

Coming to the Table

Sustainable decision-making for future food technologies



A research project to engage government, science, business and community stakeholders in decisions on future food technologies

Report on the ‘End User’ Workshop



“Food, Markets and Society”

Held at Rutherford House, Victoria University of
Wellington
8 December, 2008

May, 2009

Introduction

This is the first report from a 4 year FRST funded research project on sustainable decision-making for future foods.¹

It outlines the proceedings of a workshop held in Wellington in December, 2008 which introduced the project to interested organisations and explored some of the general issues around future food innovation in New Zealand. The workshop was attended by around 45 participants from the science sector, the food sector, government, Maori and community organisations who have been invited to participate in the project. As research 'End Users' they will have a unique opportunity to contribute their expertise to the research process and make use of the findings.

We hope this report will provide a useful overview of the research project, and encourage wider discussion of the issues in End User organisations.

Focus of this research

What is coming up in future food technologies, will they be accepted by consumers and the public, and how can improved understanding of the social and market context make a difference for future technological development?

This project is investigating responses to a range of future food technologies, including but not limited to biotechnology, nanotechnology, and functional foods. Public and consumer preferences are critical to the success of new technologies and products. In the food sector, particularly, social values have a major influence on risk acceptance. It is increasingly important that policy and investment decisions take account of the social and environmental context for innovation.

The aim of the research is to see if early engagement with stakeholders (including users and developers) on technology options and preferences can lead to better informed and more sustainable decisions for research and investment in the food sciences. The process is designed to strengthen relationships between the different stakeholders and help develop socially robust decision-making in this area for New Zealand. The outputs are intended to support decisions in government and industry regarding future research directions, investment in R&D, legislation, and ultimately the products that reach the market.

Background

This research will investigate social, cultural and consumer responses to a range of emerging future food technologies (particularly but not exclusively in intragenics, nanotechnology and functional foods) in the New Zealand and international context, and will demonstrate how this understanding can be used to support sustainable decision-making for technology development.

The project is using dialogue² communication to engage scientists, industry, government and community groups at an early stage to discuss emerging technologies, and to identify the social, ethical, cultural and economic issues for different innovation pathways.

¹ FRST: Foundation for Research, Science and Technology. See SET Contract C02X0801 at <http://www.frst.govt.nz/results/0708round/concept/SET>

² 'Dialogue' is two-way communication. It allows for different points of view to be expressed and involves active listening as well as speaking. One-way communication is designed to present information from one perspective and influence audience perceptions. Dialogue communication is designed to elicit wider sources of information and identify areas of common ground, as a basis for future action.

It is being led by two Crown Research Institutes, Plant and Food Research and Environmental Science and Research. The research team is: Dr Karen Cronin, Prof. Gerald Midgley, Maui Hudson, Annabel Ahuriri-Driscoll and Virginia Baker (ESR); and Dr Nigel Larsen (PFR). There is also an international partnership with Prof. Lynn Frewer (Marketing and Consumer Behaviour Group, University of Wageningen, The Netherlands).

The research will ask if we can predict and avoid social and market aversion to the risks of new technologies through effective and early engagement with stakeholders. It is hoped that a deeper understanding of the issues will lead to better informed and more socially responsive investment decisions by science, industry and government. Dialogue workshops will be used to identify risk acceptance profiles for a range of future food technologies, and will facilitate dialogue between developers and consumers. It will create an 'upstream' engagement process early in the technology innovation life cycle that will then be linked into strategic planning processes in science, government and industry.

The project structure is set out in the appendix. More information can be found on the ESR website at: <http://www.esr.cri.nz/futurefoods>

Aim of the Workshop

The workshop (held in Wellington in December 2008) marked the beginning of the research project "Sustainable Decision-Making for Future Foods", which runs from July 2008-June 2012.³

It was aimed at End Users in science, industry, government and public interest groups with an interest and role in determining the future direction of food technologies in New Zealand.

The workshop brought 45 members of the End User Group together for the first time and provided an opportunity to hear about the project, contribute their perspective on the issues and learn more about how they could benefit from the research findings.

Programme

The workshop began with a welcome from Maui Hudson, Maori Development Manager at Environmental Science and Research (ESR). After an introduction by Dr Karen Cronin of ESR, Dr Nigel Larsen of Plant and Food Research outlined how the research came about and what PFR hoped to achieve by working with social scientists in ESR to identify the issues around future food technologies. Dr Cronin then explained the social science approach being used, how the project will work, and the structure of the project team.

