

5 June 2007

Members  
CSIRO Sustainability Network**Feature thought:**

*"The ideology of industrial society, driven by notions about economic growth, ever-rising standards of living, and faith in the technological fix, is in the long run unworkable. In changing our ideas, we have to look forward towards the eventual target of a human society in which population, use of resources, disposal of waste, and environment are generally in healthy balance. Above all we have to look at life with respect and wonder. We need an ethical system in which the natural world has value not just for human welfare but for and in itself. The universe is something internal as well as external."*

*Sir Crispin Tickell, in his address "The Earth Our Destiny" 2002*

Dear Networkers:

**SUSTAINABILITY NETWORK UPDATE – No. 66E**

This is the last Sustainability Network Update. In it, the two final features look at two pressing issues – one involving a physical resource – water – and the other a social resource – our children. First, from regular contributor Peter Fisher, comes a warning about being too “gung-ho” on recycling effluent into the potable water supply ([p.1](#)). Then from high-profile children’s health researcher, Dr Fiona Stanley, comes a further warning, this one about our failure to invest in the next generation at a time when intellectual and social development, education and children’s wellbeing are vital to leadership for a sustainable future ([p.5](#)).

We also touch on: rising sea levels ([p.11](#)), sustainable cities ([p.12](#)), ‘enlightened agriculture’ ([p.12](#)), ‘food miles’ ([p.14](#)), consumerism and morality ([p.16](#)), and climate change as not the only issue ([p.17](#)). In addition, there is further feedback on global warming and tropical forests ([p.17](#)), the variability of renewable energy sources ([p.19](#)), and base-load electricity generation ([p.21](#)).

Finally, I will explain the termination of this newsletter service and speculate on the ‘next sustainability frontier’ ([p.25](#)).

**Don’t just go with the flow on water recycling**

**Dr Peter M J Fisher** – [pmjfisher@bigpond.com](mailto:pmjfisher@bigpond.com), a physicist by background, has spent over a decade working as an environmental industry specialist, consulting to a number of high-profile corporations and government agencies. Although his main focus is water and energy management, he also has expertise in air quality, traffic management and ecological systems. Peter wears a further two hats: Senior Lecturer in water management at Central Queensland University, Gladstone, and environment and science writer for The Australian Financial Review. He was also the writer and presenter of an intensive course in Sustainable Urban Development at the University of Sydney in 2006. He is nationally recognised for his role in environmental journalism, and is also a regular contributor to this newsletter. The following feature is adapted and updated from an article in The Australian of 9 August 2006.

**In a nutshell:** WATER, that plainest of compounds, is turning out to be far more complex than commonly thought. As scientists try to better understand its properties and ways these can be

harnessed, it is throwing up odd surprises. It can be made fit for re-consumption, but research reveals it isn't a simple process. Sewage effluent is the ultimate witch's brew, containing everything put down plugholes or toilet bowls, including all manner of pharmaceutical, hormones and illicit drugs, generally in excretions. How these or their metabolites react with each other and a range of additional organic compounds found in sewerage systems is still anyone's guess. In addition, the underlying processes in "membrane filtration" are still not fully understood, particularly the ability of some large organic molecules to slip through nano-metre scale barriers. While the science of micro-contaminants is still so incomplete, more than just engineering and politics are needed to deal with effluent re-use. To rush in at this stage would be unwise.



The science journal *Science* recently intrigued its readers by reporting that water may have a remembrance of substances once dissolved in it. Distortions to its hydrogen bonds caused by earlier solutes seem to persist. In other words, water can store and transmit information by means of its hydrogen-bonded network. Ongoing studies have shown that it may also have a structure of long, 3D-ordered molecular chains based on multi-faced water clusters of 280 molecules.

By contrast, the water industry operates in settings a million times up the size scale, treating their raw resource as a bulk commodity. These separated water worlds of micro-research and bulk purification have of late edged closer as a result of Toowoomba's indirect potable reuse proposal. The debate, brought to white heat by the 29 July 2006 referendum in that City, has given a new urgency and some breathing space to the further study of unregulated micro-contaminants. These are the hormones, drugs (including illicit ones) and chemical agents in personal care products (such as the antibacterial, triclosan in soaps) that are commonly found in effluent at trace concentrations.

The precise chemical relationships behind remnant contaminants and potential long-term health effects have been little studied in Australia. But in Britain, Europe and the US there has been considerable activity and research.

Signs that drugs might be entering the environment via waste water were in evidence 60 years ago: because of the scarcity of penicillin, US army teams recovered it from the urine of soldiers who had been so treated. However, until the past few decades it was taken for granted that concentrations of excreted drugs and hormones were so minuscule as to be of little consequence to human health or biota in receiving waters.

The discovery of malformed fish in a river downstream from a sewage plant in the US as a result of traces of estrone, a naturally occurring estrogenic hormone found in the urine of pregnant women, changed that perception. The find triggered research into the persistence, toxicity and degree of biological activity of feral drugs and their breakdown products.

A Californian study on frogs, for example, has found that while one chemical alone may do no harm in low doses, in conjunction with others, even in doses that are individually safe, it can do serious harm. As the US Geological Service notes, "the potential effects of contaminant mixtures on people, aquatic life and fish-eating wildlife are still poorly understood". Researchers at Britain's Brunel University reporting on their findings on oestrogens in sewage have similarly

warned "that mixtures of chemicals can pose a significant threat to population-level processes, even when the components are present at low and individually ineffective concentrations."

Given that some effects are thought to be occurring at or below detectable limits, advances in analytical techniques have paralleled this research. As a result, a more precautionary approach has emerged, with bodies such as the British water regulator Ofwat asking water companies to filter their effluent with activated carbon before discharging it into rivers from which water supplies may later be extracted.

Emma Pemberton of Britain's Environment Agency told a recent conference hosted by the Society of Chemical Industry: "We simply don't know whether drugs and drug metabolites in the environment are going to lead to significant impacts." Scientific understanding of the extent, if any, of effects on people is similarly tricky, so risk assessments are problematic. And precautionary technologies for detection and treatment are still evolving.

For example, pilot and lab-scale studies have established that water treatment by reverse osmosis is more effective for pharmaceutically active compounds (only 0.1 to 0.3 of 1 per cent slipping through the membrane) than hormones (11 to 60 per cent slipping through, even though hormones have equal or greater bulk).

Scientists at the University of Wollongong have suggested that in the early stages of filtration hormones chemically bind into the active skin layer of the polyamide membrane aided by the presence of water, then fuse through it by "make-&-break bonding" with its chemicals, finally desorbing (purging) themselves on the other side. Coupled with sieving, adsorption and charge repulsion, retention is highly compound specific. (Might this "purified water" bear the scars of these processes through distortions to its hydrogen bonds and dismembered 3D lattices?)

Such observations highlight the complexities underlying refinement of reverse osmosis and related nanofiltration technologies. Exacting maintenance and operating procedures are needed whilst slip-ups such as using highly alkaline solutions to clean membranes could impair effectiveness.

Meanwhile, American Water Works Association researchers have investigated different removal systems, finding reverse osmosis performed best. They've recommended treatment trains (sequences), such as reverse osmosis - ozone-advanced oxidation-activated carbon - as the most reliable means of stripping microcontaminants. This aligns with results from an electrolysis-based sequence operating on Brisbane sewage influent during 2005.

Unfortunately, trains incorporating reverse osmosis and/or nanofiltration need a lot of energy to force water through membranes. Add other elements to the train and the energy need is even greater. Pumping water over long distances is no better.

A 10 ML per day RO plant for instance could use in excess of 15,000 kWh venting 12 tonne or more of CO<sub>2</sub> into the atmosphere if the electricity comes from a black coal fired power station and half as much again if it is a brown coal station. Add nano-filtration, other purification elements, and pumping and this figure will rise further.

What is needed is integration of water and energy into a consolidated greenhouse gas abatement and climate change adaptation strategy, including the accelerated development of low carbon or carbon neutral advanced water treatments.

If recent northern hemisphere summer heat levels are any guide, we're staring at the prospect of runaway energy consumption. It's time to do the energy arithmetic for water security, too.

## **Conclusion**

We still have much to learn about water, its chemistry and structure. I have previously highlighted this knowledge gap in a water chemistry section I wrote for an Engineered Water Cycle course is now being taught at the Universities of Adelaide and South Australia. This is the proper stuff of analytical chemistry, while issues of health and environmental risk should not simply be left in the hands of (water) engineers as they often seem to be but rather placed with those trained in toxicology etc. A few years ago I did a 'straw poll' of a group of 90 young professional members of the Australian Water Association (AWA) at a meeting I was addressing and found that only one had studied toxicology during academic training.

In the past there have been two water worlds – one research focussed dealing with water at a molecular scale; the other resource focussed dealing with water at a bulk scale. These two strands were forcibly thrust together recently in the public battle over water recycling in Toowoomba.

What I want to convey here is that the science of micro-contaminants, while steadily evolving, is still far from complete. Parallel development is occurring in detection and measurement. Despite what is commonly assumed by equipment manufactures, some water engineers and politicians, the underlying processes in "membrane filtration" are still not fully understood – notably the uncanny ability of large life-based molecules to apparently undergo a form of metamorphosis to slip through nanometre-scale barriers. Sewage effluent to which such systems are to be applied are the ultimate witch's brew with just about everything going down plugholes or toilet bowls including all manner of illicit drugs like "ice", generally in excretions. How these or their metabolites react with other organic compounds found in sewerage mains and STPs is anyone's guess. One thing we can be more certain about, however, is that the assessment of around 80,000 synthetic chemicals that have been released since the 1930s, and around 1800 new ones that come into use each year, is well beyond the current capacity of health and environment authorities.

**Although pressure on water resources is rising world-wide, caution is needed while the knowledge gap on water recycling is closed. We should not just rush in!**

*Just before 'press', Peter sent in the following piece of additional publicity from The Australian (29 May) to reinforce the argument above. He also suggests that we should "note that antibiotic resistant genes (ARG) are often carried on mobile pieces of DNA leapfrogging from one bacterium to another – even between very different types of bacterium. Cascade effects – whoa, what are we doing....! For example, my work in the MID has revealed very high levels of cow administered antibiotics in the Latrobe River."*

#### **Twist in recycled sewage**

Small concentrations of antibiotics have the ability to pass through conventional wastewater treatment plants, according to a new study that will reignite the debate over the use of recycled sewage.

An article this month in the international journal Water Research found small concentrations of antibiotics passed through advanced wastewater treatment using microfiltration and reverse osmosis. The National Research Centre for Environmental Toxicology, the Co-operative Research Centre for Water Quality and Treatment and the National Measurement Institute assessed the removal of 28 human and veterinary antibiotics.

With the Queensland Government hoping to pump recycled sewage into Wivenhoe Dam before Brisbane's main water supply runs dry – in late 2008 or early 2009 – the Queensland Water Commission has gone to great lengths to emphasise the safety of the end product. A panel of experts is guiding its regulatory processes, even as protest groups – angry at being denied a referendum on the use of recycled sewage – distribute leaflets warning of potential health risks.

