

Rethinking Food from a 2020 perspective

This paper is a synopsis of a presentation by Mike McAllum of the Global Foresight Network delivered to the Future Food for Future Health conference held in Melbourne on the 24th of July 2007

Abstract

In our fashion driven and celebrity obsessed world, strong causal links have been drawn between what we wear, how we live and what we eat. In many senses food trends are a mirror about the kind of society we are and the kind of society we want to be. While the evidence suggests that profound changes have reshaped food production and consumption and are unlikely to abate, there is also mounting concern that simply projecting what we are into the future is unwise. From a 2020 perspective, it is almost certain that the environment won't stand it, our bodies can't take it and it will become even more costly. But different futures start with challenging the way we think and a willingness to engage in new conversations. In a world where geopolitics are reshaping modern society and spectacular technology brings new possibilities and new perils, our conversations need to explore thresholds, changes to our thinking patterns or dominant logic, convergences and system based linkages. Unless we do so we will not be able to free ourselves from the constraints of the Age of Progress and truly create an Age of Sustainable Design.

Food as a Mirror

How we think about food and how we use it has become a mirror for the sort of society we are. Recent research suggests that by 2020 if the trends continue 75% of all Australian adults will be overweight or obese and that obesity will soon become the biggest preventable burden of disease, overtaking smoking. In a sense the obesity epidemic is not just about food it is about everything. We are excessive in the way we use fresh water, energy and natural stocks like fish. In short, we are overweight in the ways that we use almost all of the resources available to us. If we are to rectify this 'weight' problem by 2020 then we will need to go on a collective but healthy diet. The future of food therefore is in a sense a visible measure of the kind of challenges that we face as a collective whole.

The value of foresight as a way of thinking about 2020.

The technique of foresight requires us to mentally stand in a future position and look back rather than simply stand in today and forecast

the way forward.ⁱ Foresight does not give us the ability to predict the future but it does free us from the constraints of today's mental models and allow us to both anticipate what might be and increase our sensitivity to the weak signals of the future which are already here.

For the purposes of this paper I have examined 'Food 2020' from three perspectives. Firstly I am suggesting that there are three major shifts which, with hindsight, have changed the nature of the food business from production to consumption since the mid 1990's. Secondly I have explored the nature of food business within the wider consumption based society and why this will need to be changed in the 2010 to 2020 time frame. Finally I am advocating that we embark on a quest to redesign the world of 2020 in a way that will move us away from the perils of our current behaviours. How we think about and manage food will be central to that process.

Seeing shifts in Food with the benefit of hindsight

Since the beginning of the 1990s three important shifts stand out. They are the industrialization of the entire food chain, the development of new organization models which are increasingly creating seamless and borderless value and supply networks and the hyper extension of the 'I want it now' consumer society.

The production of food is really quite different now from how it was even 50 years ago. Between 1950 and 1965 we saw an age of geographical expansion. This was driven, in this part of the world, through the resettlement of returning soldiers from the second world war and very high commodity prices for the staples we provided, like wool. This meant that relatively marginal land could be farmed profitably.

In this first phase there was a relatively low level of technology and the widespread use of the accepted generic techniques. After 1965 though, this changed as the interests of science switched

in part, from making more machines for the military, to making machines for the domestic market. The 'family' farm started to be run in a more scientific manner and was encouraged to become more business like in its thinking. In this age of mechanization, monoculture based efficiency ruled, aided and abetted by improvements in

Increasing use of
energy & fertiliser



Phase 1. 1950 - 1965	Age of Geographical Expansion	Soldier settlements High commodity prices meant marginal land profitability Relatively low tech generic techniques
Phase 2. 1965 - 1990	Age of Mechanisation	Family farm businesses Farms as factory mindset Farming as a science Improved productivity through plant breeding Move from commodity to specialised product.
Phase 3. 1990 -	Age of Intensification	Farms as part of industrialised supply chain Use of off farm supplements to increase production Rapid changes through advances in biotech, IT & genetics ...

productivity through plant breeding and dramatic increases in the use of energy and fertilizer.

