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In This Issue:

Redesigning Our Agroecosystems for Sustainability and Wellbeing.

Professor Stuart B. Hill, University of Western Sydney

Those who practice ecological approaches to agriculture have done amazingly well, particularly given the lack of support (research, legislation, marketing, promotion etc.), misinformation in the media and the ridicule to which many producers have been subjected.

Yet, at the same time, it is important to realise that we have still hardly scratched the surface of what is possible, particularly in relation to the application of ecological knowledge and ancient wisdoms to our food systems. We also need to acknowledge that we are divided and weakened by our attachments to sub-categories of 'alternative' agriculture, and that most of us have difficulty acknowledging the flaws associated with our particular models and approaches.

Because of this we are prevented from making some of the progress that would otherwise be possible. Most of us are more interested in production than marketing, which often gets neglected to our detriment. Many of us tend to blame others for the difficulties we face, and some of us have become prickly characters (I'm sure you know some – you may even be one)!

The good news is that progress is well within our reach, but we do need to be willing to work on this in an integrated way at personal, social and ecological levels. This means 'composting our psychological shit' and reclaiming our power and awareness, revising our visions and goals, and reflecting on our values and world-views. It also means collaborating across differences to find commonalties (finding our 'WEs' with others), and learning from nature and indigenous

knowledge, and from those who know about them. Perhaps most importantly, it requires us to become better at working with the unknown.

Modernism, science and an overemphasis on knowing have led us to forget that most of reality remains unknown and hidden (for some it may help to picture this as over 95%; for others it is more easily conceived as an ever unfolding mystery). What is important to acknowledge is that these mysterious processes are as essential to our lives and the wellbeing of the planet as are those that are known. The widespread failure to acknowledge this goes a long way to explaining why so many are surprised by such crises as 'Mad Cow Disease' and 'Swine Flu'. It is also why so many overconfident statements are made by many scientists about the benefits and safety of genetic engineering (we still have hardly any data on its long-term bio-ecological side-effects), and also about the use of pesticides.

It is clearly naive to try to base our actions only on the small amount of knowledge that we know we know, and yet this is exactly what our culture encourages us to do. Biodynamics (http://www.biodynamics.net.au/ has made some attempt to address this situation; although most modern practitioners have failed to recognize the nature of the gift that Rudolf Steiner gave us and they have turned his lessons on working with the unknown into dogmas.

I call the imperatives that I am talking about above 'taking a social ecology approach'.
My focus remains 'the big picture', the interrelationships between the separate issues we face, and the need for more embracing holistic approaches. This is in contrast to the more common, reductionist, fragmented approaches favored by conventional science and most of society.
Take energy, food quality and rural decline, for example. They are invariably dealt with as separate issues, but in reality they are all interrelated; to such an extent that if we take a holistic approach to one of these in a particular context, it is likely that we will also be helping to solve all of the others. On the other hand, if we try to solve any one in isolation, it is likely that over the longer-term we will impact adversely on all the others.

Working with the processes of change

Many years ago I developed a strategy for working with change that I called the 'ESR' (efficiency, substitution, redesign) model. The 'efficiency' approach involves finding ways to make a conventional solution to a problem more efficient. With spraying pesticides, for example, this might involve improving nozzles and formulations, using Integrated Pest Management (which tragically is usually just Integrated Biocide[1] Management) to reduce the amount of chemical used, and so on. There is room for huge improvements in efficiency, as Amory Lovins (see his books: 'Factor Four' and 'Natural Capitalism') has become famous for pointing out. Pesticide use is incredibly inefficient. Usually less than one per cent of biocides applied to crops actually reach the target. The remainder is wasted and creates havoc – usually over a longer time frame than any benefits that are experienced; and throughout the rest of the ecosystem.

Whereas efficiency focuses on improving the current inputs and methods, 'substitution' involves replacing the current inputs to the system with less impacting or disruptive ones, such as biological controls. However, our problems can only really be solved when we start to 'redesign' the systems involved (or design them from scratch) so that they don't give rise to the problems being addressed by our use of curative inputs.

Redesign/design is an example of a ‘deep’ approach, compared with the more ‘shallow’ strategies of efficiency and substitution. Design approaches address the underlying causes of problems by changing the structure and functioning of the systems involved so that the problems – symptoms of maldesigned and mismanaged systems – do not arise. In fact, the aim of this approach is to make systems ‘problem-proof’.

