Global Food Crisis

Edited by Justin Healey
Global Food Crisis

Edited by Justin Healey

Volume | 327

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**Global Food Crisis** is Volume 327 in the ‘Issues in Society’ series of educational resource books. The aim of this series is to offer current, diverse information about important issues in our world, from an Australian perspective.

**KEY ISSUES IN THIS TOPIC**
Currently, a billion undernourished people experience hunger on a regular basis. Global food production will have to rise 70 per cent by 2050 as the world population expands to 9.1 billion from 6.8 billion people.

Recent global food prices have been the highest on record, exceeding 2008 levels that sparked deadly riots across the world. Causal factors include population growth, climate change and weather-related crop problems, diminishing water supplies, oil prices and diversion of food crops to biofuel production, damaging farming practices, and land shortages.

Is an ongoing world food crisis inevitable?
What is Australia’s role in global food security and how are we managing our own domestic food challenges in relation to environmental sustainability, rising food prices and declining productivity?
This book is presented in two chapters: Global hunger and food supply; and Australia’s food security.

**SOURCES OF INFORMATION**
Titles in the ‘Issues in Society’ series are individual resource books which provide an overview on a specific subject comprised of facts and opinions.

The information in this resource book is not from any single author, publication or organisation. The unique value of the ‘Issues in Society’ series lies in its diversity of content and perspectives.

The content comes from a wide variety of sources and includes:
- Newspaper reports and opinion pieces
- Website fact sheets
- Magazine and journal articles
- Statistics and surveys
- Government reports
- Literature from special interest groups

**CRITICAL EVALUATION**
As the information reproduced in this book is from a number of different sources, readers should always be aware of the origin of the text and whether or not the source is likely to be expressing a particular bias or agenda.

It is hoped that, as you read about the many aspects of the issues explored in this book, you will critically evaluate the information presented. In some cases, it is important that you decide whether you are being presented with facts or opinions. Does the writer give a biased or an unbiased report? If an opinion is being expressed, do you agree with the writer?

**EXPLORING ISSUES**
The ‘Exploring issues’ section at the back of this book features a range of ready-to-use worksheets relating to the articles and issues raised in this book. The activities and exercises in these worksheets are suitable for use by students at middle secondary school level and beyond.

**FURTHER RESEARCH**
This title offers a useful starting point for those who need convenient access to information about the issues involved. However, it is only a starting point. The ‘Web links’ section at the back of this book contains a list of useful websites which you can access for more reading on the topic.
GLOBAL FOOD CRISIS

An information sheet from the Australian Council for International Development

What are the issues?
According to World Food Program, an estimated 854 million people experience hunger on a regular basis. The impact of the food crisis might add another 100 million to the current figure (2009) of a billion people who live on less than $1 a day (the common measure of absolute poverty).

The global food crisis disproportionately affects the poor in developing countries who spend 60 per cent to 80 per cent of their income on food.

Since early 2007, the food crisis (in combination with the global financial crisis since September 2008) has pushed a number of countries to implement emergency measures to protect domestic industries. India, Pakistan, Argentina, Russia and China are amongst the countries that have taken steps to block exports of food.

Food aid volumes in 2007/08 reached their lowest levels since the early 1970s as a result of rising food prices accompanied with increased transportation costs.

What is causing the food crisis?
Experts quote several factors affecting the balance between the demand for food and the availability of supply, including:
➤ Poor harvests in Australia, some Asian countries and parts of Europe;
➤ A growing demand for biofuels, experts predict that the growing demand will continue to inflate the price of food;
➤ As the prices of fuel and fertiliser products rises, the cost of producing food is increasing;
➤ Increasing world population means larger demand for food and with the Chinese and Indian economies still growing there is further increased demand for food;
➤ Massive underinvestment in agricultural production and technology in developing countries.

What should be done?
While the root causes of the current food crisis will take time to address, there are immediate actions that can be undertaken.

The first response to the food crisis must be to provide the poor with access to emergency supplies of food or cash to buy food provided that is a possibility in their development context.

Increased investment in agriculture is of importance for finding a longer-term solution to the global food crisis. Governments in the poorest countries, with the support of key donors and international institutions, must undertake serious reinvestment in agriculture, in particular to increase the productivity of small farming businesses.

Export bans aimed at protecting domestic markets can be counterproductive in the long term because they can undermine the incentives for farmers to increase production and they can reduce the resilience of the food system. Barrier free international trade can be an important contribution to market stabilisation, allowing countries to compensate local shortfalls through the market.

In developing countries in particular, there is a need to ensure that biofuel crops do not replace essential stable crops to the extent that affordable food becomes unavailable to local people.

FURTHER INFORMATION
Another Inconvenient Truth: How biofuel policies are deepening poverty and accelerating climate change, Oxfam International (25 June 2008).
Crop Prospects and Food Situation No.1, UN Food and Agriculture Organisation (2009).

© Australian Council for International Development | www.acfid.asn.au
ACFID Information Sheet, April 2009
TACKLING THE GLOBAL FOOD CRISIS
An UNCTAD policy brief in response to the 2008 food crisis

The rush to address the most urgent humanitarian aspects of the global food crisis should not deflect attention from the profound failure of trade and development policy that underlies the crisis. This policy brief addresses the systemic causes of the crisis and identifies strategic policy measures – such as boosting investment, innovation and productivity growth – for creating a more robust and sustainable framework for global agricultural production and trade. It also suggests the need for a coordinated global response to speculation in food prices.

World food prices have roughly doubled over the past three years, but between April 2007 and April 2008 alone they increased by 85%. This price rise has been broad-based, led by wheat (whose price almost doubled), then maize (up 67% since July 2007), followed by rice (which has tripled since September 2007 and soared by 160% between January and April 2008 alone). Prices for vegetable oilseeds and oils also shot up, multiplying by about 2.5 since early 2006.

The fact that the current price boom includes nearly all major basic foodstuffs and feedstocks is what most distinguishes it from earlier such booms. And the fact that it applies to all commodities, not just food, hints at driving forces that go beyond shocks from drought and flooding. No single factor has been responsible. Rather, different factors have been of varying importance for different food items.

Many contributing factors ...

By now, the constellation of these contributing factors is well known. Some analysis is, however, essential, especially of how the factors interact. Without it, not only is the crisis likely to recur in one form or another, but the policy failure that underpins it will be with us for decades.

Most experts trace the start of the crisis to the long-term trend of increased demand for food. The effects of that rising demand – largely the result of population growth, urbanisation, and rapid economic development in East and South-East Asia in particular – were amplified by recent droughts, slow supply response, the fall in the dollar, high energy prices, and concerns over increased demand for biofuels. The effects of these factors on food commodity prices were in turn exacerbated by government export restrictions and market speculation.

It is probably no coincidence that global food prices surged in the wake of the global financial volatility sparked by last year’s collapse in the US subprime mortgage market. Speculators looking for assets with rising prices may well have sensed the strains in world food markets and re-oriented their portfolios towards food commodities. This would go a long way towards explaining why the UNCTAD food price index rose by 84% between April 2007 and April 2008, when a much more gradual increase might otherwise have been expected. In 2006, for example, the index was up by only 8.5%, even though both China and India, for example, were already growing at record rates.

But the crisis also has deep-seated, longer-term causes, including low and declining agricultural productivity in many developing countries. Particularly in the LDCs, the sector was more productive 50 years ago than it is today, according to UNCTAD figures. In terms of yield, the annual growth of cereal crops in many LDCs shrunk from 3-to-6% in the 1980s to just 1-to-2% today.

Low productivity has its own contributing factors, which are physical, policy-related, institutional, and financial in nature. The availability of arable land is dwindling. More and more farmers work on ecologically fragile land, and average farm size is diminishing. In countries like Ethiopia and Malawi, for example, since the 1990s it has fallen by one third, to about 0.8 hectares. This worrying trend is only being accelerated by climate change and, paradoxically, attempts to mitigate climate change, such as the increasing use of arable land for afforestation.

Also contributing to the low productivity are policies that abolished or weakened the role of key institutional support measures. Such measures include, for example, state-supported extension services, marketing boards, and state subsidies for agricultural inputs like seeds, pesticides, herbicides and fertilizers. Farmers are further discouraged by the availability of cheap food products on international markets, due largely to export subsidies in developed countries. According to recent analysis by the FAO and UNCTAD, these subsidies have been associated with rapidly increasing food imports in developing countries. Indeed, a number of traditionally food-exporting developing countries – many of them LDCs – have become net food importers over the past 20 years. Sadly, these countries are the hardest hit by the current crisis, a crisis made even worse for them by mounting oil prices.

Investors – whether domestic or foreign, public or private – are discouraged as well, leading to a downturn in investment in agriculture and the transport and logistical infrastructure needed to distribute agricultural products. Worse still, international aid to developing-country...
agriculture has been seriously inadequate, and actually declined in recent years. Donors’ new emphasis on social-sector and emergency aid, while essential, has meant less investment in productive sectors like agriculture.

Between 1980 and 2002, multilateral institutions slashed ODA on agriculture from US $3.4 billion to US $500 million, an 85% decline. Bilateral donors reduced spending by 39%, from US $2.8 billion to US $1.7 billion. Most crucially, donors appear to have neglected aid for science, technology and innovation in agriculture.

... and many possible solutions

While emergency measures can address the most urgent needs, the food crisis in the longer run must be addressed at the national and international policy level in order to boost sustainable investment, innovation and productivity growth.

In the short term

Emergency measures through UN food programmes and bilateral food-related development aid are one priority for ensuring that sufficient food is available to the poorest households. So is assistance to poor smallholder farmers to boost production – for example, by expanding their access to such vital inputs as seeds and fertilizer.

At the international level, preparing a coordinated global response to global speculation in food prices is another urgent task. This should include measures to allow concerted government intervention in food markets if there is a strong indication that speculation is driving prices. Similarly, international coordination could help minimise the potentially dangerous implications of food hoarding and restrictions or bans on food exports. Producer-consumer cooperation schemes, and schemes that promote integrated agricultural production for food and fuel, should also be looked at anew.

The inflationary effects of rising food and energy prices need to be tackled as well. Many central bankers may be faced with inflation beyond targeted levels, which could well make them reluctant to ease monetary policy, even though that is what is required to offset the expected slowdown in economic growth. Again, global cooperation may be needed to avoid an accumulation of repressive measures.

In the medium term

A priority in the medium term is to address the undercapitalisation that limits food production and productivity in many developing countries. Cheap and reliable credit for small farmers and enhanced public investment in infrastructure and irrigation are therefore important. With greater public and private investment in agriculture and rural development, and especially in agricultural R&D, the world’s 400 million smallholders could mobilise their potential, improving not only their own nutrition and incomes but national food security and economic growth as well. Other medium-term priority measures must be for developed countries to consider some flexibility for their biofuel blending targets; to review the erection of protectionist barriers against ethanol and biodiesel imports from developing countries; and to review the granting of subsidies to domestic biofuel and feedstock producers. At the same time, the opportunities that biofuels can present in terms of reduced energy bills and a more dynamic agricultural sector should not be ignored.

Yet another priority is to reduce long-standing agricultural export subsidies and domestic support policies in developed countries, which have hurt developing-country agriculture, as mentioned above. In this regard, current price levels offer a double dividend. In the developing world, they can motivate farmers to boost production. And in the industrial world, where they offer farmers a decent return without the need for subsidies, policy makers can use the opportunity to phase out the subsidies and invest the freed-up financial resources in agricultural development in developing countries. An agreement on agriculture in the current Doha Round of negotiations could help capitalise on this dividend.

In the long term

Raising agricultural productivity around the globe is clearly crucial in addressing the substantial increase of both food consumption and land use for non-food purposes. At the national level, it needs to become a priority in development strategies. Developing countries must design a policy framework that creates the right incentives for investment in agriculture and defines the appropriate mix between food and export crops. They must provide the necessary infrastructure and extension services. They should calibrate their national trade policies to promote agriculture production; eliminate tariffs on agricultural inputs; and provide better training and knowledge to farmers. At the international level, these efforts must be supported through increased ODA and investment in infrastructure and agricultural R&D, and by removing distortions in the international agricultural market.
FOOD AND WATER CRISIS: FACT OR FICTION?
A strategic analysis paper by Gary Kleyn from Strategic Directions International

SUMMARY
Future Directions International (FDI) is embarking on a significant study into food and water crises that exist around the world. Before beginning this task it is useful to determine if we presently have global food and water crises or if there is a potential for such crises. That is the aim of this preliminary paper. This paper will set the framework for further study as outlined in FDI’s 20 January 2010 Strategic Analysis Paper Food and Water Crises: Research Process.

ANALYSIS
The Food and Water Crisis: Research Process began with the overarching question:

How can Australia best display a global leadership role in improved and sustained agriculture productivity and landscape regeneration in the event of a global food and water crisis?

While the above scoping question suggests one event or crisis, FDI recognises that the issue is far more complex. Rather than being universal in its nature, a crisis may occur only in certain parts of the world at different periods of time.

A crisis is also subjective and philosophical: what one person or nation might term a crisis may be considered normal to other people. There is no sliding scale which is universally recognised which could help researchers to determine if there is a crisis and the extent of such a crisis. The difficulties in determining whether a crisis, or a number of crises, exists need to be recognised in any study on the issue of food and water security. A useful starting point then is to consider the definition of a crisis.

So what is a crisis?
Adopted from the Greek word ‘krisis’, the Oxford Dictionary provides two variances to the word by referring it to:

1. A decisive moment, a time of danger or great difficulty, or
2. The turning point.

Depending on what version of crisis is meant, synonyms to the word may include emergency, predicament, meltdown, critical situation, plight, critical point, climax, turning point, culmination, and moment of truth.

It could be argued that evidence of land and water degradation, climate change and a rising population could be individual crises. Combined they can make a super crisis.

The theory
While a number of economists and population experts have sought to understand food and water constraints, arguably the most useful articulation of population and its relation to food production was achieved by Thomas Robert Malthus who lived from 1766-1834. In 1803 he wrote an essay on the Principles of Population.

He argued in this essay that the standard of living of the masses could not be improved because the power of population is indefinitely greater than the power of the Earth to produce subsistence for men.

Unless the population was checked by famine, disease or war, Malthus argued that mankind was doomed. Central to this theory is that the population increases by a geometric ratio. His theories are based on the Law of Diminishing Marginal Returns.

FIGURE 1: THE DECLINING TREND IN THE PROPORTION OF UNDERNOURISHED IN DEVELOPING COUNTRIES HAS BEEN REVERSED

Percentage of undernourished

Source: FAO
The Law of Diminishing Returns says that when additional quantities of labour are applied to work on a fixed quantity of land and capital, then, while output would grow, it would do so at progressively smaller rates. Malthus believed that population growth was the obstacle to human progress. Concerns about excessive population, methods of birth control and problems of feeding the world’s poor hark back to Malthus. His application of the Law of Diminishing Returns, however, has been discredited because it failed to adequately allow for technological advances.

History of crises

History indicates famine and drought have often been a factor that humans have dealt with.

We read of numerous famines and droughts in the Bible. More recently we can point to the Chinese famine that existed from 1958 to 1961 which killed up to 40 million people. The Irish potato famine of 1845-1851, during which time an estimated 1 million people died, is another example. In the African country of Ethiopia many famines have devastated the country including the 1984 famine when an estimated 1 million perished.

Under communist rule, the Ukraine Famine 1932-3 resulted in a death toll that has been estimated at between 6 million and 7 million – approximately 20 per cent of the population.

From this historical context it is difficult to determine if the crisis is worse now than in previous generations. Indeed, the percentage of the world population suffering from hunger could be significantly lower than in previous generations although, in absolute terms, the number of people suffering from hunger has increased.

The point of the FDI study is not to question the depth of the crisis in historical terms but to recognise that hunger still does exist and to consider the reasons for this in order to seek solutions.

Current situation

The Food and Agriculture Organization (FAO) of the United Nations estimates that in 2009 1.02 billion people were undernourished worldwide. The number of undernourished people has increased.

There are more hungry people than at any time since 1970s – the earliest year when comparable statistics are available. Of these 642 million live in Asia and the Pacific, while 265 million live in Sub-Saharan Africa.
In percentage terms the number of people in hunger in Sub-Saharan Africa is 32 per cent - the highest relative to its population size in the world. In 1969 an estimated 878 million, or 24 per cent, of the world were undernourished.

The largest percentage increase in the number of hungry people in the developing world occurred in the Near East and North Africa. The FAO refers to the Near East as being the countries of Iran, Jordan, Kuwait, Lebanon, Saudi Arabia, Syria, Turkey, United Arab Emirates and Yemen, while North Africa region includes Algeria, Egypt, Libya, Morocco and Tunisia. In these regions, the number of those undernourished increased by 13.5 per cent. An additional 100 million people have been added to those undernourished in the past year.

While the number of hungry or undernourished people increased since the 1990s, the number of undernourished was actually in decline in the 1970s and 1980s. From the mid 1990s, however, and especially in the past year, the number of undernourished has risen. Undernourishment or hunger occurs when the food intake is less than the minimum energy requirements.

The FAO released in December 2009 the report The State of Food Insecurity in the World. This report indicates a significant worsening in global food security since 1996. 2009 was described as a devastating year largely due to the global economic slowdown. As the graph Figure 2) indicates, the number of people undernourished has increased significantly in the past year.

The United Nations claims that the current crisis is historically unprecedented, with several factors converging to make it particularly damaging to people at risk of food insecurity.

Reasons behind crises
The global financial crisis is viewed by Oxfam and the United Nations as one of the significant factors behind the sharp increase in food insecurity and vulnerability in the past year.

The financial crisis led to a substantial decline in remittance inflows into developing countries. Concurrently, the price of food remained higher than average. At the end of 2008, domestic prices for staple foods remained in developing countries 17 per cent higher in real terms than 2 years earlier.

The FAO also points to the linkages between energy markets and food as a factor in greater food insecurity. Biofuels and the new linkages between agricultural and energy markets have been an additional complexity. This is particular so the energy market is significantly larger than the world grain market, so that grain prices may be determined by oil prices as opposed to being set by the supply of grain.

CONCLUSION
In future studies FDI will continue to examine the nature of food and water crises, when and where it will occur, what form they will take and what the global, regional and national implications might be. FDI will also be looking at the potential for future intra- and inter-state conflict as a result of food and water insecurity. Perhaps most significantly, FDI will demonstrate ways that such crises can be averted and what leadership role Australia can play in providing solutions to the crisis.

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FOOD SECURITY

FACTS

➤ World Food Day, 16 October, highlights the need to ensure that all people have physical and economic access at all times to enough nutritious, safe food to lead healthy and active lives
➤ More than half the world’s population lives in low-income, food-deficit countries that are unable to produce or import enough food to feed their people
➤ More than one-third of all children are malnourished and 6 million children a year die of causes related to malnutrition
➤ Most of the world’s hungry people are found in the developing world, but 34 million live in the developed world
➤ Soil degradation, chronic water shortages, inappropriate agricultural policies and population growth threaten food production in many countries
➤ While growing export crops such as coffee, cocoa and sugar produces export income, it can lead to a decrease in basic food production, causing hardship for people who are poor
➤ Between 1960 and 1990 world cereal production more than doubled, food production increased by one-third per head, daily intake of calories increased by one-third, and real food prices fell by almost half
➤ There is enough food in the world for everyone to have enough to eat, but it is unevenly distributed.

Source: www.fao.org

BACKGROUND

WHAT IS FOOD SECURITY?

Food security exists when all people, at all times, have physical and economic access to enough safe and nutritious food to meet their dietary needs and food preferences for an active and healthy lifestyle. (World Food Summit 1996)

To be food secure means that:
➤ Food is available – The amount and quality of food available globally, nationally and locally can be affected temporarily or for long periods by many factors including climate, disasters, war, civil unrest, population size and growth, agricultural practices, environment, social status and trade
➤ Food is affordable – When there is a shortage of food prices increase and while richer people will likely still be able to feed themselves, poorer people may have difficulty obtaining sufficient safe and nutritious food without assistance
➤ Food is utilised – At the household level, sufficient and varied food needs to be prepared safely so that people can grow and develop normally, meet their energy needs and avoid disease.

WHAT HAPPENS WHEN PEOPLE DO NOT HAVE FOOD SECURITY?