Lead researcher Andrew Watkinson said last night the additional process in Brisbane's recycled water pipeline project, advanced oxidation, would almost certainly remove the remaining concentrations. Mr Watkinson said the research had shown concentrations of antibiotics in many Brisbane rivers and waterways, flowing from conventional treatment plants. Although there appeared little risk to human and animal health, further work was needed to determine whether the concentrations might contribute to bacterial resistance to the drugs.

*“Only when we drink the last drop of truly clean water will we realize that oil wasn't the main problem after all”*

John Heij

## Children are the future – Why putting them first is so important

*Professor Fiona Stanley AC, paediatric epidemiologist, Head of the Telethon Institute for Child Health Research and Executive Director of the Australian Research Alliance for Children and Youth – [www.aracy.org.au](http://www.aracy.org.au) – began her career by studying medicine at the University of Western Australia, including a clinical post at the Aboriginal Clinic in East Perth. The poor health of many of the patients, especially the children, inspired her to concentrate on paediatrics, epidemiology and public health. After completing six years of overseas study including a Masters degree at the University of London, she returned to Western Australia to establish research programs at the University of WA and the Health Department of WA. She also was instrumental in the creation of Perth's Telethon Institute for Child Health Research. Two of her most significant discoveries are that a maternal diet rich in folic acid can prevent spina bifida in babies, and that cerebral palsy is not only the result of birth trauma. It may also be caused by other factors including infections or blood incompatibilities. Fiona Stanley has received many awards, including the Companion of the Order of Australia for her contribution to child and Aboriginal health and health research. In 2003 she was named Australian of the Year, marking the occasion with an address to the National Press Club (6/8/2003) entitled “The Real Brian Drain – Why putting children first is so important for Australia”. The following feature is a condensation of that address. It is presented here because of the critical importance of the material to any drive for a more sustainable Australian society. It is vital we do not lose sight of Professor Stanley's insights. They just as pertinent today – much more needs to be done nationally to follow them up, and time is getting shorter!*



**In a nutshell:** While we are continually told that Australia is riding high economically, this upbeat economic viewpoint masks a number of alarming downward trends in outcomes for children and young people across a wide range of health, development and wellbeing domains. These include things as diverse as low birth weight, child abuse and neglect, behaviour problems, educational problems, mental health problems, substance abuse, unemployment and juvenile crime. The problems can be traced back to a complex interplay of genetic potential with social environments and brain development. To date the focus has been on treating the problems after they have emerged, which is expensive and relatively ineffective. A much more effective strategy – and the only one likely to support a more sustainable society in the longer term – is to: (1) safeguard the healthy development of babies; (2) strengthen early childhood services focussing on prevention and support for parents; (3) improve schools and local communities, reducing segregation and effects associated with poverty; and (4) create a family enabling society.

We now realise that the real gains in reducing disease and improving health will come from the social and economic circumstances operating in families, communities and the wider society, and that the most effective preventive strategies lie OUTSIDE the traditional areas of the health professions. The exciting thing is that outcomes other than health such as educational and behavioural competencies may also be enhanced.

I would like to give you two statistical stories to illustrate the power of prevention compared with the costs and limits of treatment. I then want to pose some questions about children and young people in today's Australia, and finish by calling Australia to action. By then I hope I will have made the case that by placing a greater value on children's futures will be of benefit to the whole of our society.

The first statistical story describes recurrent otitis media (middle ear infection) in disadvantaged Aboriginal children, and the second, suicides in children from moderately advantaged families. So picture my Aboriginal child with runny ears, living from birth in poor housing on the fringe of a rural town in any Australian state. She has probably been given several courses of antibiotics, may now be resistant to penicillin, so needs more expensive and maybe less effective antibiotic treatment. She has been intermittently deaf throughout all her pre-school and primary school years and is significantly delayed in both language and educational performance compared with her age peers. Her young parents, loving and caring, take her on the advice of the local community health nurse, to have grommets inserted to enable the pus and fluid in the middle ear to drain properly and to give her a chance to hear. This entails long distance travel, the costs of surgery which is not particularly successful and significant trauma for her. With increasing delay in her schooling she becomes a "naughty" teenager, feels that she is stupid and starts sniffing to escape the pain.

The story could continue on a number of paths, the most likely (statistically) are fairly grim and do not auger well for her, or in the future, her own children. She is unlikely to become a competent contributor to Australian society and her brain has certainly not been given an opportunity to develop to its full potential. How wonderful if we could have avoided the cost, pain and anguish of this story which is common to so many of our Aboriginal children?

And now to my other statistical story – one all too common – of suicides in young people: Many young people in relatively advantaged families with a good standard of living, start on pathways to high risk behaviours, substance abuse, poor school performance, low self esteem, depression and suicide.

This young man may have been bullied, may have been overweight, not confident about friends – pretty common in today's schools. There may have been considerable attempts to diagnose and treat a range of mental health or behavioural problems in the primary school years, but of course less than 10% of young people with problems actually get to use the already stretched mental or other health or educational services. Alcohol and cannabis was involved and the young man ends his own life. This brain is certainly not going to contribute to Australia's future and the situation has left a family devastated. Forever they will ask could they or others have turned our young person around. Could the cost, pain and anguish of this story have been prevented? How DO you count the cost of a suicide?

And now to the questions:

### **Are outcomes for Children and youth improving in Australia?**

As so many outcomes are related to social disadvantage, surely as economic prosperity and living conditions improved, so have the health, educational, behavioural and general status of our children?

I have pulled together the best data on the total population trends that I can from the best sources available. We are observing increases in poor outcomes for children and youth across a wide range of health, development and wellbeing domains. These include things as diverse as low birth weight, child abuse and neglect, behaviour problems, educational problems, mental health problems, substance abuse, unemployment and juvenile crime. The common pattern is that these are increasing in younger and younger children, and in girls as well as boys even for those areas in which girls were rarely observed 20 - 30 years ago, such as aggressive behaviour, substance abuse and violent juvenile crime. And whilst these problems are much higher in our Aboriginal children, this pattern is across the whole population.

Suicides have increased fourfold in 15-19 year old males since the 1970's and the worrying thing is that the rates are now higher still in 24-35 year olds; nearly 20% of teenagers have a mental health problem; obesity has increased in teenagers from around 10% in 1985 to nearly 25% in the latest years. And in our cerebral palsy data in WA we observed the rise in irreversible brain damage due to non-accidental injury/shaken baby syndrome from 4% to 18%.

**Is there any evidence more recently of a levelling of social gradients, that is fewer differences between the 'haves' and the 'have nots'?**

Are all in society winners from the dramatic economic and social changes in our society?

Our expectation of the increases in wealth and better living conditions in Australia was that they would deliver better situations for all Australians, that is that social gradients would not be so steep but would flatten out. **The PARADOX OF PROGRESS is that not only are we seeing the increases in serious problems in our children that I have mentioned, but the social gradients, the differences between the 'haves' and the 'have nots', have INCREASED not decreased!** So for example, if you compare babies born to the most disadvantaged groups compared with the most advantaged the disparity between their levels of low birth weight (that is less than 2500g) in 1984-6 was 171% (that is 1.7 times more likely to have a low birth weight baby). Rather than decreasing this has now risen to 190% (that is 1.9 times more likely). As birth weight is such an important predictor of later child and adult health, disability and other problems, this is of concern.

You see lots of media coverage of smaller and smaller babies being heroically treated in neonatal intensive care units, but where is our interest in prevention? More data on increasing disparities – for example for infant deaths 250% (2.5 times more likely in disadvantaged) in 1984-6 rising to 320% (3.2 times) in 1996-98; for suicides and drug abuse the social gradient is not so strong and we have seen increases across all social groups, but particularly higher in Aboriginal and rural youth. And Aboriginal youth are still 300 times more likely than non-Indigenous youngsters to be locked up in our prisons.

Of course the differences are extreme when we compare all Aboriginal and Torres Strait Islander versus non-Aboriginal and Torres Strait Islander children and youth – they have 3 times the rate of low birth weight; 7 times the rate of SIDS and 7 times the death rate from infectious disease and accidents in childhood.

All countries show a relationship between socio-economic status and a wide range of health and other outcomes. For example: all the following conditions are associated with a social gradient: – Substance abuse in pregnancy; Teenage pregnancy; Low birth weight; Birth complications; Physical growth in children – poor growth and obesity; Exposure to environmental contamination; Poor nutrition; Behaviour problems at 3-4 years of age; Capacity to start school; Educational outcomes in 1<sup>o</sup> and 2<sup>o</sup> school (school does not even out the gradient); Mental health problems; Infections; Asthma; Accidents; Suicide; Substance abuse in adolescence – and back to the beginning again and the impact becomes intergenerational.

From this list you can begin to understand the extent to which socio-economic status is so important and why we need to ask questions as to why: So the paradox of progress is that not only are all these problems increasing and so is the disparity across the social gradient **BUT also these disparities tend to be steeper NOT less steep, in richer countries (for example far greater in USA than Canada or China or Japan) and as GDP (Gross Domestic Product) increases so do the disparities!** And the evidence also suggests that the overall levels of problems across the whole of society are higher in such countries. As Australians we pride ourselves on being an egalitarian society. It is obvious that the economic reforms and technological changes have not delivered the improvements in society that were expected.

My feeling is one of considerable concern. The more we look the more we see that there are winners and losers from these changes in our society. And the impact is lifelong. If you start off compromised, then your whole-of-life chances are affected and if you start off healthily and well-nurtured then you are much more likely to reach your genetic potential. This is the stuff that was omitted from the Generational Report which Peter Costello brought out around the 2002 Federal Budget, that is not only can we see the increase in the aged and a shrinking fertility resulting in fewer in the workforce to support the old in our society, but we also see the REAL BRAIN DRAIN that is the increasing proportion of young people falling out of that competent workforce.

The trends that I have described suggest that this brain drain is continuing to rise. The success of knowledge economies will depend on a competent workforce and high levels of social capital. Failure to invest in all stages of human development, particularly in the early years, is being recognised by organisations such as the World Bank to negatively affect future economic prosperity in two ways. First, we may lack the human resources needed to sustain future economic growth, and second, the drain on the welfare and health budgets in looking after these groups.

### **What has been the impact of services (mostly focussed on treatments not preventions)?**

Current policies and practices reflect our neglect of prevention as an overall strategy. Instead we see a very unequal focus of effort and dollars into costly and on the whole ineffective interventions too late in the causal chain to make any difference to the OCCURRENCE of these problems. For example, school programs for children with literacy and numeracy problems ignore the most powerful predictors of success – the pre-school home and neighbourhood environments. As mentioned above, very low birth weight babies are “saved” at earlier and earlier gestations in neonatal intensive care units and so on. Quote: “90% of the health dollar is spent on people who will be dead in 12 months” Many services for schools, health, mental health, child protection and justice are in crisis in Australia with people demanding more and more spending on band-aid solutions. At the same time there has been a reduction in those services which are most likely to prevent problems and enhance developmental successes, such as early childhood support, child health nurses, preschool and primary school teachers, public health programs, tobacco control and so on.