Participants then broke into small groups to discuss key trends in future food technologies, how new technologies might be received, and how public discussion on technology options can be made more effective.

After a shared lunch, there was a plenary discussion and presentations from: Horticulture NZ Vegetable Groups, Organics New Zealand and the Slow Food Movement of Aotearoa NZ. [There was also to have been a presentation from Fonterra, but this was not possible due to illness]. The closing session outlined the next steps in the project and how End Users can be involved.

Details of the discussion are presented in the following sections of this report. The full programme is included in the Appendix.

³ The project has been funded in two phases, with a review at the end of the first 2 years.

Opening presentations

**“Sustainable Decision-Making for Future Foods:
how this research came about.”**

Dr Nigel Larsen

(Science Group Leader, PFR)



The history of scientific endeavour provides many examples of non-acceptance and resistance to new technology. There can sometimes be a mismatch between what scientists feel they should be free to explore, and how their findings might eventually be used.

“Education” and “scientific facts/evidence” aimed at the public are not necessarily a fix. This approach may lead to costly debates. Effective discussion can lead to constructive evolution of the science and an acceptable common ground.

Investment in a technology application that is unacceptable to customers will cost both the investment and future customer streams. Knowing what future food technologies may mean for business will help investment, product development and marketing strategies. Talking with community interests earlier and knowing what aspects of these technologies are acceptable/ unacceptable will help inform decision making.

New Zealand’s food industry is very important to our economy and standard of living. PFR sees itself as being one of the leaders in developing new food science and technology for NZ and also as a gateway for the introduction of new science from across the world. It is important for science organisations and the food industry to understand what will be acceptable/not acceptable and to develop food research strategies and commercialisation pathways accordingly.

PFR decided it was important for our emerging food research programmes to develop consultative and engagement processes to help guide us. But we couldn’t do this on our own, so we joined forces with ESR social scientists Prof Gerald Midgley and Dr. Karen Cronin to develop a research partnership. PFR brings knowledge of the physical sciences and technologies; and ESR contributes knowledge of the social sciences and engagement methodologies.

“Sustainable Decision-making for Future Foods: how the project will work.”

Dr Karen Cronin

(Science Leader, Science Technology and Society Research,
ESR)



Developments in future food science are moving ahead in functional foods, nutraceuticals, nutrigenomics, GM foods and nano food technologies, along with new production trends such as sustainable agriculture and organics. Globally, future food production will be affected by climate change, energy use, and market changes. Trends in society are also influential e.g. an aging population, obesity, personal values about food. Along with our ‘scientific imagination’, the environment, market preferences and government policy will all determine the direction of future food technologies.

Social responses to technologies in general show an increasing expectation for accountability e.g. technologies have to demonstrate social as well as commercial benefits. Scientists are now increasingly aware that society will ‘talk back’ rather than just accept science on trust. However, the public debate on GM food in New Zealand and elsewhere tended to be based more on ‘argument’ than on dialogue. This has now led to a greater emphasis on public engagement in science, and at an early stage when issues and options are open for evaluation. Dialogue represents a move away from a ‘deficit’ model of communication (selling science to the public), and towards an ‘engagement’ model (communicating with the public about science).

This project will scope out trends in the science and identify new food technologies coming on stream. From the social science literature, we will also investigate trends in public and consumer responses to new technologies, both in New Zealand and international markets. Dialogue workshops, to engage scientists, industry and community stakeholders, will consider the potential impacts and issues around different food production technologies and identify future preferences. We will then work with End User organisations to transfer this knowledge into the strategic planning process in key organisations. This will highlight the social and market implications of different technology choices before investment commitments are made.

The ‘dialogue’ approach to engagement is an important trend in strategic management. By adopting inclusive practices and actively involving stakeholders in decision making (including the selection of options) it provides for adaptive organisational behaviour - which is likely to prove more resilient in times of complexity and uncertainty.

End Users will benefit from participation in this future food research project through:

- Involvement in the research process
- Access to latest research/ NZ and international literature
- Contribute views and information
- Involvement with other End Users
- Participation in workshops
- Access to research findings
- Input to future strategy.

Small Group Discussions



The workshop participants worked in small groups to discuss a series of questions around the development of future food technologies. The full responses to each question are recorded in the appendix on p.11. Here is an overview of the points raised.