But the most dramatic shifts started during the 1990's. The advent of easy to use information technologies allowed retailers for the first time to see in a virtual manner their entire supply chains. With the use of this technology and cheap energy, they established distribution and delivery models that rapidly industrialized and integrated all parts of the value chain including production. Packaged fresh cut salads are perhaps a useful symbol of the process described here. As this industrialization continued both in general retail and food service, producers were forced to become industrial food factories. This industrialization saw a further extension of monoculture thinking, increasing use of off farm supplements, and some rapid changes through advances in biotech. The question that has to be asked is this: is the intensification model the pinnacle of food production techniques and can it continue in the face of increasingly high energy costs and increasing competition for fertilizer? If not, what comes after the intensification model?

The issues imposed by intensification are even more complicated now that food can be grown almost anywhere by almost anyone and distributed anywhere at any time in the world. Food like information technology is just a commodity that with the right conditions will be sourced from the lowest cost producers. The seamless corporations who are now running much of our global food production in a sense exist outside the regulatory and environmental frameworks that we developed for a world when food organizations were discreet entities inside national borders. Now, through a combination of investments, partnering and outsourcing, aided and abetted by information technologies, GPS and RFID, where an organization starts, and where it finishes, is becoming difficult to determine. What this means is that as we think about how food might be produced between now and 2020 we need to better understand the signals that will make most sense to organizations who are not bound by national orthodoxies and values. While we have known for years that more than 80% of all products are produced by less than 20% of the food industry, this seamless corporation model has some potential for Australian companies as they develop future strategies and it also has interesting implications for the food industry. A recent example is the purchase of Australian Meat Holdings, our largest producer of packaged meats, and the US Swift company, by JBS, a Brazilian family company, who in turn are now the biggest beef company globally.

The third and most important shift is in the change in consumer behaviour as an extension of the industrialization process. The research

suggests that up to 50% of all meals are now eaten outside the home and that most of this is in fast food which is generally speaking higher in trans fats, lower in nutritional value and larger in size. What is most disturbing, as Dr. Kylie Ball's *External Influences on Nutrition* paperⁱⁱ indicates is that this fast food bias is heavily weighted towards the most vulnerable sectors in our society.

The same shift can also be seen in retail. Some estimates put the spend with the two major chains at 0.70c in every retail dollar. This represents a market dominance that even Walmart with some 0.19c in every dollar can't match. What this all means is that notwithstanding significant disruptions the strategies employed, by these chains and the major food service outlets, will have a large influence in the shaping of our food behaviours in the next five to ten years. This industrialized food chain works hard to cater for our every need. In a world where almost all the rural poor have a choice of a small amount of staple plus if they are lucky a little extra, we have literally hundreds of choices. I wonder, have we in our pampered and spoilt ways lost the joy that comes with things like seasonality?



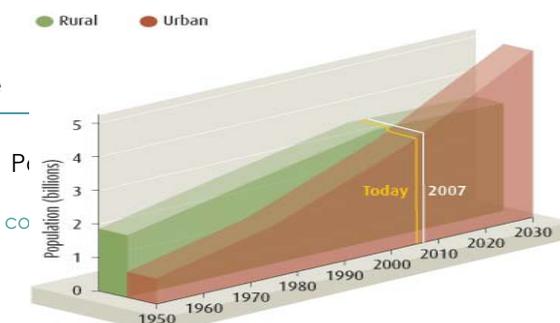
Source: <http://www.deakin.edu.au/hmnbs/cpan/beg-presentations/Ball-Enviro&nutrition.pdf>

The end of the Age of Progress

2007 will come to be seen when, again to use the weight metaphor, we were told that if we didn't do something soon then our collective health would decline sharply. In other words there is a disconnect between how we are, and how we need to be. It is important to understand the nature of this disconnect, if we are to rethink Food 2020. In essence we have crossed two important thresholds which are so significant that they will impact on, and demand a response from, everyone engaged in the production, distribution, and consumption of food.

