A SURVEY ON

ENVIRONMENTAL MANAGEMENT OF BONLAC DAIRY FARMS

Bonlac Foods Limited
Milk Supply Group

2000

ENVIRONMENTAL MANAGEMENT SURVEY OF BONLAC DAIRY FARMS

Background:

- Bonlac is currently collaborating with the Australian Centre for Cleaner Production, which is a division of the EPA that is directly involved with industry and environmental solutions.

- The project aims to monitor and develop a course for improvement in environmental management systems on farms to enhance Bonlac's achievements in environmental excellence at processing sites and give the Company a distinct competitive edge in the market place.

Survey Outcomes:

⇒ To determine existing attitudes and perceptions within our supply base.

⇒ Identify a range of "real" issues.

⇒ Develop significant benchmarks on a range of environmental practices.

⇒ Identify significant motivations that will encourage farmers to change any practices considered unsustainable.

⇒ Develop an accurate On-farm Self Assessment tool.

⇒ Provide recommendations for the implementation of an extension program specifically for Bonlac suppliers.

- This project is unique in that we are surveying dairy farms on all the issues relating to environmental management, not just our effluent control, as has been focussed on previously. It is a one to one interview, with the farmers providing their current practices and attitudes on all the issues. Essentially the data should provide benchmarks on management and attitudes towards environmental responsibilities and give direction on drivers for uptake and implementation for continual improvement programs on farms. The project will set up a self assessment project and initiate some extension programs to facilitate adoption. Sections of the community and our customer base are already aware we have taken this initiative.

- It is extremely important that Bonlac has this information and that our stakeholders know we are leaders across all industries in Australia. Environmental management issues threaten the industry and being prepared to deal with issues and having data to substantiate our claims will strengthen viability and be seen as impressive.

Summary of Outcomes:

Benchmarks:

		Ave	Range
Water Use	Stock (L/Cow)	42,651	36500 - 60453
	Dairy (L/Cow)	11,770	1338 - 50384
	Irrigation (ML/Cow)	1.01	(0 - 4.61)
	Total Litres(ML/Cow)	1.06	
Effluent	Pond Capacity (M^3/Cow)	8.2	0 - 109
	Total Load (L/Cow)	19,912	
	Area Dispersed (% Farm)	12	0 - 100
Soils	Salt affected (%)	2	0 - 50
	Needs Improvement (%)	8	0 - 50
	Renovated due to Pugging (%)	4	0 - 50
	Renovated Annually (%)	15	0 - 50
Nutrient Balance			
	Fertilizer (Kg P/Cow)	18	0 - 45
	Grain (Kg P/Cow)	3 - 7	0 - 10
	Total Input (Kg P/Cow)	22	2 - 47
	Total Output (Kg P/Cow)	7	3 - 14
	Input Output Ratio	3.9	0.3 - 7.8
Land Management			
	Weedicides used (L/Cow)	0.36	0 - 3
	Area protected (ha)	4	0 - 56
	Area treed (% Farm)	3	1 - 25

- These benchmarks are key figures for farmers to gauge their performance. It will show how they rank compared to the other farmers in the district. It will also indicate any differences that may exist for different areas.

- One of the key benchmarks we measured is water use, information the industry hasn't seen before. Farmers are very interested in this figure and will use it to seek continual improvement, because it has a direct impact on farm costs and attracts community acceptance.

- Most dairy water is collected in effluent ponds which raises problems, in terms of disposal and perception as potential contaminants of waterways. The emerging solutions or best management practices are simple and already in place on a percentage of farms and could easily be adopted by other farmers.

- Creating awareness about point sourcing of ponds to collect effluent off pads, calf sheds and lanes will also create interest because of impact of increased loads in these areas.

- Developing nutrient balances over the whole farm will lead to improvements in management decisions on fertilizer use and grazing management and have very significant impacts on nutrient outflows off farm.

- Our analysis of attitudes was interesting in that the farmers surprisingly expressed strong support in environmental issues and standards and they surprisingly considered their own standards were not good enough. Some would be prepared to do more work to improve yet for most spending money is out of the question.

- There is an indication that any support, particularly in terms of subsidies/tax relief/rate relief for farm environmental works, would be well accepted. The success of Landcare programs are proof of this because trees and fencing is heavily subsidised.

- Surprisingly, farmers are greener than we originally thought, and feel responsible for sustainability issues.

- If current practices and results on leading farms show that BMP such as planting more trees, using less water, and spreading effluent, improves productivity and profitability, then adoption of these programs will increase. However, return on investment in these areas is probably never going to compete for scarce funds for, say, fertilizer, grain or grass species, and we need factual information to develop a case for potential support funding from areas like NHT.

- Initially I underestimated the interest in our comments at farmers' kitchen tables about these issues. Just creating awareness of all the environmental issues involved, has lead to interest from all groups of farmers, even those top farmers who thought they had everything covered.

- So, I believe, our process is very beneficial and once we finish our survey and prepare and disseminate our self assessment in place for all farmers, then we will have an impact, and farmers will have motivation for continual improvement. Just having a self assessment program on farms will give Bonlac recognition.

Opportunities for Bonlac Foods Limited:

◊ Company has data and information about the status quo of our suppliers environmental management.

◊ Being able to quell irrational or false perceptions about our industry.

◊ Being able to demonstrate sustainability and continual improvement to the community and to our customers.

◊ Increased knowledge or new knowledge about our farms and attitudes towards environmental management.

◊ Provide benchmarks on BMP's relating to environmental management on dairy farms.