For the more than 800 million people who do not get enough regular, healthy food, ill health and a shorter life expectancy are real risks. Children, and especially very young children, who suffer from food insecurity will be less developed than children of the same age who have had sufficient food. They will most likely be shorter and weigh less, and be less able physically and intellectually, because of poor nutrition.

WHY IS THERE FOOD INSECURITY?

Poverty

Poor people lack access to sufficient resources to produce or buy quality food. Poor farmers may have very small farms, use less effective farming techniques, and/or

Multiple factors are behind the global food security crisis:
➤ Rapidly increasing energy prices
➤ Lack of agricultural sector investment
➤ Rapidly rising demand for food arising from economic growth and higher incomes
➤ Trade-distorting subsidies
➤ Recurrent bad weather and environmental degradation
➤ Subsidised biofuels that substitute food production
➤ Imposition of export restrictions leading to hoarding and panic buying.

Source: WHO | www.who.int/food_crisis/en/
be unable to afford fertilisers and labour-saving equipment, all of which limit food production. Often they cannot grow enough food for themselves, let alone generate income by selling excess to others. Without economic resources and a political voice, poor farmers may be forced on to less productive land possibly causing further environmental deterioration. Addressing poverty is critical to ensuring that all people have sufficient food.

Health

Without sufficient calories and nutrients, the body slows down, making it difficult to undertake the work needed to produce food. Without good health, the body is also less able to make use of the food that is available. A hungry mother will give birth to an underweight baby, who then faces a future of stunted growth, frequent illness, learning disabilities and reduced resistance to disease. Contaminated food and water can cause illness, nutrient loss and often death in children.

The HIV/AIDS pandemic has reduced food production in many affected countries as productive adults become ill or die. Lacking the labour, resources and know-how to grow staples and commercial crops, many households have shifted to cultivating survival foods or even leaving their fields, further reducing the food supply. Addressing health issues will improve utilisation and availability of food.

Water and the environment

Food production requires massive amounts of water. It takes one cubic metre (1,000 litres) of water to produce one kilogram of wheat and 3,000 litres of water to produce one kilogram of rice. Producing sufficient food is directly related to having sufficient water. Irrigation can ensure an adequate and reliable supply of water which increases yields of most crops by 100% to 400%. Although only 17% of global cropland is irrigated, that 17% produces 40% of the world’s food. Increasing irrigation efficiency and limiting environment damage through salinisation or reduced soil fertility are important for ongoing food availability.

Where water is scarce and the environment fragile, achieving food security may depend on what has been called ‘virtual water’, that is, importing food from countries with an abundance of water. This may be a more efficient use of a scarce resource.

Gender equity

Women play a vital role in providing food and nutrition for their families through their roles as food producers, processors, traders and income earners. Yet women’s lower social and economic status limits their access to education, training, land ownership, decision making and credit and consequently their ability to improve their access to and use of food. Food utilisation can be enhanced by improving women’s knowledge of nutrition and food safety and the prevention of illnesses. Increasing women’s involvement in decision making and their access to land and credit will in turn improve food security as women invest in fertilisers and better seeds, labour-saving tools, irrigation and land care.

Disasters and conflicts

Droughts, floods, cyclones and pests can quickly wipe out large quantities of food as it grows or when it is in storage for later use. Likewise, seeds can be destroyed by such environmental dangers.

Conflict can also reduce or destroy food in production or storage as farmers flee to safety or become involved in the fighting. Previously productive land may be contaminated with explosive debris and need to be cleared before it can again be used for food production. Stored food, seeds and breeding livestock may be eaten or destroyed by soldiers, leading to long-term food shortages. Government spending needs to prioritise food security in the aftermath of conflict.

Population and urbanisation

Population growth increases the demand for food. With most productive land already in use, there is pressure for this land to become more productive. Poor harvests and higher costs lead many poor farmers to migrate to cities to look for work. Expanding cities spread out across productive land, pushing food production further and further away from consumers. This increases the cost of all the activities associated with producing and transporting food, and decreases the food security of the poor in cities.

Trade

Many poor countries can produce staples more cheaply than rich nations but barriers to trade, such as distance from markets, quarantine regulations and tariffs make it difficult for them to compete in export markets against highly subsidised farmers in rich countries. This deprives poor farmers of income and entire countries of the agricultural base they need to develop other sectors of the economy. In addition, trade imbalances prevent poor countries from importing agricultural products that could enhance their food security.

WHAT IS BEING DONE?

Improving food production

Increasing the amount of food available is necessary to feed the growing population. The Green Revolution of the 1970s and 1980s led to huge increases in output, largely due to the cultivation of high-yielding varieties of rice and wheat, the expansion of land under production and irrigation, greater use of fertilisers and pesticides and greater availability of credit. In many countries these gains have reached their limit, and social and environmental issues must now be addressed. Further increases in food production depend on better integration of traditional knowledge with research; improving farming practices through training and the use of technology to increase outputs from current land without further loss of productive land; land reform to provide secure access to land for more people; and the provision of low-cost finance to help farmers invest in higher quality seeds and fertilisers and small irrigation pumps.

While genetically modified seeds are being hailed as a means of improving crop outputs, there are also concerns about the ownership of seeds, adequate compensation for traditional knowledge and possible side effects.
Economic growth and trade liberalisation

Increasing food production leads to greater availability of food and economic growth in the domestic and/or overseas markets. Generating income can provide access to more and varied foods and provide cash for use in other areas of the economy, such as small enterprise and manufacturing, which in turn helps reduce poverty. Trade liberalisation is opening up markets slowly, but there are costly barriers to overcome. Work is underway through the Doha Round of multilateral trading negotiations in the World Trade Organisation to make trade rules fair, encourage trade liberalisation and assist developing countries to participate in the global trade environment.

Distribution

While there are sufficient resources in the world to provide food security for all, policy and behavioural changes are necessary to guarantee a fair share for all people, especially the poor.

Building on a series of global conferences, in particular the 1992 International Conference on Nutrition and the 1996 and 2002 World Food Summits, countries have developed national nutrition plans and policies in nine major strategic action areas that:

➤ Include mainstream nutrition goals in development policies and programmes
➤ Improve household food and nutrition security
➤ Protect consumers through improved food quality and safety
➤ Prevent and manage infectious diseases
➤ Promote breastfeeding
➤ Care for the socioeconomically deprived and nutritionally vulnerable
➤ Prevent and control specific micronutrient deficiencies
➤ Promote appropriate diets and healthy lifestyles
➤ Assess, analyse and monitor nutrition situations.

The progress towards achieving these goals, however, has been much slower than intended.

Recognising the role of women

Gender equality is a prerequisite for the eradication of poverty and hunger. Many programs recognise the need for changes in access to food, land, credit, education, health and nutrition training and decision making in order to make effective use of women’s roles in agricultural production and food preparation.

Food aid

The need for food during emergencies such as drought, disaster, population displacement and conflict is addressed by the distribution of basic food supplies and fuel. Early warning systems can predict problem areas, allowing action to be taken to keep people in their homes and help them back to food self-sufficiency as quickly as possible. Food sourced locally rather than internationally minimises the costs and disruption to local markets. In severe situations feeding may be necessary but often food aid is linked with work, health or education to avoid dependency and address the long-term causes of food insecurity.

AUSTRALIA’S RESPONSE

The Australian Government helps developing countries in its region to reduce poverty and address food security by promoting trade liberalisation, peace and stability, good governance, security of land tenure, rural development and agricultural research. Australia also provides emergency food aid to developing countries in need. In May 2003, the Australian Government announced a $1 billion food security pledge for the 5 years from 1 July 2003 to 30 June 2008 for programs and initiatives that enhance the food security of people in the developing world.

Specific programs to improve food security for those in need include:

➤ Helping people improve their farms and productivity
➤ Constructing food stores and improving roads so that food can be moved to where it is needed or where it can be sold
➤ Promoting national and international trade to encourage economic growth and poverty reduction
➤ Improving the status of women and girls so they have more control over the areas in which they have traditionally been involved and can access new areas
➤ Ensuring that people, and especially children, receive food in emergency situations
➤ Promoting rural development, including sustainable agricultural, fishery and forestry production and management of natural resources
➤ Preparing for disasters and emergencies to meet transitory and emergency food requirements in ways that encourage recovery and rehabilitation.

Each year Australia contributes up to 150,000 tonnes of Australian-produced wheat and rice to the World Food Programme. This operates like a ‘food bank’ that can be used during both humanitarian emergencies and development situations to help households shift towards more sustainable livelihoods.

FOR MORE INFORMATION


Global Education | www.globaleducation.edna.edu.au
GLOBAL HUNGER DECLINING, BUT STILL UNACCEPTABLY HIGH

INTERNATIONAL HUNGER TARGETS ARE PROVING DIFFICULT TO REACH, ACCORDING TO THIS FAO FACT SHEET

At close to 1 billion, the number of undernourished people in the world remains unacceptably high in 2010 despite an expected decline – the first in 15 years. This decline is largely attributable to a more favourable economic environment in 2010 – particularly in developing countries – and the fall in both international and domestic food prices since 2008. The recent increase in food prices, if it persists, will create additional obstacles in the fight to further reduce hunger.

FAO estimates that a total of 925 million people are undernourished in 2010 compared with 1.023 billion in 2009. That is higher than before the food and economic crises of 2008-2009 and higher than the level that existed when world leaders agreed to reduce the number of hungry by half at the World Food Summit in 1996 (Figure 1).

Most of the world’s hungry live in developing countries, where they account for 16 per cent of the population. While this figure marks an improvement compared to 2009, it is still well above the target set by the Millennium Development Goal (MDG) 1 of halving the proportion of undernourished people in developing countries from 20 per cent in 1990-92 to 10 per cent in 2015 (Figure 2).

BETTER ACCESS IS KEY

Global cereal harvests have been strong for the past several years, even as the number of undernourished people was rising. The overall improvement in food security in 2010 is thus primarily a result of better access to food due to the improvement in economic conditions, particularly in developing countries, combined with lower food prices.

The International Monetary Fund estimates that world economic output will increase by 4.2 per cent in 2010, faster than previously expected, following a contraction of 0.6 per cent in 2009. In general, income is growing faster in emerging economies and developing countries than it is in developed countries.

The World Bank estimates that private capital inflows to developing countries are also increasing faster than originally expected.

In parallel, international and domestic cereal prices have declined from their 2008 peaks, reflecting two consecutive years of record yields. While production in 2010 is forecast to be lower, the overall supply situation is considered as adequate. However, food prices in most low-income food-deficit countries remain above the pre-crisis level, negatively affecting access to food by vulnerable populations.

INSUFFICIENT RESILIENCE TO ECONOMIC SHOCKS

The analysis of hunger during crisis and recovery brings to the fore the insufficient resilience to economic shocks of many poor countries and households. Lack of appropriate mechanisms to deal with the shocks or to protect the most vulnerable populations from their effects result in large
swings in hunger following crises.

Moreover, it should not be assumed that all the effects of crises on hunger disappear when the crisis is over. Vulnerable households may deal with shocks by selling assets, which are very difficult to rebuild, by reducing food consumption in terms of quantity and variety, and by cutting down on health and education expenditures – coping mechanisms that all have long-term negative effects on the quality of life and livelihoods.

UNDERNOURISHMENT BY REGION

Developing countries account for 98 per cent of the world’s undernourished people. Two-thirds live in just seven countries (Bangladesh, China, the Democratic Republic of the Congo, Ethiopia, India, Indonesia and Pakistan) and over 40 per cent live in China and India alone.

Estimates for 2010 indicate that the number of undernourished people will decline in all developing regions, although with a different pace. The region with most undernourished people continues to be Asia and the Pacific, but with a 12 per cent decline from 658 million in 2009 to 578 million, this region also accounts for most of the global improvement expected in 2010. The proportion of undernourished people remains highest in sub-Saharan Africa, at 30 per cent in 2010 (Figure 3).

MDG 1 DIFFICULT TO REACH

Latest available statistics indicate that some progress has been made towards achieving MDG 1, with the prevalence of hunger declining from 20 per cent undernourished in 1990–92 to 16 per cent in 2010.

However, with the world’s population still increasing (albeit more slowly than in recent decades), a declining proportion of people who are hungry can mask an increase in the number. In fact, developing countries as a group have seen an overall setback in terms of the number of hungry people (from 827 million in 1990–92 to 906 million in 2010).

As of 2005–07 (the most recent period for which complete data are available), the Congo, Ghana, Mali and Nigeria had already achieved MDG 1 in sub-Saharan Africa, and Ethiopia and others were close to doing so. In Asia, Armenia, Myanmar and Viet Nam had achieved the target reduction and others were coming close, including China. In Latin America and the Caribbean, Guyana, Jamaica and Nicaragua had succeeded in reducing the prevalence of hunger by half and Brazil, among others, was approaching this objective.

The fact that nearly a billion people remain hungry even after the recent food and financial crises have largely passed indicates a deeper structural problem that gravely threatens the ability to achieve internationally agreed goals on hunger reduction. In order to tackle the root causes of hunger, governments should encourage increased investment in agriculture, expand safety nets and social assistance programmes, and enhance income-generating activities for the rural and urban poor.

FURTHER INFORMATION

➤ The State of Food Insecurity in the World: Addressing food security in protracted crises. FAO/WFP (released in October 2010).
FAO Hunger Map 2010

Prevalence of undernourishment in developing countries

Note: The map shows the prevalence of undernourishment in the total population of developing countries as of 2005-7 – the most recent period for which complete data are available. Undernourishment exists when caloric intake is below the minimum dietary requirements (MDER). The MDER is the amount of energy needed for light activity and a minimum acceptable weight for attained height, and it varies by country and from year to year depending on the gender and age structure of the population.

The designations employed and the presentation of material in the map do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal or constitutional status of any country, territory or sea area, or concerning the delimitation of frontiers.

Prevalence of undernourishment in developing countries (2005-07)

- Very high (undernourishment 35% and above)
- High (undernourishment 25-34%)
- Moderately high (undernourishment 15-24%)
- Moderately low (undernourishment 5-14%)
- Very low (undernourishment below 5%)
- Missing or insufficient data

Source: FAOSTAT 2010 (www.fao.org/hunger)
Countries currently requiring external assistance for food

Countries in crisis requiring external assistance for food are expected to lack the resources to deal with reported critical problems of food insecurity. The list below covers crises related to lack of food availability, widespread lack of access to food, or severe but localised problems. However, many countries are also severely affected by high food and fuel prices. These include countries which are large net importers of cereals and fuels, with generally low per capita incomes, relatively high levels of malnutrition, and for which there is a strong transmission of high international food prices. Information from the Food and Agricultural Organization of the United Nations

<table>
<thead>
<tr>
<th>ASIA (7 countries)</th>
<th>MAIN REASONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exceptional shortfall in aggregate food production/supplies</td>
<td>Economic constraints and lack of agricultural inputs leading to inadequate food production and aggravated food insecurity. Severe winter conditions are expected to reduce wheat harvest</td>
</tr>
<tr>
<td>Iraq</td>
<td>Severe civil insecurity</td>
</tr>
<tr>
<td>Democratic People’s Republic of Korea</td>
<td>Lingering effects of the extreme cold (Dzud) last winter resulted in death of nearly 6 million heads of livestock out of a total of 44 million and adversely affected livelihoods of some 500,000 people</td>
</tr>
<tr>
<td>Mongolia</td>
<td>Economic constraints and lack of agricultural inputs leading to inadequate food production and aggravated food insecurity. Severe winter conditions are expected to reduce wheat harvest</td>
</tr>
<tr>
<td>Severe localised food insecurity</td>
<td>Conflict, insecurity and high food prices. Moderately food insecure areas are in the centre and north-east of the country</td>
</tr>
</tbody>
</table>

| Kyrgyzstan | Effects of social unrest, recent ethnic conflicts, internally displaced persons |
| Pakistan | Lingering effects of severe flooding last year, which affected some 18 million people causing damage to housing, infrastructure and crops |
| Yemen | Effects of unrest and recent conflict, internally displaced persons (about 300,000 people still in camps) and refugees (about 170,000 people) |

<table>
<thead>
<tr>
<th>LATIN AMERICA AND THE CARIBBEAN (1 country)</th>
<th>MAIN REASONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe localised food insecurity</td>
<td>Over 3 million people will need food assistance in April-May. The majority of food-insecure households are mostly in poor and extremely poor areas affected by the cholera epidemic and Hurricane Tomas. Socio-political situation uncertain and high food prices</td>
</tr>
<tr>
<td>Haiti</td>
<td>This table continues overleaf on page 14</td>
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</tbody>
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13 August 2009

Counting the cost of malnutrition

World Vision explains the impacts of malnutrition on children and their families

Every year, roughly 6 million children under 5 die because of nutrition-related illness. And beyond this shocking statistic, malnutrition causes daily suffering and long-term setbacks for individuals, communities and entire countries.

When children don’t have enough to eat or when they lack adequate nutrition, this affects almost every aspect of their lives.

According to UNICEF, some 300 million children go to bed hungry every day. Of these only 8 per cent are victims of famine or other emergencies. The rest suffer from long-term malnutrition which can be caused by poor health and illness that prevents the body from absorbing the nutrients it needs.

First and foremost, malnutrition affects children’s health. Sustained undernutrition can lead to stunted growth and retardation. Malnourished children have weaker immune systems and are more prone to infectious diseases.

Lack of food and/or adequate nutrition also affects children’s education and many malnourished children have trouble concentrating in school because of lethargy and poor attention spans.

When starvation is a real possibility, families are forced to make difficult choices. Children may be pulled out of school and sent to scavenge or work for food, subjecting them to lost education, early forced marriage, damaged health, sexual and labour abuse, and loss of basic rights. Girls are particularly vulnerable.

Beyond these immediate impacts on children, malnutrition carries social and economic costs that hold back entire communities. It’s widely recognised that malnutrition is a result of poverty. But it’s also a cause of it.

Unable to reach their mental and physical potential, malnourished children who live to see adulthood are less productive than their well-nourished counterparts and often face a lifetime of chronic illness and disability.

At the family level, malnutrition-linked illnesses place enormous strain on coping mechanisms especially in poor communities where ‘social services’ don’t exist.

When you add all this up, the drain on global development caused by malnutrition is overwhelming. World Vision is focused on ensuring that all people, especially children, are able at all times to be free from hunger.

