1 Re-Enchanting Agriculture
Farming with the Hidden Half of Nature

Julia Wright
Coventry University

CONTENTS

PRELUDE: SOMETHING HAPPENED IN A HOT TENT IN TELANGANA

It looked unlikely that anyone was going to come to the workshop. Buses had jolted us for three hours from the conference centre in Hyderabad to a farm in the Telangana hinterland, land that was dry and dusty those November days and adjacent to a river where signs warned to 'beware of crocodiles'. Now all were busy pitching their tents and queuing for some late lunch that hot afternoon. Thus was the transition from the first formal part of the 13th International Permaculture Conference, in India, at which government ministers and keynote speakers had held forth, to the more informal and interactive, tented Convergence, and we were all tired and drowsy. A volunteer led me to the tent where I was scheduled to give the workshop one of seven rectangular structures arranged in a semicircle to one side of the encampment and adorned with deep gold and purple bunting. It wasn't only the heat and fatigue that were serving as potential deterrents. 'Quantum-inspired agriculture: is it time for permaculturalists to embrace the invisible?' was the title of the workshop, and I was mindful that (the late) Bill Mollison, the co-founder of permaculture, had stressed many times, and most vehemently, that belief systems, or 'woo-woo' as he and many practitioners put it, should be kept out of permaculture.

> As I have often been accused of lacking that set of credulity, mystification, modern myth and hogwash that passes today for New Age Spirituality, I cheerfully plead guilty. Unqualified belief, of any breed, dis-empowers any individuals by restricting their information. Thus, permaculture is not biodynamics, nor does it deal in fairies, devas, elves, after-life, apparitions or phenomena not verifiable by every

DOI: 10.1201/9780429440939-2

> person from their own experience, or making their own experiments. We permaculture teachers seek to empower any person by practical model-making and applied work, or data based on verifiable investigations. This scepticism of mine extends to religious and political party ideologies.
>
> *Mollison (1996: 623)*

A smattering of people wandered into the tent, then a few more, until almost all the fold-up seats were taken. Feeling relieved at the numbers, I made a start. A few more people turned up, filing in around the edges, then more and I encouraged them to fill the spaces at the front where they sat around my feet till I was confined to one spot. Then more formed an outer ring, and still more who couldn't squash into the tent and so grouped around the open entrance or peered in through the gaps between the flimsy tent walls and the canopy. Engulfed in a sea of expectant, bright-eyed faces, my presentation started with a question, inspired by developments over the last century in quantum science and the underlying wave-based nature of reality. What else could be at play outside of the small percentage of the electromagnetic spectrum that is visible to the human eye? Indigenous, Majority World cultures are characterised by their holistic worldviews about the nature of reality, and these are reflected in their farming practices. Their interactive relationships with invisible dimensions recognise the existence of spirit, /consciousness and the other-than-human. Yet even though the founding fathers of quantum science were openly influenced and inspired by such worldviews and especially those of the Vedic tradition, modern science is ill-equipped to properly explore these dimensions in agriculture, limited as it is by its own adherence to a particular belief system, one which is underpinned by reductionism and physicalism.

With audience attention still strong, and sensitive to the customary reticence to share on this subject in public, each person was invited to turn to her or his neighbour and share a story or personal experience concerning the hidden half of nature. With just a few exceptions, a multitude of conversations erupted, so animated that the speaker in the neighbouring tent's (rather empty) workshop came to inspect. And then, once people realised that they were in a safe space and wouldn't be laughed at or ridiculed, and that they weren't alone in their experiences, stories began to be shared with the group. The atmosphere was one of vibrant relief; something important had happened on that previously worn-out afternoon in the hot tent in Telangana.

INTRODUCTION: THE STRANGLEHOLD OF THE INDUSTRIAL WORLDVIEW

Contemporary, ecologically based farming approaches (i.e. agroecology and what may be considered as subcategories - organic and biodynamic farming, and permaculture) have met with strong opposition since they arose over the last century as a conscious effort to divert from the path mapped by the industrial and Green Revolution models (Conford, 2002). Why should something as simple as the desire to caringly produce nutritious foods touch upon such a raw nerve? Exploring this question as part of her doctoral studies in Cuba in the late 1990s, the author asked over 400 of the country's farmers, researchers and government officials why they had not shifted wholescale to more ecological farming. After all, during this period of tough US sanctions and economic instability, several conducive factors were in place: the scant access to agrochemicals and fuel to drive heavy machinery, a plentiful labour supply, relatively widespread knowledge of ecologically based agriculture, and a pro-social politics in favour of human health. Curiously though, the majority of responses to this question fell into either of two categories: those who had not shifted to more ecological farming because they were fearful of *losing control* – be it over smallholder farmers, specific pests and diseases or nature in general; and those who had not shifted because they were fearful of *not having enough*, whether it be of chemical inputs, crop yields, fuel or food (Wright, 2009). Such fears were unsurprising given Cuba's economic

vulnerability after the collapse of the Soviet Union, yet they revealed themselves to be unfounded when evaluated against the scientific and practitioner evidence available, and rather were based on myths or misperceptions around the performance of ecologically based farming (2009: 209, 237). For example, for every farmer who was adamant that the only way to control the maize corn stalk borer was through the application of a chemical control, another farmer down the road would be successfully using a biological control method for the same problem, and this backed up by research data. Fear rather than evidence, the study concluded, was a major driver of Cuba's agricultural strategy, and this in a country with no private sector or corporate interests to champion the industrialised farming approach that prevailed. What the country did have, enduring from its pre-Revolutionary, colonial period and later imported from its Soviet comrades in the 1960s to 1980s, was a heavily industrialised conceptualisation or *worldview* of agriculture, based on a belief in technological expertise which manifested through the design of large-scale monocultures, high levels of specialisation and mechanisation, and reliance on chemical inputs (Mesa-Lago, 1998; Sinclair and Thompson, 2001; Wright, 2009).

