

**What Is Sustainability?**  
**Plenary Session 14th July 2003**  
**Students Of Sustainability Conference**  
**Flinders University Adelaide**

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**First published in CSIRO Sustainability Network Update No 31E**  
**September 2003**

## **Introduction**

It seems that my role in this plenary is to be the iconoclast, a kicker of sacred cows. This is a role I enjoy, but most especially when it involves breaking icons that I have helped create.

The title of my new book, *Permaculture: Principles and Pathways Beyond Sustainability*<sup>1</sup> implies a serious problem with the Sustainability concept. I hope that the substance behind the title will stir up the sustainability debate in positive ways. In the workshop on Wednesday I will look more closely at the design principles from the new book which I believe provide a framework for adapting to ecological realities.

## **Third Wave Environmentalism**

A resurgence of environmentalism in recent years has occurred despite the diversionary politics of fear and hatred which dominate the mainstream political discourse. This environmentalism has involved both oppositional and developmental activism. By *oppositional activism* I mean that which aims to stop, ameliorate or mitigate adverse environmental impacts, especially of corporations and governments. The anti (corporate) globalisation movement integrates the experience of oppositional activists on both the environmental and social fronts.

By *developmental activism* I mean the process of constructing the systems which produce positive environmental and social outcomes. These most typically operate at the personal and household level but include community and entrepreneurial processes. In a recent speaking tour to promote the new book<sup>2</sup>, I characterised this side of environmental activism as the “third wave” of environmental solutions.

The “first wave” of environmental solutions of the post W.W.II era developed in the late 1970’s. The permaculture concept and movement were milestones of that “first wave” but permaculture action increased dramatically both nationally and internationally during the “second wave” in the late 80’s & early 90’s. What happens to permaculture during this “third wave” is hard to say, but in calling the ideas in my book *permaculture* I obviously want to build on, rather than break that heritage. Although I am vigilant against the development of permaculture dogma I still believe the concept, and the extraordinary positive influence it has had over the last 25 years, are foundations for further influence and action.

## **Sustainability as virtue**

The word “sustainability” is most broadly used to mean the collection of ideas, processes and elements in society which are currently seen as progressive, enlightened or even simply good. Sustainability has become a virtue by its perceived scarcity. But what is this virtue beyond current socially progressive ideas and fashions, and what is its relationship to Permaculture?

## **Permaculture and Sustainability**

Permaculture is *a design system for sustainable land use and living* that emerged out of a brief working relationship between Bill Mollison and myself in mid 1970's<sup>3</sup> (we used the term permanent rather than sustainable) . It predates most of the sustainability literature which came to the fore as part of the “second wave” environmentalism.

Permaculture was, in part, a response to the evidence of the unsustainability of continuing extraction of non renewable resources and the industrialised exploitation of biological resources. The Club of Rome's seminal report<sup>4</sup> The Limits To Growth, and the first and second oil shocks of 1973 & 1979 were obvious influences. Less well known, to this day is the systems ecology, energy circuit language and energy accounting work of Howard Odum first described in his difficult but pivotal book Environment Power and Society<sup>5</sup> . It was the first reference listed in Permaculture One and his work since has continued to inform my development of the the concept over the decades<sup>6</sup> .

Permaculture, like other sustainability concepts, has focused on the creative and positive actions that are practical and appropriate, without necessarily attempting to understand how it all adds up in the long term. This is a reasonable response to rapid change and uncertainty about the future. However it also reflects the difficulty of discussing the future in terms other a good and evil polarity between growth and development on the one hand and decay and destruction on the other.

### **Energy descent**

In addressing the question; What is sustainability? I want to indicate how an understanding of global energy peak and resultant energy descent defines and reshapes both environmental concepts and strategies. I use the term “*descent*” as the least loaded word which honestly conveys the inevitable radical reduction of material consumption and/or human numbers which will characterise the declining decades and centuries of fossil fuel availability. I believe the “third wave” of environmental solutions will be a response to both the realisation of the limits to consumption from the “first wave” combined with realisation of the limits to pollution (global warming) from the “second wave”. Permaculture is the whole hearted engagement with energy descent as the opportunity for a better world where less is better.

### **Sustainability: A Systems View**

Beginning with "sustain" as the provision of the necessities of life , sustainability could be defined as the ability to continually provide the necessities of life.

A systems perspective is useful to take this definition further.

Self organising systems (such as those found in nature and society) all collect net energy from their surrounding environment.

As well as nourishing their constitute parts, sustainable systems maintain and renew themselves over time without exponential growth, major collapse or massive internal restructuring.

### **Times scales for assessing sustainability**

Time scales for assessing sustainability are proportional to the physical scale or territory of influence of the system in question. Thus the sustainability of a household, business or community might be considered over years or decades while that of a nation state or culture might be considered over centuries or even millennia.

