Certified Organic Forests & Timber: the Hippocratic Opportunity

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Abstract

Organic farming was proposed in 1940 by Lord Northbourne as a response to chemical agriculture. Since then, organic agriculture has developed into an international A$50 billion industry with annual growth reported up to 30%. Currently it is one of the fastest growing food sectors with demand exceeding supply in many markets, and price premiums averaging 80% in Australia. With economic, and now environmental, incentives for planting trees, there is the opportunity, and even imperative, for a new silviculture category that embraces the precepts of organic agriculture. There are environmental, economic and ethical issues with carbon offset programmes that seek to reduce, or erase, the carbon footprint of an activity, while collaterally increasing the pesticide footprint; this may be a Faustian bargain. Certified Organic Forestry standards have made a tentative start with a modest uptake. Organic forestry offers a clean green, rather than a dirty green, option for carbon offsets, and can appeal to those inclined to a precautionary principle rather than a postcautionary principle approach. As consumers who are already familiar with the premises and promises of organic food and agriculture are attracted to carbon offsetting, this customer group has the potential to drive demand for Certified Organic Forestry. Moving beyond the current chemical forestry and silviculture standards to an organic silviculture presents a matrix of new opportunities, implications, impediments and even stakeholders.

Introduction

National and international forestry standards fall a long way short of organic expectations. The development of carbon offset retailing has the potential to lead to consumer demand for the emergence of Certified Organic Forestry standards and implementation.

Context/ Uncertainty

Three recent environmental news stories raise more questions than they answer. We read that “Right now is not a good time to be a fish, especially if you happen to inhabit English rivers … And mysteriously, it seems that more and more of the fish that are swimming in those rivers are female” (Cresswell, 2007). We read of bee Colony Collapse Disorder (CCD): “American farmers face a make-or-break summer as the US honeybee population struggles to recover from a mysterious killer that threatens to destroy crops and deplete the nation’s dinner plates” (Goddard, 2007). And in Tasmania of “devil facial tumour disease” (DFTD) we read: “Scientists say the window of opportunity to save them is rapidly closing and they could follow the Tasmanian tiger into extinction in 10 to 15 years at the current rate of decline” (Cordingley, 2007).

In each case, pesticides are potential candidates for the causes of these environmental catastrophes. Studies of fish in the UK link intersex and feminized fish and chemical contamination in rivers (Jobling et al., 2002; Brightly 2002; Beresford et al., 2004). Cadbury (1997) has previously identified pesticides as suspects for what she dubs “the feminization of nature”.

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Minowa & Cummins (2007) have recorded that: "Some [US] states have reported up to 70% disappearance of commercial bee populations. Researchers are struggling to find the causes of this mysterious collapse … organic beekeepers across North America are not experiencing colony collapses".

Tasmanian devils are part of that island's eco-waste disposal system, they are scavengers, they eat dead and sick animals. As hunters, devils lack speed and agility, they compensate by their stalking persistence, and vice-like jaws. They consume the whole carcass, including the bones and teeth. Hall (2001) reports that "as with most forestry operations, 1080 poison would be used to kill all native animals in the area that could browse seedlings in the plantation's first year". Statham (2001) reports that "as 1080 generally takes several hours to kill animals that have eaten baits, animals may die in thick scrub up to 1 km from bait lines and impose unanticipated risks to off-site scavenging animals". While the 1080 poison (sodium fluoroacetate) is not a known tumorigen, the 1080 used in Tasmania is only specified to be 90% pure (Wigley, 2004), which is consistent with Worthing (1991), and sodium fluoride "is a usual contaminant" of sodium fluoroacetate (Worthing, 1991). That contaminant is a tumorigen, and has been used as a tumorigen to experimentally induce and promote tumors (Tsutsui, Suzuki & Ohmori,1984; Armato et al., 1992; Prasad & Edwards-Prasad, 1990). Anderson & Rice (1991) have reported an inheritance pattern for tumors in offspring from tumorigen-exposed parents which they report as "100-fold greater than expected" than if mutation was the cause.