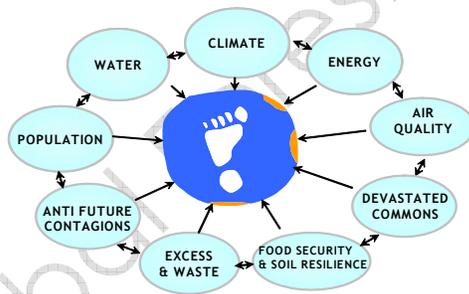
The first of the changing thresholds is that for the first time

Talent, ideas and relationships, networking to co



in our collective history more people now live in cities than in the country side. This is different. Even with marauding armies like those of Genghis Khan and Alexander the Great, never have we organized ourselves in a way that is so disconnected from food sources. There is evidence that the new urban dwellers are not only totally remote from the sites of food production they are intellectually and emotionally bereft when it comes to understanding what drives rural communities. They don't care really about rural drought as they believe they can get what they want elsewhere, and they will exercise their considerable power and influence to trade off the needs of hinterlands for their own. This change in the population balance is one of the great but unknown social experiments of our time. How it will play out in the next 20 years is uncertain, but unless there is a significant calamity it is unlikely to reverse anytime soon. What is clear is that the mega cities require vast resources to support themselves. Their environmental footprint is enormous. A recent New Scientist articleⁱⁱⁱ estimated that London alone needs 125 times its own area to support its consumption. That is almost the entire area of the UK without taking into account the needs of any other inhabitants!

The Environmental **DISCONNECT** is reframing what is important, and will reshape markets.



The second threshold that we are approaching relates to marked declines in a whole series of environmental systems that not only are essential for food production, but for our continuation as a species. The most important and concerning declines relate to what might be

termed the 'unholy trinity' - climate change, expensive energy and scarce fresh water. The negative system effects of these important environmental building blocks are now becoming obvious to all but the most devoted sceptics and are likely, at least in the 2020 frame, to fundamentally reshape the very essence of our societies. All our food systems are built on the use of cheap energy and water for production and distribution. There are few scenarios which suggest that low prices and availability in previous quantities can continue. Indeed the trends are somewhat farcical. While they haven't been done for food as far as I know, as China builds the 200 million houses it requires for its rural poor, it will need some 25% of all its agricultural top soil and 50% of the world's coal resources simply to make the bricks!

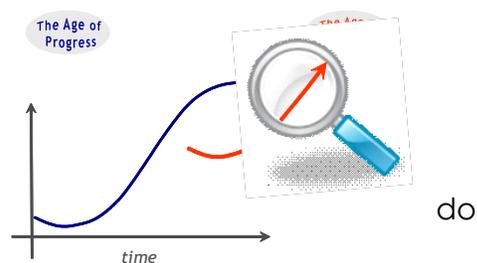
But the 'unholy trinity' aren't the only systems in crisis. We know that there are increasing issues of air quality and that the resilience of biological systems to clean and scrub our air is declining day by day. We are all too familiar with our decimation of fish stocks and our clearance of tropical forests for palm oil yet we seem powerless to do anything about it. At the same time our obesity and its waste confronts us in almost every aspect of our lives. The fertility of our soils can now only be maintained with ever increasing use of fertilizer^{iv} and we awake to a world that will have 2 billion more people by 2030. The trouble is that we don't do think about these things and give them the focus they deserve, because our attention is diverted by important but less urgent concerns like terrorism, corruption, drugs, bird flu style pandemics, and other short term bumps in the road that might upset us today but will be forgotten tomorrow.

This cursory analysis of the other disconnects caused by the collapse in important environmental systems is quite challenging for Food 2020 and is overwhelming almost to the point of denial. It suggests that the time when we use resources without thinking is at its use by date. There is, however, in my view considerable hope, providing we redesign much of what we do, and that we use every technology available at our disposal so that we use per head, and overall, far fewer resources than we do now.

This new age with smarter resource use I call an **Age of Sustainable Design** and our current age of resource intensity I term the **Age of Progress**. Given the thresholds that we have crossed, or we will cross if we don't change, the future for Food 2020 should be a continuation of present practice. We need to move quickly and urgently into smarter production practices, less footprint intensive delivery and distribution, and consumption patterns, that will see us move from obese, to lean and healthy.

Food 2020 in an Age of Sustainable Design

The kind of world therefore that we might think about from a 2020 perspective should be one that conforms to the principles outlined above and meets the challenges that I have just described. But how we design for it?