In non-socialist regimes, similar fear-based insecurities around a perceived lack of control or of survival necessities are identified as contributing to the relentless drive of agribusiness (Clunies-Ross and Hildyard, 2013). Whether restocking food reserves in post-Second World War Europe (Conford, 2001) or averting food insecurity in the Global South by rolling out Green Revolution technological packages (Sonnenfeld, 1992), this form of agriculture, with its top-down approach, obsessive focus on narrow goals, quick results and lack of consideration of broader impacts, could at best be seen as a short-term, emergency strategy.[1] So, 70 years on, why are we still farming as if in an emergency? Vorley (2003) and others (e.g. Elder and Dauvergne, 2015; IPES-Food, 2016; Lang, 2004) attribute this stagnation or stranglehold to the persisting political power of agribusiness to maintain industrialised production systems in order to continue expanding sales, lowering production costs and increasing profits. Yet the previously described experience of Cuba indicates that we need to look beyond or behind agribusiness and to the industrialised worldview from whence these behaviours manifest. For it is out of this worldview that we are frequently reminded of the overriding material urgency of 'feeding the world' at the expense of mainstreaming more sustainable, ecologically based farming approaches (e.g., by AGRA (2016), Goulding et al. (2011) and Rickard (2019)). This perspective continues to be propounded in the face of clear and growing evidence that agroecological farming systems can better achieve the more egalitarian objective of 'enabling the peoples of the world to feed themselves', as well as ensuring the health of our life support systems (Ponisio and Erlich, 2016). As the pioneering environmental philosopher Callicott (1990: 270) succinctly explains with regard to the industrial-scientific worldview:

> Notoriously it is not working, at least not sustainably and it is based on a bankrupt metaphysics, a worldview that has not sustained critical scrutiny and that is in fact, dead in pure science even though it lives on in applied science…soil compaction, erosion and the loss of fertility, the unforeseen exhaustion of fossil fuels and fossil waters, agrochemical pollution of air, surface and ground waters; and food itself; cyclic outbreaks of pests and the ensuing dialectic of ever more toxic and intensively applied pesticides; the loss of genetic diversity and the loss of wild ancestors and relatives of our cultivars; rural depopulation and disruption of rural patterns of life; the corollary loss of centuries of transmitted agricultural experience and knowledge, the dessication, in short, of the culture of agriculture; concentration of land ownership and the proletarisation of farm labor…all bode ill for the sustainability of modern agriculture.

[1] Underlying these altruistic motives were political and economic drivers. In Europe, ammonium nitrate was lucratively repurposed as a fertiliser after WW2 (Conford, 2020), and the rolling out of Green Revolution technologies was seen as a means to quell political unrest during the Cold War period as well as being another lucrative venture for the pharmaceutical industry (Cotter, 2003).

TOWARDS UNDERSTANDING THE COGNITIVE FACTORS BEHIND THE INDUSTRIAL WORLDVIEW

Which other living creatures soil their own living spaces, food supplies and life support systems? Environmentalist David Orr, who proposed the term 'ecological literacy' as the ability to understand the natural systems that make life on earth possible, explains the need to recognise the relationship between the disorder of ecosystems and a prior disorder of mind (Orr, 1991). Similarly, Roszak (1992) believes that the environmental crisis is rooted in the extreme disturbance of a part of human consciousness. Yet the views of Orr, Roszak and other ecopsychologists who connect the way we treat nature as a reflection of our own mental states have been more widely accepted by environmental scholars (e.g. see Joanna Macy's 'Work That Reconnects' (Macy and Brown, 2014)) than by those in agricultural disciplines. (One early exception was social ecologist Stuart Hill who, with reference to agriculture in the Canadian Prairies, linked ecological with psychological prerequisites and identified 'distressed human states' as resulting in unsustainable farming (1991: 34)). The very act of separating farming from the environment is arguably a manifestation of such a disorder.

This disorder had been spotted long before by people from non-Western cultures. Indigenous American peoples used the term 'wetiko' (from the Cree First Nation) to describe the mentality of the arriving colonisers, defined as a type of cannibal sickness or mind-virus infecting people with symptoms such as greed, ambition, materialism, arrogance or a split personality (Forbes, 2011). In his book on the same subject, journalist Paul Levy (2013) draws on works from Jungian psychology as well as spiritual wisdom traditions to explain how this mind-virus operates at a covert level through our unconscious blind spots, rendering us oblivious to our own madness and compelling us to act against our own best interests.

A more in-depth understanding of this condition has been provided by acclaimed scholar and psychiatrist Iain McGilchrist. McGilchrist's treatise (*The Master and his Emissary: the Divided Brain and the Making of the Western World*, 2019) concerns the bihemispheric structure of the brain, with the right hemisphere's insightful and holistic approach moderating the left hemisphere's reductionism. In a healthy individual, he explains, the left and right hemispheres of the brain work together, with the right ('the Master') taking the major decisions that the left ('the emissary') then carries out. The problem has arisen that, rather than cooperating, these hemispheres have become involved in a power struggle and this, McGilchrist asserts, has given rise to many aspects of contemporary Western culture.

