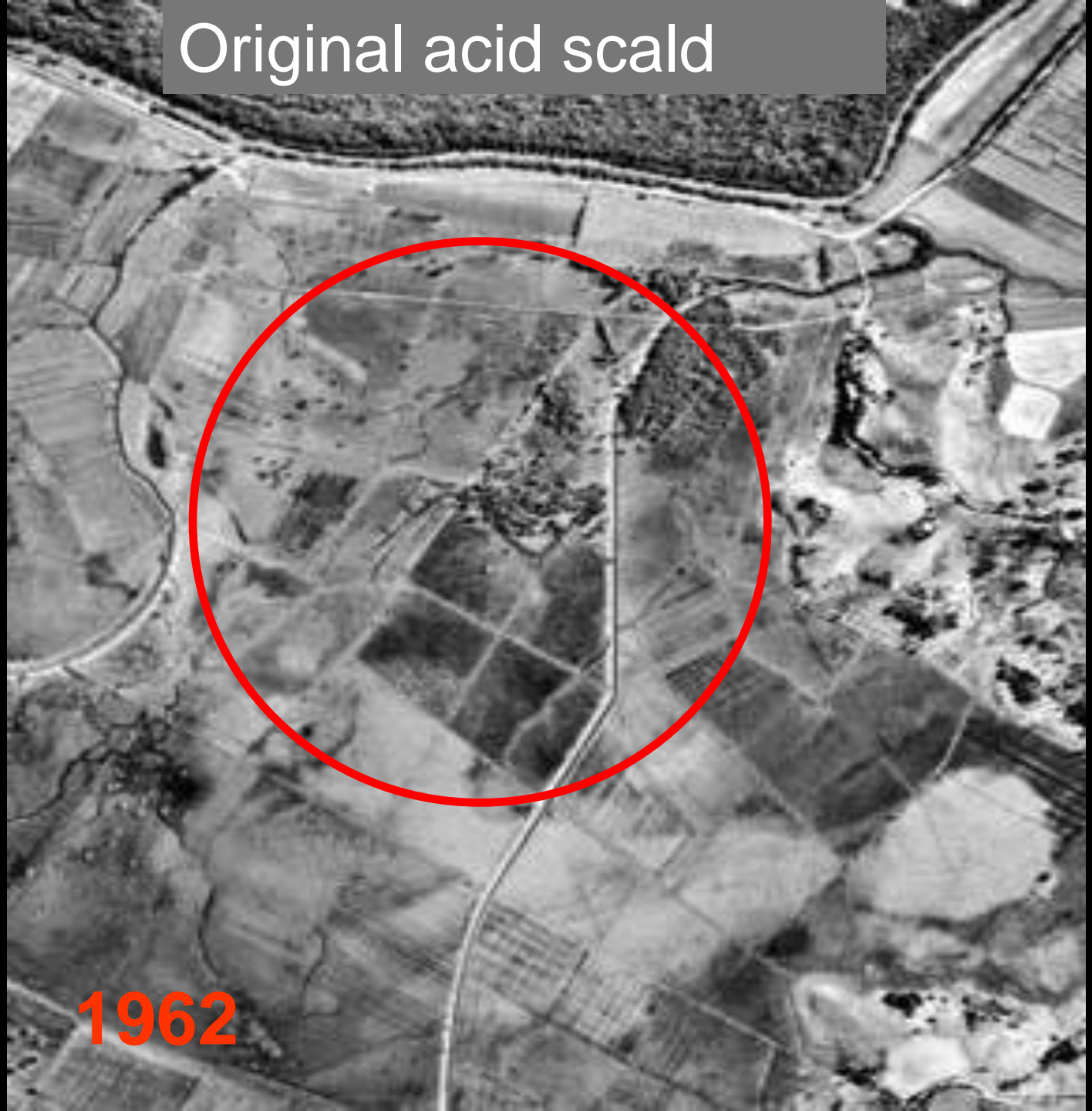
Accumulation OC

Total Emissions	167.22			
	0816			
Avoidance of N/year	98.172			
Plant stones	74.304			
	2	3	4	5
Co2 sequested	14266.	28532.	35665.	
	37	21399.55	74	92
years of offsetting your activities N/avoidance	153.54	230.31	307.08	383.85
Excluded plant stones included				
years of offsetting activities plant and n excluded	85.31	127.97	170.63	213.29

Wet and Dry



Original acid scald



1962



Making progress...?



1993

6,800 tonnes



The finished product

- Filled 6 km of drains
- Laser levelled 100%

2002

11,200 tonnes



.5 Metre AHD



The BAD NEWS...



Major fish kill - 1987



Our problem soil



Audit sheets

Laser grading

Q 7 Did you laser grade any blocks last year?

Yes No

Q 8 If "Yes", please list the blocks you graded and whether lime was applied.

Paddock No.	Area (ha)	Amount of lime applied (tonnes)		No lime required
eg paddock 202	1.62	4.0	OR	<input type="checkbox"/>
111	1.64	STPH	OR	<input type="checkbox"/>
302, 304	Not Laser Levelled	STPH	OR	<input checked="" type="checkbox"/>
403, 601, 611			OR	<input checked="" type="checkbox"/>
506, 101, 108	27.5	STPH	OR	<input checked="" type="checkbox"/>
805, 806, 807			OR	<input checked="" type="checkbox"/>
812, 814			OR	<input checked="" type="checkbox"/>

Other lime

Q 9 Did you apply lime to any other blocks?

Yes No

Q 10 If "yes", how much lime did you apply to these other blocks?

..... 137tonnes

Fish kills

Q 11 Have you noticed any fish kills on your farm and adjoining drains over the last year?

Yes No

Q 12 If you answered "yes" please provide some details.