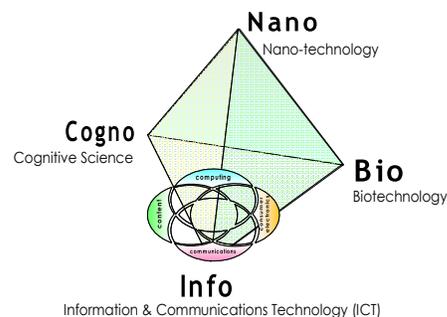
Step one will be to ensure that year in and year out the footprint of our food production and consumption systems is less than the year before. It is interesting to note that in line with this new found sensitivity to the

environment, packaging around food is shrinking rather than increasing and in the process increasing the profitability of the companies concerned. No longer are marketers boasting about what they have added to their products but more frequently they are bragging about what they are taking out through cutting down on packaging and its impact on the environment.

While this is a great first step it will not be sufficient. We will need to rethink the whole design of food production consumption as we know it. Through the industrialization process food has become part of what is known as the 'cradle to grave' cycle. That is we take some resources, we use them in the cheapest and most convenient way possible and then we dispose of the excess without thought. This model of production and consumption needs to shift to what is termed a 'cradle to cradle' cycle.^v Cradle to cradle thinking demands that we reengineer all of our processes so that, not only are they more environmentally friendly in their whole of life cycle, but all the elements, if there is any waste, can be recycled in a way which is either food for other natural cycles or high quality raw materials for other important technology based processes. Changing the balance from 'cradle to grave' to 'cradle to cradle' will be a fundamental first mover advantage in the next few years and must be underpinned by rapidly adapting policy settings. It would be tragic if outdated legislation got in the way. The question must be asked if Australian food production cannot demonstrate low footprint and cradle to cradle technology does it have any long term future?

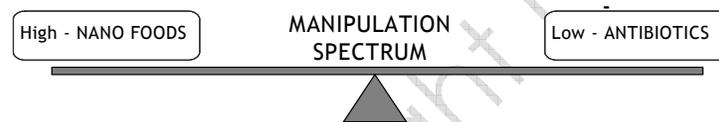
I have already stated that such is the seriousness of the environmental disconnect that we will need to use every design skill at our disposal and every technology to make the necessary transitions. The technology part of the equation though is not without its challenges. Before commenting on what might be possible it is important to understand that we in the early phases of a whole new set of technologies that are more powerful and more profound than digital has been. This new convergence is based on a collision between the nano, bio, information and cognitive sciences and is naturally called the NBIC convergence. Some of us are familiar with genetic and cloning as fundamental biosciences but rapid advances on many fronts will require us to have far more rounded and mature debates than have occurred thus far. Will we be able to harness the amazing information properties that most

- Technology integration from the molecular scale
- Revolutionary advances at the interfaces ready to create new tools
- Human improvement (individual and societal) becomes possible



biological systems naturally have? Should we develop super breeds of plants that not only remediate many negative environmental effects like salinity but can be programmed to interact with the next generation biomass reactors that may be one of our most important transitional fuel sources? As we better understand micro-organisms and how we might manage soils better, are there any limits to interference and design and do our policy makers have a sufficient level of understanding about what is responsible and what is not? Or will these advances continue under the radar in an ethical free zone?

While the cognitive science gives us the hope and the vision for robotic farm workers and production processes, untouched by human hand, the art of manipulation and building at an atomic level, or nano science, tests our understanding about, and willingness to, manipulate food. On the nano end of the spectrum we are already seeing nano foods in the weight loss market, and there is the potential to exactly design many foods.



Indeed if research companies like New Harvest^{vi} have their way they will replace high footprint production of proteins, such as meat grown on farms in remote places like Australia, with near market factories where the meat is created atom by atom. Research has already created tendon like protein strands. Perhaps this is the high point of intensification? On the other end of the spectrum the manipulation process lends itself to other sorts of intensification. Antibiotics and growth hormones are now increasingly used in a whole range of foods with uncertain long term consumer effects. Many of us have noted the recent scandals about food from China but again with 2020 in mind what are the frameworks and design limits of manipulation in food?