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## AFRICA (21 countries)

<table>
<thead>
<tr>
<th>Country</th>
<th>Main Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exceptional shortfall in aggregate food production/supplies</td>
<td>An estimated 1.68 million persons in rural and urban areas require food assistance despite overall improved food security conditions</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>Widespread lack of access</td>
</tr>
<tr>
<td></td>
<td>High level of food insecurity persists due to economic constraints and internal displacement of population</td>
</tr>
<tr>
<td>Eritrea</td>
<td>Slow recovery from war-related damage. Inadequate social services and infrastructure, as well as poor market access. Massive influx of refugees from Côte d’Ivoire: over 35,000 people have fled to Nimba, Grand Gedeh and Maryland counties, and taken refuge in 32 villages along the border.</td>
</tr>
<tr>
<td>Liberia</td>
<td>Slow recovery from war-related damage. Depreciation of currency led to higher inflation rates negatively impacting households’ purchasing power and food security conditions</td>
</tr>
<tr>
<td>Niger</td>
<td>Lingering effects of the 2009/10 food crisis which resulted in depletion of household assets, including loss of animals and high levels of indebtedness</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>About 2.4 million people are in need of food assistance due to the ongoing civil conflict and the severe drought during the 2010/11 secondary ‘deyr’ season</td>
</tr>
<tr>
<td>Somalia</td>
<td>Severe flooding affected 680,000 people causing damage to housing, infrastructure, crops and livestock</td>
</tr>
<tr>
<td>Benin</td>
<td>Poor crop production in the north and north-east and high food prices exacerbate current food insecurity situation</td>
</tr>
<tr>
<td>Burundi</td>
<td>Civil insecurity restricts access to agricultural land, while volatile prices hamper food access</td>
</tr>
<tr>
<td>Central African Republic</td>
<td>Large numbers of refugees located in southern and eastern regions – approximately 270,000 Sudanese and 82,000 from Central African Republic. Lingering effects of drought that led to livestock deaths and other damages in 2009/10, notably in west-central areas of the country</td>
</tr>
<tr>
<td>Chad</td>
<td>Influx of more than 100,000 refugees, mostly from DRC, since the end of 2009, increased pressure on limited food resources</td>
</tr>
<tr>
<td>Congo</td>
<td>Civil strife, internally displaced persons, returnees and high food prices</td>
</tr>
<tr>
<td>Democratic Republic of the Congo</td>
<td>Despite a good 2010 ‘meher’ harvest, the estimated number of people requiring food assistance has recently increased from 2.3 to 2.8 million due to the poor rains from October to December in southern and south-eastern areas affecting pastoral and agro-pastoral households</td>
</tr>
<tr>
<td>Guinea</td>
<td>Access to food is negatively affected by high food prices and general inflation</td>
</tr>
<tr>
<td>Kenya</td>
<td>Food insecurity persists in southern regions, due poor crop production in 2010, tightening market supplies and increasing prices. Localised flooding and the passing of cyclone Bingiza in February have also damaged infrastructure and some crops. Nationally, an estimated 2.25 million people suffer from severe food insecurity</td>
</tr>
<tr>
<td>Madagascar</td>
<td>Severe crop losses recorded in southern districts, but food security conditions have improved due to a good winter harvest and the distribution of food aid. The number of people estimated to be food insecure was reduced to 508,088 down from 1 million</td>
</tr>
<tr>
<td>Malawi</td>
<td>Localised flooding in central and southern provinces result in some crop damage in 2011. About 335,000 persons in need of assistance during peak lean season, down from the initial assessment findings, as a result of production-shortfalls in 2010</td>
</tr>
<tr>
<td>Mozambique</td>
<td>About 6 million people in need of food assistance, due to a combination of factors, including civil strife (Darfur), insecurity and returnees (southern Sudan) and high food prices</td>
</tr>
<tr>
<td>Sudan</td>
<td>The country is generally food secure following the good production of 2010 first and second seasons. However, about 815,000 people are still moderately food insecure, mainly in Karamoja region.</td>
</tr>
</tbody>
</table>

### TERMINOLOGY

Countries requiring external assistance for food are expected to lack the resources to deal with reported critical problems of food insecurity. Food crises are nearly always due to a combination of factors, but for the purpose of response planning, it is important to establish whether the nature of food crises is predominately related to lack of food availability, limited access to food, or severe but localised problems. Accordingly, the list of countries requiring external assistance is organized into three broad, not mutually exclusive, categories:

- **Countries facing an exceptional shortfall in aggregate food production/supplies as a result of crop failure, natural disasters, interruption of imports, disruption of distribution, excessive post-harvest losses, or other supply bottlenecks.**
- **Countries with widespread lack of access, where a majority of the population is considered to be unable to procure food from local markets, due to very low incomes, exceptionally high food prices, or the inability to circulate within the country.**
- **Countries with severe localised food insecurity due to the influx of refugees, a concentration of internally displaced persons, or areas with combinations of crop failure and deep poverty.**

1. See, for example, Soaring food prices: facts, perspectives, impacts and actions required, page 17, table 4.
2. Crop Prospects and Food Situation, No.4, December 2010.
Growing scarcities of water, land, oil and nutrients will combine with climate change to create a serious threat to global food security in coming decades. These could result in major regional famines, wars and refugee crises.

Most of us have by now heard the forecast there will be 9.2 billion people in the world of 2050. But current projections suggest human numbers will not stop there – but will keep on climbing, to at least 11.4 billion, by the mid 2060s.

Equally, the world economy will continue to grow – and China, India and other advancing economies will require more protein food.

Thus, global demand for food will more than double over the coming half-century, as we add another 4.7 billion people. By then we will eat around 600 quadrillion calories a day, which is the equivalent of feeding 14 billion people at today’s nutritional levels. The central issue in the human destiny in the coming half century is not climate change or the global financial crisis.

It is whether humanity can achieve and sustain such an enormous harvest.

The world food production system today faces critical constraints. Not just one or two, but a whole constellation of them, playing into one another – and serious ones.

This is the great difference from the global food scarcity of the 1960s. Then the constraints were around skills and technology – and the generous sharing of modern agricultural knowledge and technology in the Green Revolution was able to overcome them.

Today the world faces looming scarcities of just about everything necessary to produce high yields of food – water, land, nutrients, oil, technology, skills, fish and stable climates, each one playing into and compounding the others.

So this isn’t a simple problem, susceptible to technofixes or national policy changes.

It is a wicked problem.

The first of these issues is the looming global scarcity of fresh water.

By 2050, 7-8 billion people will inhabit the world’s cities. They will use about 2,800 cubic kilometres of fresh water – more than the whole of irrigation agriculture uses worldwide today. Desalination may supply some but for most cities, it will be cheaper and simpler to grab the farmer’s water. This is already happening, around the world.

Then there is the slice of farm water that climate change is already stealing, whether it is rainfall over the great grain bowls, evaporation from storages, shrinking rivers and groundwater or the loss of meltwater from mountain regions. The Himalayan glaciers are disappearing – the only debate is how fast. And the North China Plain is running out of water. These two regions feed 1.7 billion people now and must feed twice that many in future. If they fail, the consequences will affect everyone.

Worldwide, groundwater levels and rivers are dropping as they are pumped dry. Immense waterbodies like Lake Chad are simply vanishing. Australia has emptied its vast Murray-Darling basin. The world is becoming dotted with dried up Aral Seas, like aquatic tombstones.

IWMI director general Colin Chartres says “Current estimates indicate that we will not have enough water to feed ourselves in 25 years time, by when the current food crisis may turn into a perpetual crisis.” (IWMI).

Today almost a quarter of the world’s farm land is affected by serious degradation (FAO 2008), up from 15 per cent two decades ago.

Though no-one has done an accurate assessment, it appears the world may currently be losing about 1 percent (50,000 sq kms) of its farmland annually – due to a combination of degradation, urban sprawl, mining, recreation, toxic pollution and rising sea levels.

If we’ve already lost 24 per cent and we lose around 1 per cent a year from here on in, you can figure out for yourself how much land our grandchildren will have left to double their food supply. That the world may be close to ‘peak land’ is suggested by the UNEP.

In 1900 every human had 8 hectares of land to sustain them – today the number is 1.63 and falling. Put another way, between 1990 and 2005, world demand for food grew 15 times faster than the area of land being farmed.

By 2050 the total area of farm land buried under cities may exceed the total landmass of China, and the total area of land diverted to recreation and other non-food activities may rival that of the United States. This is nearly all prime farm land in river valleys and on coastal plains.

Many of these cities will have 20, 30 and even 40 million inhabitants – yet little or no internal food production capacity. They will be in huge jeopardy from any disruption to food supplies.

The world is haemorrhaging nutrients at every link in the chain between farm and fork. On farms it appears anything up to half of applied nutrients can be lost into soil, water and the environment.

Our resources of mineral nutrients are starting to fail. When Canadian Patrick Dery applied Hubbert’s peak theorem to phosphorus he found, to his dismay, we had passed it in 1989. According to the International Energy Agency peak oil and gas are due in the coming decade. These spell scarcity and soaring prices in the primary nutrients – N, P and K – that sustain all advanced farming systems worldwide.

At the other end of this equation we are ruining our rivers, lakes, seas and oceans in ways that prevent our getting more food from them. Each year we pump around 150 million litres of river water through our cities.
tonnes more nitrogen and 9 million tonnes more phosphorus into the biosphere than the Earth’s natural systems did before humans appeared: we have utterly modified the planet’s nutrient cycle, more radically even than the atmosphere or fresh water cycle. That we may double our release of nutrients to the environment as we seek to redouble food output is alarming. According to Nature this is one of the safe planetary boundaries the human race has already crossed.

Then there’s waste. In developed countries we throw away from a third to half of all food produced, in developing countries we lose similar amounts post-harvest. All told, the Stockholm Institute calculates we waste 2,600 out of every 4,600 kilocalories of food harvested.

Put another way, half the achievements of world agricultural scientists and farmers of the past 50 years are going to landfill. While a billion starve, we waste food enough to feed 3 billion.

Peak oil has already happened in the United States, in Australia, Britain and in 49 out of 65 of the world’s oil producing regions. Yet 51 million new cars continue to hit the world’s roads every year.

Just as farmers have little control over who snatches their land, water and other assets, they have little control over who takes their fuel. By 2040 dwindling reserves of fossil oil may well be reserved for the military and everyone else will have to get by as they can, including food producers.

The average citizen of a developed country today consumes the diesel distillate from 66 barrels of oil a year, such is the dependency of our modern food systems on fossil fuels. The high-yielding crops we pin our hopes on will be of little use if there is not enough fuel to sow, harvest or transport them.

One of the most pressing questions is where the energy to power the world’s tractors, trucks, trains and ships that move the food will come from in future. It cannot come from the farm: to do that would reduce world food output by 10-30 per cent, at the same time as we need to double it.

Optimistically, we may have until 2030 to solve this problem and convert the whole of the world’s advanced farming systems to another energy source, algal biodiesel maybe. Or hydrogen. Or solar-electrics. But there seems little sense of urgency about this issue from governments.

Natural gas will also peak shortly and since it helps make 97 per cent of the world’s nitrogenous fertilizer, an N scarcity is also on the cards. Using coal to make fertiliser does not seem smart, as its contribution to climate change is to create more drought and hence lower crop yields.

By the 2040s it is unlikely we will be using fossil fuels in agriculture. There needs to be a crash global research effort to head off a farm energy crisis. For the following reason: Consumers may be more than a little annoyed if asked to pay $30 for a loaf of bread. Yet compare how much real food prices increased in the recent oil price surge – with how much they went up under the major oil shock of the 70s. The risk of soaring global food prices in the event of a world energy shortage is real.

Lying in wait for us is a marine time bomb. Twenty-nine per cent of world fisheries are in a state of collapse. This will require a billion tonnes more grain and 1,000 cubic kms of extra fresh water.

FAO’s projected increase in world meat demand by 2050 is 185 million tonnes. Add this to the fish deficit and we would need to discover three more North Americas to grow sufficient grain to feed all these animals. This gives some impression of the scale of the challenge of meeting global protein demand by the mid-century.

The UK’s Hadley Centre projects that drought could regularly affect 40 per cent of the planet’s land area by the end of this century.

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**FIGURE 1: THE CHALLENGE TO PRODUCE ENOUGH FOOD WILL BE GREATER OVER THE NEXT 50 YEARS THAN IN ALL HUMAN HISTORY**

**EXPLANATORY NOTES**

- Based on data from FAOSTAT (Food and Agriculture Organisation of the United Nations) and UN Population Division, with simple scenario modelling from CSIRO 2009 (BA Keating, unpublished)
- Assumes growth trends in per capita food consumption growth in developing countries (currently 2,668 kcal per capita per day) are maintained such that current developed country food consumption levels (3,331 kcal per capita per day) are reached by 2050
- Assumes that diversion of food products (or production resources) to biofuels grows from current levels to 15 per cent by 2050
- Assumes no food wastage prior to 1920 ramping up to current estimates of food wastage of 30 per cent and these are not reduced going forward
- A Petacal is 10^15 calories, an Exacal 10^18 calories.
Their soil moisture projection suggests that regions once thought to have big farming potential, like Brazil, southern Africa and the Indian grain bowl, may prove unreliable.

The International Food Policy Research Institute has warned of a potential 30 per cent drop in irrigated wheat production in Asia and 15 per cent in rice, due to climate factors. The World Bank fears African productivity could halve and India’s drop by as much as 30 per cent, unless urgent steps are taken.

Ecological overshoot is the term used by the Global Footprint Network to describe how humanity now withdraws more resources from the planet than it is able to replace in a year. The GFN estimates we consume the total productivity of 1.3 Earths in food, water, energy and other resources. If the trend continues, they say, we will be using 2 planets’ worth of production by 2050.

If the GFN is even partly correct, then today’s diet and agricultural systems are not sustainable in the longer term.

We must reinvent them.

This challenge facing the coming generation of farmers is to double the global food supply:

- Using half the water
- On far less land and with increasingly depleted soils
- Without fossil fuels
- With increasingly scarce and costly fertiliser and chemicals
- Under the hammer of climate change.

Furthermore, farmers are going to have to accomplish this miracle using less science and technology.

On top of the scarcities of land, water, energy and nutrients the world’s farmers are driving into a huge technology pothole.

This is the result of decisions by national and regional governments worldwide, aid donors and academic institutions, to slash resources for agricultural research and extension over four decades. This has happened in the US, Germany, Britain, France, Japan, Australia and China. In the year 2000 the rich countries spent just 1.8 cents in every research dollar on agricultural research, so unimportant has the issue of sustaining food production become to them.

Between 1980 and 2006 the proportion of the world’s aid budget devoted to raising food output fell from 17 to just 3 per cent.

The cost is high. In local research stations, in national agriculture departments, in universities, colleges, research agencies and in the international agricultural research enterprise, support has been cut or allowed to erode, hundreds of labs and field stations have been shut, and thousands of vital research programs terminated.

Of the scientists who fed the world in the past 40 years most have quit – in anger, sorrow, or disappointment – have been fired, or have retired.

The dilapidation in the enterprise that feeds the Earth has disheartened a generation of young would-be agricultural scientists, especially in developed countries where many universities and colleges of agriculture cannot find enough students to fill the places they offer. Disciplines vital to reinventing agriculture, like soil science, are languishing.

Global funding for agricultural research, public and private, is estimated to total around $40 billion.

There is a stark contrast with the $1,500 billion the world now spends on weapons.

There has been almost no real increase in funding of international agriculture science effort since the 1970s – although the human population has doubled. The effects of all this are evident in the declining growth in world crop yields. The gains are now below 1 per cent a year – less than half what is needed to keep us fed.

Generally speaking, it takes around 20 years for a piece of research to be completed, turned into technology or advice, commercialised and adopted by millions of farmers worldwide. Often far longer.

The global decline in agricultural R&D in the past four decades means less new technology will be available to farmers between now and 2030 than in the past two generations. Also, by its nature, much of the existing new technology will not help to raise global food output because it is geared more to the needs of agribusiness corporations than it is to the needs of farmers or consumers.

Much of this technology is quite unsuitable for use in the developing world or in smallholder agriculture, and will do nothing to overcome hunger and unsustainability as it is highly dependent on costly and increasingly scarce inputs. So the rate of technology diffusion from the developed to the developing world is also going to fall.

There is an urgent need, not only to redouble the agricultural research
effort worldwide but to develop a new ‘eco-agriculture’ that is sustainable and less dependent on heavy use of energy, water, nutrients and other increasingly scarce industrial inputs.

Creating it is humanity’s most pressing scientific challenge.

This new food producing system has to be science-based. It has to be low input. And it has to work for farmers large and small, everywhere.

If we fail, the consequences will be profound. Modern wars are often driven by scarcities of food, land and water. Dafour, Rwanda, Eritrea, the Balkans were all destabilised, at root, by squabbles over these resources. Going further back, the French and Russian civil wars both grew out of bread crises. We know that hunger breeds war.

The UK Ministry of Defence, America’s CIA, the US Center for Strategic and International Studies and the Oslo Peace Research Institute all identify famine as a potential trigger for conflicts and possibly even for nuclear wars.

The wars of the 21st century are less likely to be global conflicts with sharply defined sides and huge armies than a scrappy mass of failed states, rebellions, civil strife, insurgencies, terrorism and genocides sparked by bloody competition over dwindling resources.

However the good news is that many wars can also be prevented – by using science to meet the rising demand for sustenance, despite the constraints described in this paper.

Refugee and internally displaced person numbers have risen sharply in recent years. Future famines in any significant region – Africa, India, Central Asia, China, Indonesia, Middle East or any of the megacities – will confront the world with tidal waves of tens, even hundreds of millions of refugees.

But the 50 million refugees who now flee every year are now preceded by over 200 million legal immigrants – a quarter of a billion people on the move each and every year. These are mostly people smart enough to read the signs in their home countries – and leave before disaster strikes.

Yet such vast movements are as nothing to the movements of the future. These will dwarf the greatest migrations of history. Thanks to the universal media, all the world now knows that safety, sustenance and a good life are to be found elsewhere if you have the courage and the means to reach for them.

In future, even places that are physically remote may face refugee tides in the millions or tens of millions, threatening profound change to society.

If we fail to secure the world’s food supply, governments in many countries may collapse under the onrush of people fleeing regional sustenance disasters. Every nation will face heavier aid and tax burdens and soaring food prices as a result.

Solving the challenge of global food insecurity should be the paramount concern of all nations and all people in the coming three generations.

1. Redouble knowledge
We need to redouble the global investment in agricultural science. In my estimate we should lift the total agrifood R&D spend to at least $80 billion, twice what it is today. Then, for every research dollar we need to spend another dollar getting the knowledge into the hands of the world’s 1.8 billion farmers and food processors.

Science not applied is science wasted. We must generate the greatest knowledge sharing effort in history – to reach not only farmers, but also consumers everywhere, because the farmers alone will not be able to solve the challenge. Using the excellent mass communication and media systems now available and ramifying through the world, this is
To one that doesn’t actually kill half the people who eat it, as does our present one.

Sounds hard? Not really. It means returning to the sort of balanced nutrient intake our grandmothers would approve.

One way to do this is to double the amount of vegetables in the diet, many produced in these new urban systems using recycled water and nutrients.

There are over a thousand ‘undiscovered’ indigenous vegetables to make this a culinary adventure as well as a global awakening and a health revolution. The richness of nature has scarcely been tapped in this regard and our shops, supermarkets and restaurants are poor in diversity compared with what they will become.

To achieve this we should also embark on the world’s most ambitious educational campaign – to install one full year, a food year, in every junior school on the planet.

A year in which every subject – maths, language, geography, science, society and sport – is taught through the lens of food, how precious it is and how it is produced, where it comes from, how to eat safely, thriftily and healthily. How to help ensure it never fails. Teaching food is acceptable in all cultures, races and creeds. Teaching respect for food and how it is produced is equally so. The means already exist to share these principles and educational courses universally.

We must enlist the food processing industry, the supermarkets, the cookbook writers and nutritionists, the TV chefs and restaurants and the health departments to promote the same universal messages.

“Eat well but eat less. Eat more vegetables and less energy-intensive foods. Choose foods that spare our soil and water. Be happy to pay more for such good food, so our farmers can protect the precious environment that produces it.”

4. Pay more for food

Today many people enjoy the cheapest food in human history. In rich countries it is one third the price our grandparents used to pay for it.

But it is destroying landscapes, water and farming communities worldwide and causing colossal wastage.

It is too cheap to last. It is imperative in the coming decade that we do two things – first abolish all trade barriers so food production can go wherever it is most efficient and second, to start paying all farmers a fair price.

The prices that globalised food chains now pay farmers will end up destroying agriculture and its resource base. They will hollow out our global food security.

Almost everyone in society now receives fair pay – except farmers. This has to end if we want to eat sustainably in future. There are many ways this can be done, which there is not room here to discuss in detail.

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Report predicts future for food

Although the world produces enough to feed its population, recent price spikes and the economic crisis have contributed to a rise in hunger and food insecurity.

Farm commodity prices have fallen from their record peaks of 2 years ago but are unlikely to drop back to their average levels of the past decade, according to the annual joint report from the OECD and the UN Food and Agriculture Organization (FAO).

The OECD-FAO Agricultural Outlook 2010-19 sees average wheat and coarse grain prices over the next 10 years between 15-40 per cent higher in real terms (adjusted for inflation) than their average levels during the 1997-2006 period. Real prices for vegetable oils are expected to be more than 40 per cent higher. Dairy prices are projected to be on average between 16-45 per cent higher.

Rises in livestock prices over the next 10 years are expected to be less marked on the whole, although world demand for meat is climbing faster than for other farm commodities as increasing wealth among some sections of the population in emerging economies alters dietary habits.

Sustained economic growth in emerging markets is an important factor underpinning growing demand and higher prices. Continued expansion of biofuel output – often to meet government targets – will also create additional demand for wheat, coarse grains, vegetable oils and sugar. Increasingly, higher production costs add upward pressure on prices, particularly where energy is used intensively.

GROWTH IN FOOD PRODUCTION LIKELY TO MEET FUTURE DEMAND

The Outlook sees global agriculture output growing more slowly over the next decade than in the past 10 years but nevertheless remains on track with previous estimates to meet the 70 per cent increase in world food production required to meet the market demand of estimated population levels in 2050. Brazil is by far the fastest growing agricultural producer, with output expected to rise by more than 40 per cent between now and 2019. Production growth is also expected to be well above 20 per cent in China, India, the Russian Federation and Ukraine.

