

Submission to the Senate Inquiry into Food
Production in Australia

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Summary:

- Australian agriculture is facing a series of interlocking threats, the greatest of which is climate change
- Vegetation, from grasslands to old growth forests, and the management of watersheds determine climate. How these must be treated to increase rainfall and mitigate climate extremes in Australia needs to be understood and acted upon.
- Our current land use behaviour is destroying the hydrological cycle
- Cities, forests, wetlands, agriculture and other land uses all need to be part of the food growing picture
- There are many systems of land management that have been proven to work including: Natural Sequence Farming, Holistic Management, Grass Farming, Regenerative Farming Systems, Permaculture and carbon and soil fertility management.
- These systems need to be incorporated into Australian methods of food production in a far greater and more organised way.
- Farming can only survive by working within natural systems
- Seeds need diversity to maintain viability, vitality, resistance to pests, disease and climatic variations
- The current concentration of ownership of seed, patenting and Genetic Modification is drastically undercutting seed diversity and health
- The global system of agriculture and agribusiness control is negatively affecting farmers, consumers and the environment
- All the research and literature is showing the global agricultural system is failing ecologically, economically, socially and politically
- There are great gains to be made by implementing the changes that research and commonsense dictate
- *“You already know enough. So do I. It is not knowledge we lack. What is missing is the courage to understand what we know and to draw conclusions”*

Introduction

Worldwide there are an interlocking series of threats to the global supply of food. Australia has been a major exporter of food but drought and crop failure has meant an on-going reduction in the amount of food grown.

Therefore the widest possible look at how food is produced is necessary.

This submission will cover the issues of:

- Climate change and Australian food production
- Seed – diversity, viability and ownership
- Research showing the necessity of both a change in what is grown and how it is grown

1) Climate change and Australian food production

Australia is forecast to be severely affected by Climate Change (1). The 12 year drought has affected crop yields severely and the Murray Darling river system, the food bowl of Australia, is near collapse. (2)

Plants produce climate

Research is accumulating that shows plants are the way the Climate is modulated. Plants, of course, include forests, grasslands, weeds and each and every plant in between. Plants control the water cycle, evaporation, transpiration, cool and shade the ground and help create rain. (3)

A 2005 study by the Australian Nuclear Science and Technology Organisation showed that rainfall has dropped in the Amazon because of deforestation. Vegetation moves water progressively inland by evaporation, transpiration and condensation that forms rain and feeds the forest and the river. “The team found a clear connection between the degraded forest and reduced rainfall.” (4)

Climate change and water movement

Slovakian scientist and Goldman prize-winner “Michal Kravcik and his colleagues believe that our collective abuse of water is the most important factor in climate change and warn that with time, our current behaviour will completely destroy the hydrological cycle. They argue that the only solution is the massive restoration of watersheds” (5)

“Our cities must be ringed with green conservation zones and we must restore forests and wetlands – the lungs and kidneys of freshwater.” (5)

If plants are the main drivers of water movement and climate then it follows that the capture and storage of carbon, by itself, is irrelevant to the control of our global climate. The only system that will mitigate climate involves the understanding and creative use of vegetation within watersheds. Therefore Food Production in Australia will have to understand and support the major drivers of a stable climate, namely plants and watersheds.

Food Production means forests, land use and home gardens

Food Production has tended to focus on the crops and fields in which they grow. However this new understanding of how rain is “made” means that forests, rivers, flood plains, wetlands, urban planning and home gardens all need to be part of the equation.

“Michal Kravcik showed that when water cannot return to fields, meadows, wetlands and streams because of urban sprawl and the removal of green spaces, there is less water in the soil and local water systems and, therefore, less water to evaporate from land. It is as if the rain is falling on a large cement umbrella, which carries it out to sea.” (4)

Currently 25% of our food is grown in and around cities. Urban subdivisions are threatening this. The Victorian Local Governance Association is running workshops on Land Use and Food Security to address this issue. (6)

Old growth logging is proceeding in Victoria and Tasmania with total disregard of its effect on water and climate. The Green Carbon report shows that three times more carbon is locked up in forests that was previously realised.(3c) Logging also decreases run off, young trees require more water and the rain producing effects of forests are reduced.