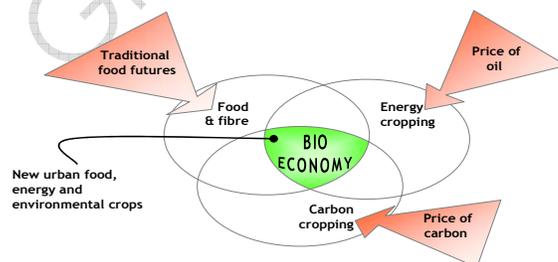
As we think about Food 2020 it is important to point out that in the global agrifood complex everything is, and probably always will be, connected to everything else. The food for fuel debate is a graphic illustration of that. Since 2001 the USA has diverted production away from food products to energy products so that we as consumers can continue to pretend that energy is still cheap! At the outset it should be pointed out that even if the entire US crop was diverted into bioethanol it would still only provide with current technology about 5% of that countries transportation needs and that significantly greater savings would occur if the trend to heavier vehicles was reversed at the same rate or faster than it has increased. The effect has been dramatic. The

price of tortillas has increased in Mexico, pasta in Italy and noodles in China by more than 20% in each case. Tropical rain forests are now under more threat than ever as we search for land to turn palm oil into biodiesels. But the connections go further. It makes no sense to me to discourage children from eating fast foods yet permit advertising that does exactly the opposite. If we are to create this Age of Sustainable Design we need to step out of our silos [especially in government] and work quickly on practical holistic approaches more suited to the situations that confront us.

The inadequacy of our historical arrangements to confront new situations can be graphically illustrated when we explore the emerging bioeconomy convergence which will reshape our rural society and the production of food. The term 'agriculture' should be consigned to the historical bin because it no longer reflects the reality of how we are using biosystems. Whatever I may think about food as fuel, in rural Australia we are seeing the emergence of at least three, and possibly four, quite different production systems, with different drivers and different markets. As the diagram below illustrates the first of these systems is the carbon market. This market is driven by the global price of carbon and is a lot about doing as little as possible. Success requires either the maintenance of existing biological cover or the rapid planting of high uptake low input crops. Energy farmers on the other hand are driven by the price of oil. Their focus is on long term supply contracts and the production of volumes of carefully defined biomass. The third group is the traditional food and fibre market which will not only be driven by world prices [that can be impacted by the price of corn!] but by increasingly vexed issues like food and soon water miles.^{vii} Finally somewhere in the middle of this is a whole range of urban and peri-urban activity that until now has been at the margins of the food discussions but might well be the key to better futures.

From Agriculture to the Bioeconomy

The shift will be as profound as "digital" was to the 1990s



This new convergence challenges both the public and private sector frameworks that we have used to think about and talk about food and other biological production. To get to a better 2020 we will need to shift both the debate and the research quickly from our outmoded models

Any exploration of ideas which range across thirty years will be confronting because it challenges the patterns of success that are imprinted in all of us. We know though that the pace of change is unlikely to slow down and indeed many of us believe that between now and 2020 we will experience a rate of change equivalent to the last 100 years. Why should this be at all surprising in a world that by 2010 will see the amount of available technical information, by any measure, double every three days. We will only cope with this kind of velocity if we have useful frameworks to have shared conversations and the will to navigate. These frameworks cannot in my view be based on an Age of Progress paradigm. If we are to survive and thrive in a world of 2020 all of us will need to think and act differently or at least avoid those who won't.

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Notes.

ⁱ For further elaboration of foresight and strategic foresight reference; *Strategic Foresight: the power of standing in the future*, Marsh, McAllum and Purcell, Crown 2001

ⁱⁱ <http://www.deakin.edu.au/hmnbs/cpan/beg-presentations/Ball-Enviro&nutrition.pdf>

ⁱⁱⁱ Eco-cities special: *Ecopolis now*. New Scientist, 17 June 2006

^{iv} Nitrogen use has climbed ten fold in the last thirty years and is in most demand in developing countries. What is more concerning is that the amount of available phosphorous peaked in the mid 1980's with an estimated exhaustion around 2050. However production has continued to increase in line with population increases which could bring that date closer. Source: peak Phosphorous- The Oil drum – 17 Aug. 2007 www.theoil drum.com

^v W McDonough & M Braungart, *Cradle to Cradle*, North Point Press 2002

^{vi} www.new-harvest.org

^{vii} Water miles defines the amount of water that it is estimated to produce a food product. One piece of grain fed steak for example requires some 15,000+ of water to produce. Australia in this sense is a net exporter of water.