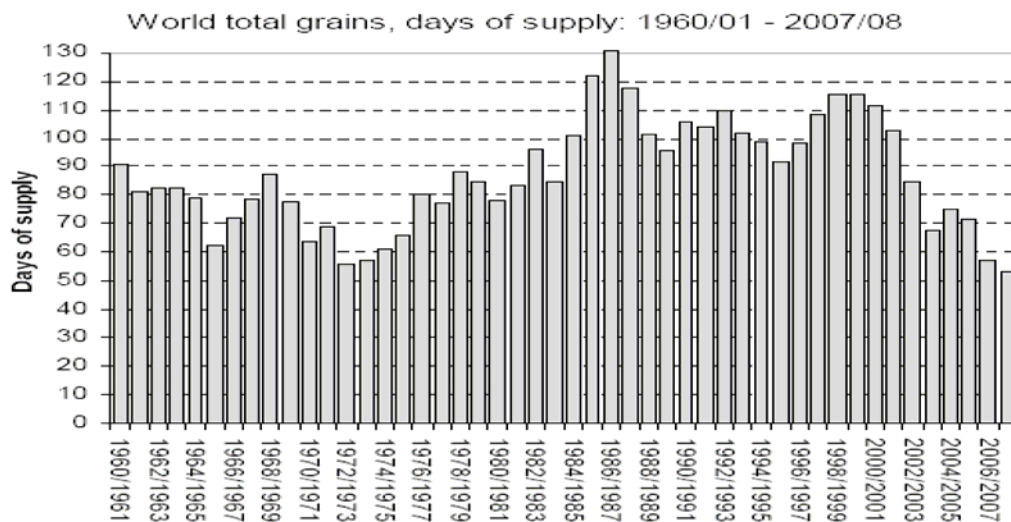


# TACKLING THE GLOBAL FARM CRISIS

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Meeting over a mountain of caviar, sea urchin roe, Kyoto beef, conger eels, truffles and champagne in Japan last month, leaders of the G8 richest countries discussed spiralling grocery prices in the developed world and growing starvation in Africa, India and Asia. Between mouthfuls of an 18-course banquet prepared by 60 chefs, the world's eight most powerful men said they were 'deeply concerned'.

Four months earlier global food security wasn't even on the radar of world leaders. In their busy round of affairs it was an issue they rarely devoted a moment's thought to.

Yet, in each of the past seven years, the world has consumed more grain than its farmers have been able to grow. The warning signs have been plain to read for quite a while. Grain reserves are at their lowest level in half a century.

Like many people, the world leaders sounded puzzled at the sudden emergence of a food crisis. They blamed climate change, biofuels, oil prices and Chinese appetites – but there was little sign they fully grasped what was happening, down on the farm.

The present food crisis is a forewarning of what the world can expect in the decades ahead as civilisation runs low on water, arable land, nutrients and technology, as marine catches collapse, as biofuels expand, energy costs soar and as droughts intensify under climate change. And as global demand for food doubles.

The reasons are straightforward:

1. The human population is growing, towards 9.1 billion in 2050 – but demand for protein food, especially in China and India, is rising faster still. Total world food demand is forecast to rise 110 per cent in the next 40 years. By 2050 we will be feeding the equivalent of 13 billion people at today's nutritional levels.
2. We are facing a global water crisis. Cities will soon half of the world's fresh water - that was once mainly used to grow food. Groundwater levels are falling in every country in the world where it is used for agriculture. The volume of fresh water available to grow food is now in decline and it is probable we will have to double farm output using only two thirds of today's water volume.
3. The world may be facing 'peak land', meaning it has run out of good arable country – unless we wish to clearfell the Amazon. We are building cities, golf courses and resorts on our best soils. We are locking them in conservation reserves. We have degraded a quarter of the global stock of arable land to the point where it is scarcely usable.
4. We are haemorrhaging nutrients. Farmers apply 150 million tonnes of elemental fertiliser to their farms every year – but erosions strips away an estimated 1.1 billion tonnes of nutrient - six times the amount applied. Yields are now falling in some countries.

From 10-60 per cent of all fertiliser applied is not used by the crop or pasture and goes to waste. Up to half of farm produce is discarded during processing. Up to half the food in our shops, restaurants and homes is thrown on the tip. Most of the nutrients in our sewage systems are lost.