So, without even asking why are we observing such increases in problems, can we prevent them? Can we enhance child development? We keep putting money into activities which are too late because the problem has become irreversible, and we keep cutting services which are earlier and more effective. And then the media and public rightly question “We have put all this money into mental health or Aboriginal and Torres Strait Islander health so why isn’t it improving?” I hope it is becoming obvious to you why it is not; the interventions are too late – providing more renal dialysis machines to Aboriginal and Torres Strait Islander people is important and humane but it will not decrease renal failure in these people. Programs to reduce skin sores, vaccines against infections, better nutrition and so on in children are much more likely to do so.

Why have so many of the problems in children and youth not improved? Are there some common explanations? Why ARE we observing these increases? Surely we cannot blame only economic reforms? Are there some common pathways here that influence both educational outcomes and behaviour problems in young children and suicide rates in teenagers? We now have a lot of research data to start to answer some of these questions. **“Children who have good early childhood experiences before age 6, in stimulating, nurturing environments have better outcomes throughout their life and the earlier they have these experiences, the better the result. They have better school grades, better self esteem, fewer social problems, fewer health problems, and are less likely to be teen parents, use drugs or be involved in crime”** Hertzman, Canada, 2003. So it seems that there is evidence that, if we neglect the early years of child development, there can be profound effects on a range of problems. Family environments then are crucial to the issues we are discussing. Most parents want to be good parents and want the best for their children but they need to be equipped and capable to do so. We also need to look beyond the family to neighbourhoods, workplaces, the social and economic policies and environments and to ask what is it about modern Australian communities which are what we might call “family-disabling”.

Here we come to the crux of all this – there are new and powerful drivers of these poor outcomes and social disparities in our society, drivers that are increasing risks for individuals, families and neighbourhoods, and decreasing the nurturing and hence the protective factors which enhance resilience. This is the broad explanation of these trends and, yes, this includes economic reforms as Peter Saunders says: **“The key to improving social outcomes lies in abandoning the idea of market supremacy in favour of an approach that sees the market as one of the MEANS of achieving social objectives, not as an end in itself.”** Saunders 2003.

There have been lots of other changes in our society, many quite rapid which have also impacted negatively on early child development and youth problems. These include disparities in opportunities and services (privatisation of things like child care means that those most in need may miss out), family breakdown, increasing hours of work, rapid technological change, the information explosion, stress, violence (violence has a particular and extreme effect on young children), reduced trust and social capital in neighbourhoods (less likely to call on neighbours for child care, advice, social support etc).

I believe we need a serious national debate about the role of work and family time as key developmental resources for children. We should look at other countries (e.g., in Europe) that have imposed a shorter working week and observe what the economic, social and community impact of that has been.

What do we know about the causes and possible prevention of these problems? Can we “vaccinate” our children against later school problems, drug addiction and suicide? If these rates have increased so much surely we can decrease them? There are 3 main points here:

- The mechanisms appear to be explained by new research in brain development and the interactions between genes and social environments;
- Adverse social environments interact with genetic potential to influence competencies which act over the whole life, resulting in the intergenerational transmission of childhood vulnerability and further worsening social disparities;
- There is lots of evidence that early intervention to enhance child development is extraordinarily effective.

**Exciting new research in neuroscience, the human genome, linking social and biological research, demonstrates the huge importance of early social environments in successful brain development.** Childhood exposure to abuse and less severe levels of stress can actually

change the brain through the 'switching on' of genes which influence other biological processes which govern brain responses – for example how we self regulate. This helps explain the increased rates of common disorders such as child and adolescent behaviour problems, attention and learning difficulties, obesity and eating disorders, depression and addictive behaviours. Whilst research may deliver new drugs to influence some of these gene switching pathways, they are a long way off and are likely to be expensive. There is such strong evidence that providing a more nurturing social environment from birth is such a powerful factor to prevent such a range of problems and to enhance resilience and capacity – it seems to me more logical to implement such activities. Programs to enhance child development and readiness for school, that is those focussing on the early years, have given further proof that what I have been talking about is likely to be true.

You might expect that 'Head Start' and 'Early Head Start' (the Perry preschool project and Chicago child development programs) would have had an enormous impact on special education placements, better behaviour and academic performance in primary school, which they have. **But they have also improved much later outcomes such as retention rates to year 12, intelligence tests, dental health, mental health, employment, teenage arrests, teenage pregnancy, welfare payments and substance abuse!** Why aren't we putting more efforts in to early programs – this must be at least part of the answer to our last question.

### **What should Australia do?**

Why is this so important? Even if we don't particularly care about kids (which I do), even if we have not got children of our own, even if we only judge everything by an economic bottom line – this 'brain drain' I have described is the most concerning and worrying problem we have. Surely all of us want a fair Australia, an advanced Australia, a clever country that can both compete in an international knowledge economy AND look after the social problems of our modern world? I have suggested that the quality of the social environments in which we live impacts positively, particularly in early childhood but also across the whole life span, which in turn secures better futures for our children and better social and economic outcomes for everyone. It means better workers and better communities. We need to use the resources of the whole community to manage the challenges of competing in a global knowledge economy, to create and use innovation and to manage complex problems in today's world (such as the environment, lifestyle, aging population etc). As Michael Pusey wrote in 'The Experience of Middle Australia: the dark side of Economic Reform', "a well ordered society needs strong markets and strong active governments and strong families all working together to put people first."

So perhaps now you may be starting to understand my excitement and interest in these interacting social, biological, family, child development, educational and health for life patterns. And I am joined by a large and increasing group of researchers, policy makers and practitioners across the whole country, in universities, in centres and institutes, in government and non-government departments and organisations. We have established a fledgling national network - the Australian Research Alliance for Children and Youth - with the aims of pulling together as much of the Australian expertise and data as we can to enable a new model for cross-disciplinary knowledge and 'research into action' for children and youth. Working together and copying both the United Kingdom and Canada, we are pushing for a National Children's Agenda. The Australian Research Alliance for Children and Youth and Longitudinal Study of Australia's Children, both of which have received funding from the Federal Government, are important first steps towards this. In these other countries the children's agendas have resulted in significant changes already. In the United Kingdom they have a portfolio of programs to improve child and youth outcomes such as 'Sure Start', run out of Treasury. In Canada the National Children's Agenda has influenced the uptake of early intervention and population-based research; a continuous longitudinal study to evaluate interventions and major new

national research initiatives on human development and learning societies. And in USA they have initiatives such as 'From Neurones to Neighbourhoods' influencing research, policy to "think joined up". All of these programs have significant government support, that is new money and all of them value hard and rigorous evidence of what works.

**So to summarise** – our economic progress has not delivered better outcomes for children and families in Australia nor has it reduced the disparity across the social divide. The levels of these problems are now so high that services are already stretched in providing for them and all indications are that they are continuing to increase. While expensive 'band-aids' seem to be what the community are clamouring for, they will never deliver the long-term effective solutions to these problems, some of which may be coming entrenched in some groups in our community and crossing generations of families.

So my call is for Australia to harness its great capacity, to work collectively to make sure that we put children first, that we reverse the real brain drain. I am frightened about the road we are on, following the current trajectories towards a technological and wealthy elite, with increasing proportions of the population marginalised. Such a pathway raises concerns about the stability of society itself, with increasing social gradients, increasing problems demanding more and more costly solutions. Alternative pathways may push us towards a more virtuous cycle aimed at prevention rather than costly cures, on to a path that encourages universal participation in collaborative knowledge building, not focussing only on economic prosperity but also how we function as a society – the notion of what the Canadians are calling a "learning society" and "raising and levelling the bar" (a reference to improving educational success across the whole community of children). Let me quote Canadian Strategy: 1. "safeguard the healthy development of babies; 2. strengthen early childhood services focussing on prevention and support for parents; 3. improve schools and local communities; reduce segregation and the effects associated with poverty and 4. create a family enabling society." And what may we find? My Aboriginal girl is far less likely to get middle ear infections because her physical and social environment has improved, and our young suicidal male was supported earlier in life before he reached a crisis point. Both finished school and are contributors. We have reversed the 'brain drain'. And we have found that what is good for children benefits the whole of society!

I would like to end with a quote from Gabriel Mistral: "Many things we need can wait, the child cannot. Now is the time his bones are being formed, his blood is being made, his mind is being developed. To him we cannot say tomorrow, his name is today." I say to Australia – our time is now, we cannot wait.

## "Little Morsels" – Food for Thought

### Noah's reminder to "the low Countries"

Al Gore, in his global-warming documentary "An Inconvenient Truth", makes the point that rising sea levels associated with melting of ice caps and glaciers will put almost all of Holland under water. Substantial areas of Holland are already below sea level, but how much higher can the existing dikes be built?

The Dutch general public seem surprisingly relaxed considering the enormity of the implications of global warming for one of the most densely settled nations on Earth. One only has to visit a Dutch beach on a fine summer day (right) to grasp the scale of the disaster that could occur with higher sea levels and more powerful storms – and also





the scope of the migration that might be required to move many millions to higher ground. At present there seems to be widespread faith that the authorities have the matter in hand, and that more investment in higher ramparts and water pumping will keep people as safe in the future as these measures have done in the past.<sup>1</sup>

Perhaps the building and public opening of a half-scale replica of Noah's Ark by Dutch creationist, Johan Huibers in the town of Schagen might help bring the fragility of these solutions into focus.<sup>2</sup> Even at half the reported biblical scale, the ark is huge: 68 metres long (150 cubits) and nearly 3 storeys high.

Even if such a massive, in-your-face reminder does not stir community concerns, at least Johan Huibers and his family will float if the dikes are overtopped!

## Sustainable cities – a new blueprint for the future

*Herbert Giradet, Director of Programmes of the World Future Council, is a specialist on the role of cities in sustainable development. He is also the Editor of an important new book from Earthscan entitled *Surviving the Century: Facing Climate Chaos and other Global Challenges*,<sup>3</sup> with chapters from high-profile experts on *Countering Climate Chaos; Renewable Energy Policy; Creating Sustainable Cities; Local Farming Systems; Rainforests and Climate Change; Cradle to Cradle Production Systems; Living Democracy; and A Radical Vision for Trade*. In summarising his own chapter on sustainable cities in the magazine *Resurgence* [www.resurgence.org](http://www.resurgence.org) (No. 242, May/June 2007), he has this to say:*

The bulk of the world's fossil-fuel energy is burned within or on behalf of cities. The ecological footprints of cities cover much of the globe: they stretch to the most distant farmland and to the remotest forest regions. The important thing now is to reconfigure the way existing cities work. Above all else we need to wean them off systemic dependence on fossil fuels and fulfil their potential as resource-efficient human habitats.

Fortunately, China, the country with the most rapid urbanisation in human history, is starting to take some small steps towards a different future. The Dongtan Eco-City project near Shanghai is pioneering a process of sustainable urbanisation – with the creation of a series of interconnected pedestrian villages powered by the sun, the wind and biomass. Dongtan will have an essentially circular metabolism and will be surrounded by its own agricultural belt to assure a sustainable food supply. By demonstrating a very different way of creating a new city, Dongtan sets a good precedent.

