

Susan Higgins

# **From the Sandpit to the Paddock**

Growing our future farmers

Kellogg Rural Leaders Programme 2012

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# From the Sandpit to the Paddock

## - Growing our Future Farmers

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### **Executive Summary:**

Today's Farmer is a professional businessperson operating in a culture of complexity. The business focus requires many skills in the endeavour of converting energy into food. The challenges of managing production costs, developing the business, weather and bio-security risk, fluctuating commodity and financial markets, and environmental management are many.

The average age of farmers is increasing so the need to develop future farmers is great. The importance of science to our future economic wellbeing cannot be underestimated however we are currently not producing enough science graduates for their replacement. We need to encourage students into science based courses through increasing understanding of the interdependency between urban and rural dwellers. The New Zealand farming sector has been built through innovative science practices and this will become increasingly important going into the future.

The New Zealand Curriculum is an inquiry based document which offers opportunities to connect learners across all year levels and subjects with primary based industries. I believe that developing agri-educational resources that also refreshes teacher professional development will enhance science literacy in general. This can be achieved through collaboration between an Agri-Food Board representing industry good organisations and the Ministry of Education.

In a world increasingly concerned with food security, New Zealand is well placed to build upon the current base of agricultural knowledge that is renowned for growing sustainable, high quality, safe food that is free of subsidies. Industries must find ways to bring through a new generation of agribusiness leaders who will be our future farmers. These people will be the change agents driving science and technological innovations that will create economic prosperity for our nation into the future.

## **Introduction:**

As part of my participation in phase two of the 2012 Kellogg Rural Leaders Programme I have undertaken to complete a project entitled 'From the sandpit to the paddock – growing our future farmers.'

The idea for this topic grew from thinking about present and future issues facing the rural community: realising that decisions affecting our political, economic, environmental, social and technological development are made based on the level of understanding by the people involved in the issues affecting the sector.

The rural and primary sectors of New Zealand are continuously exposed to issues affecting their ability to generate income, some within their control which might include increasing production through improved livestock genetics and management. Others are macro concerns beyond individual control such as bio-security incursions, imposed governmental regulations and the international monetary exchange rate which is especially significant for exporters. Increasing environmental concerns and expectations by industry outsiders and urban dwellers will demand more vigilance and innovation. This will add to the wide knowledge and skill sets primary producers must have in order to survive and run thriving businesses.

I believe we need to encourage greater recognition of the interdependency between rural and urban communities in the economic development and future of our nation. Therefore to truly understand we must have leadership by people well versed in all facets of the issues facing our primary producers to make the best informed decisions. The common denominator underpinning this will be science.

Professor Suzanne Gatt, a teacher trainer and science educator of the University of Malta suggests that, "Science education has to fulfil the need to have scientifically literate citizens. This citizenship of science enables people to understand the environmental, social, ethical and moral implications of scientific activity; and be capable of understanding scientific issues and make independent and informed judgements on scientific developments to know how to exercise their rights and take action as active citizens."

When I considered how to address our nation's present and future rural issues I realised there is a common thread of misunderstanding or lack of understanding by many New Zealanders who have no direct involvement with the issues or opportunities concerned. This has the potential to create unnecessary constraints through ill informed decisions. It is this science literacy that allows people to distinguish between evidence and misinformation of issues along with fostering an environment of innovation and creativity which will be needed to address local, national and global issues.

### ***The Challenge:***

The agribusiness sector of New Zealand is part of our national identity. It has underpinned our nation's prosperity and there is no doubt that in 2012 agribusiness is still fundamental to New Zealand's economic well being and this is likely to continue. The Ministry of Primary Industries reports that in March 2012 seventy percent of New Zealand's merchandise exports were from primary industries.

The future challenge of the importance of food and its security offers significant potential for New Zealand's agribusiness future. To realise this will require leaders and entrepreneurs with a vision for New Zealand who recognise the career opportunities within the sector. The Agri-Food strategy report, 'A Call to Arms,' sets out transformational strategies tasked with trebling the real value of agri-food exports to \$58 billion by 2025 (Riddett, 2012). This will require collaboration and leadership between both industry leaders and government.

According to Rural Women New Zealand 13% of New Zealanders are classed as living in rural areas with only 7% of the population deriving their whole income from primary industries. In days gone by most families had some connection to farming through family and friends however this is no longer common.