The key trends in food science and technology were seen to be responding to consumer preferences for health, taste, convenience, cost and safety. At the same time, there are new social concerns about the connection between food and public health, and concerns about modern, high impact agriculture driving science innovations. There are new production methods based on sustainability and new values about the social meaning of food as illustrated by the Slow Food Movement. Participants noted trends in nanotechnology, GM, nutraceuticals, functional foods, nutrigenomics. Strong connections were made to the global context including climate change, food miles, poverty, soil depletion and the gap between rich and poor.

Consumers are asking about packaging, preservatives, naturalness, freshness and nutritional quality. Social changes include the aging population, obesity, health needs and issues of equity. People want to be able to trust food labels and regulation. While there is an emphasis on convenience, there are also new trends such as people growing food at home and expectations from a more culturally diverse community.

Many future food technologies might be seen as controversial including biotechnology, nanotechnology, nutrigenomics and fortified foods. The term 'new technologies' covers a wide range: some applications may be seen as OK and others not. Existing technologies and agricultural production are also controversial e.g. where there are environmental effects. The issues may not emerge until people hear more about it. If science pushes ahead, this may create a public 'push back' later on.

Some of the social and cultural issues include changing the way we think of food and relate to e.g. is it just for nutrition or also for pleasure and sociability? Genomic technologies will affect the way we see ourselves, and may raise issues regarding the control of our genes and the commercial use of information. People are concerned about the effect of food production on environmental sustainability, and about access to food by the less well off. There is a backlash against the idea that 'Technology is the Solution' to health problems, especially when technologies are seen to be imposed without concern for the consequences. Technologies can raise ethical concerns such as animal welfare and the impact on cultural values. New technologies can also trigger concerns about the assessment of risk and trust in food safety regulation. Decision-making on future food technologies may need to deal with both economic and other values raised by the public.

Participants said that in New Zealand we are not particularly good at debating controversial technology issues; we tend to turn public debates into an argument rather than using dialogue. However we may be better off than other, larger countries because there is less of a gap between scientists and the community.

They were critical of the lack of expert and in-depth coverage in the news media, and about the limitations under current law e.g. RMA hearings, to fully resolve issues. Several people pointed to other decision- making models which would support early engagement and recognise different points of view.

When asked about constructive conversation, participants could point to experiences where communication was based on listening, sharing personal values, and looking for common beliefs rather than trying to convince the other person of your position. Features of positive dialogue include asking questions, seeing the issue from multiple points of view and showing respect. Dialogue includes being open to the question: “what’s the consequence of me being wrong?”

Discussing a science issue is one thing, dealing with it is another. If a decision has to be made, there are now many models for engagement including citizen’s juries and collaborative governance, which use facilitated processes. However, dialogue can be difficult in practice if people are deeply entrenched or if there is no room to consider alternatives. It is important to conduct deliberative dialogue early enough to look at different pathways or uses of a technology, before commitments are set in place.

A full summary is provided in the appendix.

Plenary Discussion



After coming back to the plenary room after lunch, participants raised some points with the research team about the project:

The research team is defining 'End Users' of this research as those with an interest in future food technologies and who have an influence on future investment decisions. This is not the same as 'end users' in the whole food chain; it will be important for commercial and consumer end users to be part of the process.

A question was raised about how the project will address strategic national issues about future science investment and other contextual issues – such as changes in patents, and global market conditions? The researchers emphasised that this was the first project of its kind to focus on upstream engagement, looking at future investment options before commitments are made and bringing together government, science and industry decision-makers for dialogue with other stakeholders. The research partnership with University of Wageningen in the Netherlands will ensure that international trends in investments, governance and markets are taken into account.

Clarification was sought on whether the intention is to pick a couple of good examples of future food technologies, or whether the project hopes to latch onto 3 or 4 technologies and look at the impact? The research approach is to scope out a range of future food technologies and identify where they are in the innovation cycle – and therefore how much opportunity exists for upstream or downstream (reactive) engagement. Then key examples will be explored in dialogue workshops to identify the potential issues and risk acceptance. This will be complemented by a review of the New Zealand and international literature on social and consumer preferences around emerging food technologies. It is intended that the outcomes of the dialogue will be fed back into decision making processes in industry, science and government.

End User Presentations

1. Apology – **Anne Abraham** Technical Manager, Sensory and Consumer Science
Fonterra Co-operative Group Limited, Fonterra [unable to attend due to illness]

2. **Jon Tanner**, Chief Executive, Organics New Zealand

Jon talked about the growth of the organics movement, including production in New Zealand and international markets. The domestic market is worth \$240m, and exports \$120m. He was concerned that some future technological developments could undermine the 'Clean Green' brand. Organic food consumers are focused on the integrity of the product. They tend to be healthy, well educated. There is now a new consumer trend identified as LOHA's – lifestyles of health and sustainability. While the LOHA niche market is growing, traditional subsistence organics agriculture feeds the world's rural poor.