> The Master realises the need for an emissary to do certain work on his behalf (which he, the Master, must not involve himself with) and report back to him. The emissary, however, knowing less than the Master, thinks he knows everything and considers himself the real Master, thus failing to carry out his duty to report back. The right hemisphere's view is inclusive, 'both/and', synthetic, integrative, it realises the need for both. The left hemisphere's view is exclusive, 'either/or', analytic and fragmentary – but, crucially, unaware of what is missing. It therefore thinks it can go it alone.
>
> *McGilchrist (2019: xxiv)*

With the domination of the left hemisphere and the impact of its vision and priorities on human action, the right is unable to function in its role of counterbalancing with the real world, because the real world is now a manifestation of the left. The left meanwhile is incapable of making a paradigm shift to resolve a problem: 'There is a self reflective hall of mirrors at work, where logic seems to lead back to a solution within the system itself, rather than a need to break out of it' (2019: xxiv). Crucially, although the left hemisphere likes to believe it is more rational and thus more highly evolved, it is in fact the right hemisphere that is in contact with both body and emotion and also has more representation in the pre-frontal cortex which is the most highly evolved part of the brain.

Since it was first published, McGilchrist's treatise has received slight criticism, only for extrapolating on the implications for society which fall outside McGilchrist's own area of expertise. From the food and farming system perspective at least, he may be spot on. His explanation 'The left hemisphere is not impressed by empathy; its concern is with maximising gain for itself, and its driving

value is utility' (2019: 145) could well be describing a driver for industrial agriculture, where the right hemisphere's priorities, such as nature, culture, the body, the arts, spirituality and soul, have been deconstructed and devitalised. McGilchrist concludes 'I believe that reductionism has become a disease, a viewpoint lacking both intellectual sophistication and emotional depth, which is blighting our ability to understand what is happening and what we need to do about it' (2019: xxv).

Whilst this theory may help us to understand the nature of the underlying disorder or mind-virus that manifests through the industrial worldview, McGilchrist's otherwise comprehensive work omits discussion of gender and the feminine. This absence stands out not only because the worldviews of many of the non-contemporary cultures that McGilchrist refers to were rooted in the feminine, but also because of the clear parallels of his work with those of feminist scholars. One such is psychologist Anne Baring and her classic work *The Dream of the Cosmos: a Quest for the Soul* (2020). In this, Baring attempts to address the roots of Western culture's multifaceted crisis by exploring its historical and psychological causes. Echoing McGilchrist's perspective of the dominant left hemisphere's inability to hold awareness beyond itself, she asks:

> What happens to us if we exist without a relationship to anything beyond our own consciousness? We are left bereft of relationship with the Cosmos. Psychic energy that has nowhere to go implodes on itself… Recognising nothing beyond ourselves, we become both inflated and diminished.
>
> *Baring (2020: xvii)*

Baring similarly talks of a malignant pathology and the need for release from our current defective worldview. Whereas McGilchrist identifies the historical decline of key civilisations (the Greeks, Romans and post-Enlightenment West) as triggers for the increasing entrenchment of the left hemisphere, Baring points the finger at two erroneously held beliefs of the three Abrahamic religious cultures (Judaism, Christianity and Islam): the myth that a woman caused the expulsion of humans from Eden, and the belief that humans are separate from both God and nature. Baring notes that, prior to this, cultures dating to 40,000 BC emphasised the feminine (e.g., see Marshack, 1972), and she explains that 'the idea of the whole Cosmos as an entity with consciousness or soul in which all life participates derives directly from the image of the Great Mother' (2020: 30).

A shift from lunar to solar imagery, and from feminine to masculine deities, happened around 2000 BC, from which time imagery of the divine feminine was largely repressed or excluded, or became 'almost exclusively associated with nature as a chaotic force to be mastered, whereas the God assumed the role of creating or ordering nature from a "place" that was outside or beyond it' (Baring, 2020: 31). Arguably the most misogynistic manifestations of this belief, Baring points out, were the witch trials, instigated in 1485 by Pope Innocent VIII and spanning the 15th to 18th centuries. Many thousands of women, often herbalists, were tortured and killed (and in the UK, it was only in 1944 that the last woman was convicted under the Witchcraft Act of 1735 (Morton, 2014)). Ultimately, according to Baring, the loss of respect for nature and for woman, and the current ecological crisis, can all be traced to this denigration of the feminine over the last four millennia.

McGilchrist and Baring agree on the problematic manifestation of a certain type of science, a critical rationalism that focuses on the physical dimension and not simply ignores – but proactively ridicules – anything outside of this perceived reality.[2] Baring states:

> We no longer have access to other levels or modes of consciousness because our 'rational' mind has, over the last four centuries, increasingly ridiculed, disparaged and repressed what it has been unable, so far, to accept, prove or comprehend.
>
> *Baring (2020: 491)*

[2] In his essay on the work of Francis Bacon (1561–1626) who was the so-called founding father of the scientific method, Scalercio explains Bacon's perspective, 'The purpose of studying nature was to recover man's original dominion over the earth, bestowed upon Adam in Eden but lost in the Fall' (2018: 1080). Other authors describe how Bacon used the way women suspected of witchcraft were tortured by mechanical devices to extract confessions, as a metaphor to indicate the methods of inquisition by which he thought nature's secrets should be extracted (Conner, 2005; Merchant, 1990).

For the left hemisphere, according to McGilchrist, belief, or the absence of certainty, is seen as a 'feeble form of knowing', whereas for the right, belief is a matter of care or of relationship. In other words, the right believes that one cannot know, whilst the left knows that one cannot believe. He concurs with Baring that 'The sheer vehemence with which the right hemisphere has been dismissed by the representatives of the articulate left hemisphere, despite its overwhelming significance, suggests a possible rivalry' (2019: 129).