I have drawn some dots - joining those dots takes research time that we and the Tasmanian devils, and perhaps the fish and the bees, do not necessarily have. As we saw with asbestos and cigarette smoking, proving the links "beyond a reasonable doubt" is a lengthy and costly process, which may play out over generations, with vested interests opposed, and both chemical manufacturers and governments relying on plausible deniability stratagems. As Mencken (1920, p. 155) commented "The form of the argument is simple and familiar: to dispose of a problem all that is necessary is to deny that it exists". This is currently a popular response to consumer concerns about pesticides. Currently the "burden of proof" rests with the victim and their champions, rather than the commercial or government enterprise licensing, or profiting from the usage. In law, two levels of proof apply: (a) there is the "beyond reasonable doubt" proof that is applied in criminal cases, and (b) there is the "on the balance of probabilities", a diminished level of proof that is applied in civil cases. There is a question: what level of "proof" is appropriate for environmental concerns such as these fish, bees and devils?

Responses to uncertainty

When consumers make purchasing decisions, including eco-purchases such as organic food or carbon offsets, they are operating in a state of uncertainty. They will use their own trade-off strategy, or perhaps avoidance strategy, for coping with uncertainties.

In his organic manifesto, Northbourne has given an early and lucid account of the *Precautionary Principle* (Paull, 2006):

> *"if we waited for scientific proof of every impression before deciding to take any consequential action we might avoid a few mistakes, but we should also hardly ever decide to act at all. In practice, decisions about most things that really matter have to be taken on impressions, or on intuition, otherwise they would be far too late … We have to live our lives in practice, and can very rarely wait for scientific verification of our hypotheses. If we did we should all soon be dead, for complete scientific verification is hardly ever possible. It is a*

regrettable fact that a demand for scientific proof is a weapon often used to delay the development of an idea" (Northbourne, 1940, p. 41).

The Precautionary Principle

The precautionary principle has a long history. It is encapsulated in folk wisdom as "better safe than sorry". Greek metaphysician Hippocrates (*c*. 400 BCE.) gave the idea wings with which it has travelled across continents and through two millennia; his dictum is popularly rendered as: "First do no harm".

La Rochefoucauld (1665) declared "No man is clever enough to realise to the full all the evil he does". This is the driver of the Precautionary Principle, the unknown unknowns, and that these unknowns may be "evil". The perspicacity of La Rochefoucauld has much to recommend it in this, the century of the environment at risk.

The United Nations recognised the precautionary principle in the World Charter for Nature 1982. A decade later the UN Conference on Environment and Development, at Rio de Janeiro, is a turning point which extended the precautionary principle to the whole environment (Gee, 2001). It is the Rio articulation of the principle that is most widely quoted:

> "In order to protect the environment, the precautionary approach shall be widely applied by states according to their capabilities. *Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation*" Principle 15, 1992, [italics added] (Gee, 2001).

The principle was formally adopted by the European Union in the EU Treaty of Maastricht 1992 (Gee, 2001). The Stewart Report in the UK summed up: "we live in an era where science and technology are advancing at an ever-increasing rate ... many people have anxieties about ... the potential for major adverse consequences if developments are not appropriately controlled - if science has greater power to do good, it also has greater power to do harm" (Stewart, 2000).

The precautionary principle is a serious challenge to the concept of scientific certainty, and substitutes for it, the contestable concept of sagacious guesswork. The injunction is to act before the threat is reified - this makes measuring the success of the implementation of the principle a challenging prospect. We now turn to its antithesis, the postcautionary principle.