I believe the disconnection between town and country is a barrier to understanding the role of the food producing sector of New Zealand. In days gone by most people were exposed to farm life through family connections with these experiences attracting many students towards agriculture. These links however have become tenuous. I believe this has contributed towards the decline in attracting students into primary based careers.

The urban community is vital to the primary sector because it holds the majority of voters and therefore has significant political influence as well as holding the majority domestic demand for consumer goods. How then do we engage urban families with the primary sector who may have very limited or indeed no exposure to country life or country based role models? How can we interest urban educated students to take agricultural courses? How do we develop these students and encourage them as potential rural professionals contributing in all aspects of future food production science, processing and marketing?

The KPMG Agribusiness Agenda of 2011 highlighted the need to attract talent to the primary sector to replace older people retiring from the industry. This is of significance given the importance of agribusiness to New Zealand and should be given equal priority to other career options in the education system (Proudfoot, 2011). As the only developed country that relies on the primary sector to underpin our economic wellbeing, we not only have to be as good as the rest of the world – we have to be better (Proudfoot, 2012).

In true New Zealand fashion farmers in general have undersold the complexity of their job. It has many variables that affect profitability and the development of the business. At the same

time farmers must focus on risk management in all areas of resource usage, financial, environmental and social issues. This truly is a professional career.

I believe the key to understanding the importance of the agricultural sector in New Zealand can only be achieved by educating people and inspiring curiosity for improving the future. I believe this should be addressed at every level beginning with early childhood education.

Only through increasing their knowledge will more students understand 'what agriculture is all about'. The challenge ahead lies in preparing our future agribusiness leaders by encouraging our best and brightest students to choose science and agriculture based pathways as their preferred career choice and have them recognise this is an area where they can contribute and 'make a difference'.

### **Findings:**

The average age of the New Zealand farmer is 58 according to Bruce Wills, president of Federated Farmers and there is a lack of young farmers entering the industry. With the growth occurring in urban New Zealand this raises the question of who will buy and work farms into the future as farm ownership patterns are also changing. Farms are tending to increase in size and these farms are likely to be run by a corporation

The demand for agriculture based graduates outstrips supply. Immigration New Zealand's immediate term skill shortage list of 5 December 2011 included the agriculture related occupations of apiarist, arborist, beef cattle farmer, dairy cattle farmer, poultry farmer, fruit or nut grower, logging plant operator, market gardener, mixed crop farmer, pig farmer and winemaker and yet New Zealand is a primary producing nation (Immigration New Zealand, 2011).

Jacqueline Rowarth, an agricultural scientist who is Professor of Agribusiness at Waikato Management School recently stated that of the twenty thousand students in tertiary education this year, 2012, only one hundred will graduate from agricultural based studies. There will be four hundred and ten sports graduates. She believes that for too long we have encouraged our children to undertake options that make them 'feel good' instead of encouraging them into areas where they can make a difference. An increased uptake of science at secondary level would give students more options.

Professor Rowarth says that, "Global Statistics are about the need for people who understand science, technology, engineering, maths and agriculture for employment. It is vital that people understand more of what the world needs and wants which is more food. Information about what the world needs is health, nutrition, food production and sustainability. Globally there are rewarding careers and high employment to be found in these areas but New Zealand has been blinkered in its approach to what world needs."

The May 2012 report, 'Science in the New Zealand Curriculum Years 5-8' by the Education Review Office raised concerns about the overall quality of science teaching and learning in schools. "We are not giving our children the best opportunity to build on their excitement about discovering the world around them," said Dr Graham Stoop, Chief Review Officer for the Education Review Office. "We need to improve the way we teach science to our young children to help them succeed in an economy increasingly based on knowledge and innovation."

My particular area of interest is the challenge of how to increase the profile of agribusiness, to make it 'cool' so that students see this area as a desirable career to aspire to. I wish to investigate whether greater exposure to 'things rural' including the whole food production chain, will make science more relevant for primary aged children. In so doing it is hoped this will encourage greater adoption of science subjects by students at secondary level thus allowing wider career potential and increasing the pipeline of students entering the sector.

In the future primary producers will need to continuously seek ways to produce more food from diminishing resources. This will require enthusiasm and innovation across the whole production sector to create a better environment for the consumer and a healthy economy for the nation. The importance of science to this sector cannot be underestimated and will continue to be significant for New Zealand's future productivity and prosperity. Farming in the future will be recognised as the income generator of the nation.