To move through this impasse, both authors prescribe new conceptual paradigms. Baring weaves recent developments in consciousness studies with quantum physics and the Vedic philosophies, resulting in a new cosmology that unifies life, consciousness and the cosmos (2020: 340, 350). Similarly, McGilchrist suggests seeing life not as a linear process with piecemeal strategies (the left view) but as holistic, circular systems (the right), and draws from other cultures' cyclical perspectives of history and the universe. Pointing towards East Asian cultures that continue to be grounded in the right hemisphere, he concludes, 'We might have to revise the superior assumption that we understand the world better than our ancestors, and adopt a more realistic view that we just see it differently – and may indeed be seeing less than they did' (2019: 461).

This bihemispheric imbalance of the Western mind, and its correspondent secular-materialist worldview, is of course a generalised stereotype. Baring is careful to note that patriarchy and its associated disconnect from nature were present in some regions of the world prior to their being colonised, and the West itself contains a plurality of worldviews. However, there is certainly a case for the secular-materialist worldview and its science having shaped the West's approach to agriculture. Seeing the industrial worldview as a form of mind-virus or disorder is helpful in that, if the diagnosis is even half true, we are more consciously enabled to take effective, restorative action at a systemic level, a kind of self-medication. For once, the mind may bring awareness to itself rather than continue along the well-trodden path of identifying the problem as being outside of itself, whether externalised as corporate control or climate change.

THE BLIND SPOT OF CONTEMPORARY, ECOLOGICALLY BASED FARMING SYSTEMS

This chapter commenced by calling to attention the strong opposition to sustainable, ecologically based agriculture by the mainstream, industrialised farming sector. In one sense, there is a clear parallel between the reductionist, nature-disconnected left hemisphere and the industrial worldview, and the holistic, right hemisphere with the systems-thinking, ecological worldview. Various authors contrast the industrial farming approach of yield maximisation, use of chemical inputs, and ecosystem suppression and control, with the ecological approach of yield optimisation, crop diversification and the synergistic integration of natural processes (e.g. IPES-Food, 2016; van der Ploeg et al., 2019; Röling and Jiggins, 1998).

An analysis of fundamental texts of the organic, permaculture, biodynamic and agroecology movements reveals the kind of cyclical approach (to production systems) suggested by McGilchrist as a means to regain balance. For the organic farming movement, one of its most important principles is the 'Law of Return' or the recycling of all organic wastes, advocated by pioneer Albert Howard (1943); permaculture's focus on mimicking the cyclical events and patterns in nature runs throughout its curriculum (Mollison and Slay, 2013); and similarly for biodynamic farming, cycles and rhythms are ever present, from growing cycles to cosmic cycles (Steiner, 1993). Yet as well as considering the cycles of life, the fundamental shift urged by both McGilchrist and Baring should also involve a revival of indigenous cosmologies and ontologies including around the nature of consciousness and spirit. To understand what this means in relation to farming, a closer look is taken at such indigenous perspectives.

Harmony and Balance: The Indigenous Relationship of People, Land and Nature

Indigenous worldviews from whichever continent place a higher value on spiritual and non-material factors than do contemporary Western cultures (Kohler et al., 2019; Pierotti, 2011),

and this distinctive spiritual relationship is enshrined in the United Nations Declaration on the Rights of Indigenous Peoples (Article 15, UNDRIP, 2007). In a critique of the impacts of colonialism on African Indigenous Knowledge Systems, Mashingaidze (2016: 25) writes, 'For indigenous peoples, the land is the core of all spirituality and this relationship to the spirit of the earth is central to all the issues that are important to indigenous peoples today'. Similarly, in a comparative study of traditional ecological knowledge systems of the Māori and Quechua peoples, Huambachano explains that 'For Indigenous peoples, land is both an agricultural and sacred space where both human and nonhuman relations work together as stewards' (2019: 1). Marsden (1988) describes the body of knowledge that Māori peoples refer to as 'mātauranga', as being 'the knowledge, comprehension or understanding of everything visible or invisible that exists across the universe; this includes all Māori knowledge systems or ways of knowing and doing'.

The work of Huambachano and others (e.g. Haverkort et al., 2002; Tchombe and Lukong, 2018) provides a generic picture of the dynamic and mutually reinforcing relationships between the human, spirit and natural worlds. These animistic or panpsychic traditions share three pertinent ontological characteristics: (1) that life has an invisible, spirit or energetic dimension; (2) that everything in nature has sentience or consciousness; and (3) that there is every-day communicative interaction between humans and the other-than-human. They also share axiological issues around the need to maintain harmony and equilibrium, to right relationship, to sacredness and to collaboration with the other-than-human. These provide the context for, and influence, their farming and food gathering activities. In his essay on indigenous knowledge, Posey (1998) explains that knowledge of the environment depends on the relationship not only between humans and nature, but also between the visible world and the spirit world. Within this, agriculture provides balance through relationships amongst not only people, but also nature and deities, so that, for example, the blessing of a new field is not a mere spectacle but rather an inseparable part of life where the highest value is harmony with the earth. Following this, Table 1.1 compares key characteristics of a modernist worldview of farming and of nature, with a generic indigenous worldview.

Unsurprising, this invisible dimension of indigenous agriculture has been little explored in academia, yet science has evidenced the highly sophisticated knowledge of indigenous cultures in relevant fields such as applied ecology and genetics, psycho-geography, geomancy, astronomy, transpersonal psychology, geometry and, chronobiology (Critchlow, 1979; Peat, 2005).