3. **Richard Klein**, The Slow Food Movement of Aotearoa New Zealand

Richard explained that Slow Food Movement has grown internationally as a counter to fast food and fast life, especially with concerns around diminishing bio-diversity, an increase in child obesity etc. It is now established in 150 countries.

They focus on the wider meaning of food in its social, historical, and cultural locale. There is an emphasis on quality, taste and health as well as sourcing food in an economically sustainable way from local producers. Increasingly, citizens are re-thinking of their role as food consumers. When you purchase food you are giving money to particular sources in the economic system. Supporting different sources is therefore a political choice. Slow Food aficionados therefore see themselves as "co-producers" rather than consumers. The Slow Food Movement is interested in increasing understanding of the history of foods and improving appreciation of the taste of good food. It works at the grass roots level – e.g. developing school gardens and also works to promote sustainable agriculture, and food production systems that are 'good, clean and fair'. Internationally, the Movement encourages regional food traditions e.g. in Italy – the Terra Madre (Mother Earth) Forum of food producing communities from around the world.



4. **Sonia Whiteman**, Manager Vegetable Research & Innovation
Horticulture New Zealand

Sonia explained that Hort NZ is an industry advocacy group for the vegetable sector. Commercialism is a key driver– "making money for our growers." Understanding the consumer is important to market success – what they want and how they would like to get it. Consumer preferences are changing. They are highly educated, inquisitive and active. They will verify your information against other sources. Hort NZ doesn't sell direct to consumer. Supermarkets have a major role in mediating between industry and the consumer e.g. Tesco, Walmart.

Looking to the future - sustainability, carbon costs, water, biodiversity, cost are all considerations.

Sonia concluded that dialogue with stakeholders on future food technologies is good, but it is also important to preserve the space and flexibility for scientists to explore.



Final discussion: what this research project might achieve

Simon Terry of the Sustainability Council commented that the research project was a welcome development and he was pleased that NGO's are being invited to comment. He noted that the Fonterra rep had not been able to attend today and hoped they would continue to be involved. He asked what the project would achieve. Karen Cronin replied that the research will be linking people together in order to add value: it will to engage a wide range of stakeholders and identify areas of differences and commonality on future food investment. This will build shared information. Simon emphasised that the risks to NZ in global food markets come from social factors and this should not be divorced from economic and environmental factors. We need to bring all this information to the table and look at tradeoffs. Key issues will be food sovereignty and nanotech. We also have to remember the big picture including climate change and our carbon emissions.

Donald Aubrey of Federated Farmers commented that they would find information from the project useful, particularly regional data. They would like to see the outcomes of the project acting to enhance NZ's present position, and not to undersell our wonderful scientists and food producers.

Paul White of the Slow Food Movement said they would not want to see the project become a 'green wash' exercise which obscured the issues around food technologies. They saw a need for more science backing up organics, and more openness about how food is produced e.g. the wine industry talking about additives.

Juliet Gerrard of Canterbury University/Riddett Institute emphasised that there should be more space for scientists to do science. Fears that might develop around one particular application may prevent any research in that area.

Gretta Carney of the Maori Organics movement commented that they were initially reluctant to participate in this project. NZ has a very strong position; we should not mess with our heirloom food plants and we need to uphold the whakapapa of our seeds. She was interested if the project could lead to a deepening of trust, finding a shared vision and pathway forward. It would be a good process if what they say is heard and applied, but otherwise a waste of time.

Sue Muggleston, from Plant and Food, noted that it will be interesting to approach this using a process of dialogue. They hope to get recommendations from the research on how to engage more fruitfully with people in dialogue, and the pitfalls to avoid.

Brenda Cuttress of the Grocery Manufacturers concluded that the issue was a huge challenge and that we had already been hearing polarised views. She hoped for a constructive dialogue on the way forward. Finding a middle way will be important for NZ.

Drawing the discussion to a close, Karen Cronin thanked everyone for their interest and contribution. Participants were asked to:

- a) send in any further names for the contact list, to be End Users for this study; and
- b) send information to the researchers on any key studies relevant to the project.

APPENDIX

Notes from the small group discussions.

Each group worked through the same set of questions. The data from all groups is combined below.