The Next Step for Bonlac Foods

◊ Encourage self assessment, create awareness of issues and opportunities, and reinforce benchmarks and Best Management Practices.

◊ Concentrate on the major issues of water use, effluent containment, and nutrient balance.

◊ Irrigation accounts for 94% of water use, so practices improving its use (Production/ML) and minimizing run-off are imperative. Engaging in programs with the EPA/DNRE/CMA to encourage construction of reuse dams, not only to collect run-off from irrigation, but also to collect effluent run-off off farm during rainfall (as highlighted by the Survey), would help containment and supplement irrigation water, reducing costs. Point sourcing of effluent ponds to catch effluent off farm tracks, feed pads and calving pads, is a similar issue, warranting development. Bonlac could support a claim for tax relief or a subsidy on rates that would ensure uptake.

◊ The variation in water use in dairies was large, ranging from 1300 to 50,000 L/Cow/Year, indicating opportunities to save water and costs. Re-using dairy water is minimal, but offers large benefits, e.g. recycling yards wash and minimizing platform and cup washing in rotary dairies, which can use 15000 - 20000 Litres a day.

◊ Avoiding overuse of hot and cold rinsing volumes would save rain water and ensure better quality water over Summer when many dairies draw on dam or creek water contaminated with thermoduric and psycotrophic bacteria jeopardising milk quality.

◊ The high load/capacity ratios of effluent in the West and East are a concern because of the increased risk of overflow and off farm run-off. Minimizing the load (by using less day water, reycycling, installing rainfall diversion gates, etc.) and using the effluent on a Summer crop, are real options that need encouragement. The major problem is though, the ponds are too small and loads are increasing with increasing herd size (and proportionately more water is used to save labour). More education is needed about pond sizes, loading and emptying.

◊ There are still some farms without effluent disposal procedures, especially in the West. These farms need focussed support and attention.

◊ Nutrient Balance is a very important issue and is discussed in detail in the text. At this point we do not have detailed data on the relationship between balance ratios and production and environment risks, (or alternatively viability and sustainability. More information is required and Bonlac should support EPA/DNRE investigations.

The Survey:

A questionnaire on Environmental Management of Dairy farms was developed (see Appendix). This was completed in a one-to-one interview on the farm that took approximately 2 hours to complete. Usually the farmer and his wife were present.

Information on physical aspects were collected together with current practices being implemented and, in some cases, their outcomes.

The areas covered were:

1.	Water Use	-	Dairy & stock water use
		-	Source of water
		-	Water quality issues
		-	Cow troughs
		-	Irrigation
2.	Effluent Management	-	Effluent collection
		-	Capacity
		-	Application and run-off
		-	Regulations
		-	Disease management
3.	Soil & Pasture	-	Chemical, Biological & Physical maintenance of soil
		-	Wet soil management
		-	Salting
4.	Nutrient Balance	-	Fertilizer use
		-	Off farm run-off
		-	Farm inputs/Export of nutrients
		-	Farm production
5.	Land Management	-	Weed control/Herbicide use
		-	Streambank Management/ Land protection and reclamation
6.	Farm Development	-	Whole farm plan
		-	Disposal of dead animals & solid waste
		-	Feed/calving/Wintering pads
		-	Laneways

This was complimented with some questions on attitude towards environmental issues. The questions were:

List the three most important environmental issues in running your dairy farm.

⇒ What do you think your local community considers to be the most important environmental issues in running your dairy farm?

⇒ Do you believe your cattle and land management standards meet the expectations of the local community?

⇒ What are your most important sources of information on environmental issues relating to regulations, funding and assistance for on farm environmental management issues?

⇒ What actions should Bonlac Foods take to assist suppliers with environmental issues?

Finally, farmers were asked to fill in a self-assessment form, which asked them to rank their performance in the six environmental areas surveyed. This function was to trial the design and question selection in a self-assessment pro-forma that creates awareness and motivates continual improvement.

Results - Discussion:

The individual results of farms surveyed in the West (42) and the North (42) and the East (30) are tabulated in the Appendix. Averages and range for each region and for the State average are given. A summary of these results, together with benchmarks are given here in the text.

Benchmarks : Farm Operation

		W	N	E	Ave
Farm Size (ha)		152	76	123	117
		(90 - 480)	(50 - 600)	(95 - 420)	
Cow No's.		229	202	253	228
		(64 - 350)	(15 - 280)	(38 - 363)	
Production (T)		1106	1159	1279	1182
		(242 - 3023)	(200 - 3486)	(414 - 2600)	
	(L/Cow)	4822	5607	5139	5189
		(2200 - 7372)	(2857 - 10505)	(3237 - 9630)	
Grain	(T)	217	238	234	230
		(45 - 1100)	(0 - 850)	(40 - 670)	
	(T/Cow)	0.93	1.04	0.91	0.96
		(0.05 - 2.67)	(0 - 2.5)	(0.15 - 3.0)	
Fertilizer	(T)	86	38	101	75
			(0 - 114)	(4 - 423)	
	(T/Cow)	0.215	0.215	0.180	0.200
		(0 - 511)	(0 - 0.44)	(0.045 - 0.386)	
Hay/Silage		72	109	126	102
Purchased	(T)	(0 - 500)	(0 - 7466)	(0 - 850)	
	(t/Cow)	0.31	0.54	0.49	0.45
		(0 - 1.47)	(0 - 12.4)	(0 - 2.0)	
Bobby Calves Sold		140	125	125	130
		(24 - 310)	(0 - 300)	(40 - 300)	
Heifers Sold		32	4	1	12
		(0 - 80)	(0 - 70)	(0 - 15)	
Choppers Sold		35	32	41	36
		(0 - 90)	(8 - 116)	(15 - 80)	

