

# Positioning Geography: Strategic Issues in Geographic Education

## Hamilton – 19 – 22 January 2010

### Sustainable Dairying Field trip

#### Outline of the day

- 8.20am Meet in Gate 1 Carpark
- 8.30 Discussion and coffee at Momento  
 What do we currently do on our farm visits?  
 How might that change when focus shifts to sustainability?  
 Do any use the LEARNZ virtual fieltrips?  
<http://dairyfarming93.learnz.org.nz/index.php?.vft=dairyfarming93&user=dairy>  
 If time, visit northern Hamilton: expansion of urban area on what had been prime dairy farm land (an issue of sustainability?)
- 9.45 Leave for Dairy NZ: Scott Farm
- 10.00 Dairy NZ section of field day  
 Meet Mike Scarsbrook and Dave Clarke (Principal sustainability scientist)  
 Current initiatives  
 The national picture  
 Aspects covered: Water  
 Effluent  
 Nutrient losses  
 Climate/Greenhouse gases  
 Resources made available
- 12.30 (approx) Leave Dairy NZ. Head to Hamilton East (or ?) for lunch.
- 2.00 Arrive at Shaw's Jersey Stud farm, Paterangi
- 3.30-4.00 Leave Shaws.  
 Exact time will depend on if people want to see cows being milked  
 Any time remaining we can do a detour route back to Hamilton to see the Te Awamutu dairyfactory and pass many dairy farms to see the importance of dairying in the Waikato.
- 5.00 (At the latest) – Arrive back at the University.

#### Links to Thursday afternoon session

Sustainability in farming with particular reference to dairying and the planned Achievement Standard 1.3, 2011.

Notice the Standard appears not to necessarily require the content to be on farming or mining. It could be any aspect of the sustainable use of resources, such as sustainable urbanisation.

## What do people currently do for farm field trips?

## In future, could a farm study be reinvented to become research?

## Scott Farm – Dairy NZ

The notes below are from a talk Mike Scarsbrook gave in June. These will provide a framework for you, but you will no doubt want to make additional notes as well.

## NZ Dairying and Issues of Sustainability

Mike Scarsbrook, Dairy NZ, Fieldays 2009 (13 June 2009)

- Dairy NZ**
- Funded by dairy farmer levies based on milk solids supplied
  - Funds research on environmental issues, land systems and reducing environmental footprints
  - Is an indication of how seriously the industry considers these issues

A key focus is the **Farm Enviro Walk**

- A walk to specifically identify environmental issues
- To raise awareness of them. 7000 kits supplied to dairy farmers
- Supported by a DVD on compliance (regulatory) issues
- Strategy that is goal-focussed out to 2020
- Integrated in to the farm management system, rather than just focussed on increasing production
- The environmental awareness translates in to pure environmental, operational and financial considerations
  - o Eg. fertiliser runoff into waterways: N applied to increase production but if it runs into waterways, it pollutes the water, does not increase grass growth and is wasted. Advice to farmers is to not put the fertiliser on in winter when it is more likely to not be used by plants (grass) and be washed into waterways in runoff or in underground water.
  - o Has been found ground water 'lag' can be 40-50 years, so have to manage fertiliser runoff carefully. Wasted fertiliser is also wasted dollars.

### **Clean Streams Accord**

A mostly voluntary agreement with only a few binding requirements

- Fence out waterways so animals cannot enter them
- Effluent compliance (binding)
- Manage effluent input and output in an effluent budget
- Identify sediment contaminants
- Monitor nitrogen and phosphorus (key nutrient) losses
- Monitor losses of soil and faecal material
- Water quantity available for dairying as against for other uses
- Efficiency of the use of water, ie is it wasted?
- Impact of climatic/weather fluctuations on water quantity and quality
- Greenhouse gas mitigation (in NZ about ½ GHG are from animals)
- Canterbury and Hawkes Bay, in particular, have water quantity problems

### **Greenhouse Gases**

- Biggest offenders are nitrous oxide (NO<sub>2</sub>) and methane
- Methane a byproduct of the digestion of grass. Currently nothing can be done about that.
- NO<sub>2</sub> produced by the breakdown of urine in the soil
- Ruakura research has found it can be controlled by the use of ‘inhibitors’ spread with fertiliser to slow the conversion of fertiliser into offending nitrates and regulate the conversion so that it is more available to plants.
- Now realised there needs to be a maximum level of N fertiliser application per hectare, which combines shedwaste spread on paddocks and chemical fertiliser in a nutrient budget.