Postcautionary Principle

The postcautionary principle is an end-of-pipe approach, essentially the obverse of the precautionary principle. In folk wisdom it is represented by such statements as "throw caution to the wind", "strike while the iron is hot" and "he who hesitates is lost". The classic postcautionary principle retort is: "we'll cross that bridge when we come to it". So this is a more aggressive approach to development, risk and the environment; very much a, see if it breaks, and fix-it-later if it does.

The postcautionary approach to environmental risk can be characterised as:

> *Where there are threats of serious or irreversible damage, the lack of full scientific certainty shall be used as a reason for not implementing cost-effective measures until after the environmental degradation has actually occurred.*

A classic example of the postcautionary principle is the Tasmanian government's placing a bounty on the world's, then, largest marsupial carnivore, the thylacine, commonly know as the Tasmanian tiger. This unique government campaign to exterminate a species was waged from 1888 to 1909. By 1936 with a single thylacine left, and under advice from the Fauna Board, the government declared the thylacine to be "wholly protected" on July 10th, 1936 (Guiler, 1985; Paddle, 2000). That single surviving thylacine subsequently died of neglect in Hobart Zoo on September 7th, 1936, less than two months after being "protected".

Another example of the postcautionary principle is the story of *El Grande*, described as "the nation's largest tree" and "a national icon" for Australia (BBC, 2003). As *Forestry Tasmania* reported, a tree such as *El Grande* "is of course protected from harvesting under our Giant Tree Policy" (Forestry Tasmania, 2003). However they "harvested" the surrounding native forest, and burned the residual debris, as is standard *Forestry Tasmania* practice. *Forestry* reported that the tree "is expected to shed its current covering of leaves" (Forestry Tasmania, 2003). As a consequence of this clear-felling and burning, *El Grande*, a tree that has stood as a sentinel in the forest since before Captain Cook's visit and white settlement of the continent, is now dead. International media reported the silvicide of the world's largest flowering plant (Radford, 2003).

The following government response exemplifies the postcautionary principle approach:

> *"The Giant Tree management policy was implemented during the year with 'El Grande' being identified during a harvesting operation and excluded from the coupe but was unfortunately critically damaged by fire during the regeneration burn. New standard operating procedures have now been developed for use in areas where giant trees are likely to be present"* (FPB, 2004).

The one-legged eco-economist

The trees are coming. Whether you are a Climate Change true-believer, a skeptic or an agnostic, whether you are of the old-school Global Cooling, or of the new-school Global Warming, probably matters not a jot for the purposes of the Carbon Offset Program. For some, the debate has been simplified to "the climate change debate is over, for good" (Steffen, A., 2007), and, the "debate is virtually over, - there is no debate" (Steffen, W., 2006). Political and economic agendas are in the process of overwhelming and supplanting much of the scientific debate.

The drivers and motivations for carbon offset initiatives include the government-scientist consensus IPPP reports on climate change (IPCC, 1990, 1995, 2001) and the Stern Report. Stern (2006) addresses the economic implications, while assuming the IPCC is correct that (a) the climate is changing, (b) this is bad, (c) this is an anthropogenic effect, or largely an anthropogenic effect, and finally (d) an anthropogenic reversal, or at least a retardation of the change, is possible.

According to Stern (2006, p. 450) "This Review has made a compelling case for action - on both mitigation and adaption - demonstrating that the global economic costs of business as usual paths are likely to far outweigh the costs of taking action to reduce the risks".

As a mitigation strategy Stern urges that we reduce our "carbon footprint". Planting trees is proposed as one way to achieve this. All plants photosynthesise ($6CO_2 + 12H_2O$ + light ---> $C_6H_{12}O_6 + 6O_2 + 6H_2O$) and trees can achieve this carbon sequestration on a grand, and visible, scale.

There are now do-it-yourself toolkits to reduce your "carbon footprint (McCarthy, 2006), and there are companies that claim to help you achieve this (Dutt, 2007).