Old growth forests, new monoculture blue gum plantations, existing orchards and new water hungry orchards that have flourished under the Managed Investment Schemes all need to be assessed for their effect on climate and therefore food production.

Proven systems of land management

Many people have adopted farming systems that work within the wider hydrological, plant and soil fertility cycles. They report great success and so it would be sensible integrate these developments into Australian agriculture to stop it from systemic failure.

Peter Andrews – Natural Sequence Farming

Peter Andrews in his latest book “Beyond the Brink” explains in detail how plants, including weeds, are vital to Australia. He also explains how he would revitalising the Murray Darling and the Australian flood plains by the use of biodiversity and by re-establishing the original flows of water and fertility through the landscape.

Briefly he shows how the carbon content of Australian soils has dropped dramatically since the introduction of European and, latterly, industrial farming methods. This means that soils are less of a “carbon sink”, are less fertile and are less able to hold water.

His contention is that modern methods of land management are unsuitable to the Australian landscape.

“Two thousand years ago North Africa was a wonderfully fertile area that for a time was the empire’s main source of wheat. So what did the Romans do to turn it into a desert? They ploughed, they drained, they irrigated, they grew crops as monocultures, they cut down forests. (In fact, it has even been argued that large-scale deforestation by the Romans in Italy, both for agriculture and wood was the real reason for their empire’s downfall.) In short, the Romans did everything that farmers are still doing everywhere around the world, which is why around a third of the world’s agricultural land is said to be no longer productive.” (7)

Since Peter Andrew’s methods have had great success in bringing areas back to life it seems reasonable and urgent that his methods be trialled on a large scale. At the end of the book two scientists urge that his methods be adopted as the only way to avert catastrophic climate change.

Holistic Management (8)

It is worth looking at the pictures on the website of the difference in the land under holistic management. It receives the same rainfall as the adjacent areas and yet is green and without erosion. I spoke to an Australian farmer using this method and he has not had to buy in feed for any of his stock although his area has been in drought. He estimated that this had saved him \$700,000 over the past decade.

Grass farming

This is a system where the grass is managed as the foundation of a farm’s productivity. Michael Pollan wrote of this type of farming in his best selling “Omnivores Dilemma”. The farm he described is Polyface Farm. The website shows the multiple crops produced. The farm has been restored to health by this method of farming. (9)

Regenerative farming systems

Again this is based on increasing soil carbon. The link in the reference section has full details (10).

Permaculture

The short film “Greening the desert” explains how careful capture of water and sensitive planting can create life in the desert. It is a short film but well worth viewing. (11)

Australian Soil Carbon Accreditation Scheme

“Under the Australian Soil Carbon Accreditation Scheme (ASCAS), carbon sequestration rates will be measured within Defined Sequestration Areas

(DSAs) located on regeneratively managed broadacre cropping and grazing lands. Soil Credits will be paid annually and retrospectively for validated soil carbon increases above initial baseline levels determined within each DSA.

Receipt of Soil Credits will be similar to being paid 'on delivery' for livestock or grain, with the bonus being that sequestered carbon remains in soil, conferring ongoing production and NRM benefits. Soil Credits will be calculated at one-hundredth the 100-year rate (\$25/tonne carbon dioxide equivalent)." (12)

I am not sure if this scheme is working in practice but it is an interesting idea of how to reward farmers for improving both their land and the global climate by storing carbon in the soil.

Soil Food Web

This site explains how soil works and how industrial farming has been destroying the complex web of fungi, bacteria etc on which growing food depends. (13) This is an important issue as soil cannot continually support crop after crop unless it is itself replenished. Currently there is an increasing use of chemical fertilisers and pesticides. This increases input costs, energy costs and is ultimately destined to failure as chemicals always upset the soil balance and health.

Farming can only survive by working within natural systems

There is a plethora of other information available all which comes to the same conclusion:

- The natural living and physical systems of earth that have developed and supported life over billions of years need to be understood.
- Agriculture must be in partnership with these systems otherwise it will fail.
- The industrial farming system we have developed over the past century is in conflict with the way the planet works.

