Doctors for the Environment Australia
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Submission to the Senate Select Committee on Agricultural and Related Industries Inquiry into food production in Australia

from

Doctors for the Environment Australia

Doctors for the Environment Australia Inc (DEA) is a voluntary organisation of medical doctors in all states and territories. We work to prevent detrimental health outcomes – local, national and global – caused by damage to the earth's environment.

"Everything is connected to everything else" is the first rule of ecology: (Barry Commoner, revered pioneer of ecology). Food is one of humanity's life support systems and its production must be studied as an ecological service. On the basis of Commoner's quotation we will make some observations on economic systems, governance, health and the ecology of soils for all are inter-related with the production of food.

Global environmental changes (GEC) such as climate change, biodiversity loss, and degradation of ecosystems on land and in the oceans are the major determinants of sustainability and of future population health and survival. In medical terms these are the life support systems for humanity. These determinants are enmeshed in a wide set of 'global changes' typified by the growing scale, speed and intensity of changes in social, economic and environmental conditions in the world.

It follows that we must understand these changes if we are to continue to provide food security to Australians and to play a continuing role in providing food to the world. In this submission we pay particular attention to the health aspects of food production. We also make the point that this issue cannot be compartmentalised into the economics of food production, rather it must be addressed as one of the health and viability of the rural sector regardless of the many competing interests for finance, land and services.

The world situation

The Intergovernmental Panel on Climate Change warned that global warming may cause agricultural production to decline by 25% by 2080. It now seems that this is an underestimate for evidence is accumulating that climate change is accelerating. The gravity of this situation is apparent from the expected increase in world population from 6 to approximately 9 billion by 2050. According to data from the Food and Agriculture Organisation (FAO) there is little doubt that world food production is already falling and is resulting in an increase in the price of staple foods.

There is little chance that another Green Revolution can encompass the expected rise in population. Climate change and soil deterioration due to the Green Revolution and overcropping are responsible for this fall in production, a fall that is now being exacerbated by the deployment of productive land for bio-fuel. The magnitude of the problem can be seen from the FAO estimate that a 70% increase in agricultural production is required by 2050 to meet the demands of this growing population. This year a report from the International Food Policy Research

Institute (IFPRI) has examined the interplay between climate change, agriculture and food security. The report projects that in 2050 there will be 25 million additional malnourished children, a 90% increase in wheat prices and a 15% decline in irrigated rice yields in developing countries. (1)

Considering individual countries, a World Bank study of India's water balance notes that 15% of its grain harvest is produced by the over-pumping of ground water. In human terms, 175 million Indians are being fed with grain produced from wells that will be going dry. The comparable number for China is 130 million. Among the many other countries facing harvest reductions from groundwater depletion are Pakistan, Iran and Yemen. In response to the world food situation Saudi Arabia, China and South Korea are leasing and buying large tracts of land in developing countries on which to grow food for themselves.(2)

The rural sector in Australia is therefore of increasing importance not only for feeding Australians but for exporting to a needy world. In Australia more land will become "marginal' due to climate change but even if its production is halved it may remain economically viable because of price increases. The task in hand is to achieve dual goals of food security and emission reductions with long-term investments in infrastructure, research and development as well as incentive systems to promote adoption of new practices by farmers.

Some health aspects of food production

The impacts of climate change on health are a priority of the World Health Organisation. The impacts in Australia have been documented by Doctors for the Environment Australia. (3)

It is relevant to this submission that non-indigenous people in rural Australia have life expectancies 3-10 years less than their counterparts in big cities. While the lack of medical services undoubtedly plays a role in this, it is not the whole story; some of the other reasons will be evident from this submission.

The term of reference *"Food production in Australia and the question of how to produce food that is affordable to consumers"* the word 'affordable' needs comment. A price in the supermarket would be more expensive if the health, environmental, and social costs were not accounted as externalities. To set the scene we ask the Committee to listen to a statement made by Kathryn Rothe, a lifelong farmer dependent on the Murray River. (4, Attachment 1)
It is indictment of many aspects of our present system of agricultural management.