TABLE 1.1

Comparison of Modernist with Indigenous Worldviews of Nature and Farming

Key characteristic	Modernist (Western) Worldview	Indigenous Worldview
Main goal	Striving for increased productivity	Striving for balance and harmony
Perspective of life processes (time, nutrient flows etc)	Repetitive and linear	Rhythmic and cyclical
Relationship with nature	Domination over nature	Oneness with nature, communication with nature
Understanding of the functioning of nature	Nature functions as a set of parts, a machine	Nature is complex and holistic
Management approach	Illness/disease focus	Health and wellness focus
Understanding of the nature of nature	Secular-materialistic	Panpsychism – animism – holds consciousness – spirit

Sources: Duran (2006), Whitewashed Hope (2020).

Do Ecologically Based Farming Systems Fully Embrace Indigenous Praxis?

The agroecology, organic farming and permaculture movements pride themselves on being based on a fusion of local and indigenous knowledge with appropriate, modern science. Albert Howard and others in the organic movement had been heavily influenced by exposure to sustainable farming practices in other parts of the world (e.g. see King, 2004). Miguel Altieri describes agroecology as a 'culturally acceptable approach as it builds upon traditional knowledge and promotes a dialogue of wisdoms with more Western scientific approaches' (Altieri and Toledo, 2011: 599). Permaculture's co-founder, Bill Mollison, attributed much of its content to what he learned from the indigenous people of Tasmania and others around the world (Fox, 2009). For biodynamic farming, however, and rather than claiming to draw from indigenous cultures, its knowledge base – primarily one set of lectures – was transmitted by one person, Rudolf Steiner, a German-Austrian polymath philosopher, scientist and mystic who lived from 1861 to 1925. Steiner was heavily influenced by German mysticism, theosophy, Gnostic Christianity, the Cathars, alchemists, Buddhism and Hinduism, amongst other traditions (McKanan, 2018), and in particular the works of Johann Wolfgang von Goethe. Primarily though, Steiner explored the spiritual worlds, which he did meticulously (Courtney, 2005), and his lectures were based on his insights and inner visions from these spiritual exercises. 'I bore a content of spiritual impressions within me. I gave form to these in lectures, articles, and books. What I did was done out of spiritual impulses' (Steiner, 1928: 316).

With regard to embracing indigenous concepts, some of the organic farming pioneers did publicly recognise energetic and spiritual dimensions, as evidenced in Eve Balfour's classic address to an IFOAM[3] conference in Switzerland in 1977 and partly influenced, she acknowledges, by the Steiner-inspired Anthroposophical Society (paras 41, 62):

> A food-chain is not only a material circuit, but also an energy circuit. Soil fertility has been defined as the capacity of soil to receive, store and transmit energy. A substance may be the same chemically but very different as a conductor of living energy… We cannot escape from the ethical and spiritual values of life for they are part of wholeness. To ignore them and their implications would be to pursue another form of fragmentation.

Nevertheless, and whatever members' personal beliefs, the organic movement as a whole seemingly made a conscious decision early on to avoid bringing the spiritual into farming, most certainly influenced in the UK by the leading organic protagonist at the time, Albert Howard. This is rather curious in that Howard had spent three decades in India and acknowledges to have learned more from Indian farmers than he could teach them (Howard, 1953). He must therefore have encountered the Vedic worldview and the associated widespread, spiritually oriented, ritualistic farming practices. We may speculate that Howard, who was known to be sceptical of Steiner's teachings (Barton, 2018; Clunies-Ross, 1990), remained unconvinced or that he may have been protecting his own reputation as a credible figure within the scientific establishment, engaging as he did in national scientific debates (Conford, 2001).

With regard to permaculture, Mollison strategically distanced the movement from what he felt were unqualified, personal belief systems (as described in the prelude to this chapter). He may yet have held nonconformist beliefs himself, in one of his recorded lectures letting slip that:

> The great preoccupation of Aboriginal Australians is dimension… and they can manipulate time, they can go else-when… There are 5 people alive who… can handle 7 dimensions easily… and they are saying that isn't it funny that as we are being decimated, some few of us are really getting a grip on things.[4]

With regard to the agroecology movement, it has on the one hand positioned itself as the most overtly political of its ecological stablemates and the one that most explicitly defends small-scale,

[3] International Federation of Organic Agriculture Movements (IFOAM).

[4] https://www.youtube.com/watch?v=rV6IjtEXyks, This video clip was accessed on 29 June 2020 but has since then (as of September 2020) been taken down by Tagari Publications.

indigenous farmers – and their knowledge systems – worldwide (Gonzalez-De Molina, 2013; van der Ploeg et al., 2019; Rosset and Altieri, 2017; Sevilla-Guzman and Woodgate, 2013). Yet although the movement includes many such farmers' organisations whose members live according to their cultural worldviews (see, e.g., the membership of La Via Campesina: https://viacampesina.org/en), its research and taught practice, like the permaculture and organic farming movements, are more characteristic of secular-material frameworks (see, e.g., Altieri, 1995; Gliessman, 1998). In arguing for the democratisation of knowledge and ways of knowing for agroecology, Pimbert (2018) calls for deep social change in order for new knowledge systems to emerge and identifies participatory democracy as providing the means to do so. Yet according to McGilchrist's treatise, as long as the left hemisphere, the emissary, is facilitating such change and doing so from within the worldview and structures it has itself created, impact at a systemic level may not be guaranteed without a conscious commitment to developing new cosmological and ontological frameworks.