Environment Waikato (Regional Council) had subsidies available for fencing waterways and planting riverbanks but they have now gone.

Regional Councils monitor effluent disposal for compliance (so can take offenders to court)

- EW (Environment Waikato) visually audits 10% of dairyfarmers a year
- If a farmer is fined, Fonterra will also impose a monetary penalty

### **Fonterra**

Also very active in environmental issues

Has found a carbon footprint of about 940g C to produce 1 litre milk

- Most of this C is produced on the farm
- Lesser amounts in the factory, and a very small amount on transport to market, even if it is the European market

BUT less C is produced in NZ for the litre of milk than if that milk was produced in Europe.

European producers produce 1/3 more C per litre of milk.

For NZ to meet its Kyoto Protocol Targets, it has to focus on the ruminant animals

‘Best Practice’ farms have been established on some of the farms that had serious environmental problems to show other farmers how they can be overcome.

### **Lunch** – we have some choices. I suggest Hamilton East

As soon as we have finished we will head out to Shaws Farm, passing on the way typical Waikato Dairy country. At the moment, while not in drought conditions are dry and so the landscape is not its usual typical lushness. The soil is in moisture deficit and farmers are currently worried about the situation, wanting rain urgently.

## Shaw's Farm

The tasks below are what I used for my class visit last year.

### 11 Geography – Shaw Dairy Farm Case Study

To prepare an up to date farm study you need information on the following. You will need to answer them on your own refill. You will not need to ask all these questions. Listen to what Mr Shaw tells you, and observe carefully.

1. This is a family farm. How long has the family been farming in Paterangi?
2. What does it mean that this is a Jersey stud farm? Why do they wish to be a stud farm?
3. Even though this is a stud farm, Shaws use AB/AI. Why? Do they keep a bull or bulls?
4. How big is the farm? It has not always been this size. Why did they enlarge it?
5. How many cows do they milk?
6. What style and size is the milking shed?
7. What supplementary crops are grown on the farm, and/or brought-in?
8. Which factory does their milk mostly go to? Would they consider supplying a company other than Fonterra?
9. Draw an approximate sketch of the farm, showing the central race, milking shed, barns and sheds, adjacent roads, the under-road tunnel. Include the land on both sides of the road.
10. What are the natural inputs: relief of the land, soil type, sunshine hours, average rainfall, temperature (eg January and July mean temperatures) and frost information, water supply?
11. What are the cultural inputs, especially transport/machinery, fencing, labour, knowledge, skills and experience, fertiliser, sprays/pesticides, grasses, animals?
12. What happens to calves born on the property?
13. What are their outputs, positive and negative.

Present your answers for Q10 – 13 as a **Systems Diagram**, correctly set out.

14. Which town, city or area do most of their purchased farm skills and services come from? What do these include?
15. Draw a **Seasonal Calendar** that shows events and activities particular to the Shaw farm that were not included in your textbook version.
16. What things is the farm doing now, or considering doing, to make less impact on the environment?
17. Include any other information you are given that you consider useful or interesting. You may also have other questions that you would like to ask Mr Shaw.