Q.1 From where you sit, what are the key trends in food science and technology emerging on the future horizon?

Importance of consumer insight:

Consumer preferences and motivations for food purchase/choice are driven by:

- Health (energy focus, fitness, e.g. elite athletic performance and recovery through sports nutrition, anti-cancer, the 'worried well', family, anti-aging/cellular renewal, cosmetics)
- Taste (flavour, texture)
- Convenience (market). There are tensions between these dimensions (e.g. health/ convenience).
- Safety (integrity of food chain)
- Cost.

Health concerns resulting in:

- A move away from vitamins?
- Moving from minimal chemical residue and use of unnecessary pesticides to NIL residue and chemical free/organics
- Biological agriculture resulting from desire to improve nutrient density of food, recognition of the value of soil science, carbon driver, and increase in fertiliser prices.

Growth of the Slow Food movement:

- Promotes whole foods, integrity, protection of products and cultures, traceability, relationships and whakapapa, holistic, interconnections.

Food science and public health:

- Food as medicine, shift to curing disease
- Improving foods, making health enhancements e.g Omega 3
- Developing cultivars to provide good nutrition.
- Processed v raw food.
- Childhood conditions (autism, dyspraxia etc) - toxicity and nutrition link. Learning disabilities, increased demand on health systems linked to nutrition and dietary behaviour.
- Production process – different structures in food affecting digestive responses.
- Taste, smell important to the body in preparing for digestion.
- Conflicting messages regarding food – e.g. concerns about mercury/lead in fish resulting in reduction in fish consumption, which has implications for nutrition.

GM technology:

- Transgenics.
- Traits aimed at climate change adaptation.
- NZ Farmers don't want to jump in just yet, but want to be GM ready

Nanotechnology:

- MRST & NZFSA are noting 'nano' as the next big thing, but people don't understand the issues yet.
- There are different branching pathways for future applications (see Nigel Larsen's diagram).
- Some food applications of nano are potentially scary e.g. yoghurt proteins are similar to 'mad cow' proteins.

Nutraceuticals / nutri genomics/ functional foods:

- Commodity price changes may open the door for nanotechnology and nutrigenomics.
- Functional foods, how many things can we extract?
- Personalised food based on human genetics.
- International research to fill different deficiencies in the diet.
- Ethics, how do we deal with it as scientists e.g. prioritise food security vs functional foods?

Agricultural production systems:

- Biocontrol.
- Low residue food production.
- Track and trace technologies.
- Low input and low impact food production.
- Sustainable food production.
- Demand for biofuels will impact food production.
- Organic food science – including growing, processing techs

Global Trends

- Globalisation of science means increasing collaboration.
- Concentration of proprietary rights.
- Affluent markets v producing food for the poor.
- Developed vs. developing world - people can buy specialist food, nutritional benefit, vs food security to feed a growing population (e.g. rice that can survive two week flooding).
- Overpopulation in parts of the world.
- Water – scarce global resource - search for better products with less water
- Biofuels using land results in more intensive farming
- Developing countries – depleting soils - can we sell technologies that are better?
- People care about environmental welfare (if they can afford to), but may be ignorant about other aspects of food production.
- How long terms are these trends? Price dependent or responding to changes in underlying values?
- Future food technology development could be growth/ export led from here or developed in response to global needs and challenges. Should production be led by technology or by the global context?
- Trends in the world e.g. feeding people in Africa, developing products for the new middle class in India and Asia.

The global financial crisis is creating a new economic world order.

Future development depends on your goals e.g. a focus on convenience, storage, taste, health lifestyle etc, mood foods.

2. What are the key **market and societal trends driving the development of future food technologies** – internationally and in NZ?

Market trends:

- Safety is very important.
- People sensitive about food – needs to be safe and cheap also beneficial and nutritious
- International context – food exports from NZ need to deal with culture, safety, protectionism.
- A key driver for innovation is the commercial focus.
- Supermarkets have a huge influence on food markets.
- New trends include localism - 'growing own food', farmers markets.
- Organics sector growing but depends on price. Organics here to stay but will be a niche.
- Greenwashing in claims for consumer benefits of different food products.
- Choice – labelling is important.
- Cost – disparity between small niche market for pure food (organics) vs global need (mass market), taste vs volume.
- 'Made in NZ' is a strong label for overseas markets.
- Dichotomy of little money and more mouths to feed vs choice and ability to buy.
- Eating out cheaper than cooking at home.
- Consumer concerns about food miles.
- Consumers asking about food technologies – packaging / preservatives / biodegradable packaging, naturalness / freshness, nutritional quality of pre-prepared foods.
- Consumer willingness to be more adventurous.
- Climate change drivers e.g. drought creating food shortages.
- Trends towards mega cities – how do you feed people in huge cities, what food can be delivered and affordable?