### ***Science Education in New Zealand:***

Various research groups have published extensive reports to encourage debate on the purpose of science in education, engagement with students, how it is delivered in schools and how it might be progressed in the twenty first century to meet the needs of both the young people today and New Zealand society in general (Bull et al, 2010). This shows that the level of science education taught in schools has been of concern for many and will continue to be considered. The Prime Minister's Chief Science Advisor, Professor Sir Peter Gluckman is charged with promoting public understanding of science by explaining, with a focus on young people, the scientific method and its opportunities and limitations (Gluckman, 2011).

My research consisted of interviewing current educational professionals to gauge their perspective on present teaching practices within their particular organisation and to investigate whether linkages between science and primary industries exist.

These educationalists are from kindergarten, primary, intermediate and secondary schools within my local area in the Tasman district of Nelson. Each of the teachers questioned has contributed in some way to the educational journey of either one or all three of my children.

The schools involved draw on both urban and rural students representing all socio-economic groups. Many families of the rural students are involved in forestry, farming, horticulture, viticulture and pip-fruit on small rural holdings. The Nelson Economic Development Agency

measured the contribution by primary industries at February 2011 as \$128m or one third of the entire Nelson and Tasman regional earnings.

**(a) Early Childhood Education:**

Early Childhood Education is guided by the Ministry of Education's Te Whariki curriculum framework four broad principles of: *Empowerment* – children will be empowered to learn and grow. *Holistic development* – Children learn and grow in a holistic way. Their intellectual, social, cultural, physical, emotional and spiritual learning is interwoven across all their experiences. *Family and community* – A child's family and community are recognised as part of the learning experience. *Relationships* – Children learn through positive relationships with people, places and things.

These principles of early childhood education are interwoven with the learning areas of wellbeing, contribution, belonging, communication and exploration (Ministry of Education).

Working within the Te Whariki curriculum guidelines the focus for my selected early childhood teaching centre is to give children experiences and challenges within a safe and fun environment so that self esteem and the confidence to 'give things a go' are nurtured.

There are five female teachers from varied life skill backgrounds and interests. Teachers contribute 'outside the gate' experiences to the children's world. This involves sharing stories, bringing in visitors and taking the children on excursions i.e. a picnic at the beach, visiting a farm, visiting a zoo, grandparent day. The structured and non-structured programme helps to extend the interests of children in learning opportunities for physical, social and brain development. At this early childhood education level an emphasis on participation as a team and learning life skills such as perseverance and negotiation are encouraged. Technology is used to share learning experiences in small group participation. This encourages children to be curious and discussion to increase learning and understanding takes place.

The Kindergarten keeps guinea pigs and there is a roster for weekend care of them to enable children to learn the importance of sharing and having responsibility for the caring of animals. The local council dog control officer has compiled a DVD explaining how to care for dogs and visits the Kindergarten to demonstrate this. The teacher I interviewed is also a farmer. The children have the opportunity to visit and share a country experience at her farm. This enables later discussions, activities and creativity for children on farming and food producing topics.

**(b) Primary Education:**

The current New Zealand School Curriculum covering year one to year thirteen education was implemented by the Ministry of Education in 2007. This is a 'Teaching as Inquiry' based document which identifies five key competencies for learning in every area. These are Thinking, Using language, Symbols and Texts, Managing self, Relating to others.

The curriculum places learners at the centre of the learning process emphasising the importance of literacy and numeracy and of a broad education across a range of learning areas (Maharey, 2007).

The teacher I interviewed teaches in a school consisting of nine classrooms and approximately 295 students. He teaches at level three of the curriculum which covers years five and six. There is one other male teacher and a male principal.

He is originally from a farming background, runs a small lifestyle holding and shears sheep for local people who run small mobs of sheep. He is the only teacher from the school with a background interest in farming. This school runs a 'Pets Day' each year but he reflected that another local school within a rural community no longer does.

He is well known within the parent community for his contribution to extending children's knowledge and practical applications of 'what farming means to the kiwi way of life'. I spoke with some of his past and present male students, who speak highly of the way he engages with the students in a practical way. He takes groups of children to his lifestyle block and demonstrates shearing sheep and has taken groups to the nearby stock sale yards to observe an auction and the buying and selling of animals.