## Trend – 'Enlightened Agriculture'

*A new book from author Colin Tudge entitled *Feeding People is Easy*<sup>4</sup> takes issue with the industrial model of agriculture in a way that is certainly worthy of thought. The following is an extract from his article on the book's theme in *Resurgence* magazine – [www.resurgence.org](http://www.resurgence.org) – issue 242, May/June 2007:*

I am struck by the contrast between what could be in this world, and what is. In particular, everyone who is ever liable to be born could be well fed, forever, not simply on basic provender but to the highest standards of nutrition and gastronomy. That is not all that matters, of course, but if we get the food right

<sup>1</sup> For more on global warming and The Netherlands, see for example *Global Warming and Coastal Deltas: Is The Netherlands Europe's Bangladesh?* [www.fragileecologies.com/sep29\\_06.html](http://www.fragileecologies.com/sep29_06.html)

<sup>2</sup> Read more about the Ark replica at <http://news.bbc.co.uk/2/hi/europe/6604879.stm>

<sup>3</sup> See <http://shop.earthscan.co.uk/ProductDetails/mcs/ProductID/791/GroupID/4/CategoryID/6/v/2> for more information and purchase details. Published May 2007; ISBN 1844074587 / 9781844074587

<sup>4</sup> Published May 2007 by Pari Publishing – [www.paripublishing.com/books/feedingpeopleiseasy/](http://www.paripublishing.com/books/feedingpeopleiseasy/) - ISBN 9788890196089

then everything else that we need and want in life – good health, fine landscapes, the company of other species, peace, amity, personal fulfilment – can start to fall into place.”

“The necessary techniques and wisdom, and the goodwill, are all out there. So why aren’t we doing the things that are so obvious? Why is the world in such a mess and getting worse? And what must we do to put things right?”

Most obviously, if humanity seriously wants to feed itself well, then we need to farm expressly for that purpose – create what I portentously call “Enlightened Agriculture”. The bedrock is sound biology and common sense. Focus first on the staple crops – cereals, pulses, nuts, tubers – that provide the bulk of our energy and protein. Devote the best land to horticulture – fruit and vegetables. But then – for we don’t need to be vegan, and crops grow better if there are animals around – fit in the livestock as and when. Cattle and sheep should graze and – especially in the tropics – browse on the leaves of trees ... where cereal is hard to grow, and pigs and poultry should be fed as they always used to be on surpluses and leftovers. In general, farms should be mixed and must therefore be labour-intensive – because well-balanced farms are complex and need very high standards of husbandry.

Now comes a series of wondrous serendipities. Farms that are rooted in common sense and sound biology produce plenty of plants, not much meat, and maximum variety. And here in nine words – *plenty of plants, not much meat, and maximum variety* – is a summary of all the worthwhile nutritional advice that has flowed in a million articles and best-sellers and TV programmes from all the world’s most learned committees these past thirty years. Yet there is more. For here too is the basic structure of all the world’s great traditional cuisines – France, Turkey, North Africa, China, India and Italy. All their finest recipes are variations on this simple theme: *lots of plants, not much meat, and maximum variety*.

In other words, the produce from farms that are designed along lines of sound biology to supply the maximum amount of food, kindly and sustainably, also accords precisely with the recommendations of the world’s leading nutritionists and – most wondrously of all – with the world’s greatest cuisine.”

“But the food chain we have now is not designed to feed people. In line with the modern cure-all – the allegedly free global market – it is designed to produce the maximum amount of cash in the shortest time. Stated thus, our approach to our most important material endeavour seems unbelievably crass. The global free market might be good for some things (perhaps we get better computers and warships that way); but for farming, and hence for humanity as a whole, it is disastrous. The simplistic business rules that may (or may not) apply to other enterprises are fatal to Enlightened Agriculture and so, since we depend on agriculture absolutely, they are proving fatal for us.

When cash rules, sound biology goes to the wall, and common sense and humanity are for wimps. The goal must be to maximise whatever is most expensive – which means livestock. So now we feed well over half the staples that could be feeding us to cattle, pigs and poultry. So instead of helping us to feed ourselves, our animals compete with us. By 2050 on present trends, the world’s livestock will consume enough to feed four billion people – equal to the total population of the 1970s, when the United Nations held its first international conference to discuss the world’s food crisis. Those livestock will mostly be consumed by people already weighted down with too much saturated fat – for the moment mostly in the west, but increasingly in India and China. The poor will remain poor. So will most farmers. The traders and their shareholders will grow rich. For this, forests are felled and the last of the world’s fresh water is squandered – for example on the soya in Brazil, grown to feed the cattle of Europe and now their biggest agricultural earner.

Cash-based farming is not mixed, because that is complicated and labour must be cut and cut again to save costs. So we have cereals from horizon to horizon, cocooned in pesticide, while piggeries in the United States (and soon in Europe, with American backing and European taxpayers’ cash) sometimes harbour a million beasts apiece – unbelievably foul and each producing in passing as much ordure as the city of Manchester.” Such cut-price husbandry is dangerous and can lead to massive disease epidemics.

“Worst of all, though – at least in the immediate term – cut-price monocultural farming puts people out of work. That is what it is designed to do. Countries with the fewest farmers are deemed to be the most “advanced”. Britain and the US are the world’s brand leaders, with about 1% of their workforce full time on the land. Both eke out their rural workforce with immigrant labour of conveniently dubious legal status

who can be seriously underpaid. In the US there are more people in jail than working full time on the land.”

In the non-industrialised world, 60% of people live on the land. If poor countries industrialise their farming as Britain and the US have done, and as they are increasingly pressured to do, then this will put two billion people out of work. Unemployment is the royal road to destitution: what a dreadful joke the “war on poverty” really is. Alternative industries are promised, but there are none on the horizon and cannot be – for no ‘alternative’ can employ the numbers that farming does. There aren’t enough resources for the entire world to be as industrial as Britain is.”

“In reality, then, our food problems are of two kinds. The first is to grow food well, get it to people, and then cook it properly. That should be fairly straightforward. Far, far harder is to circumvent the corporates and their attendant governments.” Their “aim is not to grow food but to maximise cash. That in all ways is immensely destructive. In short, the greatest threat to humanity comes from our own leaders. Solutions cannot be found through patient reform – for the powers-that-be cannot change to the extent that is needed without sawing off the branch they sit on. Direct confrontation – all-out revolution – is pointless because the world’s leading governments grant themselves new powers with every passing week.

But there is a third option: renaissance. People who actually give a damn must start doing things that obviously need doing. Let [supermarkets] and the rest wither on the vine. Gandhi would surely have approved.” What’s needed is a “Worldwide Food Club”: a co-operative of farmers and preparers (cools, brewers, bakers, charcutiers) on the one hand, who want above all to provide good food by the best possible means; and consumers who are happy to pay a proper price for food properly produced. To be sure, the movement must begin with the relatively affluent. But cheap food is not really cheap, and in any case we should ask why countries like Britain and the US which claim to have such successful economies should have so many poor people. Certainly the answer to poverty does not lie with an economy that is designed to make the rich richer.

The Club must work because it is what most people want – or if not most, then at least a critical mass. Only a monster could be satisfied with the world as it is. Only the most hopeless optimist could suppose that with present strategies things can get better. Most of what is needed is already out there – the Soil Association and the growing ranks of organic farmers, and other farmers dedicated to ‘kind’ food, excellent bakers and cooks who know exactly what is needed and care; fair trade movements; the Slow Food movement, which emphasises the unbreakable link between sound farming and great cooking; and that minority of scientists and technologists who are not employed simply to strengthen the corporate hand but truly to serve the needs of humanity. It is just a question of bringing it all together into one coherent cause. That cause, in one phrase, I suggest is “Enlightened Agriculture”.

## “Food Miles” and the trend to locally grown food

*Reducing the embodied transport energy of what we eat is gaining ground as a ‘greenhouse action strategy’, particularly through the rising popularity of local farmers markets and community supported agriculture (CSA). And the profile of local food has risen further with the publication in March this year of the book “The 100-Mile Diet: A Year of Local Eating” by Alisa Smith and J.B. MacKinnon.<sup>5</sup>*

*The book recounts the adventures of a Canadian couple making a year-long attempt to eat foods grown and produced within a 100-mile radius of their apartment. When the authors learned that the average ingredient in a North American meal travels 1,500 miles from farm to plate, they decided to launch a simple experiment to reconnect with local food. For one year, they would only consume food that came from within a 100-mile radius of their Vancouver apartment. The 100-Mile Diet was born – but at times it shook their resolve as it was to be a year without sugar, olive oil, rice, beer, and much, much more. Yet local eating turned out to be a life lesson in pleasures that are always close at hand. They met the revolutionary farmers and*

<sup>5</sup> Published 12 March 2007 by Random House, Canada; ISBN: 978-0-679-31482-0 (0-679-31482-2); see: <http://www.randomhouse.ca/catalog/display.pperl?isbn=9780679314820>

*modern-day hunter-gatherers who are changing the way we think about food. They got personal with issues ranging from global economics to biodiversity. They called on the wisdom of grandmothers, and immersed themselves in the seasons. They discovered a host of new flavours, from gooseberry wine to sunchokes to turnip sandwiches, and foods that they never would have guessed were on their doorstep.*

*The book's catchy title has certainly drawn attention and is helping to get people thinking seriously about how to adapt their cooking and eating to the seasonal food grown close to where they live. In a number of places recently I have seen reference to diets variously labelled, like the title of the book, according to how local they are. Here are a couple of examples:*

Adapted from: **Towards a 10-mile diet** – Mary Gazetas, 19 May 2007

<http://veganica.com/bb/viewtopic.php?t=901&sid=5904ab4713713cd40d64f31abb8f86d6>

There's been a noticeable shift in people's interest to make an effort to start eating food that's grown closer to home. The media coverage concerning climate change and its impact on food systems has dramatically increased in recent months whereby consumers have gained a greater awareness as to how to make choices if they care where their food comes from. Helping this movement is the book "The 100-Mile Diet: A Year of Local Eating". The 100-mile diet adventure of the Vancouver authors has sparked interest all over the world, and there are many people doing their own versions that promote less food miles and a renewed interest to grow some of their own vegetables. Perhaps it's like what their grandparents used to do, having to eat what was in season and working hard to can (preserve) a winter supply before the freezer was invented — back to a time that was pre-fast-food and probably more like a 100-yard diet.

Searching out local food sources can be fun too. Why not a 10-mile diet? For example, here on Lulu Island (British Columbia, Canada), there is fresh, picked-on-the-same-morning spinach, lettuces, arugula, radishes, bok choy and hothouse cucumbers to be discovered at local family farms.

Talk to anybody who has been selling seeds this spring. They're noticing more and more people are buying seeds. A friend, who works in a nursery, told me this week that customers are buying seeds like never before and asking "just tell me how to start." Victoria (B.C.) has launched a campaign encouraging people to dig up their lawns to create growing room. Container gardening is increasing. Waiting lists for community allotment gardens are another indication there is a need for more land to be made available so that people can grow their own food. The 1500-mile diet is giving way to the 100-mile diet and the 10-mile diet. Why not find out more.