1. WATER USE

*** Benchmarks**

*** Water Use/Farm**

	W	N	E	Ave
Dairy (ML/yr)	2.09 (0.18 - 6.6)	2.49 (0.2 - 8.3)	3.11 (0.37 - 11.2)	2.56
Irrigation (ML/yr)	23 (0 - 220)	509 (86 - 900)	86 (0 - 750)	206
Stock (ML/yr)	9.72 (3.9 - 17.8)	8.57 (3.0 - 21.9)	10.76 (3.4 - 20.0)	9.69
Total (ML/yr)	34.8	520.0	99.9	218.2
Dairy (L/d)	5989 (600 - 25000)	7453 (620 - 46600)	9106 (1140 - 34200)	7516
• Platform (L/d)	203	275	400	293
• Pit (L/d)	768	850	1360	992
• Cups (L/d)	318	363	304	328
• Teats (L/d)	31	53	6	30
• Cold Wash (L/d)	357	280	456	364
• Hot Wash (L/d)	451	340	562	451
• Plate Cooler (L/d)	8	80	228	105
• Vat (L/d)	223	170	264	219
• Yard (L/d)	3645	5042	5527	4738
Stock (L/d)	26647 (9000 - 60000)	23507 (5240 - 60000)	29483 (9500 - 55000)	26545

*** Water Use Efficiency**

	W	N	E	Ave
Stock Water (L/Cow/yr)	42711 (36500-60453)	43139 (36500-56095)	42043 (36500-47798)	42651
Dairy Water (L/Cow/yr)	9554 (1338 - 38339)	12179 (1494-48056)	13579 (1700-50384)	11770
Stock & Dairy (L/Cow/yr)	52325	55318	55622	54421
(L/L Milk)	9.7	8.08	8.58	8.78
Irrigation (ML/Cow)	0.112 (0 - 1.1)	2.63 (1.40 - 4.61)	0.31 (0 - 1.46)	1.01
Total Water Used (L/Cow)	164,325	2,665,318	365,622	1,064,421
(L/L Milk)	34	475	71	205
Rain (ML/Cow)	5.94 (2 - 17)	1.76 (1 - 5)	4.62 (1 - 17)	4.11
Total Water Available (ML/Cow)	6.05 (2 - 15)	4.39 (2 - 8)	4.93 (2 - 17)	5.12
(L/L milk)	1426 (403 - 5963)	836 (297 - 1998)	1003 (385 - 3025)	1088

Dairy Water Use

An analysis of dairy water use shows significant differences between the regions with the West using considerably less than the other regions. It was expected the North would use more because of the availability of low cost water. The low figure in the West is not explained by the drought as the Gippsland figure was highest. It is likely a reflection of rotary dairies, but not herd size, which is similar in the West and East.

% Rotary Dairies in Survey	
W	17%
N	12%
E	24%

Water Use	Rotary	H/Bone
Cows	366	190
Hot	2.34	1.7
Cold	1.91	1.6
Platform/Clusters	10.1	-
Yard/Pit	26	18.8
Total (L/Cow/Day)	47	27

Our data shows that more water is used per cow in rotary dairies, particularly for platform and cup sprays during milking. This wasn't always the case as one supplier in the West with a rotary dairy, and purchasing water in the drought, only used 7 ½ litres/cow/day.

67% of farms do not recycle any dairy water for re-use. More farms in the East and West had floodwash systems (recycling dairy yard wash water) than the North (again reflecting availability of cheap water).

If 50% of dairy machine wash water was saved (hot/cold rinse following detergent wash) and all yard wash water was recycled, the total saved would be close to 70%, not insignificant.

Of course, the cost of setting up a floodwash includes a tank and pump, installation and power running costs. Again not insignificant, but the benefits in time saved are huge.

Water Quality:

More problems are experienced in Winter in the North and West. In Summer 24% farms in East have problems compared with only 3% in the other regions.

Water Sources:

Only 22% of water sources (channels/creeks/rivers) were not fenced and only 4% say there is a risk of environmental damage. (I interpret this to land rather than water). 15% admitted some environmental damage in East and West. Only 8% in North (and this is probably more structural damage to channel banks than to the environment).

Cow Troughs:

82% of farms have 100% troughs, i.e. the only access to water is in troughs. The percentage is higher in the East whereas in the West 15% of farms only had 50% or less of the farm with troughs. The East had more. In the North 8% of farms were not all troughed.

Irrigation:

Some 54% of all farms have some form of irrigation (25% West, 28% East, 100% North). Of those that irrigate, 30% have 100% of farm linked to a re-use system.

15% have 75% re-use system
10% have 50% re-use system
40% have no re-use system

Of those that irrigate,

8% can apply re-use over 100% of the farm
20% can apply re-use over 75% of the farm
22% can apply re-use over 40% of the farm
40% have no re-use system

- The impacts of re-use dams in the North on environmental issues are large and also have significant benefit to farm productivity.

- In the North, farmers said 20% of irrigation water runs off the farm into off farm drainage systems, which eventually end up in the river. Some 2% said their run-off goes directly into a stream/river and 3% said run-off goes onto neighbour's farms. Only 20% of farms in the North do not have a re-use system, i.e. 80% have a closed system.

- Good irrigators do not require a re-use system because there is no run-off. Re-use systems eliminate the risks of irrigators that are not so attentive.