Efficiency and substitution approaches can be either stepping-stones or stages in a progressive spiral towards redesign, or they can be barriers. Substitution, because it makes the system appear workable, at least in the short-term, often acts as a barrier. This is helped by the fact that it is compatible with our market economy, which is based on the repeated purchase of products whose benefits are not long lasting.

Most modern organic farming is still dependent on substitution strategies, with synthetic chemicals being replaced by 'natural' fertilizers and sprays, and by biological controls. Organic producers commonly purchase things like humates, seaweed sprays, botanical pesticides, microorganism inoculants and biological controls, all of which provide benefits that could be created on-site if the systems were designed and managed to provide them.

For example, optimal decomposition of organic matter in soil results in the production of growth promoting hormones, such as cytokinins, and the release of trace minerals, which are two of the main benefits that seaweed products provide. Decomposition also results in the formation of humate-like materials, and the decomposers provide food for a diverse range of predators, which are, in turn, capable of ‘controlling’ many of the pests.

The problem with imports is that their benefits are always temporary. At least some of the resources that they are made from are exhaustible and will eventually run out, so systems dependant on them can never be sustainable. Taking such approaches also encourage us to postpone dealing with the underlying causes of our problems. Many parallels can be recognized in the health field and in society in general.

What I am describing here is a progression from taking a ‘deceptively simple’ approach, in which we think pesticides and fertilizers or their substitutes are the solution; then progressing to a ‘confusing, and sometimes paralysingly, complex’ approach, in which we try to understand, control and micro-manage everything. It often takes considerable persistence to pass through this frustrating stage in order to achieve the more sustainable and rewarding ‘profoundly simple’ stage, which usually involves understanding paradox, and tuning in to the wisdoms of the ages and nature, including our own often untapped natural intelligence and intuition.
Sadly there is very little support in our society for genuine redesign (or, indeed, for wisdom-based decision making). This is particularly because of the powerful influences of the pharmaceutical and petrochemical industries on governments. They know that with appropriate redesign/design, most of their products would no longer be needed.

The beginnings of redesign strategies are evident, however, in some aspects of Permaculture [http://permacultureprinciples.com/; http://permaculture.org.au/] (particularly their incorporation of P.A. Yeomans’ pioneering ‘Keyline’ approach to landscape design and management: http://www.keyline.com.au/), Fukuoka’s Natural Farming (http://fukuokafarmingol.info/), Peter

Andrews' Natural Sequence farming (http://www.nsfarming.com), Christine Jones' Evergreen Farming (www.amazingcarbon.com), Deep Organics and Holistic Resource Management (http://www.holisticmanagement.org/), but they have a long way to go to reach their full potential. We could learn so much from nature if we would just pay better attention to it - instead of so often trying to control it with interventions based on the blunt instruments of just physics and chemistry.

For example, we know that soluble nitrogen fertilizers inhibit the nitrogen-fixing organisms in soil. So an ecological soil management strategy designed to minimize this might be to manage land in alternating strips that are high and low in nitrogen (and probably also some other elements), with the crops being grown between them so that their roots have access to diverse rather than homogenous conditions. Some recent work in this country has shown, for example, that irrigating on one side of a tree, rather than all around it, results in a dramatic increase in the efficiency of water uptake. Being more creative in working with complexity, chaos, diversity and the unknown can certainly be expected to lead to a diverse range of improvements. Most modern farming systems, and indeed most modern lives, are far too homogenized, simplified and uninspiring.

If we are to develop sustainable systems we will need to get together with one another and with the larger community, including industry and government, to initiate programs for fundamental redesign. This is paradoxically being made easier by both the benefits and challenges of globalization. Only through such collaborative and participatory processes can we hope to significantly reduce our wasteful levels of consumption and achieve genuine sustainability.
The type and level of change needed to develop sustainable systems of food production will occur only when growers start to be paid fairly for their 'systems maintenance' work – by governments and/or consumers. In natural systems most of the available resources are used for system maintenance, which is what genuine sustainability is all about. Because in our society we only reward productivity, and not maintenance, it is not surprising that producers tend to neglect and over-tax their production systems. If we were to reward producers for the maintenance of the environments they design and manage they would be able to build up the natural capital in the system, and so establish the basis for sustained productivity.

This is what Paul Hawken and Amory and Hunter Lovins are arguing for in their book 'Natural Capitalism', although their chapter on the food system also only scratches the surface of what is possible. Paying producers to maintain the environment and the natural systems upon which they rely – through higher food prices and appropriate government subsidies – would be a national investment in natural capital, an investment in which the benefits over time would far exceed the costs; and the benefits would be experienced locally and globally, and in both the short and longer term. Paying for 'maintenance' – of the health of oneself and the environment – is what consumers consider they are doing when they pay more for organic produce. All of agriculture could benefit from such concerns.