And, for an even tighter "diet radius" see: **The 100-Foot Diet** – by Roger Doiron,<sup>6</sup> 25 March 2007

<http://www.commondreams.org/archive/2007/03/24/74/>

I started preparing a large pot of potato leek soup this morning. If all goes according to plan, the soup should be done simmering by late September. No, there's no problem with my stovetop or my cooking skills. The problem, if there is one, is with my admittedly extreme definition of local ingredients. Unless you managed to lock yourself in your kitchen pantry for the past year, you will have heard that road-weary foods are out and fresh, local ones are in. Yet, different people have different ways of defining local. John Mackey, CEO of Whole Foods, has said that local foods are those sourced within a 200 mile radius of a store. Nutritionist and author Joan Dye Gussow has defined local more poetically as "within a day's leisurely drive of our homes".

In my case, local foods are those coming from my own backyard, literally. In order to have backyard-grown leeks by September, I'm planting seeds indoors now which will grow into pencil-necked seedlings that I'll move outdoors in May when Maine's (northeast USA) winter officially ends and summer begins (for those who haven't been to Maine before, spring comes in the second week of May, except for those

---

<sup>6</sup> Roger Doiron is founder of Kitchen Gardeners International - <http://www.kitchengardeners.org/> - a nonprofit network of 3200 gardeners and home-cooks from 80 countries who are working to shorten the distance between people and their food.

years when it skips us completely). Once the seedlings are in the ground, they'll need a hundred days before they're ready for the soup pot.

There are certainly easier paths to delicious, local foods than the one that passes through the backyard garden, but none more direct or more satisfying. It is a path, however, that fewer and fewer Americans are willing to tread. According to latest data from US Department of Agriculture, home food production hit an all time low last year and was down a full 20% from the previous year. Meanwhile, despite recent trends, foods in the US have never travelled farther than they do now, over 1500 miles on average from field to fork, using up to 17 times more fossil fuels than foods sourced locally.

With the gardening season and climate change both upon us, I am encouraging people who have a little bit of land – be it a vacant lot, a yard, or a well-tilled window box – to use it in the service of their planet and their gastronomy. Recently, a Vancouver couple made the international news by eating a '100-mile diet' for a year. In a globally-warmed world with a growing population, we'll need even more ambitious experiments in local eating, and even slower interpretations of "slow food".

My goal this growing season is to meet one third of my family's annual vegetable needs through our modest suburban plot. That may not sound like much, but a lot of little kitchen gardens can add up to a small farm in urban and suburban areas where farmland is either not available or affordable. And now that my leek soup is on the boil, so to speak, I'll soon turn my attention to making pasta with red sauce, starting with a tomato seed order later this week. I'm thinking of trying an heirloom variety called Amish Paste. It takes about 5 days longer to mature than the paste tomato I grew last year, but, heck, I'm in no hurry.

## A reminder about greed, over-consumption and morality

**Jenny Wanless** – Editor of 'Nature & Society', the journal of the Nature and Society Forum (NSF) – [www.natsoc.org.au](http://www.natsoc.org.au) – looks at the contradictions in human nature that allow an intelligent species to indulge in a culture of heedless over-consumption.<sup>7</sup>

What a weird mob we humans are: such a mixture of intelligence and stupidity, goodwill and hostility, kindness and cruelty. Much of the time we do not even notice the contradictions in the way we behave.

At Christmas, for example, we express the wish for Peace on Earth and Goodwill to Men (let's update that to goodwill to all humans) and then act in ways that ensure these noble sentiments cannot come to fruition – good resolutions are made and quickly broken as we indulge in a season of conspicuous over-consumption and excess. Christmas, with its moral links also brings to mind the more general links between consumption and morality:

It has been argued<sup>8</sup> that we will have to have a new way of thinking if our species is to survive for more than a few generations. If so, we will need to adapt our moral code to avoid overwhelming all the natural systems on which our survival depends.

For years NSF member Neil Burry has been trying to alert us, and the rest of society, to the perils of over consumption of food by individuals and of all resources by our society. As he has pointed out, an understanding of personal obesity gives an understanding of economic obesity – it is all a matter of energy imbalance, which Tim Flannery, for example has made the supreme concern in his book *We are the Weathermakers*. Indeed, as Neil has said, we are the weathermakers, who are over our healthy economic and body weights as the result of over-consumption.

Over recent months, an interesting phenomenon has been emerging. Quite suddenly, it seems, there is much public discussion on many issues NSF and other organisations have been working for years to get into the public arena: climate change, peak oil, energy consumption and supply, the rapid decline of fisheries, the plight of the oceans, shortages of water, human health and nutrition, and many more, all are getting a really public airing for the first time.

<sup>7</sup> Adapted with permission from her editorial in the December 2006 / January 2007 issue of Nature & Society – see under "Publications" at: [www.natsoc.org.au](http://www.natsoc.org.au).

<sup>8</sup> For example by Daniel Quinn in the October 2006 issue of *Nature & Society* – [www.natsoc.org.au](http://www.natsoc.org.au).

It is fascinating to watch the growing public and political perception of the problems about which we have been talking and writing for decades. It almost seems miraculous, but of course it is not. The systems have reached a tipping point at which acceleration of the problem has occurred and it can no longer be ignored. And it is no coincidence that this is all happening at the same time; we have argued for ages that all these things are connected. They are the consequence of too many people consuming too much and stressing all the life support systems of the planet.

Neil Burry coined the term 'Darwinian original sin' to alert us to the moral dimensions of the problem. All species, humans included, tend to eat well in good times to tide themselves through bad times. This served us well when there were lean times. Anyone who has seen the Australian film *Ten Canoes* this year would have been impressed by the lean active aboriginal tribal people who formed the cast. It gave us a great contrast to the body shapes of our current lifestyles, with plentiful cheap fattening foods available every day of the year, without any great expenditure of human muscle power in acquiring them. It is in our genes to overeat and to take things easy when there is no need for energetic activity. We know what we should do about it, but it is so easy just to do what nature programmed us to do – eat what we want when it is available (and to stockpile possessions too). Scarcity would solve the problem, as it does in Africa, but scarcity is unknown to us at present. So for now willpower is the only available answer, and that is why many people are now thinking of the problem as a moral one.

While much is being said on the problem of over-consumption of food, the issue of over-consumption of all other resources has not made it into public or political consciousness. Indeed politicians, economists and business people are still busy urging us to over-consume. They still insist that supplies of energy should continue to grow, without any understanding that all the problems now surfacing have been caused by that growing consumption, and that the only way to address the problems is to start reducing consumption right now.

The concept of a new Renaissance, a change in thinking that makes everyone understand that humans are part of nature, not separate or more important, will also inevitably mean a change in our system of moral thought. It will make care of the Earth's natural systems our most important duty, realising that the wellbeing of people is totally dependent on the health of the biosphere. Human morality will have to recognise and respect the limits imposed by the finite nature of the Earth itself.

## Climate change is not the only issue!

*As the public debate over climate change heats up and captures increasing 'air time', it threatens to hijack the broader agenda of sustainability in all systems. By focusing on global warming and climate change, we risk de-emphasising the true scope of a problem that affects all of the life-support systems of the Earth. Bluntly, there are too many of us collectively consuming too much, and until we address these twin problems directly, we risk ultimately missing the point altogether.*

## Feedback

## More on global warming and the role of tropical forests

*William Kininmonth - [w.kininmonth@bigpond.com](mailto:w.kininmonth@bigpond.com) – Australasian Climate Research, both agrees – and disagrees with the paper by Walter Jehne on "The Biology of Global Warming and its profitable mitigation" in Update 64 (pp. 1-8):*

Firstly, congratulations on the CSIRO Sustainability Network Newsletter. Scientific discussion tends to be constrained by prevailing paradigms that are controlled by funding policy at senior bureaucratic and government policy level. This is no more so than in climate change. Your willingness to publish material that confronts prevailing dogma, especially that which is championed by CSIRO itself, is to be applauded.

In the above context, Jehne's paper has much with which I agree, for example:

"..... there is still much valid concern about the simplistic assumptions and models being promoted about what has caused global warming and what we need to do to address it, assumptions and policy responses which dictate that:

1. Global warming is caused by an increase in the earth's greenhouse effect ...
2. due to increases in CO<sub>2</sub> levels in the atmosphere ...
3. as a result of increased burning of fossil fuels by humans and, as such,
4. needs to be mitigated by 2100 by reducing CO<sub>2</sub> levels and fossil fuel use ...
5. over the next decades to avoid adverse impacts projected by 2100.

While the above may have been a simple expedient message to manage public concern about global warming and provide the context for governments to talk about agreements and responses such as Kyoto, it may unfortunately be grossly misleading. It may not accurately reflect the complexity of the factors contributing to global warming, its cause, urgency and potential impact, and, as a result, may impede scientific understanding of its real cause and more effective mitigation options. Indeed the status-quo assumptions, models and expedient political responses to global warming that have been locked in for the past decades may now become the major risk factor, both in understanding the nature of the challenge and in taking effective action, hopefully in time."

Jehne then goes on to give a cogent analysis of how the hydrological cycle introduces complexity to the climate system and why the simplistic and one-dimensional theory of carbon dioxide forcing of global warming may be incorrect. He reiterates a point demonstrated by Priestly (1966, Agricultural Meteorology) on how evapotranspiration regulates surface temperature.

Jehne, however, would find very little support in his view that post-industrialisation observed increases in atmospheric carbon dioxide concentration and global temperatures are both responding to another unidentified influence. This relationship may have been true for the historic variations recorded in the Vostok ice cores but contemporary carbon dioxide increase is almost certainly due to unprecedented burning of fossil fuels. That, of course, does not lead to the conclusion that recent global temperature increases are linked to the atmospheric carbon dioxide increases.

There is no doubt that changes in local land use will change the local evapotranspiration rates, temperature and surface wind structure. It is a generalisation to extrapolate these local changes to the global scale. For one thing, ocean makes up approximately seventy percent of Earth's surface; for another, managed agriculture and forestry comprise only a fraction of the land surface. For changes in local land use to affect global climate requires a major amplification of the feedback processes. In contrast, the El Nino phenomenon of the Pacific Ocean, with its global impact on climate, is recognised as one of the complex, multi-dimensional processes contributing to climate variability.

The conclusion that reforestation may be an effective way to mitigate climate change needs much further work before it can be taken as a convincing basis for policy. After all, biosphere productivity increased dramatically as Earth warmed following the last glacial maximum about 20,000 years ago, especially the northward expansion of boreal forests. Even over recent decades of global warming the increased productivity of northern boreal forests is confirmed by satellite data. A warmer and wetter world may not be the danger to humankind it is generally made out to be!

Notwithstanding the above, there is a body of research to support the view that reforestation and other appropriate activities are highly beneficial for land management at the local level in mitigating the impacts of climate change and sustaining productivity. There is a need to better understand the climate system, its variability and change and also the interactions between climate and both managed and natural ecosystems.