Floodgates

Q 13 Have you opened floodgates to allow river water to enter your drains in the last year?

Yes No

Q 14 If "Yes", have you done this more than in previous years.

Yes No

Thank you for completing this record. Please keep this form with your other farm records. Council may select your farm as part of the annual audit.

COMPLIANCE RECORD

for

Sugar industry self regulation of drainage and earthworks in acid sulfate soil areas

1st July 2011 to 30th June 2012

These records are required for the NSW sugar industry to maintain its self-regulation status for drainage works on acid sulfate soils. Please complete the form **and keep it with your records**. You may be required to produce these records as part of an annual audit by council.

Farm number: 8158

Your name: Robert Quirk

Trading name: R.G. Quirk

Drain maintenance

Please tick as necessary

Q 1 Did you clean or spin any drains on your PAE last year?

Yes No

Q 2 If "Yes", please complete the following table.

Length of drains cleaned (m)	Sampling site number closest to drains cleaned	Method(s) used (✓)				Month(s) cleaned	Lime requirement from Drain Plan	Amount of lime applied (X if no lime req'd)
		Excavator	Spinner	Drain plough				
4,900	1,2,3	Bucket with slots or holes Closed bucket (no drain holes/slots)	Spinner	Drain plough	July	12.5, 5 STPH		

Drain spraying

Q 3 Did you spray any drain banks last year?

Yes No

Q 4 How were they sprayed?

spray

Blanket

Spot spray

Shallower drains

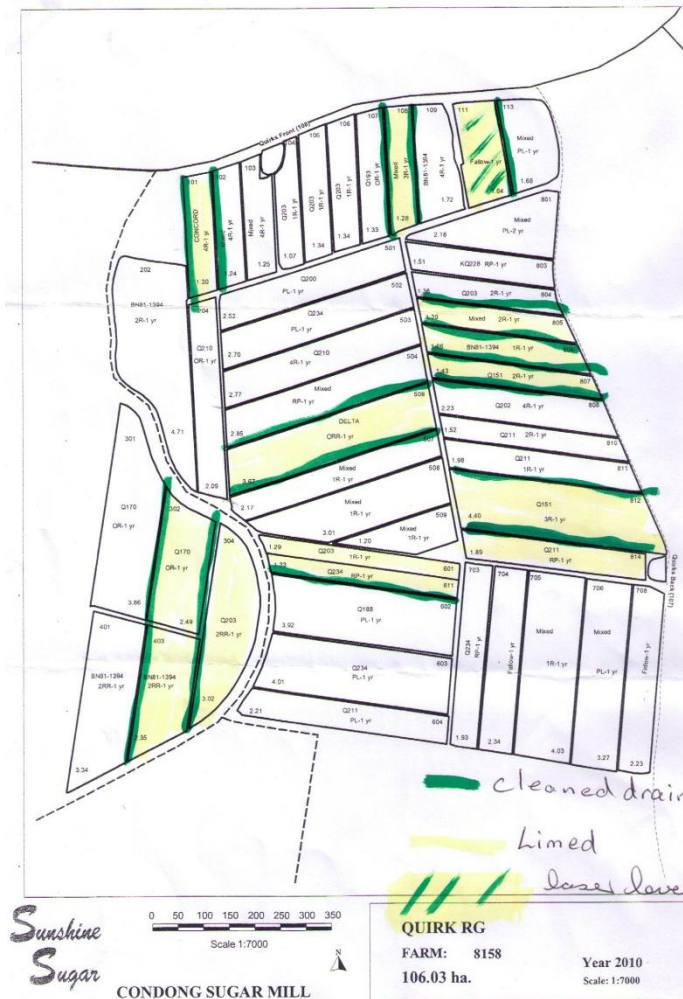
Q 5 Have you filled in or made any drains shallower over the last year?

Yes No

Q 6 If "Yes", what length of drains (approximately) have you modified over the last year?

Drains shallowedmetres

Drains filled inmetres



Good News



Mole drains



Clean drains



Sugarcane Growing – Current Direction

- Zero – Minimum Till
- Chemical weed control
- Direct drilled break crops
- Mounded rows
- Controlled traffic
- Wider multiple rows
- Direct drilled, mechanical cane planting
- Building Carbon Content
- Calcium Nitrate



Zero – Minimum Till

- Harvesting
- Minimum Till Fertilising
- Stool Raking



Chemical Weed Control

- Inter Row Weed Control
- Selective Herbicides
- Trash After Seven Years



Direct Drilled Break Crops

- Direct Drilled Soybeans Into Trash Blanket



Direct Drilled Break Crops

- Direct Drilled Soybeans Into Trash Blanket





Lupins in ass



Mounded Rows

- Laser Levelling
- Bed Forming



Controlled Traffic



Building Carbon Content

- Minimum Input Oats
- OM Incorporation
- Urea Application



Wet and Dry



Other Practical Solutions

Riparian Re-vegetation



Other Practical Solutions

- Development of wetland

- 2ha – reducing discharges

- Industry leadership

- COMPASS program

- EMS

- BMP



Results of Changing My Farming System

- Flotation Almost Eliminated
- Fertiliser Application Reduced by 25%
- Herbicide Application Reduced by 30%
- Fuel Usage Cut by 47%
- Tractor Hours Reduced by 40%
- Labour Component cut by 66%
- Eliminated the Use of Phosphorous Fertilisers
- OM Reduces the Discharge of Heavy Metals
- Macro-Fauna Introduced and Sustained
- Soil Biota Population has Positively Evolved and Increased
- Productivity Increased by 75%
- Unit Cost Decreased by 50%



Take Home Message

My Experience shows that the development and implementation of an economically improved farming systems has unexpectedly demonstrated that positive economic outcomes are directly linked to positive environmental outcomes