- Re-use systems, however, will catch a Summer rain and potentially save water. For example, 50 mm rain is equivalent to 38 ML on the average farm. Some farms have the capacity to catch this and recycle. So 38/509ML = 7%. Therefore, two summer rains could save 14% irrigation water, which is not insignificant.

- Most irrigations could lose 10% of irrigation water as run-off. Average farm uses 509 ML so 50ML could be caught. If we add this to the Summer rain, which could be caught, this now equals 20% of irrigation water.

- Water in the North costs about $20/ML. So, 20% of 509 ML = 100 ML @ $20 = $2000. Farmers could afford to spend $2000 on a re-cycle dam for payback in 12 months.

- Farmers in East and West should also consider a re-use dam. Cattle spend at least 20% of time in laneways and at dairies and drainage from these areas contains farm effluent, equivalent to 3 T superphosphate. If farm size is 140 ha, and laneways and drains and dairies collect 10% of the rainfall (880mm), this equals 123 ML. (14ha x 0.88) and even 10% of this represents 12.3 ML (not insignificant). Collection of this water would certainly reduce the impacts of P leaving the farm, and provide irrigation for Summer crops.

- At present farmers in the East and West build dams across gullies to contain stock water. This practice, which has been subsidised, is now under threat from the CMA's because of its restriction on stream flow.

- However, the concept of catching water from laneways and farm drains, which contains effluent, is a new concept. Re-use of drainage water should be encouraged and this infrastructure could be subsidised.

2. EFFLUENT MANAGEMENT

*** Benchmarks**

		W	N	E	Ave
*Eff Dam Capacity (ML)		1.93 (0 - 19.2)	0.88 (0 - 4.8)	2.78 (0 - 12.8)	1.86
	(m^3/Cow)	9.28 (0 - 109)	4.48 (0 - 33)	10.88 (0 - 16.0)	8.21
LOAD					
Dairy	(L/Cow)	9554	12179	13579	11770
Rain	(L/Cow)	15074	2573	6223	8142
TOTAL LOAD (ML)		5.64 (0.18 - 83)	2.98 (0.36 - 15)	5.01 (0.55 - 18)	4.54
RATIO					
Dairy Load/Capacity		0.85	2.17	0.99	1.10
Total Load/Capacity		2.6	3.4	1.80	2.45
% Farm Effluent Applied		4 (0 - 50)	21 (0 - 100)	11 (0 - 25)	12
Ha. Farm Effluent Applied		7 (0 - 50)	18 (0 - 95)	13 (0 - 44)	13

- Pond Capacity in the North is considerably less than the East and West because of less rainfall in Winter and they are more frequently emptied and used with irrigation. So, the low load/capacity ratio in the North is not important if the effluent is used regularly with irrigation and captured in a re-0use dam, minimizing the risk of run-off.

- In the East and West, dairy load approximates pond capacity and, with rainfall, the ratio of load to capacity is 2 : 1. So, even if evaporation is close to rainfall, the ponds need emptying annually, preferably before Winter when rainfall is high and evaporation is low. The high load/capacity ratio does present a risk of overflow and run-off leaving the farm if the pond is not emptied onto a crop in Summer.

- 90% of farms have 90% collection off sheds and yards at dairies into the point source. All regions are similar.

Method of Storage:

46% have 2 ponds, 32% 1 pond, 9% tank/sump and pump directly into paddocks, 13% have no storage. This figure is significantly higher in the West where 20% of farms have no system, as opposed to 5% in the North and 8% in the East.

- 51% of farmers said their storage was insufficient for Winter (confirmed by benchmarks).

- Surprisingly, storm water diversions were more common in the North than the East and West (5% North, 8% East and 15% North).

- Emptying
  - 20% Effluent ponds never emptied, just stored
  - 20% Ponds are cleared every year
  - 20% Ponds are cleared every second year
  - 6% clean after every milking (tank/sump)
  - 30% regularly shandy effluent with irrigation water (mainly in North)

- Distribution % of Farm: Only 2% can place effluent over 100% of the farm, 6% regularly put effluent on 50% of the farm (highest in the North), 20% place over 20% of the farm, 12% put effluent over less than 10% of the farm and 30% over 5% of the farm. 30% of farms never place effluent (equates with farms with no storage). The overall average is 12% of the farm and the average area is 12 hectares.

- Spread over same Area: 35% of farms regularly place effluent on the same paddocks. Hence, on 65% of farms using effluent, the nutrients are distributed, minimising risk of loss and environmental impact.

- Timing of Application: Most is applied in Summer but 16% is applied in Winter, mainly by those with tanks/sumps.

- Method of Application: 30% use sprinklers, 12% siphon, 12% use manure carts daily and 30% apply it with flood irrigation.

- Collection of Run-Off Effluent Applied to Pasture: In East and West 92% do not collect run-off, whereas in the North 70% of farms collect all run-off of effluent.

- What is the potential for Effluent to leave the farm? 40% claimed effluent could leave the farm in a flood. 16% claimed effluent could leave via laneways on bridges/fords, and 5% claimed constant overflow of effluent systems. 3% claimed leakage could occur into ground water and 14% claimed off farm losses from drains, 1% from feed pads and 4% from a once in 10 year flood.

- What % off effluent could leave the farm? 40% of farmers claimed no effluent left the farm, 42% said less than 5% left the farm, and 18% claimed less than 10% could leave the farm. The overall average was that 2% of effluent collected at dairies left the farm.

  Now the annual average effluent load per farm contains 2940 Kg P. If we assume cows are standing 18 hours/day (when they defecate) and 4 hours is spent in laneways and at the dairy, then 4/18 x 2940 Kg P is deposited outside the paddocks. If 50% of this is deposited in the yards, this amounts to 327 Kg P (equivalent to 3.7 T superphosphate) and 2% of this is 6.5 Kg P, which arguably is insignificant.