## Exemplar of notes made during the Field Trip Visit

### 11 Geography Dairy Farm Visit Shaws' Jersey Stud

1. 1910 – Grandfather first came to farm here (West Farm) and bought East Farm 1911. The West farm was later sold and the family farm was the one on the East side of the road. The West farm was bought back in the 1990s. Ray is the 3<sup>rd</sup> generation Shaw farming here, and extended family also close by.
2. Farm is now 77ha and was enlarged in order to be economic.  
Milked 240 Jersey cows last season, will milk 270 this season.
3. A stud farm provides good animals that are worth more. Their ancestry is traced through their blood lines. Semen from the best bulls available through LIC for AB. Semen may be from NZ or overseas. Best semen used to fertilise the best cows ('best to best') to improve the herd and improve production.
4. Currently has 15 Jersey bulls, 11 small ones ready for the bull sales, and 4 bigger ones used to mate cows that don't get in calf by AB. Empty cows sent to works. That is the main reason for culling. Average cow age in NZ is 5 years. These cows are often older, but a full range of ages.
5. Has 110 heifers off grazing. The bulls will mate them in Oct/Nov for them to go into herd or be sold.
6. Shed now fairly old, built 1970s. A 26a-side Herringbone shed.  
A concrete feed/wintering pad is alongside the shed.
7. Supplementary feed includes 2ha maize silage that was bought in plus 3ha they grew. Also 350 tonnes palm kernel from Malaysia / Philippines / Indonesia. Also make own hay and silage.  
Grows chicory to feed as a green crop.
8. Supply Fonterra, mostly to Te Rapa or Te Awamutu, so mostly for milk powders or casein.  
Wouldn't consider supplying anyone else. It's personal preference, plus Fonterra have the marketing expertise.
9. Calves: Heifers either kept to rear, or sold and go into other farmers' herds.  
Bull calves sold because they are of good blood lines  
Very few ever end up being collected as bobby calves.
10. Rolling relief, with soils developed from Maeroa Ash from Pirongia, and Ohaupo silt loam.  
Rainfall averages 1100 – 1200mm pa. Only a few frosts a year. January mean temperature about 18°C and July 7°C. 1800-2000 hrs sunshine a year.
11. Operates a 2-pond effluent system. Shed waste drains into first pond that is deep, for solids to settle. Liquids drain off into shallow second pond where ammonia gas released into air. Waste from ponds used as fertiliser on the farm
12. Artificial fertiliser also used: superphosphate and potash. This year also put on 70 tonne lime to lift pH and make nutrients available to the grasses.
13. Grass primarily a ryegrass/clover mix, but also has 30% fescue to better withstand the summer dries.
14. Cows are a prime asset (apart from the land) and must be looked after. Girls saw a mob of 135 heifers, they would be worth about \$1¼ million. One cow worth about \$10 000. Is the top 2-yr old producer in NZ.
15. Has planted lots of trees and fenced out the drains to reduce environmental impact. No waste enters waterways.
16. NZ has about 6 500 dairy farmers. Number of farmers generally going down, but size of farms and herds increasing.
17. When buys in goods and services, tries to buy local in Te Awamutu. Dairy farming underpins the whole Waikato economy.
18. Fences are post and wire. Electric fences used to provide the breaks.
19. Water supply is from 3 deep bores, and pumped out. Does not use irrigation.
20. The Meadows Farms operate with the owner (semi-retired) and his son as the sharemilker who mostly does the milking. Part-time worker employed during calving.

The family has a 3<sup>rd</sup> farm, a few kms away, run by another son who has a Massey degree in Ag Science. It is 100ha and milking 340 cows.

21. Main inputs are the land, animals, fuel, chemicals (for shed, sprays drenches and medicines, fertilisers), transport (2 quad bikes, 2 tractors, ute) and machinery (shed, feed out wagon, baler), bought-in feed.

22. Main output is milk, but also live animals for sale, and animals sold at works.

23. See separate farm layout on sketch map.

## Achievement Standard 1.3 DRAFT

<b>Subject Reference</b>	Geography 1.3		
<b>Title</b>	Demonstrate a geographic understanding of sustainable resource use		
<b>Level</b>	1	<b>Credits</b>	3
		<b>Assessment</b>	Internal
<b>Subfield</b>	Social Science Studies		
<b>Domain</b>	Geography		
<b>Status</b>		<b>Status date</b>	
<b>Planned review date</b>		<b>Date version published</b>	

This achievement standard involves demonstrating a geographic understanding of the sustainable use of resources.

### Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> <li>Demonstrate a geographic understanding of sustainable resource use.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate a detailed geographic understanding of sustainable resource use.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate a comprehensive geographic understanding of sustainable resource use.</li> </ul>

### Explanatory Notes

- This achievement standard is derived from the second Level 6 Geography achievement objectives and the values of *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007, and is related to material in the *Geography Teaching and Learning Guidelines*, Ministry of Education (<http://secondary.tki.org.nz/>).
- Definitions:
  - A *geographic understanding* in this standard refers to an understanding of how people interact with natural and cultural environments when they use resources, and the consequences.
  - Resource use* refers obtaining resources (natural or cultural) and using them to make a product.
  - Sustainable resource use* refers to obtaining and using resources in such a way as to minimise environmental, social and economic harm, and ensuring future generations have access to the resources as well.

- 3 *Demonstrate a geographic understanding* would typically involve:
- describing how resources are obtained and used to make a named product
  - describing the consequences for people and places
  - evaluating the sustainability of the resource use
  - making a personal response to the sustainability issue.

*Demonstrate a detailed geographic understanding* would typically involve:

- describing how resources are obtained and used to make a named product
- explaining the consequences for people and places
- evaluating the sustainability of the resource use and supporting the evaluation with specific evidence
- identifying beliefs and/or values on which the personal response is based.