Tree planting has now become the prerogative of the everyday traveller. When you are purchasing an airline ticket, for example, will you click on the box to contribute say an extra dollar for a program, an outcome of which may be more trees? If you drive a car, GreenFleet Australia offer you the option of them planting, on your behalf, 17 trees, which by their calculations will offset your vehicle's greenhouse gas emissions.

Other things being equal, a flurry of Australian, and indeed global, tree planting would seem like a "good thing". This is especially so when we consider that the global forest loss over the past two centuries amounts to 30%, and deforestation is proceeding at 7.3 million hectares per annum (Mygatt, 2006).

For Australian airline customers, according to Virgin Blue's CEO: "The new Carbon Offset Program will allow you to quickly and easily offset the emissions created by your flight". This program is "independently verified and Australian Greenhouse Office - endorsed … with all voluntary monetary contributions used to support approved Greenhouse Friendly™ Abatement Projects. These include … tree planting … projects" (Godfrey, 2007, p. 5).

For Australian motorists Greenfleet Australia advertises: "for $40 (tax deductible) … Greenfleet will plant 17 native trees to neutralise your car's greenhouse gas emissions for one year". What the trees will be doing in year 2 and thereafter is not stated.

IF we focus on the "carbon footprint" we can take action, either of commission or omission, to reduce it. But is there a boot on other foot?

Shades of green: clean green and dirty green

"There is always a well-known solution to every human problem - neat [and] plausible", wrote Mencken (1920, p.158), "and wrong". Often misquoted as: "for every complex problem there is a solution that is simple, neat and wrong".

So-called green solutions come in various shades, on a clean green to dirty green continuum. While they are not necessarily "wrong" in the Mencken sense, they are certainly open to improvement. Three examples of dirty green solutions follow, and then there is a consideration of the colour of trees.

Fibreglass insulation saves home heating costs, is encouraged by governments (Warren, 2007) and comes with safety instructions - wear gloves and a respirator. However at demolition time, the product is exposed to the passing parade of pedestrians and local residents, and is then trucked to landfill, with no provision for safe disposal, whatever that might be, and no provision for recycling. It is a dirty green solution, offering some upside for the environment hand-in-hand with some environmental downside.

The Australian federal government has broadcast a plan to ban incandescent globes and replace them with compact fluorescent globes - on the basis that the latter use less energy, and are hence a green solution (Beeby, 2007). On the downside, they use more than three times more material to produce, and they contain mercury, a heavy metal neuro-toxin (Pirrone & Mahaffey, 2005) - in some US states it is illegal to put them in the trash (Shogren, 2007). There is no proposed method of collection of used compact fluorescent globes, they can be expected to end up in land fill, and even if they were somehow diverted, there is no established way of recycling them to recover the complex circuitry and the incorporated toxic raw materials. This is an example of a dirty green solution.

Nuclear energy may perhaps reduce CO_2 emissions. Yet the US has 70,000 tonnes of high-level nuclear waste currently looking for a home. Yucca Mountain has been proposed since 1987, and "decades of effort costing billions of dollars" have already been expended on this proposed repository, yet "we can never know whether the repository 'worked' " since it is required to contain the radioactivity for 10,000 years (Ewing & McFarlane, 2002, p. 660).

As examples of dirty green options, these three "solutions", fibreglass, compact fluorescent globes and nuclear energy, offer short term green gain for long term green pain. Now let us consider growing trees as a green solution.

How to grow trees

Modern forestry as practiced in Australia is best characterized as chemical forestry. "Most of Australia's plantations are in blocks of uniform age and one species and are managed intensively to optimise yield" (Parsons et al., 2006, p. 15). Optimising yield is not synonymous with optimising environmental outcome - intensive management is code for pesticide use. Jenkin & Tomkins (2006) concede that while "it may be possible to conduct … non-chemical pesticide forestry… in large scale industrial plantations … mechanical application of chemical pesticides is required" (p. 6). "The term 'pesticide' used in the context of plantation forestry… is: any chemical or chemical mixture used for controlling weeds, insects, fungi, nematodes and animals which adversely affect growth (quantity and quality) and the health of plantations" (p. 12).