Social trends:

- With aging demographics and affluent lifestyles a new emphasis on health.
- People relating food to health.
- Obesity.
- Perceived risks and changing trust in food producers and regulators.
- Expectations for food safety – but is the precautionary stance too far on the pendulum? (you can't have 'no risk').
- Expectations for natural food, less intervention.
- Trend towards less additives – organics.
- Expectations for sustainability.
- Cultural & religious beliefs.
- Maori and increasing ethnic diversity in NZ.
- A desire for fresh but convenient foods.
- Time constraints in people's lives - speed and convenience/ instant food vs. authenticity, natural products. But some have more leisure time (retired, ageing population), creating a demand for convenience food that is also good food.
- Eating out or ready prepared meals in supermarkets? In 50-100 years cooking will be seen as a hobby.
- On the other hand, more people are growing food at home.
- Religious beliefs e.g. Halal.
- NZ society is changing and new values are emerging.
- Changes in underlying values about the meaning of food e.g. do we eat for nutrition or eat for pleasure?

3. Which of these technologies might be **controversial or non controversial**?

Many!

Current agricultural practices

- High impact/high intervention agriculture may be counter to the NZ brand image we want for our exports.
- Operating below 'safe' levels desired by consumers.
- Farming seen as a risky business, using simplistic solutions to issues, e.g. application of fertilisers.
- Environment concerns.

Biotechnology

- There is greater acceptance around non-food, health or medical applications of GE than in the food chain.
- GM perceptual shifts – greater acceptance now than in the past.
- 80% soy is GM – how can it not be in our foods?
- Using hormones/ pheromones to control pests to move away from chemicals

Nanotechnology

- People not understanding what it is.
- No definitions of nanotechnology, very little information eg. toxicity
- Nanotechnology: some useful applications, but others questionable, e.g. 'digital dust'/sensors.

Nutrigenomics

- Ethical concerns around DNA testing.
- Specific or tailored applications are more acceptable than to mass market.

Food fortification

- Food fortification e.g. folate in bread, takes away choice.
- Introduction of folic acid in bread – not the best vehicle for folate delivery. Industry concern lined up with consumer interests. Decision by ANZFSANZ and MoH.
- Mass prescription, without knowledge of impact. Cost-benefit analysis questionable.
- Tino rangatiratanga of product?
- Organics excluded from these requirements, thus gives those products an edge in terms of appeal to concerned consumers.

General comments on controversial food science

All have the potential to be controversial, but may not get above the radar.

The local food market may be different from export markets.

They may all be controversial while people are still coming to grips with what these new technologies mean.

The issues underpinning new technology are likely to be similar to GM.

The term 'new emerging technology' is a label, a broad banner. Some applications OK, others not.

There is inherent conflict between knowing what consumers want but science continuing to develop (this is a concern regarding this research project).

Technology push is followed by government investment in science - and then a public pushback.

Information overload? There is so much information to consider.

There is ignorance of where food comes from.

People don't care what goes on organic products; they think 'if it is organic it is good for them'.

4. From your personal point of view, what are some of the social, cultural, economic, ethical or environmental **issues and impacts** that might arise around future food technologies?

Social, cultural issues

- It is a scary thing to apply new technology to food.
- Relationships with food might change e.g. the way we sit down with families to eat a meal.
- Well-off people can access the best foods.
- World population growth and ability to feed this growth.
- The kind of food you eat might strongly link with your socio-economic status.
- People with a fridge can eat foods that are vulnerable to spoilage.
- Genomic based foods – concerns about control over my genome.
- People might feel defined by their genes.
- Loss of control of genetic information – how might it be used?
- For Maori, kaitiaki is over many generations: not just a personal choice for one person now.

Environmental issues

- Need debate around organics and sustainability.
- People are more accepting of GM for medical purposes.
- There is growing acceptance of biofuel but not at the cost of food crops.
- Depends on the context of where technology is deployed, e.g. Vietnam, use of GM rice.