This visit translates to lessons on how farmers earn their income from animals. Creating exposure to such opportunities can be aligned to learning objectives within the social sciences strand of the curriculum. This area integrates concepts that cover Identity, Culture and Organisation, Place and Environment, Community and Change and The Economic World. Learning at this level establishes a foundation for separate social science disciplines offered at secondary school (Ministry of Education).

It is interesting to note that within the primary school I visited, a pristine resource circa 1980 from The New Zealand Wool Board had recently been found. It included various wool samples from different sheep breeds and a booklet on how wool is grown through to producing an end product. It is likely that this resource had never been utilised. This would most likely be due to not having a teacher at the time with a particular interest in relating to sheep and the production of wool.

The teacher explained that there are few books and resources explaining country and farming life. He felt boys especially would benefit from having more country stories to relate to, especially given the school belongs in a semi-rural community.

### **(c) Intermediate Education:**

I interviewed a principal of a semi-rural intermediate school with a roll of 620 students. The school seeks to promote the intent of the New Zealand Curriculum of empowering all students to learn and achieve personal excellence regardless of their individual circumstances (Ministry of Education). The school fosters a programme that encourages connections between learning areas and everyday life and experiences (Waimea Intermediate School).

While the context may be engagement within the community the aim is to encourage children to 'think bigger' by building global conceptual understanding. Learning is about information retrieval and repacking it to increase understanding of the whole concept. As an example studying a rainforest becomes a lesson in sustainable environmental issues.

With the ever increasing availability of knowledge through the internet it is not enough to know about a topic but learning is centred on understanding and applying the concepts. Children should be challenged to ask further questions, so what? what now?

During past years teachers from the school have successfully undertaken opportunities for professional development at higher levels through The Royal Society of New Zealand, Primary Teacher Fellowships. The fellowships support the development of leadership in science skills to enhance the quality of school-wide science teaching in school. Once completed support is provided for up to twelve months to embed the new learning into school-wide programmes (Royal Society). This has proved to be an effective way of refreshing the teachers and widening the delivery of science within the school by introducing new global conceptual thinking within programmes.

**(d) Secondary Education:**

The school is a co-educational one with approximately one thousand five hundred students. Over the past four years, 2009-2012, there has been an average of seventy five students across year nine to year thirteen studying the course of agriculture and horticulture. The school had no record of the students carrying onto tertiary education in that field however I do personally know that in 2006 my son was the only student to continue on to Lincoln University. There were no students from the school going straight to Lincoln either in the previous or following year.

The agriculture and horticulture course is taught as an applied science with topics taught both inside and outside of the classroom. Students are able to take part in the 'Get Ahead Experience Days' run by New Zealand Young Farmers together with DairyNZ and Beef + Lamb NZ. This is promoted as a fun day where students are able to experience practical farming applications and learn more about a career in agriculture. Agribusiness experts are available to demonstrate and explain farming practices and equipment.

Since the introduction of NCEA it has been noticeable that the physical education and outdoor education departments have experienced major growth in the number of students choosing those subjects. This growth reduces academic achievement especially when much of the programme is based outside of the school i.e. river rafting and rock climbing. For students choosing to study both agriculture and outdoor education timetabling can interfere with the seasonal nature of some primary based topics.

Many secondary students have become credit oriented instead of pathway oriented when making subject choices e.g.

Level Two Agriculture and Horticulture requires 8 internal and 12 external achievement standards credits.

Level Two Outdoor Education requires 18 internal achievement and unit standards credits.

Level Two Physical Education and Health requires 17 internal achievement and unit standard credits.

The Horticulture and Agriculture Teachers Association (HATA) is dedicated to promoting the New Zealand secondary school subjects Horticulture and Agriculture nationally. This is an important network as at this school the department consists of one teacher and there can be a sense of isolation on a day to day basis. There does not appear to be crossover between the science and agriculture-horticulture departments.

### ***Going Forward:***

There are many opportunities and help available for students to progress in agricultural based careers once there is interest and a choice is made to explore options further. Young Farmers offer advice through PICA, Pathway in Agriculture. They run the Get Ahead career programme for schools and follow this with In2 the Field Mentor programme. There are many scholarships offered by both Lincoln and Massey Universities as well as those offered by industry good organisations Dairy NZ, and Beef + Lamb. Fonterra, Ravensdown, Ballance Agri Nutrients and others. These organisations seek to attract well-rounded people as well as the 'best and brightest' students.

The New Zealand Industry Training Organisation (NZITO) offers courses and qualifications for training and developing staff working in primary industries.