*Demonstrate a comprehensive geographic understanding* would typically involve:

- describing how resources are obtained and used to make a named product
- explaining the consequences for people and places
- fully evaluating the sustainability of the resource use and supporting the evaluation with specific evidence
- discussing the values and/or beliefs on which the personal response is based.

- 4 Relevant geographic ideas and skills are outlined in the *Geography Teaching and Learning Guidelines* (<http://secondary.tki.org.nz/>).

## Quality Assurance

- 1 Providers and Industry Training Organisations must be accredited by the Qualifications Authority before they can register credits from assessment against achievement standards.
- 2 Accredited providers and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

## Achievement Standard 1.5 DRAFT

<b>Subject Reference</b>	Geography 1.5				
<b>Title</b>	Conduct geographic research, with direction, and relate research findings to a geographic idea				
<b>Level</b>	1	<b>Credits</b>	4	<b>Assessment</b>	Internal
<b>Subfield</b>	Social Science Studies				
<b>Domain</b>	Geography				
<b>Status</b>	<b>Status date</b>				
<b>Planned review date</b>	<b>Date version published</b>				

This achievement standard involves conducting geographic research, with direction, and relating research findings to a geographic idea.

### Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> <li>• Conduct geographic research, with direction.</li> <li>• Relate research findings to a geographic idea.</li> </ul>	<ul style="list-style-type: none"> <li>• Conduct effective geographic research, with direction.</li> <li>• Relate in detail research findings to a geographic idea.</li> </ul>	<ul style="list-style-type: none"> <li>• Conduct excellent geographic research, with direction.</li> <li>• Comprehensively relate research findings to a geographic idea.</li> </ul>

### Explanatory Notes

- 1 This achievement standard is derived from the first and second Level 6 Geography achievements objectives and the key competencies of *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007, and is related to material in the *Geography Teaching and Learning Guidelines*, Ministry of Education (<http://secondary.tki.org.nz/>).
- 2 Definitions:
  - *Research* refers to a process involving:
    - identifying the aim
    - collecting and recording data
    - presenting the data
    - reaching a conclusion related to the aim
    - evaluating the research.
  - *Geographic research* in this standard refers to an inquiry into aspects of a natural or cultural environment, and/or the interaction of people with that environment.
  - *With direction* refers to the degree of guidance provided for students.
  - *Research findings* refers to the conclusions reached.

- *Geographic ideas* in this standard refers to concepts that relate to the how people and places interact.

3 *Conduct geographic research* would typically involve:

- collecting data relevant to the aim of the research
- processing the data
- presenting the data using an appropriate method
- stating a valid conclusion relating to the aim of the research
- completing a simple evaluation of the research.

*Conduct effective geographic research* would typically involve:

- collecting sufficient relevant data to address the aim of the research
- accurately processing the data
- presenting the data effectively by following the conventions of an appropriate method
- supporting a valid conclusion with specific but limited evidence
- completing a well developed evaluation of the research.

*Conduct excellent geographic research* would typically involve:

- collecting sufficient relevant data to address the aim of the research
- accurately processing the data
- presenting the data effectively by following the conventions of an appropriate method
- supporting a valid conclusion with specific, detailed evidence
- completing a well developed evaluation of the research that also discusses the validity of the research findings.

4 Evaluating the research involves making judgements about the strengths and weaknesses of the research, and how this affects the validity of the research findings.

5 *Relate research findings* would typically involve:

- making a link between the research findings and a relevant geographic idea.

*Relate in detail research findings* would typically involve:

- explaining how the research findings relate to a relevant geographic idea, using specific detail.

*Comprehensively relate research findings* would typically involve:

- explaining how well the research findings relate to a relevant geographic idea, using specific detail.

6 The aim of the research should relate to a natural or cultural environment, and/or how people interact with that environment.

7 The research must involve the collection of primary data from the field using an appropriate method such as observing, measuring, précis sketching, photographing, surveying, interviewing. Data from other sources may be referred to as well.

8 Assessment tasks should include the procedural steps related to collecting, processing

and presenting the primary data.

- 9 Both achievement criteria should be met in the context of a single research investigation.
  - 10 Relevant geographic ideas and research skills and are outlined in the *Geography Teaching and Learning Guidelines* (<http://secondary.tki.org.nz/>).
- 

### **Quality Assurance**

- 1 Providers and Industry Training Organisations must be accredited by the Qualifications Authority before they can register credits from assessment against achievement standards.
- 2 Accredited providers and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Accreditation and Moderation Action Plan (AMAP) reference

0226