These abstract systemic principles were once understood as common sense. For example large powerful institutions such as the Catholic Church are long lived while small and local ones come and go more quickly. Corporations have never been long lived, averaging less than a human life time but as they have become more global and powerful, average life expectancy has shrunk to a few decades. This suggests that global capitalism is set for radical change rather than a long lived golden age.

### **Maintenance of larger scale support systems**

As well as nurturing its constituent parts and self regulating growth, a sustainable system also contributes to the maintenance of larger scale environmental support systems.

For households and businesses, there must be contribution to the larger systems of community, government and economy.

In nature, local ecosystems contribute to maintenance of climate and landscapes.

In indigenous societies, use of resources helped maintain the whole of nature.

Large scale human systems of empire have declined throughout history when they fail to make that contribution or tithe to back to nature. Thus the idea of ecological sustainability is based on this expectation that modern human systems must contribute rather than simply take from nature.

### **Are biological support systems really necessary?**

Despite the evidence, and propaganda, over several decades from scientists and environmentalists about the importance of biological support systems, the view persists that nature is an optional appendage to modern industrial societies rather than the foundation. We must ask why this view persists. One of the reasons, is that there is not much evidence that the state of biological systems have determined the course of human affairs in recent times especially in the richer nations.

For example without wanting to underestimate the problems, the parlous state of the Murray River has hardly brought the city of Adelaide to its knees. There is much greater concern about its “viability” as a modern city due to decline of manufacturing and the ageing of its population.

Two important factors have contributed to ameliorating the impact of environmental degradation.

1. Bypassing local negative feedback controls
2. The fossil and non-renewable resource base



## **1. Bypassing local negative feedback controls**

In small, relatively autonomous economies and societies dependant on surrounding nature, failure in local ecosystem function leads to unavoidable economic, social and even cultural impacts if not societal collapse.

Over the last 6,000 years, warfare, slavery and the resultant power of city states and empires has allowed the capture of foreign resources, mostly as capital assets to be mined.

These densely settled pre industrial societies also staved off the impacts of local ecological failure by migration of surplus population and to some extent, export of pollution. For example the great rivers on which most ancient cities were located not only delivered fertility but took away and purified pollution.

In modern, migratory, large scale and globally connected human systems, local degradation of nature may not lead to collapse or even dramatic impacts. Without this negative feedback at the economic, social and personal level , ecological impacts tend to accumulate up the geographic hierarchy to a global scale where they are remote from any direct cause. For example acid rain, global warming and biodiversity loss are all processes which have large scale impacts often remote from the place and time of the cause.

Thus, our global industrial systems are still underpinned by global ecological processes but the connection between the ecological sustainability of households, communities, businesses or nations and the condition of global nature is abstract, complex and remote.

## **2. The fossil and mineral resource base**

But renewable biological resources have not been the primary driving force behind modern societies at least since the 1930's Depression. Mineral resources, most notably oil and increasingly gas are the biggest forms of net energy sustaining humanity. The degree of this dependance is consistently underestimated by economists, decision makers and even scientists and environmentalists. The greatest mistake is to consider these resources as simply commodities rather than looking at their contribution of net energy to supporting all other human systems and processes.

In pre-industrial settled societies, agriculture was the primary process of obtaining net energy from the environment. At the end of the industrial era it has become a major net energy consumer, highlighting the degree to which we live from the oil well.

During a visit to Israel in the mid 1990's, after seeing the feeding of broad acre irrigated crops to shed raised dairy cows I remarked that the Israeli glass of milk must be 80% oil. As comparison I suggested Australian milk from cows grazing rain fed (albeit fertilised pastures) might be 20% oil, and European milk from shed raised cows, fed broad acre, but rain fed crops might be 50% oil.



This use of technology and innovation based on resource depletion to expand (at least temporarily) agricultural productivity reinforces the idea that agriculture is an appendage, rather than the foundation of the economy.

Although these facts have been understood for thirty years, the situation has got far worse over that time.

More shocking is the realisation that most environmental policies, strategies and action for protecting and maintaining local biological systems, both the in countryside and in the city are generally at a cost of depletion of non renewable resources elsewhere.

This use of technology and innovation to reduce local environmental degradation pushes the problems elsewhere and reinforces the idea that nature is an appendage of society. This rebound effect has been noted by systems theorists and permaculture practitioners.

For example the financial savings from living in an energy efficient and passive solar house might be spent on a more resource expensive and greenhouse gas generating overseas holiday.

### **Global Energy Peak and Change Cultures**

These and other factors reduce the usefulness of sustainability concepts in explaining real world processes. Without a serious attempt to understand the energy basis of nature and society and the key issue of global energy peak, sustainability concepts and the action which they inform maybe counterproductive.