We make the point that competition has remained the basis for policy on food prices. There are good reasons to question whether this is environmentally sustainable or economically correct if the externalities are costed. Some forms of mechanised production are cheap in market terms but use more energy in production than is available from the food itself. In general the externalities from these forms of production include the health and environmental costs, both local and global. The latter include the large contribution to global greenhouse gas emissions. (5)

In summary, the health impacts that are not considered or costed in the pursuit of competitive prices are:-

- The use in intensive farming practices of hormones and antibiotics to promote animal growth. These can produce food that is potentially unsafe and lead to the emergence of organisms resistant to antibiotics with huge health implications and

costs. Contamination is direct in the food source and indirect in groundwater supplies.

- The increasing use of fertilisers and pesticides has both health and environmental impacts. In addition, there is increasing medical concern about human exposure to a range of chemicals as reflected in recent more stringent regulations from the EU. For example, there are increasing concerns about the effects of glyphosate, the basis for much GM production (see section below). (6)

- It is increasingly recognised that the consumption of red meat in developed countries is costly in heath and environmental impacts.

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  - "Factory farmed" meat has a lipid profile of high saturated fat and low beneficial fats than the meat humanity ingested in evolutionary history. This is one factor in the increase in vascular diseases in developed countries. (7) This issue needs to be addressed by livestock producers.

  - Red and processed meat is one of several factors in the causation of colon cancer and medical recommendations are for limitation to no more than two meals per week. (8)

  - The main externalities of meat production relate to water usage and greenhouse emissions. By these mechanisms the consumption of red meat has a huge financial cost to the community.

- Feed formulations that include animal tissues have unexpected and costly health implications. The huge cost to European agriculture and also to the health services of bovine spongiform encephalopathy and its human equivalent variant Creutzfeldt–Jakob disease which resulted from feeding cattle and sheep offal to cattle has not been learned in terms of better practice.

- There are examples of chickens fed fish-meal from unintended by-catch, mostly shark that is so high in mercury content that it is unfit for human consumption. (9)

- There are increasing concerns for aquaculture fish which do not have the dietary lipid benefits of native fish and also concerns about the spread of aqua-generated infections which are decimating native fish stocks.

- With the intensification of production embodied in intensive agriculture and factory farming, there is emergence in recent decades of various new infectious agents that have crossed from 'food' animals to humans— Nipah virus disease (from pig farming in Malaysia), severe acute respiratory syndrome (SARS), H5N1 avian influenza and most recently H1N1 influenza, "Swine flu".

- There are health concerns from the increasing acceptance of food produced from genetically modified crops in Australia. Commercial interests frequently state that no health consequences have been shown. Such statements are correct only because the

appropriate human studies have not been done. Doctors for the Environment Australia has recently reviewed this situation. (10)

- Finally it should be recognised that trade agreements and trade rules applied by the World Trade Organisation seek primarily to limit non-tariff barriers to trade and are an integral part of competition which lowers food prices. However, they may also erode food safety, because nations importing food are discouraged from setting regulatory standards higher than the often low standards of the exporting nation. Food may be cheaper but the cost will appear somewhere else in the accounts in the form of adverse health impacts, inadequate quarantine, or the greenhouse emissions of transport.

In conclusion it has to be questioned whether total reliance on the competitiveness engendered by an unfettered market system remains the most appropriate way of managing a life support system. Cheap at the shop may be more expensive to the community as a whole when environmental and health costs are documented.

Ecological farming

Our interest is in the cohesion, health and survival of rural communities as stewards of a life support system. To this end the health of the soil becomes an important component of production and the health of individuals. Farming must be regarded as a stewardship rather than an extractive operation. A change in societal and governmental thinking about farming, and the valuing of farming and caring for the land provide important psychological support for rural communities.

Following the establishment of the IPCC in 1988 it has become widely accepted by the scientific community that human activities have contributed substantially to global warming since the onset of the industrial revolution, particularly over the past half century of consumerism, and that the change can be largely attributed to the release of greenhouse gases from combustion of fossil fuels.