*And a brief response from Walter Jehne to the above and similar comments:*

I do understand and expect that 'established experts' need to defend their processes and the conclusions and public statements arising therefrom. There is no conflict, however, with their key points – i.e. the real situation is more complex than in the simple public message, the CO<sub>2</sub> increase in the Vostok cores is not causally linked to temperature changes, the current CO<sub>2</sub> increase is driven largely by fossil fuel emissions – nor that there has been some recent increase in forest bio-sequestration as a carbon sink.

The key point that all seem to avoid addressing is that neither their comments nor their models address what caused the increase in CO<sub>2</sub> levels from 1750 onwards – an increase that signified something had fundamentally disrupted the former negative feedback processes that had limited CO<sub>2</sub> to 280 ppm in previous interglacials. This is the key question that the analysis sought to address. I have no argument about the fact that CO<sub>2</sub> increased as a symptom of this change, but what caused it?

There is also no argument that the status-quo reality is that few would support the view that some factor other than simply CO<sub>2</sub> itself has caused the massive post industrial increase in atmospheric CO<sub>2</sub>. My minority point, however, is simply that this position, even if the status quo, is just not logical as this symptom must have been triggered by the prior disruption of some other unidentified CO<sub>2</sub> uptake process, causing inadequate CO<sub>2</sub> sequestration. The CO<sub>2</sub> increase in the previous interglacial did not cause a runaway rise in atmospheric CO<sub>2</sub>, so what has changed?

I am amused that some critics have actually read little if any of the analysis (before groaning and putting it aside) but fail to see the irony in describing it subjectively as 'misinformed and arrogant' for (a) questioning the status quo based on their models, and (b) for expressing a view without being peer reviewed by 'gatekeepers' of the same status quo. The model-makers don't know what governed the CO<sub>2</sub> minima and maxima at 180 and 280 ppm in the Vostok data and, since I have no issue with the fact that the 300 GTC (gigatonnes of carbon) released from fossil fuels to date roughly equates with CO<sub>2</sub> increases in the atmosphere minus ocean lag effects, I fail to see how this makes our (SST) analyses misleading or arrogant.

Thank you however for helping in the debate on these issues and reinforcing the challenges on many fronts that have to be met if we are to come to terms with, let alone address, global warming in time.

*[My simplistic mind likens this situation to living in a house where we have realised the heater is jammed full on but not yet realised that the air-conditioner is broken as well! EGH]*

## Variability of Renewable Energy: Response to Ted Trainer

Mark Diesendorf – [m.diesendorf@unsw.edu.au](mailto:m.diesendorf@unsw.edu.au) – of the Institute of Environmental Studies, University of NSW, takes issue with some of the points made by Ted Trainer in his feedback note on wind power variability:

Ted Trainer, in his 'Feedback' notes in Update 65 pp 16-18, has seriously misrepresented as "misleading" the research by Brian Martin and me on the integration of wind power into electricity grids. Consider the following examples.

**Ted:** "Mark gave the impression that the variability problem is essentially to do with meeting peak demand ... However ... the most important question confronting wind is how often might supply fall below demand".

**Mark's response:** It is exactly this 'most important question' that we addressed. Unfortunately, Ted confuses different aspects of our work (grid operation and generation planning). He quotes a paper which is of little relevance to the current question (namely Diesendorf & Martin, 1980)<sup>9</sup>, instead of the paper (Martin & Diesendorf, 1982)<sup>10</sup> which focuses on the balance between supply and demand in the context of generation planning. This is in spite of the correct citation being given in my previous article (Update 63E, pp. 16, footnotes 7 & 8).

**Ted:** "Conclusions should not be based on places such as Denham WA, which have unusually good winds."

**Mark's response:** Denham, with over 40% of its electricity generated from wind power, does *not* have outstanding winds. The reason why it achieves such a high wind energy penetration is the result of the high price of diesel fuel at this remote site, making large amounts of wind power cost-effective. As I

<sup>9</sup> Diesendorf M & Martin B (1980) Integration of wind power into Australia electricity grids without storage: a computer simulation, *Wind Engineering* 4(4): 211–26.

<sup>10</sup> Martin B & Diesendorf M (1982) Optimal thermal mix in electricity grids containing wind power, *Electrical Power & Energy Systems* 4(3): 155–61.

explained previously (Update 63E, pp. 15–16), the reason for quoting the success of wind-diesel systems at Denham, Hopetoun, Bremer Bay, Esperance and Mawson is to show that the limits to wind energy penetration are not primarily technological, but rather are economic.

**Ted:** “It is therefore misleading for Mark to say that back up for wind capacity ‘is rarely used’. It is probably true for the situation he is discussing, i.e. where wind contributes c 20% of demand ... Where the contribution of wind ... is low there might be no need to build additional coal or nuclear plants ...”

**Mark’s response:** Ted’s gratuitous claim that I am being misleading is contradicted by his next sentence where he admits that “it is probably true.” The result is indeed true for 20% and significantly higher wind energy penetrations, based on the computer modelling reported by Martin and Diesendorf (1982) and more detailed subsequent modelling by other authors who are cited in my new book<sup>11</sup>.

Ted considers that a 20% wind energy penetration is ‘low’ and then goes on to misquote a German-based utility E. On Netz (well-known for its hostility to wind power) that ‘high’ penetrations would need base-load back-up<sup>12</sup>. I would be very happy, however, for Australia to have a ‘low’ 20% of wind energy within a few decades. That is precisely the wind penetration that we proposed in *A Clean Energy Future for Australia*<sup>13</sup>.

**Ted:** “... if renewables are to provide almost all power it will be necessary to build a lot of coal or nuclear capacity... There will be times when both wind and solar are down”

**Mark’s response:** Ted’s leap of logic from wind power in particular to renewables in general is invalid. It repeats the base-load fallacy that is being used by the coal and nuclear industries and their politician supporters to denigrate renewable energy. I refute this fallacy in a briefing paper<sup>14</sup> and in more detail in my new book<sup>15</sup>.

To summarise that refutation, renewable energy comprises a wide range of energy sources with different variabilities. Some, like bioenergy, solar thermal electricity with thermal storage and hot rock geothermal, are base-load and can replace coal without any additional back-up. Wind from geographically distributed sites, with the assistance of a little peak-load back-up that is operated infrequently, can also replace some base-load coal. Other renewable sources, e.g. solar PV without storage, can replace intermediate-load coal and gas power. Peak-load renewable electricity can be supplied by hydro and by gas turbines fuelled by biomass.

Ted’s statement that “There will be times when both wind and solar are down” suggests a lack of in-depth understanding of the workings of an electricity supply system. He seems to assume, incorrectly, that coal and nuclear are completely reliable and that renewables are unreliable. In reality, however, no source of electricity is completely reliable. Coal and nuclear stations break down unexpectedly and require partial back-up, both base-load and peak-load. Based on an understanding of the probabilities of failure and other variabilities in outputs of different types of power station, conventional and renewable, the clean energy mix described in the previous paragraph can be made just as reliable as a mix involving coal or nuclear in terms of balancing supply and demand.

The principal scenario in *A Clean Energy Future for Australia*<sup>16</sup> used energy efficiency, solar hot water, wind, bioenergy from the residues of existing crops, and a small amount of solar electricity to provide more than half of Australia’s electricity demand by 2040. Compared with any other scenario for phasing out dirty coal power, this is a low-cost scenario. The economic savings from energy efficiency and solar hot water pay for a large part of the additional costs of wind and bioenergy.

---

<sup>11</sup> Diesendorf M (2007a) *Greenhouse Solutions with Sustainable Energy*, UNSW Press, Sydney, see especially chapter 6.

<sup>12</sup> Actually, E. On Netz is talking about penetrations below 20%. That report by E. On Netz has been superseded by another German report that includes E. On Netz as an author and contradicts the earlier conclusion that Ted quotes here.

<sup>13</sup> Saddler H, Diesendorf M & Denniss R (2004) *A Clean Energy Future for Australia*, Clean Energy Future Group, Sydney & Melbourne, [http://wwf.org.au/publications/clean\\_energy\\_future\\_report.pdf](http://wwf.org.au/publications/clean_energy_future_report.pdf)

<sup>14</sup> Diesendorf M (2007b) *The base-load fallacy*. Energy Science briefing paper no. 16: [www.energyscience.org.au](http://www.energyscience.org.au) or [www.sustainabilitycentre.com.au/popular.html](http://www.sustainabilitycentre.com.au/popular.html).

<sup>15</sup> Diesendorf M (2007a) *Loc.cit.*

<sup>16</sup> Saddler H, Diesendorf M & Denniss R (2004) *Loc.cit.*

This scenario buys time for the more expensive renewable energy sources – solar electricity, bioenergy from dedicated crops, hot rock geothermal and marine power – to be further developed to reduce their costs. After 2020 they could contribute on a large scale with the result that Australia could move to 100% renewable electricity as gas runs out in the second half of the 21<sup>st</sup> century.

There is no need for Australia to construct nuclear power stations or to risk billions of dollars on the development of coal power with the capture and burial of CO<sub>2</sub>. That should be left to the superpowers, USA, EU and possibly, in the future, China.

Ted has suggested that before making the transition to a renewable energy system, we must change our society from one that is capitalist-consumerist to one that is not. Elsewhere in his remarks, he contradicts this stance by recognising that we need urgent, big reductions in greenhouse gas emissions. We cannot afford to wait for the end of capitalism before creating a sustainable energy system based on efficient energy use and renewable sources of energy. Seemingly, Ted sees no coherent alternative to sustainable energy, only delay until the 'revolution' comes.

When readers are wondering which point of view to accept, I would encourage them to take into consideration that, as a (then) Principal Research Scientist in CSIRO, I led a team that did the original research in Australia on the integration of wind power into electricity grids, published this work in international journals, presented it at international conferences, and have remained active in this field. Ted, who is a social worker academic, comes at the issue primarily from a social systems perspective and has never published original work in the field.

Ted and I do have, however, one major point of agreement: namely that we cannot continue to allow the demand for energy to increase in the long run. Personally I support 'contraction and convergence', an international process proposed by the Global Commons Institute<sup>17</sup>. Such a process involves a more thoughtful, credible and implementable approach than any simple call to 'terminate capitalism and abandon affluence'.

### Concluding remarks

With the assistance of natural gas as a transitional fuel, a sustainable energy system could be implemented rapidly, commencing now, and could achieve a 30% reduction in Australia's greenhouse gas emissions by 2020 and possibly an 80% reduction by 2050. **This could be achieved within a democratic capitalist society, provided there is sufficient demand for this from the people.**<sup>18</sup>

## Base-load electricity generation

*Richard Swinton – [richard.swinton@dpi.nsw.gov.au](mailto:richard.swinton@dpi.nsw.gov.au) – Resource Management Officer with the NSW Department of Primary Industries, offers the following comments on base-load electricity generation:*

I'd like to make a comment on the article you included in the last Newsletter (issue 65 pp 8-10) on "the need for 'base-load' power generation is a myth" – which concept I fully support.