Since agriculture cannot survive without soil fertility, water and biodiversity we must ensure that our way of feeding ourselves is based on preserving these things.

2) Seeds – diversity, viability and ownership

The importance of diversity

Seeds have been developed by farmers over the 10,000 years that agriculture has existed. The biggest developers of seeds are still farmers.

“Since the 1980s, for example, institutional breeders have produced about 75,000 new plant varieties mostly for a handful of crops in major growing areas.

During that same period, small farmers have created millions of varieties covering a much wider range of crops and growing conditions. (14)

Farmers' varieties are not like commercial seed varieties that have been bred for maximum genetic uniformity -- primarily to meet the requirements of patent offices and, secondarily, to allow for machine harvesting.

Farmer bred varieties are open pollinated, sexually reproduced and grow true to type. They have greater diversity and so are more likely to withstand pests and diseases. This diversity will be of great importance in adapting to climate change. Over 1.4 billion people depend on farmer saved seed. (15)

In contrast modern commercially produced seed is often hybrid, uniform and requires more inputs in the form of water, fertiliser and pesticides. As was shown in the recent documentary "The Seed Hunter" (16) modern seed needs the genetic input from wild seed, landraces (17) and heirloom seeds to maintain viability. All three types of seed are under threat from the spread of commercial seed and the lack of understanding of the importance of biodiversity.

A film by the Seed Savers Network "Seed blong Yumi" explains the importance of seed and how sharing and adapting seed to localities encourages diversity and resilience. There is a 3 minute trailer on their website (18).

Therefore a global network of gardeners and farmers preserving and saving and growing out seed is essential. This is outlined in the Manifesto on the Future of Seeds (19). It also explains that the "seed banks" are not a safe repository of seeds for the following reasons:

- Seed needs to be regrown to maintain viability – seed banks have neither the funds nor the ability to do this adequately
- If seed is grown in different conditions to where it originated the plant will adapt to the new situation i.e. if drought tolerant plants are grown where there is plenty of water they will lose their adaptation to drought
- Farmers have been shown to be the best developers and conservers of seeds. It is often culturally important to share seed and to save the best seeds

Patenting, ownership and Genetically Modified seeds

There has been an enormous concentration in the ownership of seeds over the past 30 years. In the 1970's there were thousands of seed companies worldwide and none of them owned even a fraction of 1% of the global seed market.

Over the past 20 years seed companies bought out their rivals. Now the top 10 companies own 57% of the world trade in seed. (20)

In the 1990's two chemical companies Monsanto and Dupont either bought out or made alliances and joint ventures with seed companies. (21) Together

they control about 35% of the world seed market. (20) Seed is the basis for food production. Having such a significant concentration of ownership of irreplaceable seed must constitute a grave threat to food security and sovereignty.

Monsanto is the largest owner of the traits of Genetically Modified seed. In 1999, a representative from Arthur Anderson Consulting Group stated that they had helped Monsanto create a strategy to ensure 100% of commercial seeds would be genetically modified and patented within 20 years. (22)

In 2005 Monsanto bought out Seminis, the largest supplier of fruit and vegetable seeds in the US. (23) In March 2008 Monsanto bought the Netherlands based fruit and vegetable seed company De Ruiter seeds. (24) There are fears it will genetically modify varieties or make certain open pollinated and hybrid varieties unavailable.

There is currently a rush by seed companies to patent various genes thought to create traits useful to the changing climate (25). The ethics of removing these genes from the commons and alienating them from the farmers who have created and nurtured these traits is contentious. It has been called bio-piracy.

Failed promises and dangers of Genetic Modification

Many people assume that the threats to our food system can be solved by the development of genetically modified seed. Extravagant claims have been made for what these seeds are supposedly able to do. There is also confusion about what they actually are.

It has been said that we have been genetically modifying seeds for generations. It is true that changes have been made to seeds over time but this has always been done by cross breeding. This can only take place between plants that can naturally cross fertilize.