5. Biofuels are eating into food production areas, in the US and Brazil especially. By 2020 the world will be burning 400 million tonnes of grain a year – which is the same as burning the entire rice harvest.
6. There has been a decades-long decline in global scientific research to lift farm production, in both developing and developed countries. This means farmers worldwide will soon hit a major technology pothole, where less new technology will be available to help them lift output, because the research has not been done. Already yields worldwide are starting to fall.
7. There is heavy inflation in the prices of fuel, fertiliser and chemicals driven by the oil surge. This is pricing these out of the reach of both poor and medium farmers in all countries.
8. Half of the world's major fisheries are in decline. Indeed sea catches are forecast to collapse completely by the 2040s, throwing demand onto land-based farming.
9. Politics and economics are acting against agriculture. Globalisation of the supply chain is driving down prices to farmers while the failure of trade talks is keeping them out of markets. Farm subsidies also continue to depress prices.
10. The climate is changing. UK Hadley Centre modelling suggests up to half the Earth may be in regular drought by the end of this century. "Unnatural disasters" will become more common.

The challenge facing today's farmers is thus to double world farm output, using less land, far less water, fewer nutrients, and with the prospect of less technology to do so – in the teeth of increasing drought.

This is not a challenge susceptible of 'silver bullet' solutions, but will require action on a global scale and by every individual and government on Earth. What the world's leaders, indeed all governments including our own, have failed to grasp is that the farm crisis is not caused by one or two of these factors – but by all of them. It cannot be overcome by addressing one or two of them – only by tackling all of them together. While these obstacles to sustainable food production were building up, our leaders were asleep at the wheel.

This situation heralds the real likelihood of regional and global instability. It is already manifest in soaring food prices – international rice prices have risen from \$400 to \$1000 a tonne – and food riots in 37 countries, in some of which there is high risk of government failure.

Two thirds of all conflicts round the world in the last 20 years have been driven, at their core, by disputes stemming from a scarcity of food, land or water. While the media and governments see them as clashes of religion, culture or politics, in reality the tensions which ignite these wars come from food insecurity – the primal fear that one cannot feed one's children and must fight someone else to obtain the means to do so.

Food insecurity is a major driver of refugeeism and war. The United Nations High Commissioner for refugees recently reported there were 67 million refugees at the start of this year, the highest ever recorded, most of them displaced by conflict and famine. On top of this is surging immigrant pressure felt by all western countries as the educated or more affluent read the signs in developing countries and flee the gathering storm.

In 1850 a quarter of the Irish population left the country due to famine. Imagine, for example, what the world might look like if a quarter of all Indians were to do the same.... The looming regional food shortages of the coming famine could precipitate refugee waves numbering in the tens or even hundreds of millions, leaving no nation on Earth untouched.

If we wish to avoid these wars, riots and refugee tsunamis, the only answer is to secure the world supply of food and fibre.

This – rather than climate change – is the most urgent issue of the early 21<sup>st</sup> century. This is not to say climate change is not important. But merely to remind ourselves of the old Spanish proverb: *Civilisation and anarchy are only seven meals apart.*

Some of the answers to the global food challenge are laid out in the recent World Bank IAASTD report – a report which Australia has declined to support, leaving us out of step with world scientific opinion about what needs to be done. This report makes it clear that farmers are not only to be supported as the producers of the world's food and fibre, but also as the stewards of its fresh water and its biodiversity. They care for 40 per cent of the earth's total land mass – and they need help to manage it more sustainably.

At the same time they need a great deal of knowledge and technology to lift their production using less water, land and energy. You cannot just kick-start R&D after letting it run down. It takes on

average 15-20 years for a new piece of science and technology to be researched, developed and disseminated to most producers.

And we have let our R&D run down. In Australia there have been cuts to State agriculture departments for quarter of a century. CSIRO, after many cutbacks, recently announced a new round of cuts aimed almost exclusively at agriculture. Our universities have seen 20-40 per cent declines in enrolments in ag science. Many ag scientists are close to or past retirement age. The technology you and your successors will rely on to achieve the next great agricultural miracle is not being worked on, either here or anywhere else.

This is nevertheless an exciting time for farming. For the first time in over 40 years, the terms of trade are swinging in farming's favour. Costs are rising – but so too are commodity prices. There has never been a better time in the last two generations to be a farmer, or to be an agricultural scientist. Once more, young agricultural professionals are being challenged to feed and clothe the world. Once more governments are being forced to pay attention to your needs.