The article seems to assume that power generation is designed to meet demand, and that renewables can do the same – but I'd contend that a lot of the demand pattern is 'created' by such marketing tools as subsidised prices, etc. The authors mention this practice, but don't follow through with the conclusion that we can redesign our demand patterns to suit the availability of renewable power.

If, for example, we have a high proportion of solar generation, then obviously we want our peak loads to occur during daylight hours. This means those uses which we currently switch to night time operation, such as water heating, should actually occur during daylight (although much water heating should be done with local solar units). This also better matches air-conditioning demand (although I believe we should consider mandating the installation of solar PV cells on each building which is air-conditioned to match that building's a/c demand).

<sup>17</sup> See [www.gci.org.uk/contconv/cc.html](http://www.gci.org.uk/contconv/cc.html).

<sup>18</sup> Mark presents this scenario in detail in his new book – see "Feature Resource", p. 22.

Industry can also adapt (maybe an associated benefit might be fewer people working 'unnatural' shifts and consequently increased community well being). Such large power users as a potential desalination plants could be designed and operated to take up peak loads as they become available and switched off in situations of low power availability, since the water can be stored and distributed as needed. So when we look at the ability of renewables to meet our electricity needs, we should not assume the current demand patterns will necessarily apply. This strengthens the 'Myth of Baseload' case.

**Of course, the ultimate goal should be to markedly reduce overall demand for electricity as well as other consumables. As Clive Hamilton of the Australia Institute has said – “You can't consume your way to sustainability”!**

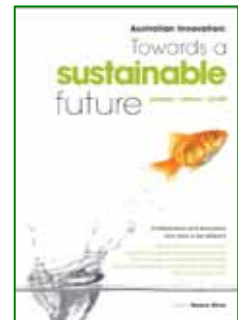
## Other Information Resources and Links of Interest

**ECOS**, Australia's most authoritative magazine on sustainability in the environment, industry and community is published bi-monthly by CSIRO – in print and online. See: [www.publish.csiro.au/ecos](http://www.publish.csiro.au/ecos).

### FEATURE RESOURCE

**Australian Innovation: Towards a Sustainable Future – by Valerie Khoo**  
[www.sustained.com.au](http://www.sustained.com.au) **New Book, Website, and Free e-Bulletin**

Corporate attitudes are changing as seen in this new book on sustainability and innovation in Australia and its accompanying website. Australian organisations are making significant inroads in sustainability, as shown by a range of case studies featuring the organisations, industry leaders, researchers and entrepreneurs who are making bold strides in new sustainable initiatives and technologies, resulting in long-term environmental, economic and social benefits. Ultimately, this book is about people – the visionaries who have turned 'Eureka' moments into global applications, the failures that preceded success, the struggle to turn ideas into commercial reality. [Published 2007 CL Creations (Associated Media Group; and available through the above website; ISBN: 978-0-9580670-7-2]



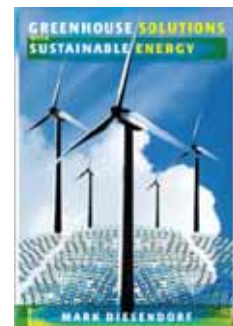
To complement the book, the website [www.sustained.com.au](http://www.sustained.com.au) has also been launched as a comprehensive sustainability “hub” to promote the significance and benefits of sustainability developments in occurring in Australia, and the organisations that are taking the journey to sustainability seriously. The site provides the most up-to-date news, case studies, events, online forum, podcasts, sustainability reports and much more. It also offers a free, fortnightly eNewsletter, **SustainaBulletin**, which explores one major topic each edition e.g., 'the pathway to sustainability reporting', carbon schemes, green building, community/business partnerships etc. You can be a part of this global sustainable network: submit your organisations news, press releases, sustainability reports and events, subscribe to our eNewsletter, or if you are considering the publication of your first or next edition of your organisation's sustainability report, our experienced publishing team can assist you with your published edition, and an innovative, online version or communication program.

For further information on the book or the associated website services contact: Helen Cameron - [Helen@amgroup.net.au](mailto:Helen@amgroup.net.au) – Communications Manager, Associated Media Group Pty Ltd

### FEATURE RESOURCE

**Greenhouse Solutions with Sustainable Energy – by Mark Diesendorf**  
[www.unswpress.com.au/isbn/un9731.htm](http://www.unswpress.com.au/isbn/un9731.htm) **New Book**

Global warming is the hottest political issue of the day, and it is likely to become even more pressing over the coming years. It is arguably the most dangerous environmental problem and the most difficult political issue to be faced by the world in the 21st century. This new book by Network member Mark Diesendorf critically assesses the various technologies that have been put forward as solutions and



builds feasible scenarios for their effective implementation. He argues that: (1) implementation of ecologically sustainable energy technologies available today, based on energy efficiency, renewable energy and natural gas, could halve Australia's greenhouse emissions within just a few decades; (2) to implement these technologies, new policies must be developed and implemented by all three levels of government; and (3) the main barriers are neither technical nor economic, but rather our social institutions and the political power of the big greenhouse gas emitting industries: coal, oil, aluminium, cement and motor vehicles. [Published June 2007 by UNSW Press; ISBN: 9780868409733]

## **CLIMATE CHANGE**

### **Giving up on Two Degrees**

[www.monbiot.com/archives/2007/05/01/1058/#more-1058](http://www.monbiot.com/archives/2007/05/01/1058/#more-1058)

The rich nations seeking to cut climate change have this in common: they lie. The governments apparently making genuine efforts to tackle global warming are using figures they know to be false! The UK government, the EU and the UN all claim to be trying to prevent "dangerous" climate change, and there is a broad consensus about what this word means: two degrees of warming above pre-industrial levels. The aim of preventing more than 2°C of warming has been adopted overtly by the UN and the EU and implicitly by the British, German and Swedish governments. All of them say they are hoping to confine the concentrations of greenhouse gases in the atmosphere to a level which would prevent 2°C from being reached. And all of them know that they have set the wrong targets, based on outdated science. Fearful of the political implications, they have failed to adjust to the levels the new research demands. This hard-hitting article analyses what it will really take to avoid the two-degree rise and provides extensive references.

## **DOMESTIC WASTE COLLECTION**

### **Belgium's rubbish solution**

[http://news.bbc.co.uk/2/hi/uk\\_news/6539813.stm](http://news.bbc.co.uk/2/hi/uk_news/6539813.stm)

Councils in England could soon be allowed to charge residents for the amount of rubbish they throw away. But what effect have "pay as you throw" systems had in other countries? The article reports on Belgium's system in which bins are weighed before and after collection, with householders then being charged for the weight of garbage collected. Although the system experienced some hostility at the start, it appears to have reduced the amount of garbage being collected with no significant increase in fly-by-night dumping.

## **ENERGY**

### **CSIRO Energy Transformed Flagship Research Program**

[www.csiro.au/csiro/channel/pch87.html](http://www.csiro.au/csiro/channel/pch87.html)

This site provides easy 'click-on' access to information and contact details for the projects incorporated within this energy innovation program including: A significant step forward in battery performance; Alternative transport fuels: prospects and impacts; Coal gasification: a cleaner option for power generation; Distributed energy management and control; Gas separation: providing clean gas for energy applications; Intelligent grid: a vision for Australia's future energy network; Looking deeper for a solution to CO<sub>2</sub> storage underground; Post-combustion capture of CO<sub>2</sub> emissions from power stations; Smart agents: an intelligent way to manage and control energy; Solar thermal energy research; Supercapacitors: powerful mobile energy storage devices; Supercharged batteries; The Energy Futures Forum; The integrated Rankine cycle project; and UltraBattery: no ordinary battery.

### **CSIRO Wind Energy Research Unit (WERU)**

[www.csiro.au/science/ps2k7.html](http://www.csiro.au/science/ps2k7.html)

WERU uses CSIRO expertise in atmospheric measurement and modelling to locate potential wind-energy farm sites efficiently and cost-effectively (wind-energy prospecting). It also uses Bureau of Meteorology weather data to predict the likely amount of energy each site may produce over a given time period (wind-energy forecasting). The site provides research and contact details.

## **ECONOMY**

### **JamesRobertson – Working for a Sane Alternative**

[www.jamesrobertson.com](http://www.jamesrobertson.com)

This is the personal website of consultant James Robertson who, based on extensive experience in the British Civil Service, now devotes himself to promoting systems – particularly a new economic system – that will better support a global sustainable culture. He explains his work as follows: “In the 1970s I came to see, as others did, that world society was in an early stage of a 'great transformation' affecting every aspect of human life, as has happened from time to time in history. Three possible responses were: (1) business as usual (BAU); (2) HyperExpansion (HE), boosting the drives of the industrial age - centralising, scientific, technical, economic; and (3) Sane, Humane, Ecological (SHE), inspired by a new, genuinely post-industrial direction for human society's next stage of development. Based on principles of Enable and Conserve, SHE would give priority to the needs of people and the earth. The conventional idea of progress, with indiscriminate economic growth, socially and environmentally damaging globalisation, and remote government decisions closely linked to the interests of business and finance, is not a possible way forward. It's not enough now to say "the future doesn't have to be like that". It can't be like that. Those who think it can are leading the world to disaster on a catastrophic scale.” The website offers a range of both visionary and practical resources, and free subscription to a periodic electronic newsletter.

### **'GREEN' LIVING**

#### **Green Magazine**

[www.greenmagazine.com.au](http://www.greenmagazine.com.au)

This new, just launched quarterly magazine – the first Australian house and garden magazine to focus specifically on sustainability – targets the growing number of homeowners demanding information and inspiration on sustainable architecture and landscape design. The print magazine is supported by a website that will expand on the magazine's content and provide a forum for readers. You can check the contents of Issue # 1 on the website.

### **HYDROGEN ECONOMY**

#### **Why we need solar hydrogen now**

[www.hydrogennow.org/Opinion/WhyWeNeedSolarHydrogenNow.htm](http://www.hydrogennow.org/Opinion/WhyWeNeedSolarHydrogenNow.htm)

Author, Dr Warren Reynolds, backed by 35 years of experience as a chemical and nuclear engineer in the USA, makes a powerful case – comprehensively researched and referenced – for solar hydrogen as the preferred energy source for the future of industrialised society.

### **PRE-INDUSRIAL WRONG TURN**

#### **The worst mistake in the history of the human race**

[www.sacredlands.org/jared\\_diamond\\_01.htm](http://www.sacredlands.org/jared_diamond_01.htm)

or <http://anthropology.lbcc.edu/handoutsdocs/mistake.pdf>

An “oldie but goodie” – still capable of livening up any debate about aspirations to increase agricultural production! Author Jared Diamond points to the beginnings of agriculture as the point at which human progress went off the rails: “As population densities of hunter-gatherers slowly rose at the end of the ice ages, bands had to choose between feeding more mouths by taking the first steps toward agriculture, or else finding ways to limit growth. Some bands chose the former solution, unable to anticipate the evils of farming, and seduced by the transient abundance they enjoyed until population growth caught up with increased food production. Such bands outbred and then drove off of killed the bands that chose to remain hunter-gatherers, because a hundred malnourished farmers can still outfight one healthy hunter. It's not that hunter-gatherers abandoned their life style, but that those sensible enough not to abandon it were forced out of all areas except the ones farmers didn't want.” “Archaeologists studying the rise of farming have reconstructed a crucial stage at which we made the worst mistake in human history. Forced to choose between limiting population or trying to increase food production, we chose the latter and ended up with starvation, warfare, and tyranny. Hunter-gatherers practiced the most successful and longest lasting life style in human history. In contrast, we're still struggling with the mess into which agriculture has tumbled us, and it's unclear whether we can solve it.”

