

Making Us “Future-Proof” — The Evolving Role of Horticulture[©]

Elizabeth G. Heij

Facilitator — CSIRO Sustainability Network, 14 Hakea Walk, Aldinga Arts-EcoVillage, Aldinga SA 5173

While this is not a scientific paper, it does examine the role of our science in the context of a profound socioeconomic change now gathering momentum around us. Although the process will be slow, this change will ultimately affect both the nature of our science and the way it is applied.

Let's reflect for a moment on the energy budget associated with our sector of “industrial metabolism” — the chain that begins in our research laboratories and ends with the application of our science in horticulture, agriculture, forestry, and conservation. Think, for example, of the lights, heating, and equipment used in laboratories, glasshouses, and propagation nurseries. Think of industrial chemicals, sterilizers, and fertilizers — of tractors, trucks, and other transport. There is little we do today that is not completely dependent on the burning or conversion of fossil fuels.

But fossil fuels are a finite resource — and, not only that, there is now almost universal scientific acceptance that their profligate use is bringing about rapid and potentially dangerous changes in the global climate. In addition, it is now widely believed, by oil scientists and geologists themselves, that we are at, or very near, the top of an oil production peak, with around half the world's extractable supply of oil already consumed and extraction costs rising as smaller and less accessible finds are tapped. With demand continuing to rise, especially in large developing nations such as China, these same scientists are forecasting an imminent “big rollover” in oil supply — from a buyers' market to a permanent sellers' market. In fact it may already be starting to happen. With around half the oil still in the ground, this is not the end of oil. It is, however, the end of cheap oil — and the geopolitics of the remaining oil-rich areas (such as the Middle East) can only add to the uncertainty of supply. Fuel switching from oil to natural gas and coal (supposing it can be made sufficiently clean for a “greenhouse” world) can delay only briefly the major adjustments society will be compelled to make in adapting progressively to a post-oil world.

So, beyond today's abundant availability of fossil fuels is an uncertain energy future that has been imagined in various scenarios (Holmgren, 2005; Fig. 1) that range from “techno-fantasy” (e.g., unlimited nuclear cold fusion) to a socioeconomic collapse in which our culture “goes under.” These two extreme scenarios both have frightening long-term implications for the planet and society. Most of the sustainability debate, however, is focused within the “green-tech stability” scenario in which we essentially maintain a steady (albeit somewhat reduced) level of energy usage by progressively moving to renewable sources such as wind, solar, tidal power, etc., as fossil fuel reserves are used up. This is a comforting and generally accepted scenario that confronts us with minimal change to our Western-developed-world lifestyles and industries. We want to believe it — but is it the most likely future?

There is a fourth scenario — envisioned by members of various “green” movements, Permaculture, and others who understand that human society functions within (not outside) the planetary ecosystem and is therefore subject to (not master of) the laws of ecology. In this scenario there is a “creative descent” down the energy

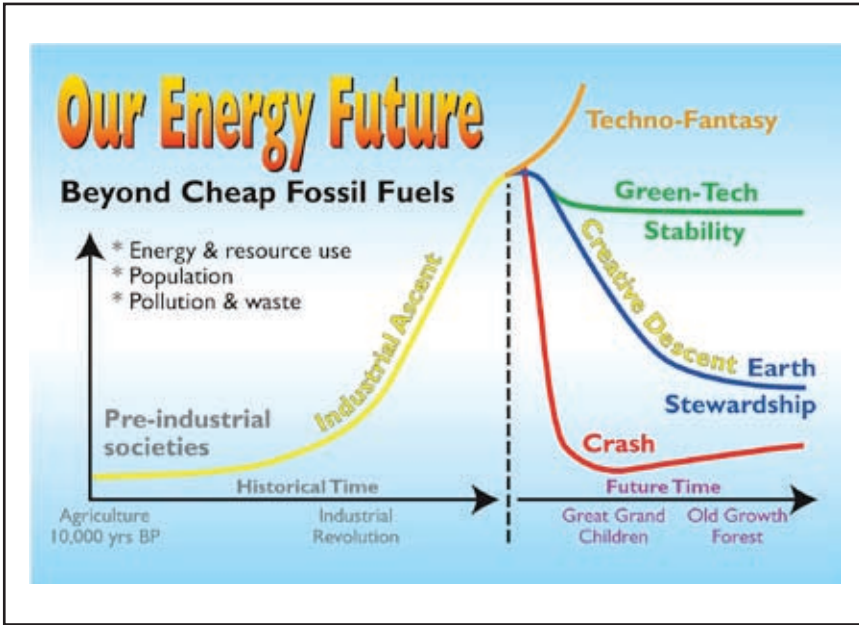


Figure 1. Future energy scenarios [after Holmgren (2005)].