This analysis of the aforementioned farming movements' key texts suggests that only biodynamic farming embraces the invisible dimension as a fundamental component of its cosmological and ontological frameworks and therefore also its research and taught practice. Steiner called his agricultural course, *Spiritual Foundations for a Renewal of Agriculture: A Series of Lectures* (Steiner, 1993). These lectures were not aimed at those new to farming; they were given as hints or 'indications' to already-practising farmers, veterinarians and others connected with the land and/or interested in spiritual matters. Many in the audience were also anthroposophists – that is, they were practising spiritual science – and they had invited Steiner to provide spiritual-scientific insights into the problems they were facing in agriculture and especially around plant and livestock health. Steiner had earlier developed spiritual science as both a spiritual path and a scientific method, emphasising that there is an objective and comprehensible spiritual basis for a reality that can be directly experienced through the development of human imagination and intuition, and verified by rational thought (McKanan, 2018). Courtney (2005) explains that this spiritual dimension enables biodynamic agriculture to provide a healing of the earth through developing a human understanding of the living forces of growth and life that originate from the sun, moon and zodiacal star system (which in biodynamics is termed 'the formative forces of the cosmos' (2005: 15)). Biodynamic production standards reflect this understanding, stating, for example, that 'In life processes many diverse forces, which do not originate solely from material interactions, work together. All agricultural measures rely on activating processes which enhance and enliven these natural connections' (BDCert, 2012: 7).

Contrary to Mollison's (mis)understanding of biodynamics, Steiner stressed that each farmer should experiment before making any claims about the practices. He explained, 'The aim of these lectures was to arrive at such practical ideas concerning agriculture as should combine with what has already been gained through practical insight and modern scientific experiment with the spiritually scientific considerations of the subject' (Steiner, 1924: 9). So, paradoxically, whilst biodynamic farming does not claim, like the other movements, to draw directly from indigenous knowledge, its worldview is in fact more compatible, and there is evidence that, for this reason, its practices may be synergistic with those of indigenous farming communities (Klocek, 2013; Ramprasad, 2012; Wright, 2019). Sprunt, a sustainable development worker, describes his successful collaboration with farming communities in Northeast India: '…prior to Christian missionaries arriving, they had also used the moon as a guide for various farming practices, they could readily access cow dung and horns – it excited the groups to realise that Biodynamics was appropriate in this context' (Sprunt, 2006: 86).

This blind spot of the agroecological, organic and permaculture movements to the invisible dimension of farming may be depicted through the differing frameworks in Figure 1.1. This chapter has discussed that industrial farming focuses on the visible-material dimension, and on reducing the whole to its component parts (also known as reductionism), as depicted in Figure 1a. Agroecology (in its broad sense) takes into account not only the parts but also the whole system, yet still from a visible-material perspective, as depicted in Figure 1b. This chapter introduces the concept of 'Subtle Agroecologies', that is the invisible counterpart to the physical, which may take a reductionist and/or a systems focus. So if we take both agroecology and Subtle Agroecologies together, we arrive at a

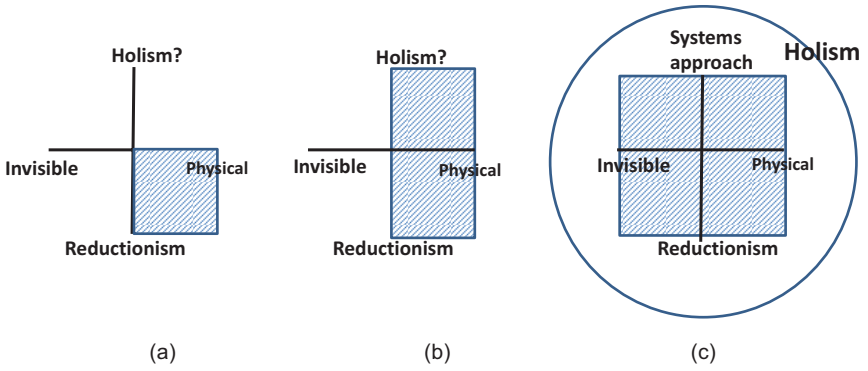

FIGURE 1.1 The conceptual frameworks of (a) industrial, (b) agroecological and (c) holistic farming.

more holistic framework as shown in Figure 1c. From this figure we can see that, by not recognising the invisible, the left hemisphere defines holism as being the opposite of reductionism, whereas this chapter posits holism as necessarily embracing the entirety of the visible and the invisible dimensions.

Based on the above, this chapter argues that as long as the research and taught practice of the ecologically based farming movements remain immersed in the secular-material dimension, they may only be paying lip service to indigenous worldviews as well as to the concept of holism (as depicted in Figure 1.1). Although those researchers and practitioners who take invisible phenomena seriously have been, at worst, subject to ridicule, and at best, in McGilchrist's words, 'discounted and seen as unimportant' when there appear to be more pressing, material issues to deal with (such as the dominant narrative of 'feeding the world'), this may be a trap of the left hemisphere's inability to reference the whole, and we may only truly solve the physical challenges facing humanity and the global environment when we do involve ourselves with invisible, subtle dimensions. Could embracing the hidden half of nature through farming enable us to experience a more authentic reality and thus to better understand and interact with nature in a more meaningful way? As Einstein and Infeld (1938: 262–263) famously wrote in relation to the nature of wave–particle duality:

> But what is light really? Is it a wave or a shower of photons? There seems no likelihood for forming a consistent description of the phenomena of light by a choice of only one of the two languages. It seems as though we must use sometimes the one theory and sometimes the other, while at times we may use either. We are faced with a new kind of difficulty. We have two contradictory pictures of reality; separately neither of them fully explains the phenomena of light, but together they do.