The report adds that although the world produces enough to feed its population, recent price spikes and the economic crisis have contributed to a rise in hunger and food insecurity. About 1 billion people are now estimated to be undernourished. The Outlook argues that agricultural production and productivity will need to be stepped up, while a well functioning, rules-based trading system will be crucial to fair competition and to ensure that food can move from surplus to deficit production areas.

Retail food prices initially remained high in many countries even after world commodity prices had fallen in the wake of the price surge of 2007-08. As commodity prices fell, the contribution of food price increases to inflation fell sharply in 2009 in OECD countries but remained a key factor in some developing and emerging economies. Higher food costs, if sustained, will undermine food security, especially for the poor who spend a significant share of their budgets on food.

PRICE VOLATILITY

Price volatility is a key concern of policy-makers as the recent shocks – production shortfalls and surpluses, low and high stock levels, oil price fluctuations, the global economic recession – have unsettled agricultural commodity markets.

However, the Outlook says that while short term price volatility is now high, the evidence is inconclusive as to whether it has changed over the long run for major food crops. The report adds that the extent to which world price fluctuations are transmitted to domestic markets varies markedly across countries. Price transmission depends on a country’s integration in world markets, its infrastructure and, often most importantly, its trade and agriculture policies.

Presenting the Outlook in Rome with FAO Director-General Jacques Diouf, the OECD’s Secretary-General, Angel Gurría, said: “The agriculture sector has shown resilience to recent price shocks and the economic downturn. On the whole, this year’s outlook is cautiously more positive than in recent years. But going forward, governments should implement measures to ensure that farmers have at their disposal better tools to manage future risks, such as production contracts, insurance schemes and futures markets.”

Jacques Diouf agreed, warning that: “The role of developing countries in international markets is growing quickly, and as their impact grows, their policies also have an increasing bearing on conditions in global markets.” He added: “This makes their role and contribution to global policy issues critical. Policy discussions must be global in scope, and we need to improve the framework for such exchange of views.” He noted in this regard the ongoing reform of the Committee on World Food Security (CFS) which aims to strengthen the Committee considerably, making it a global platform for policy convergence and the coordination of expertise and action in the fight against hunger and malnutrition in the world.
The presentation Sustainable Agriculture: Feeding the World was delivered by CSIRO Chief Executive Dr Megan Clark at the Science and Technology in Society Forum, Japan, on 6 October 2009. Below is an adapted transcript of the speech

Good morning ladies and gentleman. There are three big forces coming together to reshape the world in ways not seen before.

First, we live in a increasingly food-insecure world. Second, we live in an increasingly urbanised world. Third, we live in a carbon-constrained world.

We face an unprecedented challenge from a combination of population growth, diversions of food to non-food uses such as biofuels, and economic development leading to changes in the quantity and type of food consumed.

For the first time in 40 years, questions are being asked about how the world will feed itself in another 40 years.

Figure 1 (see page 16) takes historical and projected population levels, and past, current and projected food consumption levels for developed and developing countries, as well as a conservative estimate of biofuels diversions, to estimate global food demand back to 1500 and out to 2050.

Food and population shift

If we include allowance for food losses along the value chain, and a modest 15 per cent diversion to biofuels, the challenge to produce enough food will be greater over the next 50 years than in all human history.

The world has already met a similar challenge: doubling food production between 1960 to 2000, during the ‘Green Revolution’. This revolution was possible through a combination of new technology, genetic improvements and investments in agricultural inputs.

Second, we live in an increasingly urbanised world.

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Global food trade

One result of this trend is that global trade in basic food commodities will rise.

In Figure 3 you can see global food exports are rising at a faster rate than global population.

While cereal exports have risen twice as fast as the world’s population, global trade in higher protein and higher value commodities such as milk, meat and legume pulses has increased even more quickly.

Climate change, agriculture and food security

On top of this, the world’s atmosphere cannot cope with the current trajectories of greenhouse gas emissions without a risk of ‘dangerous climate change’. This is a critical issue for agriculture and food security for three reasons. First, in Figure 4 greenhouse emissions from livestock, soils and land clearing make up approximately one quarter of global annual greenhouse emissions, and need to be reduced if the wider mitigation effort is to achieve the projected 50-80 per cent targets by 2050.

Second, our efforts to mitigate greenhouse emissions from agriculture may reduce agricultural production placing further pressure on global food supplies.

Third, some climate change is likely to be locked into the global system, which is bound to impact agricultural productivity and hence food production.

Looking at Australia in the context of these global forces, we are an urbanised society despite the large land area.

Australia is not facing a food security problem per se, but has a strong interest in global food security.

We produce 93 per cent of food consumed in Australia (by retail value). And we produce 1 per cent of the world’s food, and 3 per cent of the food traded worldwide.

Australian agriculture is highly exposed to climate change, with constraints on irrigation water availability, and one of the highest per capita greenhouse gas footprints in the world.

While Australian grown food contributes to global food security, equally important is Australia’s contribution to global food demand, and investments in agricultural inputs.

The next ‘agricultural revolution’ will require a similar level of productivity shift, but in a constrained land, water, energy and nutrient resource base, and without sending more greenhouse gases into the atmosphere.

I will return to this as the third of the big forces reshaping the world, and look now at urbanisation.

2008 to 2009 was the first time in human history when more people lived in cities than in rural regions.

Figure 2 shows global population trends and forecasts from 1950 to 2050 and the shift is striking.

Over 3 billion people now rely on food grown somewhere else and transported to cities, a number likely to grow to around 7 billion by 2050.

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to efforts to raise productivity through provision of agricultural science, and agricultural skills and technologies to improve crops and farming systems.

Australia’s soils, climates and farming systems are particularly relevant to food-insecure regions in Africa, South and South-East Asia.

Recognising this, the Australian Government established a major food security initiative investing around A$464.3 million over 4 years, and its Carbon Pollution Reduction Scheme is also exploring how to address agricultural emissions and carbon bio-sequestration.

CSIRO’s food security research

CSIRO has reshaped its research to address some of Australia’s critical challenges, building large-scale research partnerships under its National Research Flagship Program.

Of the 10 Flagships, at least four are directly relevant to addressing the challenge of food security:

➤ The Sustainable Agriculture Flagship aims to reduce the carbon footprint of Australia’s land use while achieving the productivity needed for prosperous agricultural and forest industries and global food security. A major focus of this Flagship is to develop farming systems that use limited water and nutrients more efficiently

➤ The Climate Adaptation Flagship is developing adaptation responses to counter the expected damaging effects of climate change. Research is combining information from real mixed cropping systems with expected climate change vulnerabilities to identify on-farm management options to offset negative impacts

➤ The Water for a Healthy Country Flagship is working to improve the way we use and manage water. Research in this Flagship led to the first comprehensive assessment of the impact of climate change and competing water demands on the water available for agriculture in the 1 million square kilometre Murray-Darling Basin

➤ The Food Futures Flagship is developing innovative agrifood and processing technologies to increase sustainability for Australia’s agribusiness sector. Its grains research is directed towards value added traits such as high yielding wheat, greater nitrogen use efficiency and improved nutritional benefits.

Closing statement

Australian science and technology is highly relevant to a food-insecure, carbon-constrained world.

Our national institutions, including CSIRO, are responding to these challenges in a focused way, such as through the CSIRO Flagship model I described, and are seeking to strengthen international partnerships so Australian skills and technologies can help address global food and carbon security challenges.

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Food shortage ‘the next global challenge’

When the FAO Cereal Price Index doubled in the year to April 2008, food security became a global crisis, sparking riots in 30 countries, including many tottering on the brink of severe shortages or widespread hunger.

The World Bank estimates that food inflation during that period pushed an additional 100 million people into deep poverty, on top of a billion that were already scraping by on less than a dollar a day.

The episode of ‘soaring food prices’ was followed by the most severe global financial crisis and deepest economic recession witnessed in the last 70 years. Despite the global economy relatively stabilising, international food prices remain high by historical standards, the United Nations warns, and a growing global population and climate change are making the future of food look even more uncertain.

Population growth

The world’s 6.5 billion population is expected to reach 9 billion by 2050. This, combined with growing consumption as poverty is alleviated, will put huge pressure on food supplies, experts warn.

Climate change

Climate change is expected to worsen the problem, reducing rainfall and affecting crop growth. Added to this, efforts to tackle climate change – by using biofuels instead of fossil fuels – are taking more land away from food production.

Oil prices

And there’s more reasons why some people living in developed countries are worried food scarcity may one day affect them. Oil prices remain at historical high levels, the UN warned in its *The State of Food and Agriculture 2009* report and as cities expand, new agricultural land is becoming less available.

**Land shortage**

The panic of 2008 saw national interests dominating the response to a crisis which required coordinated global action. Many countries resorted to stockpiling food and blocking exports in order to keep down domestic prices. As a result, some major food importers, such as the Gulf States and South Korea, have lost confidence in the market and are negotiating the purchase of extensive farmland in developing countries in order to secure food supplies. This disconcerting trend has been condemned as ‘neo-colonialism’.

**Loss of biodiversity**

The great advances in crop yields since the 1970s, described as the “green revolution”, have to be weighed against their ecological consequences. The FAO says that 75 per cent of food biodiversity was lost in the 20th century whilst 80 per cent of the world’s dietary energy is now supplied by just 12 industrial crops. The green revolution has also been responsible for significant soil erosion, salinity and depletion of water resources.

**Calls for a national food policy**

In Australia, community organisations are calling for a national food policy, saying the country will face food shortages unless there’s better planning to cope with the effects of climate change and population growth. By 2050, Australia will be faced with feeding 36 million people.

“If we increase our population and we don’t protect our agricultural land and think of ways to grow food to feed our growing population, we will experience serious food shortages,” the President of the Sydney Food Fairness Alliance Lynne Saville told SBS.

For the first time, Australia is now importing more fruit and vegetables than it exports. Last year, $826 million worth of food came into the country while $749 million worth went out. Most comes from New Zealand, but increasingly garlic, peas, broccoli, cauliflower, beans and corn are being sourced from China.

Sustainable agricultural expert at the University of Sydney Bill Billotti has also been advocating for a food policy.

“We don’t currently have a national food policy in Australia and so our approach is fragmented. We stick food in agriculture, we stick food in health, we deal with food in environment but we’re not getting that across-discipline view, wholistic view of food,” he told SBS.

Rising food prices in recent years have made it more difficult for Australians to access fresh food, which is often more expensive than fast food alternatives.

“There’s absolutely no doubt that food, some food, is becoming more expensive, some food is going to become more rare and some almost extinct if we carry on the way we do,” OzHarvest’s Ronni Khan told SBS.

The Director of the Victorian Eco-Innovation Lab Professor Chris Ryan says we need to look for alternative and innovative approaches to dealing with resource scarcity and environmental change.

“Over the next few decades the way people obtain their food, water and energy will undergo a major evolution,” he said.

“One pathway we can see is people no longer relying on industrial production units hundreds or thousands of kilometres, or even continents, away. Instead they will source a greater proportion of essential resources, goods and services from within their ‘neighbourhood’,” Professor Chris Ryan said.

“This evolution means a significant switch in people’s role within the economy and in their identity as citizens, moving from one of passive consumption to a more active engagement in production and exchange of economic and social capital,” he added.
A new report by Australian researchers claims far more needs to be done if we are to feed the estimated 9 billion people who will be living on the planet by 2050.

The report, by Professor Mark Tester and Professor Peter Langridge of the Australian Centre for Plant Functional Genomics at the University of Adelaide, appears today in the journal Science.

“The simple fact is while food production has increased by 32 million tonnes a year, an annual increase of 44 million tonnes a year is what’s actually needed to meet the food targets for 2050 set down by the World Summit on Food security,” Professor Tester said.

“But this represents a 38 per cent increase over historical improvements in food production and it needs to be sustained for the next 40 years.

“This scale of increase is unprecedented and will require huge changes to current food production methods.”

CLIMATE CHANGE

Professor Tester says our ability to increase or sustain crop yields and quality is being tested by changes to the environment caused by global warming and the growth in biofuels.

“Increasing food production in a stable environment would be challenging enough, but given the dynamic global environmental changes now occurring, it will be even harder, but not impossible,” he said.

The report says there will be some benefits from climate change, such as increasing CO₂ levels acting as a fertiliser and rising temperatures increasing growth in higher latitudes and altitudes. But it also means more damaging high temperature events, new pest and disease pressures and altered drought and rainfall patterns.

Professor Tester warns the current diversion of food into the production of biofuels is putting even further pressure on world food supplies.

“It’s obscenity that such a huge percentage of the maize crop is going into biofuel production when children are starving,” he said.

“We need biofuels, but we should use different feed stocks such as algal biodiesel which won’t impact world food stocks.”

IMPACT ON AUSTRALIA

Earlier this week, the Northern Australia Land and Water Taskforce released a report that concluded northern Western Australia is unlikely to become South-East Asia’s next food bowl.

Professor Tester says this is a pity, but believes Australia has enough to sustain a growing population.

“Australia grows more than enough to feed itself, even if our population were to be double the 36 million expected by 2050,” he said.

But he warns other countries face an uncertain future.

“India, which has more undernourished people than Africa, is a real challenge,” he said.

“Especially with their government’s hard stand on genetically modified foods.”

Professor Tester believes new breeding technologies are needed to increase crop yields by quickly identifying the best genes for any given conditions.

“Facilities like the Australian Centre for Plant Functional Genomics will help to quickly identify plant varieties that will grow successfully,” he said.

“This is the way forward if we are to feed the world in the future.”
A decade ago, the international community committed itself to halving the percentage of people who go hungry. When world leaders meet next week to review implementation of this and other Millennium Development Goals (MDGs), they need to reexamine their policies and their commitment.

Last year alone, the number of people deprived of food rose from 915 million to 1.02 billion, according to the Food and Agriculture Organization of the United Nations. Although recent estimates suggest that number has dropped to 925 million in 2010, the goal of halving hunger by 2015, enshrined in the first MDG, remains extremely challenging. The situation demands more innovative, better focused, and cost-effective action.

To reduce hunger:

1. We need to increase combined investment in agriculture and social protection. Interventions combining agriculture and social protection have high payoffs, since they can protect the poorest in the short term and increase their productive capacity in the long run. Evidence from Ethiopia shows that households with access to a safety net program and a complementary agricultural intervention are more likely to be food secure, borrow for productive purposes, and use improved agricultural technologies than households that have access to just one component.

2. The private sector and emerging economies must be encouraged to play a greater role in reducing hunger in developing countries. Firms must be given the right incentives to move beyond a short-term focus on corporate philanthropy and to develop inclusive business initiatives that help fight hunger and integrate smallholders into the global value chain. Many of the world’s poorest people are smallholder farmers, and moving them out of poverty will involve increasing their productivity and linking them to high-value markets. Emerging economies need to be fully integrated into the global food security agenda, since they are ever more prominent in trade and investment, and in providing development assistance.

3. Developing countries must lead the fight against hunger with their own strategies. Some issues – such as climate change, trade, and disease control – need to be addressed at the international level, and individual countries must set their strategies in a global context. But on many other issues, experience teaches us that the most effective, efficient, and sustainable policies are those most attuned to local reality. After all, China, India, Vietnam, and others have enjoyed agrarian and economic success thanks to country-led policies, such as partial liberalisation, that were considered unorthodox because of their content, sequencing, or both.

4. Innovation must be encouraged. Pilot projects and experiments have the potential to improve policymaking by giving decisionmakers information about what works before policies are implemented across the board. Experimentation can improve the success rate of reforms as successful pilot projects are scaled up and unsuccessful ones are eliminated. Policymakers need to allow experiments to be monitored impartially, and they must rapidly transform the lessons learned into large-scale reforms.

5. Decisionmakers at the global, regional, and national levels have made commitments to enhance food security but they have often not followed through. Governments and other institutions do need to keep their promises. Mechanisms to effectively ensure accountability and measure progress are urgently needed. In addition, the global food governance system itself needs to be reformed to work better. For example, the extremely volatile wheat prices seen in recent weeks remind us of the need for global institutional arrangements to prevent export bans, other forms of ad hoc protectionism, and excessive speculation.

With only 5 years remaining until the deadline of 2015, the objective of halving world hunger can be achieved – but only if we pursue it with increased vigour and innovation.

1. The MDG Review Summit, officially called the High-level Plenary Meeting of the General Assembly, will take place on September 20-22 in New York and is hosted by the United Nations Secretary General.
2. In MDG1, UN member states pledged to “halve, between 1990 and 2015, the proportion of people who suffer from hunger.”

Fan, Shenggen, 2010. IFPRI press release, 17 September 2010
www.ifpri.org/sites/default/files/pressrel20100917_0.pdf
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Food for thought while millions die of hunger

This is an edited extract of an address by Per Pinstrup-Andersen, Cornell University professor of food nutrition and public policy

The world is rapidly moving towards disaster, whether you call it doomsday or apocalypse. But this is not the global financial crisis or the risk of financial problems in Greece and other European countries that may drag the rest of the world down with them. No, this is the global food situation. We face a global food shortage, the like of which the world has never seen.

How do I know that? I have read books, articles and blogs that tell me so. They bear titles such as Agricultural Apocalypse 2010, The End of Food, Food Wars, Fearing Food and In Defence of Food. They, and many others, try to bring back to life Thomas Malthus, the philosopher who more than 200 years ago said the world’s population would increase faster than food supply, thus resulting in mass starvation.

One could argue that these publications are written by authors aware that exaggeration and sensationalism get people’s attention. Books predicting the end of the world is nigh do sell. But even serious scientists and international organisations are talking about the “perfect storm” of global food shortages.

When global food prices increased rapidly during 2007 and the beginning of 2008, the United Nations Food and Agricultural Organisation reported large increases in the number of undernourished people. Its estimates of 100 million to 170 million additional hungry people were quoted by newspapers worldwide. Its admission that these estimates were rough and subject to large errors was lost in the frenzy to quote them.

When food prices fell dramatically during the last half of 2008, one might have expected a fall in the number of undernourished people. That did not seem to happen. At least it was not reported. Good news does not seem to be newsworthy.

Is the world really headed towards a global food apocalypse? No, not really. Large groups of people do not have access to sufficient food to meet their needs. Hunger and malnutrition contribute to the deaths of about 5 million preschool children a year. For them, the apocalypse is real. Many more survive but suffer from malnutrition and associated poverty and poor health.

But there is plenty of underused productive capacity to feed the present, and expected future, global population. The key questions are whether the natural resources that make up this capacity will be managed sustainably, whether food prices are high enough to cover the costs of expanding food production, whether the millions of poor people will get access to enough food and whether governments and international organisations will prioritise sustainable food production for all.

Without efforts to expand food production in a sustainable manner, the doomsday prophets will be right. Many more millions of children will die, natural resources will be destroyed and the world will face real food shortages.

More than two-thirds of African farmers are net buyers of food; they cannot produce enough food to meet their needs. Not because they are lazy and the productive capacity is absent, but because they do not have access to credit, fertilisers and high-yielding seeds that are resistant to insects and are drought-tolerant. They do not have access to markets where they can sell their products at prices that cover production costs. Their crop yields could be doubled or tripled. It has been done in places where these problems have been solved.

Poor farmers damage the environment. They mine their soils for plant nutrients because they cannot get access to reasonably priced fertilisers.

For them, feeding their families now is more important than protecting the land for the future. Poor farmers expand agricultural production into lands unsuited for agriculture and at high risk of degradation because they cannot increase yields on the better land.

But these problems can be solved with enlightened policies and investments. The necessary interventions will vary among countries and places, but two are likely to be very important in most settings: improved rural infrastructure (roads, irrigation facilities, institutions) and agricultural research to expand yields, reduce unit costs of production and assure sustainable use of natural resources.

Triple wins, such as reduced soil degradation, increased food production and an escape from poverty, are waiting to be realised. Access to fertilisers will reduce soil mining, increase yields and help poor farmers out of poverty – but only if the farmer has access to credit, and the infrastructure gives him access to markets without excessive transactions costs.

Without efforts to expand food production in a sustainable manner, the doomsday prophets will be right. Many more millions of children will die, natural resources will be destroyed and the world will face real food shortages.