demand curve — in effect a mirror image of the ascent triggered by the Industrial Revolution with its massive surge in technological innovation based on coal and oil. At the end of the descent is an “Earth Stewardship” scenario in which human populations are back in balance with the surrounding ecosystem; the use of energy and resources is matched to the natural capacity of the land people occupy; and societies are using their extensive ecological and technological knowledge to restore and maintain biodiversity for the well being of the entire ecosystem on which their own well being depends. The scenario is not one of returning to some “primitive” state, but of progressing towards a more knowledgeable, enlightened, and ecologically sound way of providing human “quality of life.” The ecologically sustainable plateau may seem a frighteningly long way down from the present day, but it is also a long way ahead in time. If the journey were to begin now, there would be ample time for human ingenuity to get us there without bringing on a socioeconomic “crash.”

Elements of all these scenarios can be found in the wide-ranging viewpoints and arguments of today’s “sustainability” debates. So which is the most likely? I personally hope the future lies somewhere in the region bounded by “green-tech stability” and “Earth stewardship.” Certainly, in the shorter term, the relevant strategies demanded by the two scenarios are closely aligned. In either scenario, as oil escalates in price and becomes less abundant we will not only need to switch to alternative energy sources, but also reduce energy demand.

Furthermore, as our awareness grows of the critical importance of biodiversity to the health of the planet and, in the end, the survival of human society, we will need to uphold biodiversity conservation as both a purpose and an ethic. The “Earth

Stewardship” scenario specifically emphasizes this purpose. Without encapsulating this same strategy, however, “green-tech” will never achieve “stability.”

So what has this to do with the future of plant propagation and the industries it serves?

The end of cheap oil means the end of cheap broad-scale mechanical cultivation, the end of cheap fossil-fuel-based fertilizers, and the end of cheap long-distance transport. In such a scenario, it is of genuine concern that we have (1) covered large areas of our most fertile, well watered land with giant, sprawling cities, (2) filled these cities with pretty but unproductive parks, gardens, and streetscapes of mostly exotic plants on which we lavish water and fertilizers, (3) have come to rely on growing food at remote locations and transporting it over long distances to where it is consumed, and (4) devoted large areas of our land to growing surplus crops and products that need long-distant transport to distant countries. In an energy-descent world, horticulture and productive gardening, together with some wood production, will need to become more local — shifting back into our cities where they have traditionally been in more sustainable societies.

As pointed out by David Holmgren, co-founder of the Permaculture movement, food security through retention of horticultural production within and close to cities has barely been on the contemporary planning agenda, while home gardening has essentially been ignored as irrelevant in the sustainability debate. For many urban residents, where food comes from beyond the supermarket is barely “on the radar.” Seemingly, we are happy to follow the European model of a high-density city that gets its food from somewhere else — unaware of different patterns of urban living such as those of Japan, China, and other Asian countries where cities have traditionally contained interspersed gardens and rice paddies. If food is produced in distant places, its supply is more vulnerable to risks that we cannot control (such as increased transport costs, natural disasters, and political crises). For urban residents aware of the fragility of the food supply system, home gardening is a practical activity that can not only provide much of a family’s fresh food but also improve the diet. Trends in the gardening media (e.g., television and magazines) suggest we are already starting to see a gradual shift in the balance of interest back towards home food production from purely aesthetic gardening.

Another relevant trend is the emergence and rise, here in Australia, of community supported agriculture (CSA) schemes, in which customers undertake to buy a regular box of in-season produce (fruits, vegetables, eggs, etc.) from one or more local small producers, thus providing the latter with a secure income and the ability to diversify the types of products they produce. While we may be more familiar with CSAs as relating to “small-farmer” businesses, such schemes can be set up to allow even domestic home gardeners to sell their seasonal surpluses into a neighbourhood market.