- However, 327 Kg P is deposited in laneways and this has the potential to leave the farm. It also has the potential to be easily collected as most of laneway dung is deposited proximate to the dairy. In 14% of farms this dung from laneways is collected into re-use dams and 13% of farms collect it into effluent ponds. However, this shows 73% is not contained and could leave the farm, especially after heavy rain. This means that 327 x 0.73 = 238 Kg P (equivalent to 2.7T superphosphate) could leave via laneways, which is considerably more than the 6.5 Kg P leaving the ponds. Even 25% of this P is a significant threat.

- This indicates that the point source of collection, especially the last 100 metres of laneway, requires attention and is possibly a more important focus than effluent pond problems. This laneway problem is apparently larger with larger herds where cow movement is more restricted. Obviously, other collection points should also be included, such as feed pads, calf sheds, silage stack, etc.

- Farmers in the North East, West and East should be storing “effluent water” in dams from the farm drainage system for re-use in irrigation. The Government would be wise to consider support or subsidies for their construction. The end effect would be more co-operation from farmers and the Government would be seen supporting farmers to reduce environmental impacts. It would help the Government’s current quest to release some of the need for water that is currently diverted onto farms and away from stream flow. This would neutralize the farmers and both parties would benefit.

- On reflection there appears to be no recommendation for a best practice management system. Whether it is 2 ponds, 1 pond or a pit, they all can be effective and different systems suit different farms. Generally we found the ponds were too small which leads to a risk of overflow and run-off. The best farms emptied the ponds, using them on a Summer crop. Some farms are now treating them as a water resource to catch as much water (with effluent) as possible, to use it for irrigation. These farms ensure no effluent leaves the farm, the water and nutrients are used on crops and pastures to raise productivity.

3. SOILS & PASTURE MANAGEMENT

*** Benchmarks**

	W	N	E	Ave
% Farm soils need improvement	12 (0 - 50)	6 (0 - 30)	6 (0 - 30)	8
% Farm pasture renovated annually	14 (0 - 50)	16 (3 - 50)	16 (1 - 50)	15
% Farm renovated due to pugging	4 (0 - 30)	5 (0 - 50)	3 (0 - 10)	4
% Farm affected Salinity	2 (0 - 25)	1 (0 - 10)	3 (0 - 50)	2
Ha affected Salinity	3 (0 - 40)	1 (0 - 14)	5 (0 - 111)	3

- Fertilizer Use: 81% of farmers use soil tests to decide on the type and level of fertilizer. 30% also use pasture responses in deciding on fertilizer.

- Chemical Residues: 14% of farmers know of a chemical residue in soil (35% in the West, 8% in the North and zero in the East) and 84% of farmers claim any chemical residues are unknown to them.

- Biological Health Assessment: 88% of farms rate soil health on the basis of pasture response, 13% on earthworm population and 20% use organic matter content as an index. An average of 8% of soils are considered in poor biological condition (West 12%, North 6%, East 6%), and 38% of farms claim none of their soils are poor. Farmers did not understand the differences between chemical, biological and structural differences in soils. Generally they assessed soil health based on pasture growth and quality.

- Land Slips/Erosion: 21% of farms in East and West had some erosion/slips. In the North 97% had none, as expected. Of those affected, 12% have fenced off the areas, 84% have revegetated with pasture/trees and 4% have done nothing.

- Compaction Damage: 17% of farmers claimed they didn't understand what compaction was. In the West less people were more definite about compaction problems.

- % Pasture Renovated Annually: 15% of farms are sown/over sown annually, 3% cover over 50% of pastures, and 18% renovate less than 5%.

- Wet Soil Management: On wet days, 26% use sacrifice paddock, 18% use pads, 45% graze the driest paddock available and 14% do nothing. Only 8% increase stock density and 26% decrease stock density.

  Some 45% of farms across the State have some form of feed pad and 12% of these pads are linked to effluent systems. 80% of farmers claim there is no risk of contamination of streams from feed pads. This is surprising as in Winter, when they are used, the drains are usually full and off-farm run-off would seem to be potentially high.

- Process to Reduce Waterlogging: Effective surface drains are used on 54% of farms. In the North 88% of farms use spinner cuts. In the West, 13% do nothing.

- Renovation due to Pugging: On average, 40% of paddocks are renovated annually due to pugging and 24% farmers claim no renovation of pugging is required because their farms don't pug.

- % Farms Affected by Salinity: 66% of farmers claimed they had no salinity problems, whereas 26% claimed 2% salinity and 8% farms had more than 5%. Of those affected, 99% said the problem was stable or improving. 30% said they managed it by laser grading, 34% planted trees and 12% used salt tolerant pasture species (20% in East), and surprisingly 22% used ground water pumping (mainly in the North).