Jenkin & Tomkins (2006, p. 117) profile chemicals used in Australian forestry operations: 25 herbicides, including atrazine and simazine, nine insecticides, two fungicides and seven classes of adjuvants which are "designed to improve the efficacy of a pesticide", including surfactants, wetting agents and synthetic latex. Pesticides are mostly applied aerially, by plane or helicopter.

In Tasmania, after clearfelling, the residual area is burnt by dropping incendiary chemicals. Carrots are then laid to attract native animals, using a bait and switch strategy. The first two carrot offerings are safe and palatable, then on the third application the carrots are laced with 1080 poison, and a minute dose of this colourless, tasteless, and highly water soluble poison is enough to kill any Tasmanian native animal that comes for a feast - including wallabies, possums, bandicoots and wombats (Rammell & Fleming, 1978).

According to Tomkins (2004, p. 68) "the use of pesticides is an important management tool … the use of residual herbicides … is essential to give long term weed control". Glyphosate is "an essential pre-planting herbicide in plantation establishment in most situations" (p. 71). Herbicides are applied in the first two years to plantations (Jenkin & Tomkins, 2006) and pesticides usually within the first few years of establishment and as frequently as required.

The question is, are Virgin's and Greenfleet's green customers happy with a trade-off of reducing their carbon-footprint at the cost of increasing their pesticide-footprint? Is this trade-off made clear to them at the time of participation so that they are in a position to give their informed consent? Chemical forestry is a dirty green solution, but does the target demographic believe they are being offered, and perhaps purchasing, a clean green solution? Are the offers hovering on the edge of being deceptive and misleading, not by what is presented, but by what is not presented?

Forestry Standards

According to Meidinger et al. (2003 p. 4) "forest certification is not yet a customary practice or a long standing tradition". Standards in forestry have evolved largely to suit the forestry industry and their customers. Are they environmentally sound, benign, and/or beneficial?

Fisher et al. (2005) identify three "major forest certification programmes". The Forest Stewardship Council (FSC), The Program for the Endorsement of Forest Certification (PEFC) - known previously as Pan European Forest Certification - and thirdly the Sustainable Forestry Initiative (SFI).

FSC, launched in 1993 (Kanowski, 1999), sets the tone, - it presents itself as a weak standard from the outset: "Woodmark [an FSC mark] does not insist on perfection. There will be very few forest managers who can meet every one of the norms consistently" (Woodmark, 2004, p. 3). This so-called standard is at best a very weak standard. It comprises ten FSC principles, within each of which are a set of FSC criteria and a subset of norms. *FSC Principle #5* is "Benefits from the Forest" and includes that: "Forest management operations shall encourage the efficient use of the forest's multiple products and services to ensure economic viability" (p. 20). *Principle #1* is "Compliance with Laws and FSC Principles" and includes that "Forest management shall respect all applicable laws of the country" (p. 7).

The FSC Standard does not purport to be an organic standard, and is in fact far from such a standard. *FSC Criterion 6.6a* declares that "Management systems shall … strive to avoid the use of chemical pesticides… Chemicals are only used when absolutely necessary to achieve defined management aims … Synthetic chemicals are only used where there is no known non-chemical alternative not entailing excessive cost" (p. 30). *FSC Criterion 10.7* advises that "Plantation management should make every effort to move away from chemical pesticides and fertilisers" (p. 46).

Tomkins (2006) is critical of the FSC arguing that pesticides are essential for forestry. He also points out that while "Simazine is a banned herbicide in the FSC" (p. 70) however there is a "derogation [exemption] for the use of simazine … the FSC has now extended this [exemption] Australia-wide" (p. 71)

PEFC, launched in 1999 (Kanowski, 1999) is a "framework for the mutual recognition of credible national or regional forest certification schemes that have been developed based on internationally recognised requirements for sustainable forest management" (PEFC, 2004). For the PEFC "the principles are quite elastic" (Meidinger et al., 2003, p. 18): "the PEFC defined itself not as promulgating a single standard … but rather … as providing … recognition of variable national certification programs built upon existing practices … to be based in stakeholder groups initiated by forest owners in individual countries"" (p. 19).