Will policy makers respond in time? The global food crisis that gave ammunition to the predictors of a food apocalypse was a warning of what may happen when the food sector is ignored by policy makers. Unwarranted complacency is the doomsday prophet’s best friend.
Resource hungry nations are snapping up huge tracts of agricultural land in poor African and Asian nations in an effort to secure their food supply and provide bio-fuels to meet future energy needs. With world agricultural markets in turmoil, the strategic value of land for crops has seen governments from the Middle East to Eastern Africa furiously lobby some of the poorest and most unstable countries in the world.

Why is this level of agricultural investment in foreign countries unprecedented?

Significantly, it signals a shift in foreign policy, as large scale land deals are now taking place between governments instead of private investors. Already, more than 25 million hectares have been purchased or leased in land deals estimated to have cost $30 billion. The need to provide food security to growing populations has triggered a global race for arable land. In this context, China has been one of the most aggressive investors in the search for food security. Currently feeding one-fifth of the global population with just one-fifteenth of the world’s arable land, China has been acquiring land assets in Africa, South-East Asia and Latin America since 1995. Wealthy oil states have more recently joined the rush. Cash rich, resource poor countries like Saudi Arabia, Kuwait and the United Arab Emirates which buy food on volatile world food markets, are looking to protect themselves against skyrocketing prices which have triggered more than 60 riots since 2007. Saudi Arabia is expected to be completely dependent on foreign wheat supplies within 5 years and is urgently pursuing land deals from Ethiopia to Indonesia. Much of the land sought by investor countries has been in areas with good water supplies and ready access to port facilities.

Is this a new form of neo-colonialism?

Although more than 100 such deals are estimated to have been completed, the race for food poses enormous ethical questions yet to be resolved. Some of the most hotly sought after countries include world food program recipients like the Sudan, the Democratic Republic of the Congo and northern Pakistan.

Should countries experiencing famine be exporting food crops to foreign government investors?

The trend in large scale land deals undoubtedly has the potential to produce GDP growth, inject capital into neglected agricultural industries and provide critical infrastructure in poor countries. Governments looking to acquire foreign agriculture assets must also provide for present and future population demands, and assess forecasts against uncertainty on world food markets.

At least 20 countries including Brazil and India now recognise the right to food in their constitutions. Since 2001, the Supreme Court of India has frequently enforced this right by ordering the emergency distribution of government food stockpiles.

Do home front legal obligations provide impetus for large scale land acquisitions?

A tricky balancing act, land deals which deny target countries food security or create a dependency on foreign food aid also violate the internationally recognised human right to food. Under Article 11 of the International Covenant on Economic, Social and Cultural Rights, states have a threefold obligation to respect, protect and fulfil this right. The question becomes, at what cost?

Jeffrey Sachs, advisor to UN Secretary General Ban Ki-moon, argues that foreign policy land deals can be ‘win-win’ when negotiated with respect to the rights of local populations. The right to self determination, the exploitation of natural resources and accountability for the use of revenue following such deals, are all critical elements of international law which provide a framework in which mutually beneficial transactions can take place. The issue of whether profit maximisation leads countries in a ‘race to the bottom’ whilst competing for foreign land investment is yet to be determined.

Yet compliance with United Nations principles designed to regulate large scale land acquisition currently operates on a voluntary basis. Whilst local populations in Tanzania and Ethiopia have received compensation for large scale land deals, what of 400,000 hectares acquired by United States investors in southern Sudan from the family of alleged war lord, Gariel Matip?

Concern over the loss of land to foreigners was acutely evident in the recent failure of one of the biggest foreign agriculture ventures in history. The fallout following Daewoo’s attempts to acquire a 99 year lease over half of all arable land in Madagascar for crop exports to South Korea resulted in violent protests, more than 125 deaths and the fall of the Ravalomanana government.

Chillingly, the Pakistani government is now offering farmland to foreign investors with 100,000 men to act as security for foreign assets. By 2030, there may be more than 1.5 billion extra mouths to feed in the world, the largest absolute increases being in China, India and Indonesia. Currently, more than 1 billion people in the world suffer from malnutrition, including more than 640 million in the Asia Pacific.

Over the next few decades, food security will become of paramount importance. Although population growth is undoubtedly a driving factor in large scale land acquisition, this developing trend forces hard questions about the need to plan for future generations, the nature of the world agricultural market, and why foreign governments may be seeking food security elsewhere. And food, as a resource, is unlike any other.

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The Drum Unleashed | www.abc.net.au/unleashed
The passing of Norman Borlaug last month closed the chapter on an exemplary life of service to humankind. Dr Borlaug, 1970 Nobel Peace Prize laureate and acknowledged ‘father’ of the Asian Green Revolution, is credited with saving hundreds of millions of lives by breeding high yielding wheat varieties that spread throughout Asia during the 1960s and 70s. Inspired by Dr Borlaug’s successes, new rice varieties were also developed and widely adopted. As a result, food production in Asia doubled over the subsequent 25 years, outpacing population growth. The predicted famines were averted.

Dr Borlaug was not content with the potential that his new varieties showed for increasing food supplies. “The potential is there, but you can’t eat potential,” was one of his most memorable lines. Dr Borlaug was a passionate advocate of his new varieties with governments and aid agencies, urging them in strong terms to support smallholder farmers with credit, fertiliser, irrigation, roads, and a fair price for their produce. Only with these multiple, co-ordinated investments could the genetic potential of his new varieties be realised.

Less than 3 months ago in L’Aquila, Italy, the G8 declared to act “with the scale and urgency needed to achieve sustainable global food security”, acknowledging that adequate food is not only necessary for economic growth and social progress but, more fundamentally, is the cornerstone of political stability and peace. In a rare departure from rhetoric of vague intent, the G8 and a posse of other like-minded governments and international agencies agreed to provide $20 billion over 3 years for sustainable agricultural development. Such a commitment, if realised, would sharply reverse a 30-year downward trend that has seen agriculture fall from the radar of most aid agencies and governments.

In Pittsburg just a couple of weeks ago, the G20, now championed by Mr Rudd as the new ‘driving centre’ for change, endorsed the L’Aquila initiative and called on the World Bank to establish a new global fund to scale up agricultural assistance in poor countries. In what the G20 communiqué called “this historic effort”, the new fund would require country ownership, bring in the private sector and NGOs, and allow rapid disbursement of money, breaking through the bureaucracy that has plagued past efforts to deliver aid promises.

So why invest in agriculture? Why now? What happened to Dr Borlaug’s Green Revolution?

The answer is that we have been complacent, a condition that Dr Borlaug warned us about in his Oslo acceptance address almost 40 years ago. In Asia, agricultural productivity has slowed, and in Africa, per capita food production has declined steadily for 40 years. As a result, 1 in every 6 people on Earth is hungry. And malnutrition is implicated in about 40 per cent of the 11 million deaths of children under five in developing countries.

For most, hunger and malnutrition are not the result of war or catastrophic events like droughts or floods. This is chronic hunger and malnutrition that perennially affects poor people, leaving them unable to produce or buy the food they need to stay healthy, go to school, undertake a day’s work, or simply live with dignity. Global food shortages in 2007 and 2008 and, more recently, the global financial crisis, have plunged millions more into a state of extreme vulnerability and dependency on food aid and other forms of emergency assistance. The World Bank reported that despite sharp declines in commodity prices in the wake of the economic slowdown, food prices in August 2009 were almost 60 per cent higher than in 2005. Thus, through a combination of benign neglect of agriculture and financial mismanagement, the planet is fast running out of food.

The global epicenter of chronic hunger is Africa. One in 3 Africans is undernourished. Most are not living in war zones or refugee camps. The bulk of Africa’s hungry and malnourished live on farms of less than 2 hectares. Typically, these small farms have lost their soil fertility through years of cropping without the benefits of fertiliser, irrigation, improved seed or irrigation. There has been no Green Revolution here. And there have been no surpluses to store or sell.

The good news for Mr Rudd’s G20 – and for humanity – is that chronic hunger in Africa and other hot-spots, like Haiti, Afghanistan and Timor Leste, can be ended within a few years with targeted investments based on our current knowledge. This was the unanimous conclusion of several
As a focus for our aid, there is no better place to start than sustainable agriculture and helping African farmers adapt to climate change. In the process, Australia may share and learn valuable lessons in managing with less water.

There are at least a dozen other countries across Africa that have plans to begin similar programs with the potential to boost agriculture and reduce hunger sharply. Decades of agricultural research, some of it supported by Australia, means that the knowledge exists to produce, protect and market more food. But we should not ask governments to cut back on health, education and road-building programs in order to finance agriculture. We need to invest in all these areas simultaneously and without further delay.

The Rudd Government has promised to increase Australia’s Official Development Assistance to 0.5 per cent of Gross National Income by 2015-16, and has reaffirmed its support of the Millennium Development Goals, including a deeper and broader engagement with Africa. To be most effective in delivering its aid and to ensure sustained support of the general public, Australia needs to focus its efforts on where it has shared interests and where we can bring unique expertise to the table.

Australia and Africa are vast dry continents, both heavily dependent on rainfall for food and livelihoods. The Intergovernmental Panel on Climate Change pointed to the vulnerability of African agriculture to climate change. As a focus for our aid, there is no better place to start than sustainable agriculture and helping African farmers adapt to climate change. In the process, Australia may share and learn valuable lessons in managing with less water.

The L’Aquila commitment of $20 billion over 3 years, if realised, represents less than one third of the unmet promise made at Gleneagles by the same G8 to double aid to Africa. A year from now, the world’s leaders will gather in New York to reflect on progress towards the Millennium Development Goals. In terms of the hunger goal, we are actually in a worse state today than we were when the MDGs were agreed by 189 nations in 2000. We have to seize the moment and grasp the opportunity that L’Aquila and Pittsburg have provided.

As a member of the increasingly credible and confident G20, and as a champion for action on climate change and ending extreme poverty, Australia must throw its support behind this new agriculture fund that will fight hunger at its roots. With a sharp focus on small-scale farming in selected countries that have demonstrated a commitment to action and being accountable for impact, such a fund could produce results within a year without the need to cut back investments in other crucial development areas.

With the United States, Australia and a few others showing the way with hard cash, early successes would inspire other aid agencies to step up and deliver on past promises. There would be no better way to continue the work and honour the life of the great Dr Borlaug. If we get this right, food-insecure nations will at last have the resources they need to end hunger.

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Hungry world: a silent crisis calls for urgent action

Little attention has been given to the growing number of hungry people and the possibility of mounting food crises in the years ahead. A perspective from Marshall Bouton

As the world still struggles to deal with the first truly global recession, little attention has been given to the growing number of hungry people and the possibility of mounting food crises in the years ahead. According to the World Bank, over a billion people around the world are now chronically hungry. Stagnant agricultural productivity, rising food prices and now declining incomes, especially in much of Africa and parts of South Asia, have brought the world dangerously close to humanitarian distress and resulting social and political instability. Averting such a calamity must be high on the global agenda.

Surprisingly, while our world may be increasingly urban, the world of the poor and hungry remains overwhelmingly rural. Of the 1.2 billion people in the world living on less than a dollar a day, the majority, almost 700 million, are small farmers, farm labourers and their families in Sub-Saharan Africa and South Asia who are unable to sustain themselves, not to mention rapidly growing urban populations, due to decades of lagging farm productivity.

Most of the world’s hungry people are women and children. Women comprise 80 per cent of Africa’s farmers, but they have access to only 5 per cent of the continent’s agricultural land, credit and extension services, a key reason for the region’s average grain yield being one-fifth that of the US and Europe. Sub-Saharan Africa accounts for 55 per cent of the global nutritional gap, with devastating impacts on children’s physical and mental development. Almost half of all children in South Asia, most of them on farms, are underweight for their age.

Why do we face such a crisis when it seemed so recently that the Green Revolution of the 1960s and 1970s had ushered in an era of food aplenty? Beginning in the 1980s the world turned its back on agricultural development. The Green Revolution technologies of new seeds, fertiliser and farm practices resulted in dramatic yield increases for irrigated crops, especially wheat and rice, in settings with adequate infrastructure such as market roads, largely in Asia. These breakthroughs created the false impression that the world’s food and farming problems had mostly been solved, when in fact the Green Revolution had bypassed much of Africa and the drylands of South Asia.

As a result, international support and developing country investments in agriculture declined sharply in the 1980s and the 1990s. Between 1980 and 2005, for instance, foreign aid to low income countries for agricultural development dropped from 17 per cent of overall aid to 3 per cent. By the 1990s, growth rates of global public expenditure on agricultural research had been halved.

The rising global demand for food due to population growth and changing diets (producing 1 pound of beef takes 3 pounds of grain) has outstripped the growth in the production of staple food crops. Per capita production of maize in Africa, for instance, has actually fallen 14 per cent since 1980. The projected increase of Africa’s population by 2050 means that African agricultural production would need to double just to keep the number of hungry people at today’s level.

To some extent the gap between food supply and demand has been met by imports. Commercial grain imports by developing countries almost tripled between 1990 and 2008. But the increasing dependence on food imports exposed these economies, and especially their poorest citizens, to wide swings in the world market prices. In the first half of 2008 grain prices doubled or tripled in some countries. Since then prices have fallen by 50-60 per cent in many countries but remain well above their 10-year average, swelling the ranks of the extremely poor, who spend 50-70 per cent of their incomes on food, by at least 100 million people.

These are dangerous portents for the future. Improving agricultural productivity will become a more not a less, challenging task in the decades ahead. The supply of readily arable land is diminishing in most developing countries. Water scarcity is already a constraint in the
semi-arid tropical zones of Sub-Saharan Africa and South Asia where pressure on the land is high. According to the projections of the Intergovernmental Panel on Climate Change, weather extremes including severe drought are likely to become more frequent in those same regions. When the world recovers from recession, income growth and dietary shifts will once again put demand pressure on the world’s food supply.

But there is good news. We know how to increase agricultural productivity and farm incomes – through a combination of adaptive agricultural research, improved education and extension, and market development, all aimed at small farmers, especially women farmers. A new generation of seeds and farm practices and infrastructure improvements will make possible higher yields and increasing farm incomes. A new Green Revolution can help. Though Green Revolution technologies have been increasingly criticised as benefiting only larger farms and harming the environment, later studies showed that small farmers benefited as much. In fact, without yield-increasing technologies, the expansion of agriculture into marginal lands would have wreaked greater environmental damage.

What is required first and foremost is to put agriculture back at the top of the global development agenda. We seem to have forgotten that no economy has achieved sustained growth and graduated to middle income status without first developing its agriculture.

There are promising signs of change. The World Bank has announced a new focus on agricultural development in Africa. The G20 Summit in April 2009 addressed the need, and the G8 issued a major statement on global food security at their meeting last week. Under NEPAD – the New African Partnership for Agricultural Development – African nations have committed to devoting more resources to improving agriculture.

The United States is moving to renew American leadership for global agricultural development. President Obama has announced his support for doubling US foreign assistance for agriculture. Legislation sponsored by Senators Lugar and Casey proposes to overhaul totally US agricultural development assistance.

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But the second Green Revolution cannot be a carbon copy of the first. It will have to be the result of a partnership between the donor countries, the developing nations and international institutions, with goals defined by African and Asian partners. It will also have to create public-private partnerships with universities and research institutes, agri-business companies, and non-government organisations committed to hunger and poverty reduction. Organisations such as AGRA, the Alliance for a Green Revolution in Africa funded by the Bill and Melinda Gates Foundation, represent the highly innovative approaches that can be realised by such partnerships.

The counter-productive policies of developed nations must also be changed. US, European and Japanese farm subsidies distort world market prices and undercut small farmers in Africa and Asia. European opposition to the use of genetically modified seeds in African agriculture has hampered productivity growth. The US practice that aid recipient countries buy US commodities with the aid has the net effect of depressing local markets.

While the above policy errors need fixing, the shock of global food price increases in 2008 holds out the hope that even in the midst of a great recession, this most fundamental of human needs can once again become the focus of global concern.

Marshall Bouton is president of The Chicago Council on Global Affairs and directed a recent Council-sponsored study of US global agricultural development policy.

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Food security relates to the physical availability and access to food, as well as to its affordability. With the escalation of global food prices through 2007 and 2008, the issue of food security, both globally and domestically, attracted considerable public and policy attention.

The most serious effects of the rise in global food prices were on the urban poor in low income countries. This resulted in civil unrest in some countries and an increase in protectionist trade policies in others. In developing countries, where populations faced declining physical availability of food as well as sharply deteriorated affordability, many people were forced to reduce nutritional intakes and defer expenditures on essential items, such as health and education, to survive.

In the long term, another food crisis will only be avoided if a concerted effort is made, by all governments, to raise the global food supply. The seriousness of the recent global food crisis showed how sensitive the world is to a sudden decline in the availability of food staples.

The risk of future food shortages is increasingly likely given the increased severity of weather events over the past several years; the challenges posed by climate change; and the increased demand for food because of the increasing global population and rising incomes in key developing countries.

The initiatives required to raise the global food supply in the medium to long term are clear, and need to be implemented across the world. A key initiative is greater investment in public and privately funded research and development specific to the needs of the most vulnerable countries. Specifically, research committed to developing more drought tolerant crops for arid climates is necessary, as climate change poses a significant threat to agriculture and water supplies globally.

Regulations in some countries that restrict the use of genetically modified seeds must be reconsidered. Poorer nations should be given the opportunity to increase domestic food supplies and export surpluses to other countries that may presently limit access to genetically modified foods. Biofuels subsidies must also be reconsidered in light of the diversion of substantial quantities of cereals and oilseeds from food and feed uses to biofuels feedstocks, particularly in the United States and the European Union.

For Australia, there is no immediate threat to the domestic food supply. Australia will continue to produce in excess of what it consumes and will therefore be able to contribute to the world’s food needs. However, Australia faces its own challenges, namely climate change, diminishing water supplies and soil degradation, agricultural labour shortages and declining productivity.

Australia’s role in ensuring global food security extends beyond its own immediate needs.

Australia has an opportunity to share its technologies, institutional knowledge, agricultural policy and rural development capability with poorer nations through extension initiatives and aid programs. Collaborative agricultural research, particularly in the areas of tropical and dryland agriculture, would benefit multiple stakeholders from a range of countries. Education opportunities, delivered through development assistance scholarship programs or formal and informal training schemes, are other capacity building initiatives Australia can take to assist developing and emerging countries.


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Australian agriculture faces a number of challenges and opportunities, some faced by agriculture globally and some that are unique. The most pressing challenge facing agriculture around the world is maintaining and increasing production of food and fibre from natural resources that are likely to be affected by an increase in average temperatures. While there is considerable uncertainty as to how climate change will affect specific regions, the general consensus at present is that temperatures will rise through most of this century and many regions will experience a reduction in average annual rainfall.

While climate change and natural resource management are significant challenges, rising consumer wealth in developing countries, such as India, China and Brazil, presents a range of opportunities for Australian agriculture. Increased wealth in developing countries is likely to mean higher levels of animal protein consumption per head and a greater interest by consumers in how their food is produced.

Opportunities

Global demand for a range of agricultural products has grown considerably over the last 2 to 3 years. This is forecast to continue for the medium term.

The two main factors driving demand are:

- Increasing per capita incomes in developed countries increasing the demand for higher value food products and animal proteins
- Increasing demand for renewable fuels, to reduce carbon emissions and increase energy security.

Strong global economic growth, driven by developing countries – especially the BRIC economies (Brazil, Russia, India and China) – is a major factor leading to increasing demand. The Food and Agriculture Policy Research Institute (FAPRI) predicts average annual real world GDP to grow at least 3.0 to 3.3 per cent to 2016, with the strongest growth predicted in China and India. Developing countries closer to Australia, such as Indonesia and Malaysia, are also expected to show strong growth in income and population over the next 10 years.

With increasing population in these countries, growing disposable incomes and a growing middle class, the demand for food, feed and fuel are expected to remain strong. This will result in increased consumption and higher trade levels for a wide range of agricultural and processed products. Land, natural resource constraints and underdeveloped agricultural sectors in most of the developing countries in Asia will mean that, in the medium term, food requirements will increasingly be met by imports.

Another factor influencing global commodity demand is the strong growth in the biofuels industry in the past few years. Governments in a number of countries have made it compulsory to use biofuel blends in transport fuels and have set long term targets. These mandates, rather than intrinsic economics, have underpinned the growth of the biofuels industry worldwide.