Lester Brown of the Washington based Earth Policy Institute calculated that of the 9,180 million tons of baseline (2006) anthropogenic carbon emissions, 80% can be reduced by replacing fossil fuels without harming the economy. About one third of this can be reduced by replacing fossil fuels with renewable sources for electricity generation (together with improved efficiency), about one third through a combination of ending deforestation, planting trees and managing soils sustainably to sequester carbon, and about 18% by re-structuring the transport system. (11) In passing, we make the point that farming communities and their representatives have ample opportunity to develop positive contributions to carbon fixing and therefore offsets for the 16% of Australian emissions resulting from farming, rather than worry about the impositions of a CPRS that that will affect all sections of the community.

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Australian research has emphasized the importance of soils and vegetation in regulating both climate and water cycles. Clive McAlpine of the Queensland Climate Change Centre of Excellence has estimated that land clearing over the past 200 years may have been as significant a factor in this country's droughts and changing climate as increasing carbon dioxide in the atmosphere. Modelling by the Queensland group showed a strong correlation between climate and loss of vegetation from pre-European settlement levels, with average summer temperature increase in eastern Australia of 0.4-2.0C, and a 4-12 per cent decrease in summer rainfall. The results also showed that the intensity and duration of droughts may have increased in south-eastern Australia as a result of large-scale clearance of native vegetation, amplifying the effects of

El Nino-related droughts and increasing the annual number of days with 35C- plus temperatures. McAlpine stresses that we may be heading into a very difficult and irreversible situation in terms of climate change and landscapes, particularly in the Murray-Darling basin. An indicator of this is that water flow in the Murray River has declined by 75% since 2002. McAlpine's papers are references (12-14) and the work is summarised in the New Scientist and in Ecos. (15, 16)

Russian researchers Makarieva and Gorshkov from the St Petersburg Nuclear Physics Institute have published a paper in the journal *Ecological Complexity* (17) suggesting how coastal deforestation and land clearing could lead to desertification inland. They theorise that coastal forests generate winds that push water thousands of kilometres inland – a 'biotic pump'. For illustration they compared the climate of Northern Australia – where rainfall drops from 1600 mm in vegetated coastal areas to 200 mm in the arid inland 1500 km away – with the Congo, which has forest cover from coast to interior, and where rainfall levels inland are as high as at the coast. In reviewing their work in the journal *Bioscience*, Doug Shiel of the Institute of Tropical Forest Conservation in Kabale, Uganda, highlighted the finding that "even localized clearing might ultimately switch entire continental climates from wet to arid, with rainfall declining by 95 per cent". (18) Indeed, the Russian scientists argued that burning of coastal forests by early Australians may have shut down this continent's biotic pump, shifting the prevailing climate from humid to arid. (17) On a positive note, local land degradation can be reversed, as was demonstrated by a cattle farmer in Gunning NSW who twenty years ago started to plant thousands of trees on his property. He is now the envy of his arid neighbours, since his cattle now graze on green pastures under the shade of a forest of trees.

We can conclude that there is accumulating evidence to suggest a more mixed pattern of farming be adopted in Australia to allow for more vegetation, biodiversity and protection of soils and climate.

Soil is a much neglected component in the complexity of climate science. Soil degradation from accelerated breakdown of organic matter (OM) results from massive use of agrochemicals, inversion tillage, mono-cropping and associated bare soil management, and lack of OM re-cycling. Modern industrial agricultural practices generally reduce soil OM (and associated water retention) by 50% within 30 to 40 years.