Ethical issues

- Ethical issues may arise if it is not clear who benefits from a technology.
- There may be unintended consequences from the early stages of a technology development. All technology choices have consequences e.g. food irradiation, lowland forest conversion to dairying, power pylon installations.
- There is a backlash against the idea that Technology is the Solution to health problems, especially when technologies are seen to be imposed.
- Maori ethical concerns around some technologies.
- Animal welfare ethics.
- Ethical – advertising used by industry and deception.
- Could labelling be misused?
- Use of information from gene databases for commercial purposes. Commercial issue e.g. the 23Me commercial testing programme

Risk assessment and food safety.

- Biosecurity and HASNO Acts severely restricting importation of new gene-stock.
- Food safety ie. imported food. Food ingredients
- There is good regulation behind many of these things. CODEX food safety scheme, international food markets.
- Regulators lag behind - they find a problem then get regulations in place, then police.
- Safety is key BUT 'perverse incentives' exist. A scientist explains: Food safety is disincentivised. The current competitive science funding means that success is rewarded, haste in proving commercial application of science. Risk evaluation does not attract funding.
- Food safety regulations – food processing science can sometimes go under the radar, lab to market, much of it is not 'novel', i.e. 'fiddling with proteins' is not deemed risky anywhere in the world. Two examples– the similarities between yoghurt and mad cow proteins, and the TGA croissant and risk of coeliacs. In both scientists recognised possible risk and changed to a more cautious stance. Safety very much depends on ethics of the scientists (individual, team and institutional ethics). Fed Farmers and NZ Grocers seemed quite jolted by this information - both these stakeholders place high confidence and rely heavily on the regulatory process.
- Political issues - lobby sectors / industries e.g. sugar and health, distrust of regulations.
- Trust of officials – NZ doesn't have, USA does.
- Robustness of the food regulatory systems in NZ to protect their sector and consumers interests.

Decision making on food

- It tends to be based on economics.
- Economic interests are powerful, and may override consultation? Not sure about [the point of] participating [in research projects like this] when there are such strong science and financial drivers.
- Economic values need to be moderated by other values.

- People can be cynical regarding the use of information – consultation results need to be linked to the reality of the market.
- The general public is ignorant of science.
- Science holds a naïve view at times. The GM experience shows what happens when the market base for technology is reduced and there is low community acceptance.
- How do we find common ground?

5. How good are we at *discussing and dealing with controversial technologies* in New Zealand?

Generally, not good

- Not good.
- Some consultation is done.
- Very bad, e.g. Aspartame
- Huge room for improvement.
- In NZ there is a fear of offending people.
- Concerns are often kept quiet rather than put out there. NZ'ers tend to be compliant and don't naturally go out protesting on the street. But there were examples e.g. field trial sabotage.
- We become entrenched too quickly, there is too much argument and not enough dialogue.
- The Royal Commission on GM was a more mature process
- The Springbok Tour divided the country – 2 sides and no middle ground. Difficult to move towards middle ground, so we 'agree to disagree'.
- Bad here, but different to anyone else in the world?
- New Zealand is so well networked, there is less distance between scientists and community advocates. Not as polarised as in larger countries. Opinions not so suppressed, diversity of media. Have opportunity to talk well about this.
- Discussing is one thing, dealing with it is another.

Role of news media

- Poor investigative journalism and analysis.
- Little in-depth coverage in newspapers.
- Compared to Europe, in NZ a few very vocal people can have a large influence.
- Leads to political distortions – minorities can influence majorities.
- Newspapers feed off controversial side.
- Large influence of small groups in NZ – negative views provide news.
- The news media like controversy but don't investigate well. Don't get balanced reporting. For example: water quality (swimming beaches). The info to the public is alarming, but reality of the situation is OK.
- Debate is highly opinionated and poorly informed. There are not enough experts in NZ, we are a small country.
- The media doesn't help; there has been no balanced reporting in the last 30 years. Scientists are reluctant to enter the public debate.
- Issues like forestry emission trading, plastic milk bottles, fluoride - all relate to confidence in information and expertise.
- TRUST is key- often industry is not trusted. Everyone wants the truth, but how to best convey this? Scientists need to convey information in lay language.
- The media ask for a scientist to be a spokesperson on food safety issues, but there are gaps between science expertise and the public interest in the issue where a scientist is not 'the expert'.
- Web/internet increase the availability of non-robust evidence, but there are good websites also (NZFSA & BIZNZ). How do we better promote these?