### **Conclusions:**

The challenge as I see it is to engage young people earlier by arousing their interest in the rural sector through improving the quality of information provided in schools.

The New Zealand Curriculum offers wide scope and freedom in its delivery. Minister of Education, Hekia Parata was quoted in The Nelson Mail of Saturday August 25th 2012 saying, "Principals and teachers needed to take advantage of the permissiveness of the curriculum to design a programme that is suited to their students." I believe there are many areas where the freedom within the curriculum could be utilised to allow integration between science delivery using the drivers of the national economy as contextual thinking. This would grow the science citizenship leading to increased global conceptual thinking of students.

The report released by the Education Review Office in May 2012 was concluded by observations from one hundred schools of science teaching for Years 5 to 8 classes. The report presented the findings from a team of reviewers who evaluated the quality and effectiveness of the science teaching. They observed lessons, analysed documents, and met with senior

managers, trustees, teachers and students, and assessed each school's approach to science education based on the set of good practice indicators.

The Education Review Office found some common findings amongst the twenty seven schools with generally highly effective science programmes. These included that support was provided for staff in science teaching through ongoing professional learning and development opportunities. Other successful findings linked science-specific lessons directly related to an identified science concept and incorporating flexible and responsive programmes clearly connected to students' interests and daily lives (ERO, 2012)

### ***Where to from here?***

My personal belief is that by capturing the curiosity of children at a younger age to enable them to have some understanding of 'how science fits into their world' they might be more inclined to continue learning science at secondary school. I think this could happen through improved linkages between primary industries and schools. I believe there is scope within The New Zealand Curriculum's focus on 21<sup>st</sup> Century learning which allows the freedom of teaching about the whole realm of agribusiness using local context to discover the global concepts.

Of the twenty thousand degree graduates New Zealand produces every year only eighty are in agriculture (Rowarth, 2012). Our wealth as a nation is still created by the significant exports from our agriculture and primary production sector. Future staff shortages will prevent productivity and constrain export growth.

The recent amalgamation of industry based independent training organisations combining meat, dairy and seafood industries to the new NZITO shows a recognition in Government of the need to get behind agriculture (Sutton, 2012). In September 2012, Dr Ian Ferguson was appointed to the Ministry for Primary Industries as Departmental Science Adviser. He is charged with ensuring science is adding benefit to the challenges and opportunities facing New Zealand's primary industries. This is another indicator that the importance of science to the primary sector has been recognised. This leadership could benefit an industry wide collaboration to address current education concerns.

It is time for industries within the sector to take leadership roles in facilitating a proactive promotion of career opportunities available in conjunction with the Ministry of Education. There is a need for collaboration within the primary sector to deliver a compelling message about the career opportunities the sector can create for ambitious people (Proudfoot, 2012). We must inspire talented people to contribute to making New Zealand 'a great place to live'. To do this we will need to attract more urban students to take agriculture courses, foster entrepreneurship and show students how they can make a difference.

"The late Sir Paul Callaghan championed the idea that science could make New Zealand a better place. He believed that science was not only about great ideas, but about getting value

from those ideas through innovation and commercialisation.” Education is the key to building capacity and innovative thinking in the fields of science and technology as well as ensuring the wider agriculture sector remains competitive (Catto, 2012). What better place to start than with Agribusiness New Zealand?

The nationwide rollout of ultra-fast broadband (UFB) will enable greater digital literacy and this offers many opportunities for easier collaboration between schools, businesses and industries. Resources and real time experiences can be shared.

### ***Industry Support:***

Teachers are under increasing demands upon their time outside of curriculum delivery. Many tasks that were once the domain of parents are now part of the daily responsibility of the classroom teacher e.g. checking the contents of student’s lunchboxes for healthy food. Most teachers have a social science background so helping them to gain more confidence in teaching science can only be beneficial to all.

While there are many existing resources from Primary Industries currently available to schools, most of these rely on the teacher to uptake the resource themselves in conjunction with a topic they might be studying. I believe that to increase the influence of agribusiness education into schools these need to be presented as a complete resource along with accompanying professional development to ‘refresh the teachers’. In order to create the desire for students to enjoy learning science and its applications we need to improve the quality of science teaching so that it is relevant for students.

Genesis Energy currently offer a free school programme, Schoolgen, which introduces children to solar energy. There is a whole range of teacher resources linked to the New Zealand Curriculum and this is supported by an environmental educator who helps teachers and students at primary, intermediate and secondary school level about renewable energy and energy efficiency.