4. NUTRIENT BALANCE

*** Benchmarks**

		W	N	E	Ave
Farm Size (ha)		152	76	123	117
Cows		229	202	253	228
Production	(L/Cow)	4634	5154	4773	4853
Grain	(T/Cow)	0.95	1.04	0.91	0.96
Fertilizer	(T/Cow)	0.215	0.215	0.180	0.200
Hay Silage Bought	(T/Cow)	0.31	0.54	0.49	0.45
Calves Sold		140	125	125	130
Heifers Sold		32	4	1	12
Choppers Sold		35	32	41	36
Fertilizer Loss (Super equivalent)	(T/Farm)	1.38	1.53	1.2	1.37
Effluent Loss (Super equivalent)	(T/Farm)	1.0	0.9	1.0	0.95

*** Nutrient Inputs**

		W	N	E	Ave
Fertilizer	(Kg P/Farm)	4547	4024	4045	4205
	(Kg P/Cow)	19.4 (1 - 45)	18.97 (0 - 39)	16.19 (2 - 29)	18.19
	(Kg/P/ha)	32 (1 - 83)	56 (0 - 160)	35 (11 - 100)	41
Grain & Hay	(Kg P/Farm)	759	923	967	883
	(Kg P/Cow)	3.38 (0.66 - 9.67)	4.48 (0.38 - 10)	3.50 (0 - 10)	3.79
	(Kg P/ha)	6 (1 - 14)	13 (1 - 34)	9 (1 - 34)	9
Total	(Kg P/Farm)	5306	4947	5012	5088
	(Kg P/Cow)	22.78 (2 - 47)	23.45 (2 - 47)	19.69 (9 - 36)	21.97

*** Nutrient Outputs**

		W	N	E	Ave
Calves Sold	(Kg P/Farm)	28	25	25	26
Heifers Sold	(Kg P/Farm)	65	8	2	25
Choppers Sold	(Kg P/Farm)	141	129	165	145
Milk Sold	(Kg P/Farm)	1106	1159	1279	1182
Hay/Silage Sold	(Kg P/Farm)	30	0	0	10
Fertilizer Loss	(Kg P/Farm)	122	135	105	121
Effluent Loss	(Kg P/Farm)	87	78	87	84
Total	(Kg P/Farm)	1579	1533	1664	1592
	(Kg P/Cow)	6.81 (3 - 10)	7.49 (4 - 14)	6.70 (4 - 11)	7.0
INPUT/OUTPUT RATIO		3.42 (0.29 - 7.83)	3.14 (0.38 - 6.14)	2.99 1.69 - 5.91)	3.19

Fertilizer Use: The average fertilizer use per farm was 47T (West 51%, North 45%, East 36%). 5% of farms do not use fertilizer. 47% of farmers do a soil test annually to decide on fertilizer use. 29% test every second year and 22% occasionally. Only 1% never soil test. More farmers regularly soil test in the East.

- pH: The average pH was 5.5 based on soil test results (5.5 West, 5.8 North, 5.3 East). In the North, 15% did not know, compared with 3% in the West and zero in the East. An average of 64% thought their pH was adequate (63% West, 80% North, 52% East).

- Olsen P; The State average was 24 with small regional differences (West 24, North 22, East 27). Only 2% farmers said their level was less than 15. 15% were between 15 - 20, 50% of farms had Olsen P levels of 20 - 30 and 17% claimed levels above 30. 70% of farmers claimed their P levels were adequate.

- Fertilizer Practices to Minimize Run-Off: 8% do nothing and 18% have a buffer zone, 59% take care not to go near streams/drains. An average of 37% claim fertilizer is only applied after rain or irrigation and 19% claim they minimize run-off during irrigation because of re-use dams (50% claim this in the North).

- What % Fertilizer leaves Farm? This was only an estimate. 31% of farms claimed none (53 West, 20 North, 20 East) and 15% didn't know. 38% claimed less than 5% and only 3% claimed 10% left the farm.

- Nutrient Loss in Fertilizer: Farmers were asked to give an estimate of potential losses off the farm. The State average was 1.37 T super equivalent per farm (West 1.38, North 1.53, East 1.2). Their decisions were based on whether they used practices to minimize losses. 38% couldn't provide an estimate.

- Nutrient Loss in Effluent: Estimates by dairy farmers of potential losses off farm from effluent ponds are 0.95 T super equivalent (West 1.0, North 0.9, East 1.0). Again their decisions were based on their own management of effluent and their assessed risk of loss. 40% claimed none, 42% less than 5% and 18% less than 10%. The inference is that on 60% of farms there is potential for some to leave, such as in very wet periods when ponds could overflow. This figure does not account for potential losses off laneways and out of paddocks during heavy rain. 30% of farmers use sprinklers and 16% keep spraying all year round, including Winter, but no farmers that sprayed every day claimed any losses.

- Use of Grain: 98% of farmers use grain (100% West and East and 92% in North). State average is 230 T/farm (216 West, 238 North, 234 East). A value of 2.5% P was used to calculate P input.

- Purchase of Hay/Silage: Across the State purchase was 102T/farm (West 72, North 109, East 126). No fodder was purchased on 32% of farms (West 40, North 22, East 36). A value of 3% was used to calculate P input.

- Bobby Calves Sold: State average was 130 Sold (West 140, North 125, East 125). A P value of 0.2 was assigned per calf.

- Heifers Sold: State average was 12/farm (West 32, North 4, East 1). In the West the number was elevated because of Veal production. P value used was 2 per animal.

- Choppers: State average was 36 sold/farm (West 35, North 32, East 41), which represents 16% of herd state (West 15, North 16, East 15). P value of choppers was estimated at 4 per animal.

- The object of the nutrient balance was to establish the levels of inputs and outputs of key nutrients on dairy farms to provide some insight into the potential sustainability and to get a measure of range that is occurring on farms.

- We have examined the P balance, but the data does also include N. K. S. Fertilizer levels used which also could be analysed for balance.

- An examination of the data shows that the State average for P input/output ratio is 3.2 : 1. However, this ratio ranges from (0.29 - 7.8 West, 0.38 - 6.74 North, and 1.69 - 5.91 East).