### **POST-INDUSTRIAL FUTURE**

#### **The Olduvai Theory: Sliding towards a post-industrial stone age**

<http://dieoff.org/page125.htm>

This resource has also been around for a while but it still provides an amazingly effective “devil’s advocate” position to liven up arguments about what a sustainable future may look like. In 1989, author Richard C. Duncan concluded that the life-expectancy of industrial civilization would be horridly short – caveman to moon-walker and back to caveman again. His hypothesis was defined in terms of a measurable index, world energy-use per person, and named the “transient-pulse theory of Industrial Civilization.” He sketched it’s maximum point at 1990, followed by a persistent decline. Back then there were no data to support this claim. Since that time, however, suggestive data have begun to emerge,

## Reminders

**Sustainable Development Update (SDU) – Issue 2, 2007, now online**

[www.albaeco.com/sdu](http://www.albaeco.com/sdu)

Contents include: Editorial – Will the world turn into a brighter place just because I switch to energy-saving light bulbs? And articles on: The imminent phosphorus crisis and food security; Political ecology; Inequality threatens biodiversity; Photography and resource management; Multi-species aquaculture key to sustainable seafood; Unique Madagascan forest returns; Goldman prize for curbing wildlife poaching; and Rights of poor fishermen need to be strengthened.

## End of the Sustainability Network – why, and where to from here

CSIRO has decided that this networking project has now been successfully completed in its current format, and must either become a self-funding “spin-out” activity or seek to consolidate with other media services promoting sustainability. As an organisation focused on R&D, CSIRO moves funding back to the innovation forefront once concepts are satisfactorily researched, proven and pioneered. This Network has demonstrated the feasibility of facilitated electronic networking as a means for two-way exchange of ideas, both across science disciplines and between science and the broader community. It has also demonstrated the value of broader cross-disciplinary thinking in dealing with the emerging complex social imperative of a more sustainable society. The Network’s success has been marked by a steady increase in membership – by word-of-mouth alone – to the current 1,400 plus, and, in 2003 by the CSIRO Corporate award for ‘Supporting Science’. The time has now come, however, for the inevitable decision to move funds back upstream from proven concepts.

When I initiated the Network in June 2001, the cross-disciplinary discussion of sustainability (and many other concepts) was a relatively rare process in the highly “silo-ised” research, education and government agencies of the day. Now, six years later, much has changed. CSIRO has reorganised a large proportion of its research into cross-disciplinary, collaborative, issues-based, “Flagship” programs, addressing major national concerns – such as *Energy Transformed, Food Futures, Light Metals, Preventative Health, Water for a Healthy Country, Wealth from Oceans* – and further Flagships are already in the pipeline for vital areas such as adaptation to climate change. Cross-disciplinary networking has become the norm within such programs.

Within CSIRO Publishing also, the Journal *Ecos*, traditionally based on the discipline of ecology, has embraced a far broader ecological mandate to discuss issues of sustainable development across the full range of environment, economy and society. And beyond CSIRO, many web-based information networking services have emerged over the last several years – all playing a part in harnessing the thoughts, skills and drive of the community in response to rising awareness of a society headed for environmental catastrophe. Many voices are now calling for the changes in policy and technology that, a few years ago, seemed positively far fetched in the face of an entrenched status quo.

Where, you might ask, is the next new frontier of effort, now that climate change and water shortage have entered the policy arena, and oil decline seems likely to follow in due course? As I see it, the next frontier is closure of the enormous gap between what we say in public and

what we do in our own lives. “Sustainability” has become a public catch-word. Researchers study it, companies report on it, politicians pepper their rhetoric with it; but the economy continues to grow, giving the lie to any notion of true sustainability. In our own lives as citizens, we have not yet come to grips with the notion that wellbeing (our true “standard of living”) could be increased dramatically even while reducing environmental impacts. We are still seduced by the notion that “standard of living” depends on the volume of goods and services consumed – on having and using - rather than on living and being. We see wealth as desirable, forgetting it is only a measure of our ability to consume. We feel complacent about our socially sanctioned, developed-world lifestyles, effortlessly rationalising consumerism as “good for the economy”.

Author and explorer, Laurens van der Post, highlighted this flaw in modern culture in his 1958 book *The Lost World of the Kalahari*:

*“Today we overrate the rational values and behave as if thinking were a substitute for living. We have forgotten that thought and the intuition that feeds it only become whole if the deed grows out of it as fruit grows from the pollen on a tree. So everywhere in our civilised world there tends to be a terrible cleavage between thinking and doing.”*

Looking around, I see many of us thinking about sustainability – we may even be involved with it in our professional lives – but, whether as a result of inertia, complacency, the entrenched social systems around us, or a mixture of all of these, we are collectively doing very little personally in our homes and lifestyles. Actions such as replacing incandescent light bulbs with compact fluorescents and installing low-flow shower heads barely scratch the surface and, furthermore, are consumerist solutions based on trading new goods for old. They fail to tackle the very basic issue of our reverence for the natural world and behaviour towards it. When change occurs at this more intrinsic level, it can radically transform for the better both our own wellbeing and our environmental footprint.

Manfred Lenzen, writing about studies on the relationship between environmental knowledge and concern, and concern and action, has this to say about this new frontier for action<sup>19</sup>:

*“While, in general, knowledge often leads to concern, concern does not translate into corresponding action. A survey of the Australian population shows that emissions increase with expenditure and with income. This is also generally true for the world population. It means that while living standards are increasing, so will greenhouse gas emissions. Recent research has shown that emission reductions through technological advances cannot keep up in offsetting increases in wealth.*

*More troubling is the fact that research has indicated that there is little correlation between knowledge and concern and action: emissions attributable to households are strongly linked to consumer spending, which doesn’t seem to be affected by environmental issues, even when these issues and problems are well known by those households.*

*These issues present formidable challenges for the future, and call for a multi-pronged approach, including not only technology, but also top-down policy measures, and behavioural changes in consumers.*

*The question of how to bring about behaviour changes in consumers remains a difficult one. Politicians understandably shy away from restricting the civil liberties of citizens in their consumer choices. The most promising avenue is perhaps to create the social and infrastructural environments that promote environmentally friendly behaviour, and that enable people to make significant lifestyle changes, while at the same time maintaining their status and worth in their social networks.”*

So this new frontier is where I hope to invest future effort – at the grassroots level – networking with individuals who need information and ideas to help them change their lifestyle. It can’t be

---

<sup>19</sup> See “Equity and Climate Change” in the Green Pages 2007 (pp 51-52) – [www.greenpagesaustralia.com.au](http://www.greenpagesaustralia.com.au)

through CSIRO, which remains committed primarily to industrial and scientific research in areas of prime federal government focus. These are well served by programs such as CSIRO's Research Flagships.

When the first call came in 2004 to reduce the funds going into this project, I took a voluntary early retirement and have since then facilitated this Network on 5% salary plus pension. It has been a good place from which to retain some necessary irreverence for 'sacred cows! However, it is now time to complete the transition and move the residual funding back 'upstream' as my own area of interest diverges from industry and big technology, heading for the grassroots, distributed, 'right-scale' technologies, and a different but no less important sustainability transition.

While this will be the last Network newsletter, our website - [www.bml.csiro.au/sustnet.htm](http://www.bml.csiro.au/sustnet.htm) - and newsletter archive - [www.bml.csiro.au/SNnewsletters.htm](http://www.bml.csiro.au/SNnewsletters.htm) - will remain accessible at least until the end of 2007, and I will also retain my CSIRO email address - [Elizabeth.Heij@csiro.au](mailto:Elizabeth.Heij@csiro.au) - to service the materials in the archive during that period. Again during the same period, we will be looking at the possibility that services from one of the newer web-publishing and networking services, inside or outside CSIRO, can pick up some of the functions of the Sustainability Network.

So what would be my recommendation to those of you who would like to continue some form of electronic connection to the sustainability debate? If your primary interest is in science, technology, business and policy, there are numerous options, with the evolving services at *Ecos* [www.publish.csiro.au/ecos](http://www.publish.csiro.au/ecos), and the new electronic newsletter *SustainaBulletin* at [www.sustained.com.au](http://www.sustained.com.au) being good places to start. If your emphasis is on international development and environmentalism, then *Sustainable Development Update (SDU)* at [www.albaeco.com/sdu](http://www.albaeco.com/sdu) may fill the need. If, on the other hand, your interest is more holistic, taking arts, culture, and well-being, into consideration along with technology and enterprise, then perhaps you could subscribe to *Resurgence* and *Gaia's Café Forum* at [www.resurgence.org.uk](http://www.resurgence.org.uk) for a genuinely inclusive international approach.

In closing, I want to apologise to those of you who have sent me contributions for publication but have not yet seen them in the newsletter. As we close the service, I am left with a large amount of interesting and relevant material - so I encourage all these contributors to seek other avenues for getting these important thoughts out for broader discussion.

Finally, I would like to thank all of you who have sent me the fascinating materials and positive feedback that have "charged my batteries" - especially while working in a largely voluntary capacity over the last three years. Those interactions have reinforced for me that I am talking to real colleagues in a globally important endeavour - my profound appreciation to you all.

If you have any comments on how this CSIRO Sustainability Network has operated or how it might have influenced or helped you, I would really like to hear from you.



I would also like to hear from you if you have a comment on what you see as important features to incorporate into a grassroots network for personal lifestyle change.

Sincerely,

*Elizabeth Heij*

Network Facilitator

[Elizabeth.Heij@csiro.au](mailto:Elizabeth.Heij@csiro.au)

**Final Milestone:**  
The Sustainability Network closes  
with over 1,400 members!

## Parting Shot

Spare a thought for how global warming will impact the lives of our children!



## A Few Final Notes

- Our web site at: [www.bml.csiro.au/sustnet.htm](http://www.bml.csiro.au/sustnet.htm) will be maintained as a searchable newsletter archive, at least until the end of 2007. To go directly to the archive, use: [www.bml.csiro.au/SNnewsletters.htm](http://www.bml.csiro.au/SNnewsletters.htm).
- The lists of Courses and Events at [www.bml.csiro.au/sustnet.htm](http://www.bml.csiro.au/sustnet.htm) under "Useful Links & Resources" will be maintained for the next month and then taken down.
- If you have queries about the archive or its materials, contact me at: [Elizabeth.Heij@csiro.au](mailto:Elizabeth.Heij@csiro.au).