Other industries could link into their communities in similar ways i.e. farms adopting their local school so that children can experience farm days. Learning about seasonal challenges through weather may help children to understand climate change and seasonal rotation in the effort needed to grow food. Fonterra’s free milk into schools is a good initiative, supporting healthy living and linking town to country in a positive way.

The Young Enterprise Trust is a Not for Profit organisation relying on sponsorship from many organisations. It brings business skills into primary and secondary schools and offers young people an opportunity to marry business ideas with their passion, increasing their financial literacy and the chance to make commercial products. Recently the Reserve Bank in partnership with the Young Enterprise Trust developed a board game in an effort to teach students about risk and reward when making investment decisions (Vaughan, 2012). Dairy NZ is

one of the Trust's sponsors. I believe there could be opportunities here for more involvement with other primary based industries to develop agribusiness skills.

Dr Andrew West, Vice-Chancellor of Lincoln University maintains that there is a lot of competition for careers and that it is the responsibility of industry organisations to get the smartest students. The industries are responsible for promoting worthwhile careers within their industry given that seventy per cent of New Zealand's export merchandise is from the land or sea.

### ***Primary Foods Strategies:***

The most important proposal in the Agri-Food Strategy, "A Call to Arms" is to establish an Agri-Food Board from sector leaders who will collaboratively focus on developing future food research, development and education needs to 2050. The Red Meat Sector Strategy Report of 2011 also called for a coordinated in-market approach and collaboration for efficiencies in production, processing and logistics. The success or otherwise of these proposals will depend upon having effective farming leaders prepared to drive these initiatives. Both reports highlight the need for coordinated long term strategies to maximise sustainable economic growth and this should be delivered from top down leadership.

In his book, "The Coming Famine" Australian science communicator Dr Julian Cribb has written about the combination of an overpopulated world requiring more food which will be produced from a diminishing land base. This will necessitate changes in the way we live, our diet and how we farm. It will require new thinking on how to increase sustainably produced food. Science will be the innovator for the required farming changes. Increased investment in agricultural science and technology now will place New Zealand at the forefront for agricultural knowledge.

### **Recommendations:**

Science literacy and new technologies will be the key change agents in determining the associated value chain of a high value economy that New Zealand seeks to be. Educating a new generation of primary industry leaders is the vital link to making this happen.

1. In conjunction with an Agri-Food Board I believe that primary industry good organisations should work with the Ministry of Education in providing information for creating science specific Agri-Educational resource toolkits into schools. I would expect these resources to be supported by professional development for teachers. New Zealand primary industries are underpinned by innovative science and it is science that has allowed our nation to prosper.
2. Creating Agri-Educational resources that fit within the New Zealand Curriculum will increase the educational knowledge of all students about what drives New Zealand's economy. It will promote greater understanding of the interdependency between urban

and rural dwellers and create real world experiences adding to student's science literacy that can be applied to their life-long learning.

3. The Global Financial Crisis was a catalyst for many schools to teach children about food production by creating school gardens for the children to tend and once grown create meals from. I believe an Agri-Education Board in conjunction with Ministry of Education educators should begin developing educational resources using food to transcend all subjects and year levels. This is a subject that students may find easiest to relate to and further develop global understanding of.

For in the end

We will conserve

Only what we love,

We will love,

Only what we understand,

We will understand,

Only what we are taught

- Baba Dioum

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## Appendix

### Questions:

The following questions were the basis for my discussion with educational professionals.

I would very much value your insights through your role as an educational specialist with the following questions.

1. Can you give me a broad overview of how the science curriculum is applied at the level of education you are involved with?
2. Is there any specific requirement to input agricultural learning into the units?
3. How do we engage children in urban areas who have no exposure to things rural?
4. Do you think that forming alliances and partnerships with other organisations and industry based businesses would re-energise teachers in the delivery of science in the curriculum?
5. Would your area of educational concern be enhanced by developing a cooperative educational strategy linking science and primary based industries for scientific developments leading to enterprising outcomes?
6. Do you think agribusiness models could support teachers to understand how literacy and numeracy teaching can complement science and help children make the connection between the learning?
7. Do you think an integrated, technology driven programme around food producing industries would enable learners to better understand science and the real world? Would this be beneficial to helping the delivery of science?