INTRODUCING SUBTLE AGROECOLOGIES: FARMING WITH THE HIDDEN HALF OF NATURE

In their book on the new science of consciousness, Pfeiffer et al. (2007: xxviii) pose the question: 'What would a world be like, based on a mindset that understood that all is One and interconnected?' Following this, what would farming be like? This chapter has been building up to introduce the concept of Subtle Agroecologies. The term is adapted from David Spangler's reference to the subtle world of spirit which he calls our 'second ecology' (Spangler, 2010). For biodynamic farmers, subtle forces are those that may be perceived by well-trained sense organs (Courtney, 2005). In contrast to the industrial approach, we farm *with* nature instead of 'doing-to' nature. As corroborated by McGilchrist and Baring, the exploration of indigenous worldviews forms a solid starting point for conceptualising the invisible or hidden half of nature, so as to develop an expanded cosmology that embraces the dimensions of vibrational energy, consciousness and spirit. For modernist societies, one could also take Steiner's teachings as an 'off the peg' cosmological framework, as described by Edmunds (2005). In congruence with indigenous beliefs around animism or panpsychism, Steiner

refers to an etheric dimension, a body of subtle forces, energy field of light or 'breath' of life, that is present throughout life forms including the plant kingdom (Marti, 2017).

The State-of-the Art of Subtle Agroecologies

The scant amount of literature on subtle farming practices may be attributed to several factors. Within contemporary, indigenous cultures, intergenerational knowledge about such practices tends to be passed through oral communication rather than written, and thus is often intangible or tacit (Smith, 2008). Moreover in these contexts, such practices have multiple functions and may not necessarily be identified as solely relating to agriculture, as exemplified in Box 1.1 which provides two examples of farming practices based on such ontologies. Moreover, food acquisition in indigenous cultures is not solely dependent on settled agriculture and its associated practices (Barucha and Pretty, 2010). Thus, whilst works by indigenous authors explore their cosmologies and epistemologies in relation to nature and the environment, (including Katerere et al. (2020), Kimmerer (2013), Liljeblad and Verschuuren (2019), Tuhiwai Smith (2012) and Yunkaporta (2020)), there is less written work that specifically describes subtle food production practices.

BOX 1.1 TWO EXAMPLES OF FARMING PRACTICE BASED ON INDIGENOUS ONTOLOGIES

From the Indian subcontinent, Ramprasad (2012) analyses the use of manure in traditional Indian agriculture and its relation to Vedic literature, explaining that spiritual and agricultural approaches converge in farming practices, where the objective is to maintain the equilibrium between the very existential elements of life which includes the use of physical products (of the cow) synchronised with planetary positions and the interaction of the five elements (earth, water, air, fire and ether). Underlying this is the Hindu worldview of a spiritual force that connects everything. Ramprasad explains how the ancient practice of applying Panchakavya, a concoction of five products of the (sacred) cow, not only has proven benefits as a biofertiliser, as a biopesticide and for restoring soil fertility, but also has medicinal applications and is used in ceremonies and rituals, for example to provide a link between 'the living and the dead, the seen and the unseen, the physical and the paraphysical, and earthly and heavenly forces' (2012: 179).

Based on a global study, Burke and Halberg (2005) theorised on the nature of the ancient megaliths across South and North America, Europe and Egypt. They identified that these structures were built not when times were good, but during periods of famine, and that archaeological remains consistently uncovered seed offerings at these sites. Interested in the abnormal surges of electrical ground current and airborne electric charge that these precisely engineered and precisely located structures seemed to magnify at specific times of the day, they undertook trials on seed germination and growth on these structures and also in ancient rock chambers, as well as in the laboratory under similar conditions. They found that stronger electrical activity enabled greater seed germination and growth, and conclude that these structures were designed to enhance crop fertility. They explain,

> Traditionally the ancients would not separate the physical from the non-physical, the soul from the land… … tremendous effort was repeatedly taken to create an edifice that seems to us today to be imbued with an aura of ritual, and yet our experiments show that it is tapping natural energy in a way that can increase food production.
>
> *Burke and Halberg (2005: 171).*

Some re-imagined farming approaches of today do include subtle techniques, such as Shumei Natural Farming from Japan, which aims to help individuals understand the natural laws and principles of the universe (Jerkins, 2012), and Sustainable Yogic Agriculture that derives from the Brahma Kumaris spiritual community in India and intends to harness the power of the human mind (Pandey et al., 2015).

In terms of research, and even accounting for that from the biodynamic movement, the scientific knowledge base on Subtle Agroecologies is also relatively small. Almost completely disregarded within agricultural research, other disciplines are circling more closely to shed light on the underlying concepts and mechanics of Subtle Agroecologies. Each of these contributes a small piece of a jigsaw puzzle whose whole picture is yet to be revealed. The science of sonochemistry, for example, explores the use of sound energy as a driving force for chemical transformations, and has been applied to enhance seed germination (Pour et al., 2016). Similarly, in the field of structural and molecular biology, research has investigated the effects of magnetic fields on germination, growth, development, and yield of plants (Teixeira da Silva and Dobránszki, 2016). From theoretical physics, David Peat examines the interface between quantum science and indigenous cosmologies and epistemologies (2012). Transpersonal psychologist Travis Cox explores the ideological and metaphysical underpinnings of alternative agricultural philosophies and coins the term 'transpersonal agroecologies' to include the processes and experiences of interaction with other-than-human beings on the farm (Cox, 2014). Similarly, Jack Hunter's curated compilation *Greening the Paranormal* (2019) deals directly with the fundamental issues of belief systems, ecology, consciousness, inter-species communication and reconnection to place. In particular, Hunter draws attention to the concept of re-enchantment in relation to academia as an antidote to the materialistic worldview, quoting Voss and Wilson (2017: 13),