Soil scientist Christine Jones (19) points out that soils are the planet's largest carbon sink, with a capacity five times greater than that of vegetation. Recent research has confirmed that the capacity of the ocean ('the planet's flywheel') to act as a carbon sink has markedly declined, with the top 100 metres of water being close to CO2 saturation. This finding highlights the urgent need for 'active drawdown' of excess CO2 already in the atmosphere, as well as reducing further emissions. Jones points out that the carbon cycle and water cycle are intrinsically linked, as in the following contrasting equations:

High soil carbon=improved water infiltration=recharge of transmission aquifers=perennial base flow to rivers and streams

Low soil carbon=high evaporation=loss of perennial stream flow

Jones maintains that human health and wellbeing are closely related to the health of soils. She advocates drastic changes in land management to restore soil humus, such as broad-acre cropping with perennial grasses and cropping shrubs to establish permanent mycelia networks in terms of aggregate stability, soil fertility and water retention. Also, carbon capture and local cooling can be

enhanced by massive planting of native trees. There are important ecological, economic, employment and social benefits to be obtained by this new agricultural revolution. The number of farmers in Australia has fallen 30% in the last 20 years, with more than 10,000 farming families leaving the agricultural sector in the last five years alone. There is also reluctance on the part of young people to return to the land, indicative of the poor image, low income earning potential and unsustainability of current farming practices. It is time to move away from depletion-style, high emission, chemically based industrial agriculture and get serious about grass –roots biologically based alternatives for soils, native trees, grasses and shrubs for environmental protection and climate mitigation.

We make these observations at a time of increasing stress, depression, family and social breakdown in many rural communities as reported by our colleagues in rural practice. We believe that more research and revision of farming practice will have positive health impacts for rural communities.

The economic paradigm

It seems unreasonable to us to have a life support system subject to the vagaries of the present financial system. Finance for food production and land maintenance is impacted by financial crises precipitated by speculation, by the competition from other perceived national objectives e.g. property development, by tax minimising schemes, and by the market philosophy of banks that service to the rural community is not economically rewarding for them. This is a folly based on ideology. The culture of existing banks, short-term profits rather than long term investment will remain unchanged. Rural production cannot remain at the mercy of speculation that can affect market interest rates and crises which lead to a lending drought. (20)

The agricultural base of our economy and survival is too important not to have alternative stable sources of finance. Although Australian banks have not soiled their nests and everyone else's like international counterparts, pragmatic alternatives are nevertheless needed.

Finance is needed to increase efficiency, revive marginal land and create opportunities for future carbon offsets. Rural communities can be made more sustainable by diversified incomes from local renewable power sources.

While not suggesting that Prof. Muhammad Yunus and the Grameen Bank be invited to help the Australian rural poor, please recall the Commonwealth Bank helping thousands of small businesses over 30 years prior to privatisation; it was attuned to community needs. The Charter of a Peoples Development Bank for the needs of rural and regional Australia would avoid the plethora of financial creations that have destroyed so many lives. Will Bailey, formerly of the ANZ Bank, made such a proposal in 2001 after talking to rural communities " One group of 350 stood as one person and suggested it was time that someone had a damn good look at providing financial services to that 15 or 20% of people who had been left behind following deregulation".

The creation of 'nationalised' banks will lead to cries of "unfair competition" and terrify politicians in case they are blamed for failure. This no longer matters in a complex world needing health, equity and sustainability. But we put it to the Senate Committee that there are alternatives; investors who want to see their money used to help the nation could create a rural bank.

Governance issues and food production

This is a major topic in itself which cannot be addressed fully here. However the issue is perhaps best illustrated by describing one example:-

The Green Revolution relied heavily on nitrogen fertiliser to triple the world's production of food and today food yields are underpinned by the production of fertiliser from petrochemicals. The International Energy Agency's chief economist Dr Fatih Birol has indicated that world oil production will peak within 10 years, that is earlier that estimated previously, and the average rate of decline in the world's 800 major oilfields is now 6.7 per cent a year. (21) According to the International Fertilizer Industry Association of the petrochemicals, natural gas is responsible for 97% of nitrogen fertiliser production. Gas reserves are expected to peak soon after oil reserves.

"Everything is related to everything else" is a theme of this submission. The Gorgon deal with China has long-term implications for Australian agriculture.