In Australia "To date almost 220,000 hectares of forests have been certified against AFS [Australian Forestry Standard] but this figure is likely to increase to 1.72 Million hectares shortly" (PEFC, 2004).

The SFI, launched in 1994 (Kanowski, 1999) is a North America standard initiated by the American Forest & Paper Association (AF&PA). "The SFI standard is a hybrid of systems- and performance-based requirements, and it allows the companies to select optional indicators that they consider appropriate for their management systems and conditions" (Fisher et al 2005, p. 5).

Fisher et al. (2005, p. 6) point out that ISO 14001, "often used in combination with other regional and national standards", and ISO 14061 certification, "lets landowners tailor the system to their objectives and and specific situations; it does not demand that any particular set of standards be followed".

Unlike organic food, forestry standards have been developed in the absence of consumer demand and generally have failed to attract a price premium (Klooster, 2004).

From an Organics perspective all these standards are weak, with FSC appearing as the least weak. The FSC has developed into "a document-intensive, buyer-driven preoccupation for delivering large quantities of certified wood products to market, with a focus on big forest producers and large wood consumers" (Kloosters, 2005, p. 412) and foresters "use certification to validate their activities" (p. 415).

Certified Organic Forestry fails to rate a mention in forestry literature either as an existing standard or as an emerging standard (Kanowski et al., 1999; Kanowski et al., 2000; Cashore, 2002; Meidinger et al., 2003; Fischer et al., 2005; Klooster, 2005).

The two-legged eco-customer

The opening up of a second locus of control for the planting and purchase of trees, from profit-driven corporations to ecologically driven individuals and organisations, has the potential to reshape the forestry standards landscape, as eco-customers hold different expectations, and are likely to hold to different standards.

What is an eco-customer to do when offered a "green" option of reducing the "carbon footprint" of their own activity? The invited expenditure is proffered as a purely environmental planetary gesture, there is no anticipated direct profit motive residing in the eco-customer. If the price charged for reducing one's carbon footprint is tied to an increase of one's pesticide footprint, is that an acceptable tradeoff? What other options are possible?

The Experience with Organic food

From a very modest beginning in 1940 at the start of WWII (Paull, 2006) the organics movement has grown into a A$50 billion enterprise, with 395 certifying organisations worldwide, and 31 million hectares certified organic across more than 120 countries (Willer & Yussefi, 2007). While originally a farmer-driven project, it is now a consumer-led project. "Global production of organic crops has not kept pace with demand, with many sectors reporting undersupply" (Willer & Yussefi, 2007, p. 52). Organics is one of the fastest food categories, with growth reported between 10% and 30% per annum (McKinna, 2006). The Organics enterprise has now ventured into beverages, fibres including cotton and wool, clothing and personal care products.

Organic products attract a premium price and this can be a motive for farmers to convert from chemical farming to organic farming, this has been one of the drivers, for example, of China's push into organic agriculture (Paull, 2007). The average price premium in Australia for organic produce at the retail level is reported at 80% (Halpin, 2004).

In Canada, Cunningham (2004) reports that 71% of Canadians sometimes purchase organic food with 18% as "regular/heavy buyers". It is particularly this market segment, organic food purchasers, already familiar with organics, that is likely to be open to, or may even demand, retail offerings of certified organic forestry for the purposes of carbon offsetting.