In contrast what is known as Genetically Modified plants are actually transgenic plants. Genes are transferred from viruses, bacteria, animals and unrelated plants into other plants. This cannot possibly happen without significant interference from scientists.

The attraction for the developers of GM seeds is that they can be patented. This increases the control that plant breeders have over the purchasers of their seeds.

However the credible scientific and research literature shows that genetic modification does not increase the productivity or health of crops (26). There are only two commercial traits:

- Herbicide resistance – the crop can be sprayed with a herbicide and not die
- Insect resistance – the crop is poisonous to certain types of insects

Herbicide resistance can be created by non-GM breeding for example Triazine Tolerant canola is resistant to the herbicide Triazine and is a non-GM crop.

Insect resistance has been created by the transfer of a gene from a soil bacterium (Bt). There is evidence that this plant production of insecticide has caused cotton plants in India to create hydrogen cyanide (27). There have been reports of

- allergic reactions from workers in GM cotton fields (28)
- deaths of animals grazing on GM cotton plants post harvest (29)
- damage to stream ecosystems by Bt plants (30)
- damage to soil fertility by Bt crops (31)

The Network of Concerned Farmers has recently released a report “GM crops: Risks and Risk Management Required”. This gives a detailed explanation of why current GM crops offer no benefit to farmers or consumers. (32)

We know very little about genes

Genes are far more complex than the proponents of genetic modification would have us believe. The scientific basis on which these crops were developed, tested and patented has been proved recently to be false. (33)

Genes are not discreet chunks of DNA that can be cut and pasted into any organism to produce the same substance they did in their original life form. Genes work in families, they respond to the environment and a section of DNA can link up with other sections (genes) in all sorts of ways to produce a variety of proteins and other substances.

There has been no adequate health testing of GM crops and food. The minimal amounts of animal testing that has been done has shown death, illness and sterility in animals fed GM.(34) The promoters of GM assert that extensive testing has been done but they cannot produce independent, long term, multigenerational testing showing even one GM food is safe.

The importance of diversity

In the 1960's 100,000 different types of rice were grown in Asia (35). Now 4 types of commercial rice dominate in Asia. This is setting the global rice harvest up to crash in a similar way to the sole type of potato grown in Ireland failed and caused the Irish Potato Famine.

The plummeting diversity of seed will be magnified by the development of GM seeds. GM maize has polluted the landraces of Mexico. (36) This severely limits the genetic resources of maize. It may be that maize will no longer be a staple crop if it cannot be bred with wild, landraces and heritage seed to renew its vigour. If this is the case GM will have caused a disaster.

Seeds – our common heritage

It must be emphasised that seeds have been developed over millennium and form the basis of agriculture. There are threats to their continual survival:

- loss of wild relatives, landraces and farmer produced seed
- concentration of seed ownership
- patent control
- GM pollution
- Farmers loss of control over their methods of farming by all of the above

It is widely acknowledged that food is in crisis. “Former President Clinton told a U.N. gathering Thursday that the global food crisis shows "we all blew it, including me," by treating food crops "like color TVs" instead of as a vital commodity for the world's poor.” (37)

However it is not only the world's poor who have to fear an agricultural system that is ignorant of where seeds come from and what they need to flourish and endure.

3) Research showing the necessity of a radical overhaul of the global agricultural system

There is a plethora of information on how damaging and dysfunctional our system of agriculture has become:

IAASTD report on agriculture

In April 2008 the International Assessment on Agricultural Knowledge, Science Technology and Development released a report into farming. It was a 3 year research effort by 400 scientists who looked at how to feed the world.

Its formula to create sustainable agriculture was: “improving low impact practices such as organic agriculture and providing incentives for the [sustainable](#) management of water, livestock, forests, and fisheries. Science and technology should focus on ensuring that agriculture not only provides food but also fulfills environmental, social and economic functions such as mitigating [climate change](#) and preserving [biodiversity](#). Policy-makers could end [subsidies](#) encouraging [unsustainable](#) practices and provide incentives for sustainable natural resource management.” (38)

This is the most detailed investigation into agriculture ever produced and it would seem reasonable to take its findings to heart.