Australian cotton growers are at the bow-wave of scientific farming. You are pioneers in techniques that make vastly more efficient use of land, water, fuel and chemicals – techniques which can also be extended to food crops and livestock production. You have a major knowledge resource which is an exportable commodity in its own right, if you care to market it. Mining knowledge already earns Australia \$3 billion a year – and there is no reason why, in the current climate, cottongrowers shouldn't earn an extra few hundred million from technology. After all the global market for knowledge, the world's most valuable traded commodity, is \$5 trillion - a lot larger than the global market for cotton.

It is time to see cottongrowing as a knowledge industry, both based on knowledge and producing it as one of its essential commodities. It is time to value what's between your ears, as well as what's in your back paddock.

Of course you face huge challenges, water looming as the largest. Because of the emerging focus on the need to produce more food, your industry will have to earn the Australian public's continued sanction to grow cotton by demonstrating not only it is the national leader when it comes to getting value from scarce water, but also that it is helping other industries and nations to do likewise. That cotton is part of the solution, rather than part of the problem.

The same goes for fuel, nutrients and pesticides. We need new thinking about ways to grow crops that involve less energy, fewer chemicals, smarter use of the natural biological qualities of our soils to raise yields. You have been at this for a while now, which is why your industry is a world leader. Low input farming is the way of the future – but it needs more pioneers to make it a reality and this industry, with its high level of skills, its excellent technology focus and its strong research base is superbly placed to fulfil that role.

Nutrients will be the oil of the 21<sup>st</sup> Century. The country that first finds ways to staunch the colossal loss of nutrients out of its farming, processing and urban systems and return them to the farm will be at a global advantage. Our dairy industry is well advanced in thinking about how this can be done on farm, and I commend their ideas to you, so that cotton can lead the broadacre move to conserve and recycle nutrients.

Now I'm aware that many will be thinking: 'I'm a cottongrower – why should I help other kinds of farmers, especially in other countries, who may end up competing with me?' The answer is:

- First, to earn society's continued sanction for you to operate by demonstrating your industry is here for the greater good as well as its own prosperity
- Second because it will benefit you in your other complementary farming activities
- Third because it will open up a new income stream to you as farmers, based on the knowledge, farming systems and technologies you generate and sell.
- Fourth because, so long as you continue to invest your profits in research to make you more efficient and sustainable, you need never fear the competition.

Speaking personally, I have doubts the world can produce enough protein from conventional farming systems to feed the equivalent of 13 billion people in mid-century year-in year-out. Besides all the gains in technical efficiency we must make, I foresee a time when vegetables will play a very much larger role in both the global diet and the farm commodity mix. There are, after all, over 1000 vegetables most people have never even heard of still to be farmed. So, quaint though it may presently sound, when you think about your rotations, consider broadacre vegies, even polycultures, as among the most efficient ways to grow food per unit of energy and water.

The scientific challenges of the coming decade are clear, and I have outlined them in a longer paper, *The Coming Famine*. They include:

- The world will need a 200 per cent increase in irrigation water use efficiency across all crops. Who will lead this revolution is not yet clear – but Australian cottongrowers have the skills, the science and the intelligence to do it.
- A global effort to exploit still-poorly understood soil biology to achieve major yield increases
- Development of low-input farming systems that require far less energy, nutrients, chemicals and water.
- A global effort to recycle and conserve all nutrients, on farm, in the food chain and at the sewage works.
- A worldwide effort to raise vegetable production and consumption. This will also address the problems of obesity and malnutrition.
- Large scale adoption of 'green cities' (urban horticulture) and vegetable protein biosynthesis using nutrients from recycled sewage and composted waste, to feed the megacities. Yes, the farm of the future may well be a factory.
- Development of farming systems, especially for the Third World, that protect native vegetation and biodiversity, cleanse water and sequester soil carbon.

These challenges are far from trivial.

With its current run-down agricultural science effort Australia is equipped to tackle only a few of them. Half a century ago we shouldered similar global responsibilities with huge enthusiasm, skill and commitment – but that nation is no longer with us today. There needs to be a fundamental shift in understanding among our leaders and our society as a whole that farming still underpins our civilisation, and merits due attention and investment.

The current global food crisis mainly affects the poorest billion citizens on Earth. Yet it is a wake-up call to everyone, because of the risk of further famines, refugee crises and wars.

We must all be aware of the position, and if possible, alarmed. Then, we must act - as individuals, as communities, as industries, as countries and as a species.

Australia was a leader in the last Green Revolution and we need to rediscover that spirit and that determination to make a difference. We need to replenish both our science and our generosity as a people.

The cotton industry is at the forefront of knowledge-based farming in Australia.

The challenge that I wish to leave you with is to lead by your example the world's next great farming revolution, whose need is now hard upon us.

Ends.