Certified Organic Forestry

The first Certified Organic Forestry standard was implemented by the German organic certifier *Naturland* (Naturland, 1998). In 2002, the umbrella organisation of organic groups the *International Federation of Organic Agricultural Movements* (IFOAM) incorporated a Draft Standard for Organic Forestry into its BASIC Standards document (IFOAM, 2002). That Organic Forestry Draft Standard was voted out three years later. The Norwegian organic certifier Debio established organic

certification standards for forestry, initially in 2005, and this standard was revised in 2006 (Debio, 2006). The Debio standard is the most thoroughgoing of these three documents and could feasibly be adopted with little or no modification by other certifiers worldwide, subject to usual intellectual property issues.

The fruit of this Debio excursion into Organic Forestry has so far been modest, with a single tract of 150 hectares currently under certification. However this exceeds the combined Australian, US and UK total of zero certified organic forestry hectares. Although Debio is a Norway-based certifier there appear to be no impediments to a forest or plantation in Australia seeking and gaining Debio certification (Ostreng, 2007).

Australia has a reported 150 hectares of certified organic *Eucalyptus radiata* plantation which is harvested annually for oil (Banalasta, nd), and certified by ACO, Australian Certified Organic (Seiffert, 2007).

Denouement

Forestry, both in Australia and worldwide, is often criticized, and for a variety of reasons, mostly environmental reasons, and particularly for the use of pesticides. The chemical herbicide "2,4-D was found at levels five times higher than Australian drinking water guideline limits". Also reported in Tasmanian rivers were the herbicides MCPA, atrazine and hexazinone (Bevilacqua, 2007). This report induced a reader ("Gavin of Launceston") to post the comment: "I wonder where these chemicals came from? Could they have come from sustainable forestry operations?". This lack of trust between residents and foresters is not confined to Tasmania, and is exacerbated by the secrecy, the lack of transparency in forestry operations, and the lack of specificity in the existing forestry standards.

Carbon/Pesticide Matrix	**Pesticide Positive**	**Pesticide Neutral**	**Pesticide Negative**
Carbon Positive	+,+	+,0	+,-
Carbon Neutral	0,+	0,0 (Benchmark)	0,-
Carbon Negative	-,+	-,0	-,-

Figure 1: Carbon/Pesticide Matrix (CPM). The central cell, CPM(0,0), is neutral on both counts. Moving south on the matrix reduces the carbon footprint (can be regarded as the "green" direction for the purposes of carbon sequestration). Moving east reduces the pesticide footprint (can be regarded as a "clean" direction). The two cells, CPM(0,+) and CPM(-,+), are dirty green options, The cell CPM(0,+) = carbon offsetting using chemical forestry; CPM(0,0) = carbon offsetting using organic forestry.

The forestry defence to such claims is that forestry uses "world's best practice". In the spirit of *kaizen,* perhaps the practice to be sought is rather "world's next practice". With the everyday traveller

now invited to consider a discretionary expenditure, a selfless "investment" in trees, perhaps we can expect a greater scrutiny of forestry practices and their environmental impacts.

If a customer is purchasing trees for the purpose of reducing their personal "carbon footprint", will they want the invisible other foot to also be treading ever so lightly on the planet? Or will they adopt a Doctrine of the Lesser Evil approach (Ignatieff, 2004), taking a post-cautionary approach, and rationalizing that a dirty green action of chemical forestry is preferable to no action (see Figure 1). Or will they insist on a Hippocratic, "first do no harm" approach, a precautionary approach, and hence only a clean green solution is acceptable? Or perhaps customers are willing to entertain both options and will place a price premium on the organic option, in which case an eco-sale can proceed if the premium value the customer attributes to the offer is greater than the premium price asked for - as is a commonplace decision scenario with organic food. In any event, with the introduction of carbon footprint offers at the retail level, and the consequent serious expansion of decision makers from a handful of corporations to a multitude of individuals, each bringing with them different standards and expectations, maybe we can expect *Certified Organic Forestry* to grow beyond this present gestational phase, into a serious market-place contender for the consideration of eco-wise consumers?

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