The key to sustainable change is to start small with achievable goals. Too often people embark on huge, undoable, Olympian tasks, go off half-cocked, and then hit a barrier, get discouraged and burn out and give up. When I'm working with producers, I encourage them to work with the 'smallest meaningful initiative they can guarantee to carry through to completion', even if it is

only phoning someone to talk through an issue. Such achievable first steps become the firm basis for next steps, and because they are doable they help avoid the common problems of postponement and failure. In parallel with this, I encourage them to publicly celebrate completing their small initiatives and achievements in order to make them contagious. As I said at the beginning, the possibilities are endless. Go for it and celebrate as you go! Redesigning the future for sustainability and wellbeing is in our hands.

[1] Biocide is used rather than 'pesticide' because it is the economic (that it competes with humans for a desired resource) or nuisance properties of an organism (not its biological properties, which are shared with many beneficial organisms) that defines it as a pest; and so-called pesticides cannot be specific to organisms with such properties, only to organisms with particular biological properties.

Professor Stuart Hill

Prior to 1996 Stuart was a Professor in the Agriculture Faculty at McGill University (Macdonald Campus) in Montreal, where in 1974 he established Ecological Agriculture Projects, Canada's leading resource centre for sustainable agriculture (www.eap.mcgill.ca).

In 1996 he was appointed Foundation Chair of Social Ecology at the University of Western Sydney in Australia.

His background includes chemical engineering, ecology, soil biology, entomology, agriculture, psychotherapy, education, policy development and international development. Stuart has worked in agricultural and development projects in the West Indies, French West Africa, Indonesia, the Philippines, China, and the Seychelles, as well as in the UK, Canada, New Zealand, and Australia.

Making Connections:
Social and Scientific Perspectives on Agriculture and Rural Life in Atlantic Canada
Cape Breton University Press, 2009. Elizabeth Beaton (ed.)
ISBN987-1-897009-39-0; 185 pages; cost: 19.95
Also available free on-line at www.cbu.ca/press

The original outlines of the chapers were presented at Mabou in 2006 at a conference, "Sharing Knowledge on Agriculture and Rural Life in Atlantic Canada". But it is not simply a set of conference proceedings. The re-worked papers include new research; they benefit from the conference particpants' response, and they reflect recommendations from referees and the editor.

"This publication demonstrates the connections between science and society, and between scholarship and community." Emphasis on the human role in agriculture and rural communities helps to elucidate interactions between researchers (both scientific and social), practitioners, activists and the public sector.

Authors include well-known academic researchers, government researchers, students' posters, and agricultural/community activitsts, all from Atlantic

Canada. This book makes clear the importance and positive potential of agriculture and rural life in Atlantic Canada.

Thyme: A new use for an ancient plant
by Anne Coté; http://www.fcc-fac.ca/newsletters/en/express/articles/20091113_e.asp#story_9

A familiar household herb is poised to become a money-making crop for Canadian agriculture producers.

Quebec-based Laboratoire M2 Inc. has developed a commercial disinfectant made from thyme. They claim the product to be biodegradable, non-toxic and non-corrosive with antibacterial, antiviral and anti-fungal properties.

Farmers near the proposed Laboratoire M2 processing facility will be the first to benefit from the opportunity to grow the herb on a commercial scale. Thyme is usually grown in small amounts for specific buyers. Laboratoire M2 expects that in five years they'll be buying $3.6 million of thyme for their processing facility.

According to one food development specialist in Manitoba, in order to maximize the amount of oil that can be extracted from the thyme leaves, processing must be done as soon as possible after harvesting. Shipping freshly harvested thyme from province to province would require climate-controlled trucks. That means even though soil conditions and climate may support a healthy thyme crop in agricultural areas outside of Quebec, long distance hauling isn't economically viable.

There are other obstacles to developing thyme as an agricultural crop. Not all varieties of thyme are optimum for thyme oil production. Labatoire M2 will collaborate with producers and AAFC in its quest to find the variety that has the characteristics best suited to the growing environment and the efficient production of the commercial cleaning product.

Prior to Laboratoire M2 marketing to national and international agricultural and food processing industries, it must first secure a patent for the product's use in agricultural and food industries, meet regulatory requirements for the various markets, and purchase equipment for the processing facility. The company has received $837,494 from the Agriculture and Agri-Foods Canada Agri-Opportunities program and Economic Development Canada to help commercialize the product.