Although the oil crisis of the 1970's triggered the first wave of modern environmental solutions including Permaculture, the response and adjustments by global elites have had the effect of inoculating affluent society against the Limits to Growth argument. That is, a small dose made us resistant to the influence of more powerful doses.

In a similar way I have long argued<sup>7</sup> that the over promotion of permaculture in the early 1980's "inoculated" people against a more serious consideration of permaculture because of the perceived failure of the concept to have effected powerful changes in landuse and society.

With global oil peak now unfolding all around us, the failure to recognise and understand its signs and symptoms pervades not only the anti-environmental reactionaries but much of the vanguard of sustainability. I think a workshop to enable environmental activists to get up to speed on the evidence of global energy peak and to discuss and debate the implications, would be a useful element in this conference.

### **Sustainability of Change Cultures**

One of the consequences of the understanding the larger scale dynamics of energy peak is that within a single human lifetime, we are witnessing simultaneous transformative change in systems at many scales. In these conditions, steady state models of sustainability are of limited use, other than to acknowledge that the bulk of

human history is well described by such models. Unless the pathway back to a low energy future is particularly catastrophic and abrupt, the future will deliver continuous change and novelty for hundreds of years.

Both our cultural inheritance, and any legacy we might leave for future generations, can be thought of as continuous change cultures. How can we resolve the apparent contradictions inherent in stable, permanent and sustainable cultures and those involving continuous change? Many sustainability thinkers have recognised the need to encompass continuous change but few acknowledge the key issue of directionality of change at the largest scales. While both our cultural inheritance and our legacy could be characterised as change cultures, the difference is in the directionality of the supporting energy base (energy descent vs energy ascent) as graphically illustrated by this energy peak diagram .

Although only conceptual, the rough time scales show the continuity of the energy ascent culture for hundreds if not thousands of years. Similarly it suggests continuity of the descent culture over many generations.

Most sustainability concepts and advocates , by implication are based on a plateau model for transition beyond fossil fuel peak. The ecological and historical models for establishment of this steady state energy base are very dubious but are little discussed as most of the arguments focus on the potential of, this or that technology, in isolation from the systems “top down” perspective.

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from Permaculture: Principles and Pathways Beyond Sustainability 2003

### **Permaculture as design for energy descent**

Permaculture could be seen (somewhat cynically) as just my (and many other people's) version of the those enlightened ideas and action, that others gather under the sustainability rubric) While there is some truth in this view, I would characterise those enlightened ideas and actions as all informed by ethical principles and reflecting a set of system design principles, which will be of enduring value over the long run of energy descent. This does not mean that the ideas and actions (or strategies and techniques) which are useful in the one context or time will necessarily have enduring value, but that the underlying principles will.

Further, Permaculture is the wholehearted and positive acceptance of energy descent, as not only inevitable but a desirable reality. Energy descent delivered by a continuous global recession has the potential to bring to fruition many environmental solutions and processes which have languished during the delusional decades since the evidence about global resource depletion was available. These positive aspects will exist side by side with negative expressions of energy descent such as techno-fascism which is emerging through larger scale economic and political processes.

Permaculture can be thought of as a hopeful orienteering map for the pathways down from the energy mountain. Reflecting the multiple function concept of permaculture, this map is designed to generate new pathways as we move down and even to work as an emergency parachute for rapid energy descent.

### **The positive view of our culture inheritance**

The European enlightenment, industrialisation and modernity are all aspects of the culture of energy ascent which have persisted over the several hundred years of net energy growth. Despite the novel technological, economic and social conditions over that time, the underlying concepts and design principles of our culture have changed little. That a consistent set of design principles can generate such diverse phenomena, is normal to the systems thinker, even if it is counter intuitive to most people. If we can see the unity, strength and continuity of our shared culture, despite the novel outcomes in each generation, then we have part of the answer to a new model of cultural sustainability.

In the same way that we might consider the culture of growth to have been sustainable for hundreds of years, any designed and evolved culture adapted to energy descent might similarly be "sustainable" if its underlying values and design principles were to remain intact over a similar period of human history.

To cope with the energy descent future we will have to discard most of the cultural baggage of our continuous energy ascent, but the greatest asset we can take with us is our intimate familiarity with continuous change and our capacity for creative response.

This positive message gives hope that we can map out the pathways, follow where they lead, backtrack when needed and continuously reshape our activity and culture as we descend the energy mountain over not one or two, but a dozen or more generations.

Thus the apparent contradiction between stability and change at the core of sustainability concepts, including permaculture, can be understood and used a tool in designing and creating a positive future.

David Holmgren July 2003