The strongest growth has been in the United States, where demand for corn (maize) to produce bioethanol saw corn prices rocketing earlier in 2007 (although prices have since eased due to increased plantings of corn in response to high prices). The other major soft commodities used for bioethanol production include sugar (mainly in Brazil) and wheat (mainly in the European Union), which have also experienced higher prices in recent times.

An increase in biodiesel production has also seen vegetable oil prices soaring in recent times (although they are expected to fall due to increased crushing capacities, especially in the European Union, resulting in more imports of oilseeds). The European Union is the largest biodiesel producer (mostly using canola/rapeseed oil), and it is estimated that it will consume about 21 million tonnes of oilseeds for biofuel production by 2016.
The increased demand for biofuels, while having a positive impact on farm gate prices of the agricultural feedstock, is a dual edged sword as it is also creating pressures on other agricultural industries that rely on grain for livestock feed, such as pork producers. At present, the margins for grain-fed livestock are small as feed costs escalate. They will remain so until these costs can be passed onto consumers.

Wheat and coarse grain stocks-to-use ratios have been falling since at least the late 1980s (see Figure 1). This partly results from traders reducing inventory costs and becoming more comfortable with lower stocks (just in time delivery), as well as global consumption exceeding demand regularly over the last 5 to 10 years.

**Threats**

There are several cross-industry strategic threats facing Australian agriculture that can be categorised as:

- Natural resource decline (salinity, acidity, nutrient loss, competition for water, etc)
- The impacts of climate change particularly potential declines in annual average rainfall in many regions of Australia
- Biosecurity threats (invasive plants and animals, diseases, etc).

This is by no means an exhaustive list as there are a range of individual industry threats that are well beyond the strategic scope of this paper. In many instances biotechnology can, and will, produce solutions for these challenges.

**Climate change and natural resource decline**

Global agriculture is faced with the task of producing more from a finite, and in some cases declining, base of natural resources. There is a range of views on the natural resource challenges facing agriculture around the world.

Adapting to climate change, to reduce the negative impacts and take advantage of any positive outcomes, will be a major feature of agricultural structural change over the next decade.

Some of the more alarming forecasts are outlined in Cribb (2008) and reproduced below:

- There will be 9.3 billion people in the world by 2050 but they will be eating as much food as 13 billion at today’s nutritional levels
- To meet this increase in demand, global food output must rise by 110 per cent in the coming 40 years. According to the FAO and IFPRI, this is technically feasible if all the world had modern farming systems
- However, natural resources are in decline:
  - Surface water availability to agriculture is contracting as urban demand rises
  - Ground water is in decline in most areas
  - Arable land area is shrinking
  - Soil losses are increasing
  - Quantities of applied nutrients are far exceeded by losses
  - Publicly funded agricultural research is in decline worldwide
  - Half the world may face regular drought by 2050.

While the scientific community is now convinced that the world is experiencing climate change, there is uncertainty about its impact on Australia and Australian agriculture. ABARE (2007) analysis indicates that some Australian agricultural regions are likely to experience a significant economic loss from the change in climate.

To illustrate the likely effects, ABARE has considered two very different regions that are dependent on agriculture (the northern and eastern Western Australian wheat belt, which is dependent on wheat and wool and the central western slopes and plains of New South Wales, where agriculture is less dominant. The regional effects of climate change were analysed using illustrative high and low rain fall scenarios; both assumed a global temperature rise of approximately 3.3˚C by 2100.

The regional economic effects (compared to a baseline of no climate change) are shown in Table 5. Essentially, the modelling found that the low rainfall scenarios led to significant reductions in gross regional product and in total production. However, the high rainfall scenarios resulted in an improvement in both of these aggregates.

It is important to remember...
that these outcomes are illustrative only. There is no certainty that a high rainfall outcome would lead to increases in economic welfare, if the rainfall is associated with violent storms, flood, etc. Indeed ABARE points out that the analysis focuses on the effects of climate change at 2030 and that more severe effects will become apparent in the latter half of this century.

This point has also been made by the CSIRO:

Australian crop agriculture and forestry may experience transient benefits from longer growing seasons a warmer climate and increasing atmospheric CO₂ concentrations, yet such benefits are unlikely to be sustained under the more extreme projections of global warming. Furthermore, changes in precipitation and subsequent water management are critical factors affecting the future productivity of the Australian landscape. The declines in precipitation projected over much of Australia will exacerbate existing challenges to water availability and quality for agriculture as well as for commercial and residential uses (Howden et al, 2006).

Adapting to climate change, to reduce the negative impacts and take advantage of any positive outcomes, will be a major feature of agricultural structural change over the next decade. ABARE argues that governments can play a role by:

... providing ongoing research and development to support adaptation, improving information dissemination to farmers, and ensuring appropriate policy settings that encourage adaptation (ABARE, 2007, p.167).

Many stakeholders consulted were strongly of the view that biotechnology can play an important role in addressing the future challenges expected to arise for agriculture, e.g. through processes such as developing drought and salinity resistant crops, and developing alternative sources of biofuels.

ENDNOTES

11. FAPRI was established in 1984 by a grant from the US Congress. It is a dual-university research program involving the Center for Agricultural and Rural Development (CARD) at Iowa State University and the Center for National Food and Agricultural Policy (CNFAP) at the University of Missouri-Columbia.
15. According to RaboBank, the bioethanol manufacturing industry in the United States will have grown by more than 100 per cent between 2006 and 2008. It expects that 100 million tonnes in total of corn will be converted into bioethanol by 2010. The OECD-FAO outlook estimates that United States ethanol production will double between 2007 and 2016.

Chapter 3 from Biotechnology and Australian Agriculture—Towards the development of a vision and strategy for the application of biotechnology to Australian agriculture. Report prepared for Biotechnology Australia and the Department of Agriculture Fisheries and Forestry July 2008.
PART 1: DOES AUSTRALIA RISK LOSING CONTROL OF ITS FOOD RESOURCES?
Foreign interests including state-owned companies from China and the Middle East are increasingly looking to Australia to secure their food production by purchasing key agricultural assets.

The sale of agricultural land is exempt under Foreign Investment Review Board regulations and the FIRB’s attention is usually triggered only by the sale of companies whose assets exceed a $231 million threshold.

In recent years, and especially since the global food shortage in 2008, China, South Korea, Japan, India, Saudi Arabia and the Gulf states have all been engaged in massive agricultural purchases around the world and in Australia – as outlined in these maps of Australia and the globe.

New South Wales Liberal Senator Bill Heffernan says Australia risks losing control of its wealth-creating agricultural assets. He believes the Federal Government is not paying sufficient attention to the issue of global food security.

“I would like to put on the agenda ... the urgent need to put agricultural land and our water resources on the radar of the Foreign Investment Review board.”
– Liberal Senator Bill Heffernan

“This is not about alarming anyone but it is about recognising that countries are taking strategic decisions now,” Senator Heffernan said.

Senator Heffernan says the Foreign Investment Review Board does not monitor foreign acquisitions of Australian farming land and Australia is being complacent about the fact that a number of wealthy nations that face future food security concerns are now investing strategically in agricultural property overseas. China has been particularly active in Africa; Saudi Arabia has acquired large amounts of land in Ethiopia, Sudan and Pakistan to grow wheat; and South Korea is buying up land in South America.

Anuhrada Mittal, the executive director of the Oakland Institute, a California-based think tank, estimates that as much as 50 million hectares worldwide has been purchased in this way. In some cases, she says, food land is being diverted to grow biofuels.

“Basically the world has to find twice as much food as it is producing today.”
– science writer Julian Cribb

In a new book, The Coming Famine, by University of California Press and the CSIRO, Australian science writer Julian Cribb raises major concerns about how the world will feed itself.

“Between now and the 2060s, the human population is going to grow to about 11.4 billion people ... So basically the world has to find twice as much food as it is producing today.”

Cribb believes China will only be able to feed a population of 640 million people in decades to come, however the projections for its population growth stretch beyond 1.6 billion. All the resources needed to produce that extra food will be in increasingly short supply, including arable land, water, fertilisers and oil.

Cribb says the British Ministry of Defence has identified large regions of the globe that it describes as multiple stress zones, where climate change, population growth and political instability are more likely to contribute to armed conflict over food and water in the future.

During Senate committee hearings into food security issues last month, the general manager of the FIRB’s trade
policy division, Patrick Colmer, conceded that under existing investment regulations it would be possible for an overseas company to buy up an entire district, farm by farm, without ever coming to the attention of the FIRB.

Senator Heffernan says there is no monitoring of purchases by the sovereign wealth funds of other countries. “At the present time there is no differentiation between private investment and sovereign investment,” Senator Heffernan said. “We need to put all of this on a register, we need to lower the trigger point for reporting foreign asset sales, and we need as part of our sovereignty to consider [our own] strategic investment in Australia.”

One example of a company backed by a sovereign wealth fund buying agricultural land in Australia is the Qatar-based Hassad Foods group, which is backed by the Qatar Investment Authority. Hassad Foods has invested more than $40 million in Australian properties this year, including Clover Downs in Queensland.

David Farley, chief executive officer of the Australian Agricultural Company, says the Australian public would be surprised if it knew the full extent of foreign purchases of cattle properties in Australia’s top end, and sheep and cattle properties further south.

“Australian agriculture is a very attractive investment to a lot of offshore players at the moment and I think if the sale investments were analysed there would be a lot of surprise about what size properties are being purchased and by who.”

Mr Farley says while overseas investment in Australian agriculture is a good thing, Australia needs to be careful that it doesn’t allow monopolies and duopolies to limit its ability to be a substantial and profitable international player in the world food market.

“We need to focus on making sure the investments are productive and are in the national interests of Australia.”

At the moment the Chinese state-owned company Bright Foods is in the market for Australian dairy, wine and sugar assets. Earlier this month it was outbid for CSR’s sugar subsidiary Sucrogen by a Singaporean company, Wilmar International, but it has also expressed interest in purchasing a number of vineyards in south-eastern Australia owned by Fosters. In the cattle industry, the giant Brazilian conglomerate JBS Swift is rapidly buying up abattoirs and feedlots in Australia’s south-east.

KEEN TO SELL

North-western Tasmania represents a microcosm of some the issues being played out globally. Many dairy farmers are trying to bail out, after being comprehensively defeated in a long and bitter dispute over milk prices. Many say they would welcome overseas investors.

“It actually costs us to go to work,” said dairy farmer Jim Hersey from Smithton. “We’re currently getting paid 31 cents a litre, and it costs us about 38 cents a litre to produce.”

Tasmanian real estate agent Betty Kay has just returned from the World Dairy Expo in the Chinese city of Qingdao, where she found genuine interest in the 25 dairy farms she has on the market. She says some dairy farmers are so hard up they can’t afford to buy toilet paper.

“[Chinese buyers] would come here as investors, they would still get managers for these farms, and there’s certainly farmers who have put their hands up,” Ms Kay said. Tasmanian farmer advocate Richard Bovill says many of the state’s smallholder dairy farmers stand to become either managers or labourers on farms they used to own.

“The model in Australia allows anybody to come in and acquire our assets.”

– farmer advocate Richard Bovill

“These farmers used to have viable, profitable businesses. Now they’re almost back to 200 years ago where they’re serfs working for a big landlord,” he said.

In 2005, Mr Bovill led a march of 2,000 farmers and 130 tractors to Parliament House in Canberra to draw attention to the plight of Australia’s farmers. He says Australia desperately needs to create a mechanism that will make Australian farming economically sustainable.

One Chinese businessman who sees a bright future for greater Chinese investment in Australia is Mr Cheng Xie, from Fukushoku Dairy Pty Ltd, based at Hay in NSW. The company exports processed milk powder to China.

Mr Cheng says in China, Australian and New Zealand dairy products are viewed as the best in the world. He says a number of large Chinese dairy companies are seriously interested in investing here, and that Australians should not be concerned.

“This is the 21st century. No one wants to go to war any more. Everybody just wants a piece of land or whatever to improve their lifestyle. I think we should open the door.”

PART 2: DOES AUSTRALIA NEED A FOOD SECURITY PLAN?

Tasmanian Greens Senator Christine Milne says Australia urgently needs a national food security plan because of the growing danger of foreign takeover of key Australian agricultural assets.

Senator Milne says she supports New South Wales Liberal Senator Bill Heffernan’s calls to expand the mandate of the Foreign Investment Review Board to cover the sale of agricultural land and associated water rights to overseas investors.

“I think there is a role for the Foreign Investment Review Board to look very carefully at foreign investment in agricultural land. After all, a lot of countries around the world do not allow foreign nationals and foreign corporations to actually buy the land. They allow leasehold arrangements and joint partnerships, but they don’t allow outright purchase,” Senator Milne said.

But the Greens say the FIRB can’t be expected to take a view on whether overseas investment proposals involving Australian agricultural land are in the national interest, in the absence of a national food security plan.

“That’s what the Greens want to see happen,” Senator
“We have a huge obligation to invest in food security, not only for Australia’s sake but for the world’s sake, otherwise we will be seeing food riots (and) insecurity right through Asia and our nearest neighbours.”
– Greens Senator Christine Milne

Milne said, “We need to have an assessment of where we are currently growing our food.”

Senator Milne says such a plan would take into account the vulnerability of food-growing areas to climate change, the need for more water to go back into river systems to provide ecological sustainability, and investment in agricultural science research.

“We need to look at where we can grow food into the future and protect that land for food production,” Senator Milne said. “If we see it go under housing, or if we see it go under fuel crop production, then we are really failing ourselves. But we are also failing the rest of the world, because we do have a capacity to produce more food than we can use.”

Senator Milne says Australia is seeing more and more agricultural land across the eastern states being given over to coal mining or coal seam gas.

“At some point someone has to say: ‘Where is the food going to come from?,’” she said. “You can’t eat coal.”

Senator Heffernan says Australia is not keeping up with the fact that national agriculture policies are beginning to change all around the world in response to climate change and population growth.

“We are in transition now, and the transition is being driven by strategic decisions being taken around the world, looking at the science about changes to the planet which obviously require reconfiguration of the way we’re doing business, where we can farm, and where we can’t farm,” he said.

WATER RIGHTS

Of particular concern to Senator Heffernan is that under current FIRB regulations foreign companies, sometimes with the backing of sovereign wealth funds, are able to buy the permanent water licences associated with agricultural properties.

“At the present time there’s no differentiation between private investment and sovereign investment – in other words other countries’ sovereign wealth funds buying our sovereign assets and then excluding us from access to them,” Senator Heffernan said.

“We want to be able to strategically use our water to the best advantage.”

Senator Heffernan says the FIRB needs to pay close attention to overseas interest in the sale of Cubbie Station, a 93,000-hectare cotton property in southern Queensland.

“I’m not aware of who the owners are for instance of the company that’s making a bid for Cubbie Station, which is reliant for a lot of its value on an irrigation water licence that’s been issued that’s not sustainable.

“It’s registered in the Cayman Islands. Well, it would be nice to know who we’re dealing with, and at the present time we don’t know.”

The Federal Government recently offered to buy back part of Cubbie Station’s permanent water rights for $50 million. Last year, Singaporean company Olam International bought almond plantations owned by Timbercorp, which is in receivership. In September, Olam paid $128 million for 8,000 hectares of almond groves at Robinvale that were sold with 41,000 megalitres of permanent water rights. In November the company paid $160 million in cash for a further 3,800 hectares together with 48,000 megalitres.

Olam now controls 45 per cent of the almonds under cultivation in Australia and says it is in the business for the long term. But Senator Heffernan says the plantations were bought for little more than the value of the water.

“The Singaporean company may do well out of it. I just think we’re entitled to know who they are, put it on a register, and take some control of knowledge in the market,” he said.

Senator Heffernan says it would be “a serious, serious mistake” if Australia allowed overseas companies to buy up Australian water licences in order to speculate on the water market.

Tasmanian farmer advocate Richard Bovill says Australia has turned water into a tradeable commodity without thinking about the long-term consequences.

“The Singaporeans have been clever enough to say, look, let’s get in on the ground floor and buy Australian water ... because in the longer term this is a commodity that is never going to go backwards.”

NEW ZEALAND’S LEAD

Senator Heffernan points to New Zealand as an example of the kind of response he’d like to see in Australia.

A Chinese company named Natural Dairy Holdings wants to buy up 16 New Zealand dairy farms owned by the Crafar family, whose company is in receivership.

The proposed sale has been put on hold while New Zealand’s foreign investment regulator, the Overseas Investment Office, examines it. New Zealand Prime Minister John Key has said sales of “very large tracts” of agricultural land to overseas interests may not be in New Zealand’s national interest. Bill Ralston, a spokesperson for Natural Dairy Holdings, says if Natural Dairy Holdings were to be allowed to buy the farms it would still only be a very small player in the New Zealand dairy industry.

“We are looking at only a couple of hundred million dollars – that is, 16 farms out of a total of more than 2,500 dairy farms in New Zealand. It is baby steps for Natural Dairy at the moment.”

Mr Ralston says Natural Dairy Holdings is being unfairly singled out because it is Chinese.

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“In the last 3 years, 13 different applications to acquire land have been approved in NZ mainly from Europe, Australia, the US and Russia – something like $380 million worth of acquisitions, and not a dickey bird! The sudden prominence of Chinese investments and the paranoia has set in.”

“We set water up as an asset class no different to buying gold or buying shares on the stock market.”
– farmer advocate Richard Bovill

But the Federated Farmers of New Zealand claim the Crafer farms purchase is just the beginning of a massive spending spree. They say Natural Dairy Holdings has $NZ1.5 billion to spend on farm acquisitions, which would mean they had a strategic stake in the dairy industry.

Federated Farmers president Don Nicolson says the problem is that New Zealand farms can’t go to China and buy up land there.

“But if we had this reciprocity with them, it would be so easy to do the exchange of land for money. Freehold title is so paramount in a democracy.”

Lachlan McKenzie, also from the Federated Farmers of New Zealand, warns the New Zealand Government needs to be vigilant about China’s long-term intentions.

“The Chinese Government has a 100-year timeframe on the horizon. They are looking for long-term food production. They want a supply chain for 100 years.”

AUSSIES CALL FOR NATIONAL FOOD POLICY

Australia may be facing food shortages due to the effects of climate change and population growth. SBS World News investigates

Community organisations are calling for a national food policy, saying Australia will face food shortages unless there’s better planning to cope with the effects of climate change and population growth.

“If we increase our population and we don’t protect our agricultural land and think of ways to grow food to feed our growing population, we will experience serious food shortages,” the President of the Sydney Food Fairness Alliance Lynne Saville told SBS.

For the first time, Australia is now importing more fruit and vegetables than it exports. Last year, $826 million worth of food came into the country while $749 million went out. Most comes from New Zealand, but increasingly garlic, peas, broccoli, cauliflower, beans and corn are being sourced from China. Store Manager Abilio Paiva says his customers are wary of where their food comes from.

“When we say it’s from China or from America, they don’t want it.”

Sustainable agricultural expert at the University of Sydney Bill Billotti has also been advocating for a food policy.

“We don’t currently have a national food policy in Australia and so our approach is fragmented. We stick food in agriculture, we stick food in health, we deal with food in environment but we’re not getting that across-discipline view, wholistic view of food,” he told SBS.

Rising food prices in recent years have made it more difficult for Australians to access fresh food, which is often more expensive than fast food alternatives.

“There’s absolutely no doubt that food, some food, is becoming more expensive, some food is going to become more rare and some almost extinct if we carry on the way we do,” OzHarvest’s Ronni Khan told SBS.

“We need to look for alternative and innovative approaches to dealing with resource scarcity and environmental change. Over the next few decades the way people obtain their food, water and energy will undergo a major evolution, the Director of the Victorian Eco-Innovation Lab says.

“One pathway we can see is people no longer relying on industrial production units hundreds or thousands of kilometres, or even continents, away. Instead they will source a greater proportion of essential resources, goods and services from within their ‘neighbourhood’,” Professor Chris Ryan says. “This evolution means a significant switch in people’s role within the economy and in their identity as citizens, moving from one of passive consumption to a more active engagement in production and exchange of economic and social capital,” he said.

The federal government established a Preventative Heath Taskforce to deal with burden of chronic disease currently caused by obesity, tobacco, and excessive consumption of alcohol. But there is no federal umbrella organisation to deal with food availability. When asked whether it has any plans to act on calls for a state food policy, the NSW government did not comment.
Food security plan essential for the national interest

As TV programs from Masterchef to Food Safari show, we Australians love our food. But many of us, including our governments, are complacent about where it is grown and who produces it.