  The major influence on this ratio is fertilizer use. The lowest ratio 0.29 was associated with the application of 5 Kg P/Cow as fertilizer (4970 L/Cow - 1.26 grain/Cow) whereas the highest ratio of 7.8 was associated with fertilizer applied 45Kg P/Cow, (and yet production was 3580 L/Cow with 0.64 T grain/cow).

  This data shows a huge disparity in fertilizer use (viz : x 9) and yet production per cow was less, and remarkably, these farms are in the same area or similar soil types. The range across the State of fertilizer use was 0 - 45 Kg P per cow. This coincides with P applications of 41 Kg/ha, State Average, (West 32, North 56, East 35), and ranges across the State of 0 - 160 Kg P/ha (West 1-83, North 0-169, East 11-100).

- Obviously the higher the use of P, the higher the risk of nutrient loss for a given management.

- However, our data shows that nutrient balance is not related to farm size, herd size, area or production level.

  We suspect that information disseminated through extension sources in the State has encouraged farmers to use fertilizer to lift soil P levels so that pasture production may improve. In fact, this information has been taken literally and “indiscriminate use” has not necessarily led to more pasture or more milk.

- We need much more information about the levels of balance required for sustainability or impact and how this balance affects the production of pasture and milk. It may require major revision of recommendations by "Consultants" and more judicious use and, of course, better management.

- In Europe there is a requirement in dairying to have an annual nutrient audit completed and maintained at 1 : 1 balance for P. As shown, our State figure exceeds this by a large margin.

  Similarly, in New Zealand, the counties have established prohibitive levels of N fertilizer use, and levels in excess of 150 Kg N/ha are maximum applications permitted.

- Having established a nutrient balance for dairying, it is appropriate also to look at other industries that are integrated into dairying areas. For instance, at Kooweerup, rates of fertilizer of up to 2 T/ha are applied to potato crops and soil Olsen P levels are at 170 ppm. The level of P in potatoes is 2%, which means a 45 T crop/ha uses 90 Kg P and yet, 180 Kg applied for ratio of 2 : 1. The ratio is in the same range as dairying but the higher use of fertilizer and the extremely high residual levels in soil must heighten the risk of P loss off farm.

- The assumption we have made is that high soil P levels are an increased risk to P losses. There is a mounting level of data to support this but more research is required to flesh out the "real reasons" behind P leaving farms. It seems that this is urgent because P level to sustain a farm may/may not sustain productivity and viability.

- If a neutral balance does not impact on the farmer's livelihood, then without doubt their management would change, particularly in this case as they would use less (because it would cost less).

*** Potential P Loss**

	State Ave.	W	N	E
Per Farm	205	209	213	193
Per Cow	0.87	.82	1.01	0.79
Per ha	2.1	1.3	3.16	1.87

The high losses in the North are associated with higher inputs of P from fertilizer and grain, both per cow and per ha, because stocking densities are higher. In addition, farmers tended to rate potential loss off farms higher because of the increased risk associated with their management where they use fertilizer more frequently and it is associated with irrigation.

5. LAND MANAGEMENT

*** Benchmarks**

	W	N	E	Ave
Weedicides Used				
L/Farm	83 (3 - 340)	70 (0 - 210)	61 (2 - 180)	72
L/Cow	0.46 (0.04 - 3.0)	0.37 (0 - 1.4)	0.3 (0 - 0.7)	0.36
Landcare Member (%)	65	22	47	45
Area Treed % Farm	4.7 (1 - 22)	2.5 (1 - 8)	3 (1 - 25)	3
Area Protected (ha)	6 (1 - 33)	2 (0 - 7)	4.9 (0 - 56)	4
Future Increase (ha)	7 (1 - 42)	2 (0 - 7)	6 (0 - 70)	5

- Weed Control: Only 2% of farmers do not use chemicals. In the North, 83% of chemicals used are for the control of channel weeds. By comparison, in the East and West, a broader range of chemicals are used.

  The average farmer used 72 litres per farm and the range was 2 - 340 litres. On a per cow basis, the average was 0.36 L/Cow (West 0.46, North 0.37, East 0.3).

- Land Care Groups: 45% of farmers were in a land care group (West 65, North 22, East 43). For some reason, less farmers in the North were involved in Land Care, but a much higher percentage had formal whole farm plans.

- % Property Fenced for Land Protection: The State average was 3.5% and the projected intention is to increase this to 6.3% by doubling the area planted in trees. The corresponding figures for the regions are West 4.7, North 2.5 and East 3.5% now and the intended areas will be West 9.2, North 5.2 and East 4.6. Hence, the expected increase will be much higher in the West.

6. FARM DEVELOPMENT

- Whole Farm Plan: The frequency of farmers with whole farm plans were recorded as West 50%, North 72%, East 64%. In the East and West these tended to be informal plans that were made to assist farm management, whereas, in the North, the whole farm plan was utilized to develop farm layout with the emphasis on efficient water use for irrigation and improved pasture growth. In the West, 48% of farmers did not consider any environmental issue in developing their whole farm plan, whereas in the North this figure was only 20%. More recent whole farm plans now consider environmental issues more than they did in the past.

- Disposal of Dead Animals: 95% of farms have dead cows collected and taken off farm, and only 5% of farms use on farm pits for disposal.

  Across the State, no farmers burn animals. Knackery trucks are confined to internal tracks only on 80% of farms. In the West, 25% allow the knackery truck into the paddock, North 10% and East 32%.

- Disposal of Solid Waste: Dairy wastes, syringes, gloves, filters, etc., are disposed of by Council bins on 75% of farms. 18% burn wastes, and 17% put into a farm tip. 10% of farmers claim there may be contamination of ground water from these tips.