Although less familiar, the concept of urban fuel wood production is also relevant, particularly since our cities are, in effect, extensive “forests.” New tree plantings and conservation areas within or near cities need regular maintenance to reduce fire hazard, enhance ecological value, or improve the quality of fruit or timber. With careful management, there is much valuable wood that could be saved for fuel rather than being sent to land fill or fed into fossil-fuel-driven chippers and mulchers. Wood is a high-energy fuel, is greenhouse-gas neutral, and can readily be made available for higher-density neighbourhoods as smokeless charcoal.

And beyond the question of fossil fuel availability, it is also of concern that we continue to decimate the natural plant and animal biodiversity of the land we occupy — to clear fell the natural vegetation of the land on which we grow our crops, build our homes, and make our gardens; that we ignore the potential food plants of Australia’s native flora — the “bush tucker” that has supported indigenous Australians for thousands of years; that even in our own backyards we continue to replace precious remnants of the natural ecosystem with ill-adapted, water-hogging, alien systems harbouring potential weeds and pests. We have yet to learn the art of living WITHIN the dry and fragile Australian environment — caring for and using the biodiversity around us, and modifying only the minimum required to provide us with basic food, fibre, and shelter.

So, in summary, an energy-descent world will, over time, see us using the fertile, well-watered land on which most of us live to produce more of our own food and fuel. Likewise, a more “biodiversity-aware” world will see us better conserving natural Australian ecosystems at a range of scales from National parks down to our own suburban backyards. These changes in our thinking will, over time, change both the nature of the species and range of plants we propagate, and the nature of the enterprises that plant propagation serves. Some trends and opportunities that could be anticipated include:

- Evolution of our sprawling cities into mosaics in which a number of small, dense “metro” areas are surrounded by extensive village-like suburbs with thriving local food production and conservation activities at a range of scales and levels of community involvement;
- Use of a much greater variety of crops — and a far broader range of varieties of each crop — to fill the annual seasonal calendar of fruits and vegetables for home gardeners and CSAs across a wide diversity of local climatic and geographic regions;
- A shift in the balance of crop species from those targeted at export towards those targeted at local supply;
- Propagation of species (indigenous, exotic, and modified) for incorporation into new Australian-adapted farming systems designed to combat dryland salinity and cope with extreme rainfall variability;
- Propagation of indigenous and exotic xerophytes as food crops (desert “bush-tucker” species, cacti, etc.);
- A shift in plant breeding emphasis back towards flavour, food quality, and long production season, and away from the recent objectives of mass-scale commercial production — i.e., durability, transportability, long shelf life, and once-over harvesting;
- A rise in local sale of produce via “farmers’ markets” and CSAs;
- Convergence of “heritage seeds,” seed-saver organizations, and volunteer native-plant propagation with mainstream seed and nursery supply;
- Conversion of public open spaces such as parks into conservation areas or community fruit-and-vegetable gardens, opening up a range of possibilities for cooperative community engagement;
- Enterprises supplying home food producers and CSAs with a broad range of seedling vegetable transplants appropriate to the local seasonal calendar;

- Enterprises assisting homeowners to retrofit glasshouses to the exterior walls of their homes to capture winter warmth and extend the garden growing season;
- Enterprises based on “share-farming” the gardens of urban properties where residents are unable to do the gardening themselves — or providing training to those homeowners who want to learn the relevant skills;
- Enterprises supplying transplants of local provenances of native plants for productive use (food, fuel), specific habitats, or conservation purposes — and associated advisory and education services;
- Hands-on garden services based around food production or conservation gardening rather than lawn mowing etc; and
- Convergence of tree lopping and removal services with fuel wood and charcoal production.

While the future is of course unknown, the socioeconomic environment likely to emerge from a combination of some or all of these and other emergent trends will change the nature of plant propagation services — gradually moderating the current heavy emphasis on (1) exotic species for purely aesthetic uses, and (2) the mass, mechanized, monoculture of food crops.

Are these trends a threat to plant propagation industries? It depends to a large extent on how the world negotiates “peak oil” — and also on how rapidly we, in Australia, can become more aware of the ecosystems around us and learn to live like true Australians. Certainly, we can be confident that the changes will provide many opportunities for new and evolved plant propagation enterprises backed by sound plant science.

LITERATURE CITED

Holmgren, D. 2005. Retrofitting the suburbs for sustainability. CSIRO Sustainability Network Update 49:1-9 <www.bml.csiro.au/SNnewsletters.htm>.