While people discuss the threat of obesity in the suburbs and in the seat of power, nobody talks about the threat of global food scarcity. No one in Government seems worried about where the world will source its food or the consequences of shortages. Few are concerned about land being bought by overseas interests, about farmers being driven from the land by low farm gate prices and trade rules which discriminate against Australian growers. In fact, the Labor government in its 2010-11 budget cut programmes for natural resource management and land stewardship in the face of climate change and peak oil.

The reality should be very different. The world has embarked on a dangerous era of food insecurity and imperialism which will fuel conflict and famine if it is ignored. Australia is not immune. Land and water should be treated as strategic resources by us as they are by many in the world. The Greens want Australia’s food producing land secured in terms of ecological sustainability and ownership, and the men and women on the land appropriately rewarded for producing food.

This country needs a food security plan and it needs it now.

We must produce food for ourselves and export to help meet global demand or risk having others take from us our capacity to do so because we were too slow to realise what was happening.

It is not enough for the Australian government to keep on talking up free trade and WTO rules. That era effectively ended with the food riots in 2007-2008 as a result of climate change, peak oil, the rush to biofuels and global population growth. Importing countries lost faith in trade rules when food exporting countries like Russia, Argentina and Vietnam limited or banned the export of wheat and rice so as to feed their own people.

That left importers with food shortages and riots. At that point realising that the market could not be relied upon to supply food, countries which have outgrown their own land and water resources like China, India, Saudi Arabia, South Korea, Kuwait, United Arab Emirates and Qatar embraced a global land and water acquisition plan. They intend to buy land and water in other countries from which to feed their own people. They will also send their own workers to those countries to produce the food – and if necessary employ security forces to protect it.

We must produce food for ourselves and export to help meet global demand or risk having others take from us our capacity to do so because we were too slow to realise what was happening.

Pakistan has offered 400,000 hectares of agricultural land for sale with an agreement to provide a security force to guard the food crops. A Chinese firm has secured rights to 2.8 million hectares of the Congo on which to produce palm oil for cooking and fuel. South Korea has 690,000 hectares in the Sudan for growing wheat which will take water from the Nile and threaten Egypt’s food security downstream. Hunger and conflict can only be the result.

Globally it is impossible to find out just how many land acquisition agreements have been signed, how much land has been taken over and in which countries, except that Africa is the biggest target. The World Bank was supposed to release a report in December 2009 but has not done so yet. What is known is that Australia is third on the list of countries being approached for their land in the Asia Pacific. In international fora new rules need to be set to underpin food security. Any foreign investment in food production needs to be a win-win for both the importer and exporter to avoid exploitation that is currently occurring.

In Australia, Chinese interests are looking at buying dairy farms in Tasmania and controlling interests in sugar mills in Queensland. It is impossible to find out how many hectares of Australian farm land has already been bought because the Foreign Investment Review Board does not keep track. How can we plan for food security if we do not even collect relevant information?

In a desert nation like Australia, it is madness to sell off the farm and its water or to undervalue the skills of our food growers and researchers. Our children will never forgive us if we become tenant farmers in our own country. But what recourse do farmers
have when they are not valued and cannot make a living and need to sell to exit the farm with dignity?

Government policies like free trade agreements which take no account of environmental laws or wage differences make it impossible for farmers to compete with foreign-grown products no matter how efficient Australian farmers are.

Freeing up previously farmed land on the edge of cities for land developments, 100 per cent tax deductions for managed investment schemes and carbon sink forests, and competition between farmers and coal miners are driving up land prices and driving out food producers.

The failure of the ACCC to properly assess the impacts of food processor mergers and the failure of national competition policy to increase competition are treated with a shrug of the shoulders. They need to be held to account and an inquiry into National Competition Policy is overdue.


Climate change is increasing seasonal rainfall uncertainty and peak oil is driving up fertiliser and transport prices whilst governments reduce support for sustainable agricultural practices and agricultural research and development. Land and Water Australia was abolished at a time when we need it most.

The world needs a whole new trade regime that maximises food production where it can be grown best and which guarantees fair trade in food products and equitable access for all countries. We must not keep going down the road of land grabs to feed those who can afford it at the expense of those billions who cannot.

Senator Christine Milne is Deputy Leader of the Australian Greens.
Many people are waking up to the wisdom of growing food within and around cities and towns, a movement that is leading to the creation of more sustainable communities. Rachel Sullivan reports for ECOS Magazine

Bringing food production much closer to home makes sense. As our population becomes more urbanised, the environmental and financial impacts of transporting produce to our suburbs have risen. Meanwhile, traditional agricultural belts are facing the challenges of water shortages, climate extremes and declining land productivity, while once productive land on the urban fringe is being increasingly developed for housing and other infrastructure. This all coincides with concerns about the health and environmental impacts of large-scale commercial agriculture.

Until the Second World War, when advances were made in synthesising fertiliser, most people grew at least some of their own food. They kept a few hens, had fruit trees and large veggie patches. Scraps were fed to the chickens, or composted and mixed with animal manure then returned to the soil. Backyard food production was labour-intensive but highly productive, and supplemented by produce from market gardens and smallholdings on the urban fringe.

After the war, advances in machinery and synthetic fertilisers pushed production away from towns and cities into more marginal farmland. For the next 40 years, broadacre productivity in developed countries skyrocketed thanks to artificial pesticides and fertilisers and monoculture specialisation. Recently, however, growth slowed due to a combination of changing climate, existing crop varieties reaching their maximum yield potentials and progressive soil depletion. Waste products – water, manure and vegetable waste – that were once composted and returned to the soil as an integral part of a closed production system, became a by-product liability.

Agriculture is also now responsible for 20 per cent of greenhouse gas emissions (GHGs) globally. Carbon dioxide is produced from making fertilisers and from running farm machinery, processing plants and delivery trucks. Methane is produced mostly by gut fermentation processes in cattle, and chemical processes taking place in farmed soils release nitrous oxide. Carbon is also indirectly released into the atmosphere from soil as a result of chemical applications, land clearing and conversion of savannah or pasture land to arable land, and from overgrazing and subsequent soil erosion.

“We need to plan for food, and identify where good land lies, where there are good soils and not too much fragmentation, then zone that land as primary production only, with a caveat placed on it,” Ian Sinclair says.

Against this backdrop of concern about food’s environmental and health impacts, and more recently its future availability, people in urban areas have been rediscovering the pleasures of ‘slow food’, growing and picking their own produce, and purchasing freshly harvested fruit and vegetables from suburban farmers’ markets.

Making city space work

But can food forests, green roofs, backyard veggie patches and community gardens realistically feed the tens of millions predicted to live in the cities of the near future?

Yes, says Kirsten Larsen, an expert in sustainable food systems and Eco-Innovation Policy Research Manager at Melbourne University’s Victorian Eco-Innovation Lab (VEIL).

“First we need to change our understanding of cities and start to see them as productive, not consumptive spaces.

“While we’re not going to see fields of wheat or large-scale animal production in the heart of the city, there is a great opportunity for the production of fresh, perishable foodstuffs – especially fruit and vegetables – to expand, thanks to the concentration of water and nutrient resources in urban areas.

“At the moment 47 per cent of waste going to landfill is organic; 21 per cent is food waste. Much of that could be composted or turned into mulch and returned to the soil to reduce reliance on fertilisers that are derived from fossil fuels.

“Similarly, harvesting stormwater and wastewater from cities and making it available for crops after appropriate treatment will help close agricultural production loops.”

Larsen believes that “food-sensitive urban design” can contribute to resilient, sustainable communities by diversifying food sources, making use of local resources, reducing transport and refrigeration needs, and spreading risk across different distribution channels. All of this contributes to positive community dynamics, not to mention greater food security. In Cuba, for instance, community gardens set up on disused land to compensate for reduced imports following the Soviet collapse now produce half the leafy vegetables consumed on the island.

To make urban agriculture viable again, Larsen says the same level of investment put into broadacre agriculture needs to be put into urban production systems.

Further, we would need to look at utilising different spaces, such as basements and rooftop gardens. Larsen says Melbourne, for example, has a great deal of rooftop space that could be used for food production, if certain engineering challenges could be overcome. Rooftop gardens are appearing in Japan and the USA, notably Chicago and New York. In New York’s Brooklyn district, an organic farm has been established on the 550-square-metre roof of a defunct bagel factory (see www.rooftopfarms.org).

The gardeners behind the project say they are “committed to a sustainable business model that supplies fresh, locally grown organic food and spreads food education throughout...”
New York.” Day-of-harvest deliveries are made by bicycle or locals can pick their own. It has been so successful that organisers are planning to expand into other vacant land.

New skill sets will be required to grow vegetables and fruit on walls and in aquaponics systems. Aquaponics, currently being trialled by Melbourne community farming group CERES Community Environment Park, is an ancient Aztec farming technique that combines fishkeeping and vegetable production. Similar to hydroponics, plants grow on rafts, with their roots dangling in water enriched by fish waste. The water is then filtered and recycled back into the fish tank.

Geoff Wilson, President of the Urban Agriculture Network – Western Pacific, says the technique allows relatively small areas to be highly productive. “With fish food the only input, aquaponics has the potential to be one of the world’s major food production systems.”

Another new idea is vertical farming, a concept that originated with Professor Dickson Despommier from Columbia University’s Department of Health Sciences. Custom-built skyscrapers would bring large-scale food production into the place where most of the food is consumed. Food could be produced year round in a climate-controlled, parasite-free environment, seeing the end of harvests lost to droughts and storms. Features such as water and nutrient recycling, biogas-powered cogeneration, geothermal heating and cooling, and rooftop PV technology would minimise the environmental footprint of such skyscrapers.

Proponents also believe that using soilless growing media could be up to 30 times more productive than traditional broadacre cultivation.

In an article published in Scientific American, Despommier posited that vertical farms could help combat the effects of climate change, allowing transport-related GHGs to be cut dramatically and carbon sequestering forests to be planted on former farmland. But while there has been considerable interest in vertical farms, with prototypes on the drawing board, at the moment they are prohibitively expensive: to be viable, each farm would need to feed around 50,000 people, be about 30 stores high, and cost hundreds of millions of US dollars to build. This could make skyscraper-farmed crops more expensive than those grown by traditional methods.

Australian architect Oliver Foster believes that retrofitting existing structures may be a more cost-effective solution. Pricing energy and materials at their true ecological value in a carbon trading framework would also make alternatives, like high-rise farming, more economically viable.

Community learning benefits

Back on the ground, permaculture food forests such as Brisbane’s Northey Street City Farm (www.northeystreetcityfarm.org.au) not only provide an edible landscape with more than 1,500 exotic and native fruit trees, bush tucker plants, shrubs and groundcovers growing on the 4 hectare farm site, they also provide a focal point for the community, and an education in permaculture, horticulture and sustainable living.

Kirsten Larsen believes this educational component is critical to the success of urban farms. “There has been an increasing distance between production and consumption of food and many people now don’t have the skills to feed themselves,” she says. Even in successful community gardens, which have often been set up as part of social welfare initiatives in multicultural or disadvantaged communities, education could help boost production significantly.

Through the Stephanie Alexander Kitchen Garden Program school-children are learning about food production and healthy eating from an early age. Supported by federal government funding, the program involves 91 schools Australia wide, with more being added each year.

Children from Years 3-6 spend 45 minutes a week tending an organic vegetable garden they help create, then an additional hour-and-a-half learning to cook and prepare meals from the food they harvest.

While inner-urban food production is critical to future food security and advocated by The CSIRO Home Energy Saving Handbook as an important part of sustainable living, Ian Sinclair, Principal Consultant at Edge Land Planning, believes the urban fringes will continue to play a major role in a decentralised urban agriculture mix.

“However, land use conflicts need to be managed at the regulatory level,” he says.

“At the moment, a lot of perishable food production occurs on the urban fringe in cities. Greater Sydney, for example, produces 15 per cent of the state’s total vegetables, but when looking at the perishable or fresh component, the Sydney region produces 90 per cent of Asian vegetables consumed in the state, and 80 per cent of its mushrooms.

“But as the population has grown, development has steadily encroached onto rich productive farmland. High rates and complaints from neighbours,
who like sweeping rural vistas but object to the sounds and smells of farming, are driving farmers off the land.”

Offsetting food supply shortage
Indeed, there is growing concern that the development-driven spread of urban infrastructure is permanently ‘paving over’ the highly valuable and most productive soils near cities – a natural asset that often attracted settlement in the first place.

Beyond these areas, land is more marginal or degraded. Observers, including renowned conservationist David Suzuki and state government planners, say city planners need to do more forward-looking assessments to safeguard these areas.

“We need to plan for food, and identify where good land lies, where there are good soils and not too much fragmentation, then zone that land as primary production only, with a caveat placed on it,” Ian Sinclair says.

He points out that if we want local food systems, farmers also need to be provided with an incentive to stay.

“Rate rebates are one such incentive. Another could be market-based, where development credits are ascribed to farmland and could be redeemable for projects involving higher urban density to take the pressure off land.

“In the future we will be able to feed ourselves from urban food production models, but we also need to make policy decisions and need to provide incentives to retain rural land now.”

Professor Julian Cribb, author of the forthcoming book The Coming Famine,¹ says that year-round availability of food has contributed to a massive population explosion that, by 2050, will give rise to a dozen cities of 30 to 40 million inhabitants. Unless things change radically, his research reveals, none will produce enough food, leaving them almost entirely dependent on outside food sources.

“When supplies fail, as they almost inevitably will for some reason, the ensuing catastrophe will appall humanity,” says Cribb. Among the reasons for such supply failure, he cites the fact that most agriculture depends on fossil fuel for transport, processing equipment and other equipment; with thousands of new cars on the road each day in China and India, by 2050 there won’t be any fossil fuel available for food production, according to Cribb.

Phosphates and nitrates for fertilisers will also run out. Most of the nutrients taken from soils in the form of produce consumed by urban populations during the past 50 years have been flushed out to sea. Increasing water shortages will continue to affect production, and climatic extremes resulting in droughts, floods and bushfires will have catastrophic effects.

The consequences of an unreliable food supply would be dire, says Cribb, who argues that since the 1990s, two-thirds of all conflicts in the world have been caused by shortages of land, food or water.

“Bringing food production back into the cities where it is consumed, and intelligently recycling nutrients back into agriculture or horticulture, is essential if we are to stave off disaster,” concludes Cribb.

Connecting the dots
Brisbane-based Food Connect has created an innovative community-based food distribution model that brings together small producers – including people who grow excess veggies in their home gardens, community gardeners, school farmers and even ‘gleaners’ (people who collect fruit growing on street trees) – with 1,600 subscribers who want to purchase seasonal, locally grown produce.

“We source our produce from 80 growers who live within a couple of hours of Brisbane,” says Robert Pekin, who goes by the charming title of CiEiO of Food Connect. “Farmers send their produce to a homestead or to the outskirts of Brisbane. It is then packaged into 11 different types of boxes and dropped off at various locations around the city – family homes, schools and community centres – and subscribers collect their box from there, hopefully getting the chance to talk to like-minded others in the process.

“The organic content of the boxes varies – sometimes it is as high as 100 per cent, but we opt for locally grown produce over organically certified,” he adds. “That said, no chemicals are sprayed directly onto the fruit and vegetables prior to consumption and all of our farmers, some of whom also supply eggs and dairy products, meet strict ethical and animal husbandry standards.”

Pekin comments that this model has multiple benefits: it encourages farmers to grow a more diverse range of foods, which is good for the environment, and ensures they are fairly compensated for their produce. They don’t need to transport their produce as far, which saves time, energy and money, all of which they are able to put back into growing high quality crops.

The formula has proved so popular that Food Connect is about to launch in Sydney, Melbourne and Adelaide, with other cities and regional towns such as Bellingen and Coffs Harbour expected to follow suit.

2. Read more at www.davidsuzuki.org/Economy/Sustainability/alr_report
3. The Coming Famine by Julian Cribb will be published in 2010.

MORE INFORMATION
Victorian Eco-Innovation Lab (VEIL)
Australian City Farms and Community Gardens Network
Stephanie Alexander Kitchen Garden Program
www.kitchengardenfoundation.org.au

Article from ECOS Magazine, Dec-Jan 2010
www.ecosmagazine.com
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Two years ago, $130 a week was more than sufficient for Karen to keep her young family of three children – two growing boys in primary school and a one-year-old girl – well fed and well cared for. These days, her weekly grocery bill hardly goes under $180 and she finds it a struggle to make groceries last the week.

The cost of feeding an average Australian family has risen dramatically in recent times. Recent statistics show the cost has gone up by at least 40 per cent since 2000. In the past 20 years, the price of everyday necessities such as bread, milk and eggs rose by at least 6 per cent each year, and lamb prices by almost 8 per cent each year. Food price inflation in Australia, unlike in other advanced countries, has been greater than overall inflation for the past 10 years.

Why are Australian food prices rising? Is it because of increased demand by a growing population? Or is it the lack of sufficient supply due to drought or other weather conditions, or because of an overall rise in global food prices? Most probably, there is not one single cause, but such experts as Associate Professor Frank Zumbo of the University of New South Wales, who have analysed the different factors, say market concentration in the supermarket industry is the main culprit.

Professor Zumbo reported that Coles and Woolworths account for 80 per cent of groceries sold in Australia and that 55 to 60 per cent of consumer spending on grocery items – including fresh meat, fruit and vegetables – goes to these two companies.

In addition, both the Australian Competition and Consumer Commission (ACCC) and the market researchers Nielsen found that Coles and Woolworths control a major share of dry packaged groceries sold nationally, and that these supermarket giants set the shelf prices for most of the products, to the extent that even the manufacturers have no power over the pricing policy.

Basic economic principles tell us that this duopolistic market structure disadvantages consumers such as Karen. With no one else to compete with, Coles and Woolworths are able to limit supply of food items, driving grocery prices up and extracting larger margins on their sales.

The duopoly structure allows Coles and Woolworths to charge a higher price for their goods – higher here means that grocery items are sold at prices significantly above those that would be charged if there were other competing supermarkets and a more equitable distribution of consumers. The result is that consumers have to contend with larger grocery bills. Besides higher prices, the duopoly structure has a number of other features that are not necessarily good for Australian consumers.

First, a duopoly structure can limit the range of products consumers can choose from. This can easily hold true in the supermarket sector, with two chains having an 80 per cent share of the market. When the consumer advocate group Choice conducted a survey of supermarket chains in Australia last year, it found no significant differences between the grocery items in Coles and Woolworths.

Second, given the relative ‘largeness’ of firms in duopoly structures, they are easily able to squash competition through mergers and acquisitions. For example, Woolworths acquired organic food retailer Macro Wholefoods in May last year and rebranded it as Thomas Dux. This kind of action, when unregulated, only increases market concentration and further lessens competition in the sector.
Third, an existing duopoly can practise geographic price discrimination. In the supermarket business sense, this means that Coles and Woolworths are able to charge different prices for the same product depending on the location of their outlets, further increasing their profit margins in areas where demand is relatively strong.

Choice found that strength of demand for a particular product is in large part dictated by the socio-demographic make-up of a suburb, as well as the intensity of retail competition in that area. The study concluded that consumers who live in expensive suburbs tend to pay higher grocery bills.

Advocates of Coles and Woolworths point to several benefits that arise from their duopoly, among them product variety, convenience, location and amenities. All these basically amount to one important product: services. It is said that the most important products of the supermarket giants are the supermarket services that customers enjoy while shopping.

It is argued that products in Coles and Woolworths cost more because it costs these retailers to make available such a wide set of products in one space, saving the consumer precious time, money and effort. In a large supermarket, one can buy a wide range of foods and home essentials – everything from cleaning and laundry products to shampoo, toothpaste and nappies.

In a further justification, the higher prices charged by grocery retailers include not just the manufacturer’s prices but also transportation costs, storage costs and cost of amenities such as parking, use of trolleys, larger shops and proximity to other shops, as happens in shopping malls.

In economic terms, the demand for the services provided by supermarkets is high but the supply of these services is somewhat limited to the two major chains. Given a limited supply of services, as consumers increase their demand for such services, the prices go up.