- Chemical Containers: 71% of farmers triple rinse the containers and return them to the retailer, 8% use farm tip and 21% use council bin.

- Fuel Storages: 96% of farms do not have any fuel storages that could potentially leak into streams.

*** Benchmarks**

	W	N	E	Ave
Whole Farm Plan (%)	50	72	64	62
Dead Animals Collected (%)	98	98	88	98
Solid Waste Disposal Council Bin (%)	73	90	68	75
Chemical Containers Returned (%)	65	92	48	71
Fuel Storages on Streams (%)	5	3	0	4

FARMER ATTITUDES TOWARDS ENVIRONMENTAL ISSUES:

1. Farmers think these are the most important issues:

State	Ranking %	West	North	East
Effluent Mgmt.	29	Effluent Mgmt.	Effluent Mgmt.	Effluent Mgmt.
Nutrient Run Off	18	Nutrient Run Off	Nutrient Run Off	Soil & Pasture
Water Avail.	16	Trees	Salinity	Water Avail.
Trees	13	Soil & Pasture	Water Avail.	Nutrient Balance
Soil & Pasture	11	Chemical Use	Nutrient Balance	Weeds
Salinity	8	Water Avail.	Weeds	Farm Aesthetics
Chemical Use	4	Flora & Fauna	Farm Aesthetics	Wet Soils

We believe that farmers sensed that effluent management was most important because of its visual nature and perception. Clearly in the North and West, effluent management and nutrient run-off was most important, whereas in the East, effluent management, soils & pastures and water availability were the most important.

2. FARMERS' IMPRESSIONS OF THE COMMUNITIES' CONCERNS OF HIS FARM

State	Ranking %	West	North	East
Effluent Mgmt.	23	Effluent Mgmt.	Effluent Mgmt.	Effluent Mgmt.
Odours	15	Trees	Nutrient runoff	Cattle crossings
Nutrient Run-off	14	Chemical Use	Odours	Animal Welfare
Cattle crossings	13	Odours	Flora & Fauna	Odours
Trees	9	Nutrient runoff	Salinity	Flora & Fauna
Flora & Fauna	7	Flora & Fauna	Chemical Use	Trees
Chemical Use	6	Cattle crossings	Protection Env.	Farm Aesthetics

Farmers were much more definite about their own choice of the important environmental issues on their farm than the view of the communities' perceptions. They felt the community had a much broader range of concerns. However, in every respect, effluent management still ranked as the most important issue and farmers have a genuine concern that the community views their effluent management as the most important issue (whether it is or not).

Generally, across the three regions, there was a balance of all the other issues.

3. HOW DO FARMERS THINK THEIR FARM AND CATTLE MANAGEMENT MEETS THE EXPECTATION OF THE COMMUNITY?

State	West	North	East
92%	92%	92%	80%

In the East, farmers had concerns about their own effluent management and a proportion of farms were genuinely concerned that the community would not accept their current practices, even though only 8% did not have a formal pond or effluent system.

This compares with 20% in the West that didn't have an effluent system and yet this 20% still felt they would have absolutely minimum impact on the environment.

One farmer in the West drained his dairy effluent around a plantation which was developed with this in view, and there was no potential leakage as it followed the contour around the hill.

On the other hand, in the East, all the farmers had ponds but many were too small, poorly located and not emptied, which increases the risk of over flow in the Winter.

In the North, the CMA have a strong focus on environmental concerns within the Murray system and give support and guidance to farmers. In addition, there are several areas in the Goulburn Valley where the farmers can get direct subsidies for building effluent ponds and re-use dams. In the other regions, the same assistance is not available.

If containment of nutrients is to improve, and storages and location of point sources could attract assistance and subsidies/tax relief/rate relief, this would result in similar uptakes as the North.

4. IMPORTANT SOURCES OF INFORMATION ON ENVIRONMENTAL ISSUES

Newspapers and Periodicals were the most favoured. This was followed by the other four sources, DNRE articles and personnel, CMA Publications and discussion groups.

5. BONLAC'S ROLE IN ENVIRONMENTAL ISSUES

Bonlac should maintain the farmers' focus on the relatively important issues. They should highlight the concerns of farmers on relative issues to Government bodies and bring forward the issues and challenges farmers face, e.g. finance assistance to overcome environmental issues.

Farmers also felt a premium payment to suppliers who embrace quality assurance and environmental management, is a positive step to progress best management practice.

SELF ASSESSMENT

*Ave Score	77%	W 77.6%	N 77.46%	E 76.37%
Water Management	75.9	79 (47-100)	76 (53-100)	73 (33-100)
Effluent Management	74.46	76 (36-100)	75 (28-100)	72 (24-100)
Soils & Pastures	76.37	76 (44-100)	78 (44-100)	76 (32-100)
Nutrient Balance	78.27	80 (47-100)	77 (46-100)	82 (53-100)
Land Management	78.42	80 (50-100)	76 (40-100)	79 (40-100)
Farm Development & Protection	79.91	81 (57-100)	83 (54-100)	76 (40 - 100)

Generally people were more critical in effluent management, followed by water use.

Some people felt they were doing a good job and scored themselves accordingly, but others marked themselves down, even though they were doing a reasonable job.

This is probably a fault of the self assessment as they did not have clear benchmarks to gauge themselves.

This criticism will be overcome when the benchmarks are included. This will allow them to more accurately rank themselves against the average and also allow them to continually rank themselves against a benchmark and that will provide some measurement of improvement.