Paddock to plate – ACF report into farming

The ACF has recently released a paper into farming in Victoria that calls for radical change:

“Healthy environments, healthy farming systems, healthy foods and healthy people are intricately intertwined. From a human health, environmental health and economic health perspective, there are very strong imperatives to improve the performance of the Victorian food and farming system right now. Business as usual is not a viable option, especially when the challenges of the decade ahead are considered.” (39)

Dr Miguel Altieri “Small Farms as a Planetary Ecological Asset: Five Key Reasons Why We Should Support the Revitalisation of Small Farms in the Global South” (40)

“This book argues that small, biodiverse, agroecologically managed farms in the Global South are the only viable form of agriculture that will feed the world under the new ecological and economic scenario.

1. Small farms are the key to the world’s food security
2. Small farms are more productive and resource-conserving than large-scale monocultures
3. Small traditional and biodiverse farms represent models of sustainability
4. Small farms represent a sanctuary of GMO-free agrobiodiversity
5. Small farms cool the climate”

Via Campesina

The Via Campesina is a global collection of peasant farmers showing how small farms feed people and cool the planet. (41)

Raj Patel

Raj Patel in “Stuffed and Starved” shows how although there are many farmers and consumers there are very few buying desks, grain traders and wholesalers of crops. The power is therefore concentrated in the middlemen and is it enormous. It affects subsidies, influences what crops are grown and it wields immense social and political power. (42)

Felicity Lawrence

Felicity Lawrence in “Not on the Label” and “Eat your Heart Out” details the appalling conditions of workers on farms and in food processing. Gang masters are virtual slave drivers of foreign, often illegal agricultural workers. Just in time supermarket supply lines create inhuman working conditions. The social and political and cultural cohesion of Britain is under strain from this version of food production. (43)

Michael Pollan

Michael Pollan in his books “Omnivores Dilemma” and “In Defence of Food” shows how “commodities” rather than food is grown. Commodities are foods that need processing i.e. wheat, corn, soy, canola and rice. According to Pollan corn is now a larger part of the American diet than in Mexico. This is

because it is fed to animals and processed into High Fructose Corn Syrup and numerous other processed ingredients. The other commodity crops are similarly used in processed food. The result is “edible food-like substances”. Eating these is causing an epidemic of ill-health. (44)

Jamie Oliver

Jamie Oliver, the TV chef has made a remarkable series of programmes on food. They show the physical, emotional, social and economic disasters of having an ill-fed population who have no understanding of food or cooking. His latest “Ministry of Food” shows that this style of eating is having far reaching negative effects:

“Diet and health are massive social issues. Obesity already costs the NHS more than smoking: £4.2 billion vs. £2.7 billion. Over 9,000 people already die prematurely each year due to health conditions caused by being overweight; cancer, heart disease, stroke and diabetes are the most common. This will be the first generation in which children are predicted to die before their parents.”

Jamie Oliver has challenged the British Government to use strategies developed during wartime to create a healthy nation. His Manifesto and letter to Ministers are well worth reading. It is interesting that the major challenge to British health is being tackled by a TV chef. (45)

Conclusion

The current systems of agriculture globally are failing on multiple levels. Australian agriculture is currently part of the industrial high input method of farming.

There is a decision to be made about whether to continue with this version of farming or whether to make the changes that research and experience show are needed.

Farming and food production can be viewed as just another industry with the aim of maximising yield and profit. Farmers, agribusiness, trade and costs to consumers would be the main focus in this business as usual model.

This model will fail as it is not sustainable in ecological, economic or social terms. This failure will mean loss of food sovereignty and security, environmental destruction and economic disaster.

The alternative is to focus on understanding and incorporating a broader range of issues including water, climate stability, diversity, wild plants, old growth forests, urban planning, land use, the sharing of knowledge and seeds.

Unless all these things are considered and incorporated into our production of food the complex society we live in will be unable to be supported. The

indications are that the collapse will either happen or be avoided depending on the collective and individual decisions we make in the next two years.

“You already know enough. So do I. It is not knowledge we lack. What is missing is the courage to understand what we know and to draw conclusions”
Sven Lindqvist

Frances Murrell

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