In summary, the higher prices charged by these supermarket giants are justified by their ability to offer a wide range of services that cater to the needs of consumers. However, the costs of providing these services may also be passed on to consumers in the form of higher prices, which may not be in their best interest.
preferred area, allowing them to choose the cheaper one. The retailer charging more would have to lower its prices and perhaps improve the quality of its products to survive. In other words, as more suppliers enter the market, the price of services will fall because of the competition, and grocery prices will be lower.

The idea that more competition benefits consumers is supported by conclusions derived from the Choice survey. It found that a basket of 35 items, including basics such as bread, rice and bananas, costs shoppers $123.15 in Geelong and $136.79 in Bunbury, Western Australia.

Geelong, which has many supermarket chains including Aldi, offers greater competition and lower grocery prices. Western Australia has higher prices because of an absence of competition. The survey found that it costs $94.30 to fill a basket of 35 items at Aldi, but $126.87 at Woolworths/Safeway and $127.67 at Coles. Aldi’s presence clearly provides competition for the supermarket giants.

Clearly, more independent retailers should be allowed to enter the market. The government should move to lower the barriers to new entrants in such a highly concentrated market.

Coles recently announced a uniform pricing policy for most of its products so that consumers in wealthy or isolated areas would not have to pay extra. Aldi started charging the same prices in all its stores in 2008. Coles’ decision to adopt uniform prices has led to a price war between the two supermarket giants. Woolworths lowered shelf prices on many items and claimed this would save an average Australian family about $300 a year.

These events show that independent retailers such as Aldi can provide competition to the supermarket giants and eventually competition leads to lower prices for consumers.

Clearly, more independent retailers should be allowed to enter the market. The government should move to lower the barriers to new entrants in such a highly concentrated market. The ACCC should be more careful in allowing mergers and acquisitions in the retail industry, which can destroy competition.

For the moment, Karen’s budget dilemma remains. She tries to be a wise shopper by buying cheaper generic products to keep her grocery bill below $180 a week.

Tania Dey is doing her PhD at Monash University’s Department of Economics. She was assisted by Dr Rebecca Valenzuela.

First published in The Age
Education, 10 May 2010

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Fresh food prices could soar

A food security summit in Brisbane is hearing prices are expected to increase by up to 50 per cent over the next 10 years, making fresh food unattainable for some people.

Toni Crisp reports for ABC News

Forum chairman Professor Geoffrey Lawrence says the price of food has doubled since 2000. He predicts prices will continue to increase, especially staples such as rice, corn and wheat. He says many global factors are responsible. “There’s very little additional arable land to bring into production,” he said.

“Productivity rates in farming have plateaued, irrigated water is not going to be all that much available.”

“The final major one is that climate change is going to raise sea levels and those increased sea levels are going to inundate productive areas.”

Professor Lawrence says climate change will eradicate food production areas in India, China, Indonesia and Bangladesh.

“In the Murray-Darling Basin [in Australia] there’s likely to be with worst case scenario a 40 per cent decline in available irrigation water which is going to limit the amount of crops,” he said.

He says there needs to be more spending on agricultural research to improve crop yields and less wastage of imperfect fresh food in western countries.

“The supermarkets in particular where 70 per cent of our food is sold in Australia are very careful about getting what they see as the best products.

“That means there’s a lot of food wastage and that food would normally be available but it’s not picked up by the supermarkets.”

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www.abc.net.au/news
Australian households are throwing out more than $5 billion worth of food each year, more than Australians spend on digital equipment, and more than it costs to run the Australian Army. In addition to the direct financial costs of this waste, the environmental impact associated with excessive greenhouse gas emissions and water use is substantial. This paper examines who is wasting food and the motivations behind this behaviour. The research is based on an online survey of 1,603 main grocery buyers across Australia.

The data suggest that better planning by grocery shoppers is likely to play an important role in reducing food waste. However, such ‘conscious consumption’ tends to be inconsistent with the ‘convenience foods’ promoted by some food retailers. The free provision by some retailers of plastic shopping bags, for example, highlights the manner in which grocery outlets encourage customers to shop first and plan second.

Without considerable policy change in this area, household waste is likely to grow as incomes rise and the number of occupants in each household shrinks.

In addition to the direct financial benefits to households, reducing food waste has the capacity to deliver significant environmental benefits at no cost to government. Food retailers represent a major barrier to implementing effective food waste policies, since their profits are contingent on the amount of food sold rather than the amount of food consumed.

To overcome this, better public understanding of the problems associated with food waste needs to be a priority for governments at all levels. Without considerable policy change in this area, household waste is likely to grow as incomes rise and the number of occupants in each household shrinks.
Climate change ‘threatening agriculture’

Scientists across Australia are warning that climate change is already taking place and are urging farmers to develop adaptation strategies now. SBS World News reports

Climate change will add to the existing substantial pressures on Australia’s agricultural industries and will interact strongly with the food security challenge of the next two decades, senior CSIRO researcher Dr Mark Howden told SBS.

“[Farmers will have to] effectively double food production while reducing greenhouse gas emissions, reducing impact on biodiversity and the natural resource base while facing competition for land and water from urban encroachment and biofuel use.”

LESS RAIN IN THE SOUTH, MORE IN THE NORTH

CSIRO says it has already observed a decrease in rainfall across much of southern and eastern Australia and more rain in many parts of northern and central Australia.

He says while data point to an almost certain future rain reduction in southern-eastern Australia, it is more difficult to tell whether the increase in rainfall seen recently in the north will continue in the future.

“We need to change our management, our agricultural practices, locations and the way products are treated across the value chain.”

HIGHER TEMPERATURES

The most up to date climate projections are for an increase in global average temperatures of 1.1-6.5 degrees by the end of the century along with a large range of other climate changes.

To place these temperatures rises in perspective, a 1 degree rise in average temperature will make Melbourne’s climate like that currently experienced by Wagga Wagga, a 4 degree rise like that of Moree and a 6 degree rise like that just north of Roma in Queensland.

“As a consequence we’ll see changes in drought frequency and changes in the environment animals and crops have to grow in,” Dr Howden told SBS.

“[We’ll also see] changes also in terms of the emissions that farmers will be thinking to produce as a consequence of their activities as they come under pressure to reduce those greenhouse gas emissions in the future,” Dr Howden says.

ADAPTATION STRATEGIES

He says how much Australian agriculture will suffer depends on how early a series management adaptations are put in place.

“We need to change our management, our agricultural practices, locations and the way products are treated across the value chain.”

WINNERS AND LOSERS

Dr Howden says there will be both winners and losers, but the region most heavily hit will be southern-eastern Australia – which is where most of crops are growing.

“In southern-eastern Australia, which is heavily dependent on water, industries such as the irrigated dairy industry, rice growing and similar activities are going to be probably the most seriously hit as lower rainfall and high temperatures will reduce crops.

“There will be some areas such as dry land cropping in the dry margins which will become increasingly challenged over time and management activity and land use change will need to be enacted.”

But he added that in some areas there will be beneficial impacts such as where crops or forests are limited by cold conditions and some degree of warming, providing we don’t have a too significant decrease in rainfall.

SBS World News | www.sbs.com.au
17 March 2010
ABOUT THIS SECTION

‘Exploring issues’ features a range of ready-to-use worksheets relating to the articles and issues raised in this book.

The activities and exercises in these worksheets are suitable for use by students at middle secondary school level and beyond.

As the information in this book is gathered from a number of different sources, readers are prompted to consider the origin of the text and to critically evaluate the questions presented.

Does the source have a particular bias or agenda? Are you being presented with facts or opinions? Do you agree with the writer?

The types of ‘Exploring issues’ questions posed in each Issues in Society title differ according to their relevance to the topic at hand.

‘Exploring issues’ sections in each Issues in Society title may include any combination of the following worksheets: Brainstorm, Research activities, Written activities, Discussion activities, Quotes of note, Ethical dilemmas, Cartoon comments, Pros and cons, Case studies, Design activities, Statistics and spin, and Multiple choice.

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WORKSHEETS AND ACTIVITIES

This e-book is subject to the terms and conditions of a non-exclusive and non-transferable SITE LICENCE AGREEMENT between THE SPINNEY PRESS and: Trinity College, East Perth, allan.harris@trinity.wa.edu.au
Brainstorm, individually or as a group, to find out what you know about the state of the world’s food supply.

1. What is the global food crisis?

2. What are the causes of the global food crisis?

3. What are the impacts of the global food crisis?
Complete the following activities on a separate sheet of paper if more space is required.

1. Food security exists when all people, at all times, have physical and economic access to enough safe and nutritious food to meet their dietary needs and food preferences for an active and healthy lifestyle. What are the causes of food insecurity? What happens when people do not have food security?

2. Every year, roughly 6 million children under 5 die because of nutrition-related illness. Malnutrition causes daily suffering and long-term setbacks for individuals, communities and entire countries. When children don’t have enough to eat or when they lack adequate nutrition, this affects almost every aspect of their lives. What are the impacts of malnutrition on children and their families?
3. The food production increases fostered by the Green Revolution (1940s–late 1970s) are often credited with having helped to avoid widespread famine, and for feeding billions of people. What was the Green Revolution?

4. The world’s 6.5 billion population is expected to reach 9 billion by 2050. This, combined with growing consumption as poverty is alleviated, will put huge pressure on food supplies. What are these food supply pressures likely to be?
1. For Australia, there is no immediate threat to the domestic food supply. Australia will continue to produce in excess of what it consumes and will therefore be able to contribute to the world's food needs. However, Australia faces its own challenges, namely climate change, diminishing water supplies and soil degradation, agricultural labour shortages and declining productivity. Outline the current impacts of these challenges on Australia's food supply.

2. Rising food prices in recent years have made it more difficult for Australians to access fresh food, which is often more expensive than fast food alternatives. What are the causes of rising food prices in Australia?
1. The number of hungry has declined, but remains unacceptably high. Despite the decline, the ability to achieve international hunger targets such as the Millennium Development Goal 1 (Eradicate extreme poverty and hunger) is still at risk. Governments should encourage increased investment in agriculture, expand safety nets, and enhance income-generating activities for the rural and urban poor. Discuss.

2. The coming famines of the mid-21st century cannot be solved by governments, by scientists or by farmers alone. We need a change in behaviour by every person on the planet, especially in rich and urban societies … Delivering new farming systems and technology to all the world’s farmers, paying fair prices and changing our eating habits is a matter of both national and global urgency. Discuss.
Complete the following multiple choice questionnaire by circling or matching your preferred responses. The answers are at the end of this page.

1. Match the following terms to their correct definitions:
   a. Hunger 1. When people lack access to sufficient safe and nutritious food for a healthy and productive life.
   b. Malnutrition 2. When people have access to sufficient, safe and nutritious food that meets their dietary needs for an active and healthy life.
   c. Food insecurity 3. A lack of adequate nourishment. The result of prolonged lack of food and/or the failure of the body to absorb the nutrients in food.
   d. Food security 4. Caused when the body does not receive enough nutrients due to dietary imbalances.
   e. Undernourishment 5. Social condition of people who frequently experience, or live with the threat of experiencing, the physical sensation of desiring food.
   f. Undernutrition 6. The state of people whose food intake regularly provides less energy than is required to meet their physiological needs.

2. Match the following world regions to their undernourishment figures for 2010 (total: 925 million):
   a. Latin America and the Caribbean 1. 19 million
   b. Near East and North Africa 2. 37 million
   c. Developed countries 3. 53 million
   d. Asia and the Pacific 4. 239 million
   e. Sub-Saharan Africa 5. 578 million

3. Which of the following are NOT likely causes of the global food crisis? (circle non-causes)
   a. Poor harvests
   b. Demand for biofuels
   c. Climate change
   d. Food aid
   e. Bad weather/natural disasters
   f. Fuel prices
   g. Genetically modified foods
   h. Water scarcity
   i. Environmental degradation
   j. Population growth
   k. Rising food demand due to economic growth and higher incomes
   l. Food export restrictions causing hoarding
   m. Trade-distorting food subsidies
   n. Underinvestment in agricultural production and technology

MULTIPLE CHOICE ANSWERS

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An estimated 854 million people experience hunger on a regular basis. (p.1)

The global food crisis disproportionately affects the poor in developing countries who spend 60% to 80% of their income on food. (p.1)

World food prices have roughly doubled over the past 3 years, but between April 2007 and April 2008 alone they increased by 85%. (p.2)

In Ethiopia many famines have devastated the country including the 1984 famine when an estimated 1 million perished. (p.5)

The Ukraine Famine 1932-3 resulted in a death toll that has been estimated at between 6 and 7 million – approximately 20% of the population. (p.5)

The Food and Agriculture Organization (FAO) of the United Nations estimates that in 2009 1.02 billion people were undernourished worldwide. (p.5)

In 1969 an estimated 878 million, or 24%, of the world were undernourished. (p.6)

At the end of 2008, domestic prices for staple foods remained in developing countries 17% higher in real terms than 2 years earlier. (p.6)

More than half the world’s population lives in low-income, food-deficit countries that are unable to produce or import enough food to feed their people. (p.7)

More than one-third of all children are malnourished. (p.7)

6 million children a year die of causes related to malnutrition. (pp.7,13,28)

There is enough food in the world for everyone to have enough to eat, but it is unevenly distributed. (p.7)

It takes 1,000 L of water to produce 1 kg of wheat and 3,000 L of water to produce 1 kg of rice. (p.8)

Each year Australia contributes up to 150,000 tonnes of Australian-produced wheat and rice to the World Food Programme. (p.9)

A total of 925 million people were undernourished in 2010 compared with 1.023 billion in 2009. (p.10)

Developing countries account for 98% of the world’s undernourished people. (p.11)

The proportion of undernourished people remains highest in sub-Saharan Africa, at 30% in 2010. (p.11)

Global demand for food will more than double over the coming half-century, as we add another 4.7 billion people. (p.15)

By 2050, 7.8 billion people will inhabit the world’s cities. They will use about 2,800 km³ of fresh water – more than the whole of irrigation agriculture uses worldwide today. (p.15)

In 1900 every human had 8 hectares of land to sustain them – today the number is 1.61 and falling. (p.15)

The Stockholm Institute calculates we waste 2,600 out of every 4,600 kilocalories of food harvested. (p.16)

While a billion starve, we waste food enough to feed 3 billion. (p.16)

Between 1980 and 2006 the proportion of the world’s aid budget devoted to raising food output fell from 17 to just 3%. (pp.17,30)

Our 1.8 billion farmers – mostly women – also manage half the world’s land, three quarters of its fresh water and a third of its atmosphere. (p.19)

Brazil is by far the fastest growing agricultural producer, with output expected to rise by more than 40% between now and 2019. (p.20)

Over 3 billion people now rely on food grown somewhere else and transported to cities, a number likely to grow to around 7 billion by 2050. (p.21)

We produce 93% of food consumed in Australia. And we produce 1% of the world’s food, and 3% of the food traded worldwide. (p.21)

75% of food biodiversity was lost in the 20th century whilst 80% of the world’s dietary energy is now supplied by just 12 industrial crops. (p.23)

Australia is now importing more fruit and vegetables than it exports. (pp.23,39)

The simple fact is while food production has increased by 32 million tonnes a year, an annual increase of 44 million tonnes a year is what’s actually needed. (p.24)

Last year alone, the number of people deprived of food rose from 915 million to 1.02 billion. (p.25)

Hunger and malnutrition contribute to the deaths of about 5 million preschool children a year. (p.26)

At least 20 countries including Brazil and India now recognise the right to food in their constitutions. (p.27)

Currently, more than 1 billion people in the world suffer from malnutrition, including more than 640 million in the Asia Pacific. (p.27)

1 in every 6 people on Earth is hungry. (p.28)

In terms of the hunger goal, we are actually in a worse state today than we were when the MDGs were agreed by 189 nations in 2000. (p.29)

Most of the world’s hungry are women and children. (p.30)

The European Union is the largest biodiesel producer (mostly using canola/rapeseed oil), and it is estimated that it will consume about 21 million tonnes of oilseeds for biofuel production by 2016. (p.33)

In 2009, $826 million worth of food came into Australia while $749 million worth went out. (p.39)

At the moment 47% of waste going to landfill is organic; 21% is food waste. (p.42)

In New South Wales greater Sydney produces 15% of the state’s total vegetables, but when looking at the perishable or fresh component, the Sydney region produces 90% of Asian vegetables consumed in the state, and 80% of its mushrooms. (p.43)

In the past 20 years, the price of everyday necessities such as bread, milk and eggs rose by at least 6% each year and lamb prices by almost 8% each year. (p.45)

Australian households are throwing out more than $5 billion worth of food each year. (p.48)
Biofuels
Non-fossil fuels derived from biomass (organic materials including plant materials and animal waste).

Biodiversity
The variety and variability of all life forms. Includes humans, plants, animals, fungi and micro-organisms, and the genes that they contain and the ecosystems they inhabit.

Biomass
Organic materials (derived from plants or animals) which can be burned to produce energy or converted into a gas and used for fuel.

Climate change
Changes in climate attributed to the human-induced increase in concentration of greenhouse gases in the atmosphere.

Environmental sustainability
Relates to the way we live and make decisions about how we produce and consume. It involves transforming the way we utilise our land, water, mineral and energy resources through a better understanding of human and environmental systems and the use of new technologies. Sustainability is the ability to live life and organise society so as to minimise degradation of the natural environment and not exploit or exhaust the non-renewable resources needed for healthy living.

Famine
A widespread, severe food shortage resulting in acute hunger. Usually accompanied or followed by regional malnutrition, starvation, epidemic, and increased mortality. In the early 1980s, nearly 1 million people perished in the Ethiopian famine.

Food aid
Assistance to provide food to improve the food security of people experiencing poverty and hunger. There are many forms of food aid, including in-kind commodity, cash for local purchase, cash for food, and monetisation.

Food insecurity
When people lack access to sufficient safe and nutritious food for a healthy and productive life. It may be chronic, seasonal, or temporary, and it may occur at the household, regional, or national level.

Food price index
A measure of the monthly change in international prices of a basket of food commodities. The index is managed by the Food and Agriculture organization of the United Nations.

Food security
When people have access to sufficient, safe and nutritious food that meets their dietary needs for an active and healthy life.

Global food crisis
A worldwide phenomenon that began in 2007 when a variety of climatic, economic, trade, and social factors, caused world food prices to rise dramatically. These increases created a global crisis which caused political and economical instability and social unrest in both poor and developed nations.

Hunger
The most commonly used term to describe the social condition of people (or organisms) who frequently experience, or live with the threat of experiencing, the physical sensation of desiring food.

Malnutrition
A broad term for a range of conditions caused when the body does not receive enough nutrients due to dietary imbalances. It can refer to both undernutrition and overnutrition.

Millenium Development Goals (MDGs)
Eight international development goals developed by world leaders in the year 2000 and set to be achieved by 2015. The aim of these goals is to encourage development by improving social and economic conditions in the world’s poorest countries. Three of the goals related to the global food crisis are: goal 1 – eradicate extreme poverty and hunger; goal 4 – reduce child mortality; and goal 7 – ensure environmental sustainability.

Overnutrition
A form of malnutrition when nutrients are oversupplied relative to the required amount for normal growth, development, and metabolism.

Slow food
The slow food movement advocates a return to locally and sustainably grown and prepared produce.

Staple food
Food regularly consumed within a community or society which supplies a major proportion of dietary requirements. These foods vary around the world but are commonly readily available and inexpensive within that area.

Starvation
Describes a state of exhaustion of the body caused by lack of food. This state may precede death.

Undernourishment
The state of people whose food intake regularly provides less energy than is required to meet their physiological needs. Also referred to as ‘chronic hunger’.

Undernutrition
A lack of adequate nourishment. The result of prolonged lack of food and/or the failure of the body to absorb the nutrients in food. Generally applied to energy deficiency, but can also relate to vitamin and mineral deficiencies.
 Websites with further information on the topic

AusAID  www.ausaid.gov.au
Australian Bureau of Agricultural and Resource Economic (ABARE)  www.abare.gov.au
Australian Centre for International Agricultural Research  http://aciar.gov.au
Commonwealth Scientific and Research Organization (CSIRO)  www.csiro.au
Department of Agriculture, Fisheries and Forestry  www.daff.gov.au
Food and Agriculture Organization of the United Nations (FAO)  www.fao.org
Foodwise  http://foodwise.com.au
Friends of the Earth  www.foe.org
Science Alert  www.sciencealert.com.au
The World Bank  www.worldbank.org/foodcrisis
World Vision Australia  www.worldvision.com.au

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