A media statement, September 10, 2009 stated "Throughout the Asia Pacific, Australian LNG will be increasingly important as a reliable, secure, clean energy source to power continued economic growth. These are massive contracts that will generate economic growth, jobs and prosperity for the nation for decades to come". (22)

Under the agreement, PetroChina will buy 2.25 million tonnes per annum (mtpa) of gas from Exxon's share of gas from the proposed Gorgon LNG project for a period of 20 years.

In an article by Martin Ferguson in "The Australian" attacking environmentalists he states "Those who oppose the development of Australia's uranium and LNG resources, and low-emission coal technologies, need to answer the following two questions. Do they want the world's poor to have access to electricity? If so, how do they propose to generate it? (23)

In this article the Minister of Resources and Energy could be considered to exhibit a very narrow view of the problems of the world. He did not ask the question do we want the world's poor to have access to affordable food. If so, have we considered the role of natural gas in producing it? We are not aware of any evidence that this was considered by the Minister's Department. All such departments gain their status on signing up valuable contracts supported by States that put revenue first. It might also be asked what input occurred into the Gorgon utilisation from the Department and Minister of Agriculture. A study has not been done to determine whether a proportion of Gorgon gas would be better used in Australia for power generation to prevent further expansion of coal powered generation (which would have big gains for human health and our greenhouse gas emission profile) and for the production of nitrogen fertiliser to give a distinct competitive edge to for Australian agriculture and indeed to export fertiliser to the world in coming eras of soaring prices. Indeed the contract for Gorgon was signed at a time when further coal fired power facilities are being proposed. Surely the Minister must recognise that the resource development that he regulates and promotes has been mainly responsible for what leading medical researchers and experts regard as the biggest health threat facing the world. (24) Accordingly, it behoves the Minister with the resources of his department to recognise the potential health impacts of each decision that is made.

There are many more examples which raise the issue of governance not acting as a whole system but rather as a series of independent segments which can carry conflicts of interest. It is essential (contrary to the modern trend towards specialisation and fragmentation of knowledge) to maintain a holistic approach to the human impact on the biosphere in the interests of our own and countless other species.

Some Conclusions

Food production is a health issue and one of human life support systems. If this is accepted then the recommendations below fall into place. Each one of our statements has an implication for health and wellbeing.

Global environmental change is impacting Australia. It necessitates coordinated and financed projects to mitigate impacts on our food production. Priorities must be for environmentally sustainable production to feed Australians and to export whenever possible to an increasingly hungry world.

The complexity of the modern world and the interconnectedness of all matters result in food production being an integral part of decisions in many departments other than agriculture and the functioning of government must take account of this.

There must be accounting for externalities in the costing of food production. This will lead to reform towards sustainable farming and will have positive health impacts on consumers and rural producers.

Government must produce plans for the rural sector to develop carbon offsets to existing greenhouse emissions through carbon soil programmes to be prepared for agricultural matters to be included in the next round of international greenhouse negotiations.

These matters are a national priority for planning and financing.

Mechanisms for the stable financing must be developed outside the present banking system and predatory pricing policy which affects the viability of farmers and their land must be recognised as contrary to the national interest.

If as doctors we could use an analogy from medical experience. There are two aspects to the care of human health. Firstly, treatment of individual diseases, so that the life of each of us has a series of medical interventions—we may require an antibiotic for an infection, repair after an accident, or tablets for depression. By contrast preventative health is the development of strategies to prevent these events and to prescribe the living of a healthy life, so they do not happen. Vaccinations, legislation to reduce the harms of smoking and alcohol, reduced air pollution and healthy diets all fall into this category. It seems to us, looking at the life support system of agriculture through the lives of our rural patients that government actions with the exception of a few notable innovations such as Land Care, have rarely moved beyond short-term interventions on the health of the land or the farmer. It is not clear that there is any long-term strategy based on science and wisdom espoused even by those elected representatives of the rural sector. Our plea is for the terms of reference of this Inquiry to be considered in the context of the broad future needs and health of the rural community and indeed all Australians, the sustainability of the land and the food security of Australia.

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