Democracy and decision making

- Things are discussed and debated although may not get anywhere.
- Royal Commission/GM discussion hasn't helped create trust in govt or regulators.
- Poor record of strong engagement.
- Huge input of individuals in consultation, submissions etc. It would be good to be clear about how opinions would be/are considered. There are no guarantees.
- Entrepreneurs want to meet minimal standards and then tough it out.
- Process difficult and expensive, so people fall away and most applications are successful.
- RMA and HSNO Act not proper dialogue – more combative
- Land use, RMA, windfarms, not resolved as well as could be.
- But people influenced decision-making for varroa mite control –beekeepers were unanimously against and the decision was 'not now'.
- Rubber stamping vs being taken notice of?
- Little upstream engagement.
- Change away from lobbying? e.g. Scandinavia – working groups report directly to Minister. Closed to the influence of lobby groups, more democratic. In NZ the Sustainable Land Use forum is trying for a balance between economic and environmental concerns.

6. Think about another controversial issue [not food related] that you had a view on: Can you remember **a discussion you had with someone with a different perspective** on this topic? What happened in the discussion? **What was it that made the conversation fruitful, or not fruitful?**

- Being able to ask questions.
- Getting information from others.
- Being curious about their world.
- Both parties understand where the other is coming from.
- Consideration of others' experiences, feelings.
- Historical perspective on how people have been brought together e.g. Anzac Day –now young people celebrate although it was the previous generations who had family killed.
- People will have a fruitful discussion if a common ground can be found. If both parties dig in their heels, common ground won't be found. Both should feel win-win.
- Share a common vision, at some level. Find that space and work from there, e.g. healthy children. Negotiate a pathway to get there.
- Work at the personal, emotional level.
- Avoid being trapped in ideologies, which can get in the way of logical thinking.
- Use of humour, not so confrontational. This can break boundaries.
- Relationship, talking and engaging, mutual respect, willingness to not offend somebody.
- If a decision needs to be made, use formal processes to facilitate. Dispute resolution. Well facilitated, good processes.
- Should not accept breakdown of dialogue. There is always space to talk about these things.
- Being open to the question: "what's the consequence of me being wrong?"
- Being willing to compromise.

7. How can we use **good 'dialogue' communication** to generate quality decisions on future food technologies?

Attributes of good dialogue communication

- Need to understand people's drivers.
- Debate the issue but acknowledge there is no right or wrong.
- Scientists need to acknowledge they don't know for definite [about all the effects]. They can only say 'on balance' [we know this].
- Ideology will not lead to good dialogue.
- Hidden agendas will not lead to good dialogue.
- Seeing it through another person's eyes
- Not taking a 'them and us' approach.
- Not just trying to convince other people.
- 'Facts' and 'proof' may be irrelevant – personal experience and sympathy may produce a more positive response.

Models of public participation

- ERMA ran a community environment meeting – difficult to get more than six people. However, these participants are usually knowledgeable anyway.
- Limit discussions to small groups of intelligent people.
- NZ Bioethics Council – [their approach allows] people to follow different models.
- UK citizens' juries.
- Nordic models for collaborative governance.

Dialogue about what and when?

- What stage in the process do you do good dialogue, with whom and who do you use to do dialogue?
- The community needs to know what GM and other technologies are. The whole spectrum needs to be defined. Then we can identify different applications with different purposes.
- Packaging [the discussion framework] is important – like Nigel Larsen's tree [showing different branches along which nanotechnology might develop]. Where you engage is important. Engagement on a branch of an application can get strong reactions, whereas more fundamental engagement could occur at the root or trunk.

Concerns about using dialogue

- Good on paper, difficult in practice.
- Some people are so entrenched in their perspective that they cannot be flexible.
- How do you reach large portion of society?
- Dialogue can thwart also e.g. with nutraceuticals in Australia, when the public became involved it delayed the process.

Comments on science communication

- Start educating early, start in schools BUT teachers can't do everything – need to teach critical thinking early.

Comments on science funding and investment ⁴

- Federated Farmers' position has been to push strongly for outcome based funding, but from the scientists' view this creates perverse incentives – emphasis on outcome and achievement rather than safety assurance e.g. if seeking a healthier milk product, who will check that it is healthier ?
- There is a disconnect between the funding and science and science agencies, the relationship between MORST and FRST is of significant concern.
- Contestable funding has been dreadful for some scientists. Need flexible funding to allow objectives to be met 'objectively'.

⁴ An outcome from the dialogue in this workshop was a shift in understanding between science and industry stakeholders after this conversation. FF asked for a scientist to put together a one pager to outline this issue for a briefing meeting they had scheduled with the new minister.

APPENDIX

Sustainable Decision-making for Future Foods

Project structure