> To feel enchanted is to step through a hidden portal into another way of seeing, into a new reality, where the reasonable, the certain, the measurable, and the predictable give way to the awesome, the wonderful, the delightful, the paradoxical, and the uncertain – and perhaps even the longing of the soul for some other kind of life beyond the exigencies of the everyday.
>
> *Hunter (2019: 39)*

Outside of the formal research academy, individuals and groups of practitioner-researchers have long been exploring this field. Some are based in intentional communities which have, for several decades, been exploring the deep connection between humans and nature in relation to food production (e.g. Caddy, 1978; Small-Wright, 1993). Others have formed farmer learning groups on the cutting edge of agroecology and regenerative agriculture. For example, an Australian farm education provider offers training 'where you learn how to effectively manage subtle energy to improve your profitability' (RCS, 2020). In another example, a selection of farm advisors from the USA and Australia have been interviewed about the energetic dimensions of nutrition farming (Sait, 2003). One of those interviewed, Prof. Philip Callahan (1923–2017), built up a substantial body of knowledge on the use of nonlinear far-infrared radiation for insect control, as well as on the application of paramagnetism in agriculture (2003: 142). Another interviewee, Hugh Lovel (1947–2020), discusses his seminal work 'Quantum Agriculture' how this new and evolving method of agriculture applies the discoveries in quantum physics and quantum biology to scientifically growing food of the highest quality. In his own book, Lovel (2014) explores specific techniques including the astronomical planting calendar, agricultural homeopathy, dowsing and radionics, weather moderation, energy balancing and alchemy.

Similarly inspired by quantum concepts is Henk Kieft (2019), an agricultural engineer whose curiosity was piqued when he met a group of Dutch farmers who had been experimenting with 'unconventional' farming techniques, such as playing music to dairy cows, yet were unable to find more information, support or interest from either agricultural extensionists or researchers. Mindful

of appealing to the secular-materialist worldview, Kieft has synthesised a range of techniques into three sequential categories:

1. Techniques based on energy and waves – which consider wave–particle duality, the applications of electromagnetism in health care and farming and their influence on physiological processes in the soil, plants, animals and people;
2. Techniques based on information fields, patterns and light language – which consider the energetic and informative aspects of nature, and measurements of vitality;
3. Techniques based on intention, intuition and consciousness – which consider subtle energies and how to sense and work with them.

For Kieft, the underlying concept is the relationship between mass, energy and information, and he throws down the gauntlet for researchers in the quantum sciences to step up to the challenge of exploring this applied field.

Towards a Definition of Subtle Agroecologies

Rather than a farming system in itself, this chapter proposes Subtle Agroecologies as superimposing a non-material dimension upon existing, materially based agroecological farming systems. Crucially, it is grounded in the lived experiences of humans working on, and with, the land over several thousand years to the present. It is helpful here to return to the concept of re-enchantment, which was originally used by Max Weber to critique modernist, secularised Western society (Jenkins, 2000). Historian Morris Berman advances the idea of re-enchanting the world by proposing that, rather than a return to the animistic traditions that existed prior the Cartesian era, Western society now needs a more appropriate consciousness which he suggests as being ecological, one that is grounded in the real and intimate connection between human and nature (Berman, 1981). In this sense we may conceive of the re-enchanting of agriculture as a way for people in modernist societies to reclaim their indigenous relationship with the living landscape they are in, a real-time, place-based relationship which may, therefore, be accessed and rekindled by anyone, anywhere.

Based on the predominant literature (Kieft, 2019; Lovel, 2014; Moore, 2011), the following is a collection of techniques, methods, arts and sciences associated with Subtle Agroecologies, presented simply in alphabetical order. This collection is not exhaustive, and many of the terms share similarities and may be used simultaneously.

Agro-homeopathy, astronomy, biodynamic preparations, bio-electromagnetism, dowsing, eco-alchemy, feng shui/geomancy, interspecies communication, intuition/direct knowing, love, mantras/chanting, paramagnetism, planting calendars, prayer/intention, radionics, ritual, sacred geometry, Schumann resonances, sound/ultrasound, teacher plants/psychoactives, water dynamisation.

Kieft (2019) suggests that the secular-materialist mind may be more attracted to those techniques that are based on energies and waves and that use ‘technology’ as an interface between the perceived subject and object, over those techniques that depend solely upon the human individual or group faculties of consciousness which are as yet both undeveloped and more difficult to scientifically validate. It could of course be counter-argued that every technique undertaken by a human being has an inherent influence of intention or consciousness, whether or not involving a piece of ‘kit’.

Additionally, although the focus of Subtle Agroecologies is on farming practices, through an indigenous lens this focus may itself be considered a form of separation from the inextricable human-nature relationship complex, and Huambachano (2019) refers to the inclusion of additional activities that celebrate, revere, give thanks for, seek permission or ask a question of, in the form of dance or other movement, ritual or prayer.

Based on this definition of the practice of Subtle Agroecologies, its science or research then follows as the systematic study of the nature of the invisible world as it relates to the practice of

agriculture. Depending on the situation, this may take a goal-oriented, reductionist focus on, for example, increasing crop and livestock yields or reducing the incidence of pests and diseases, or a wide-angled vision of simultaneously working with multiple factors and concerns, all based on an ethics of care and with the overall purpose of bringing and maintaining balance and harmony to the farm (and the farmer), the community, and the world.

CONCLUSION

This chapter has discussed the application of Subtle Agroecological farming practices as a means not only to enhance the sustainability of agriculture but also to fundamentally shift the way we treat nature as a whole. If ecologically based farming is to be truly holistic in its practice and live up to its claims of embracing indigenous knowledge and worldviews, then a serious consideration of Subtle Agroecologies is long overdue. By working on the vibrational-energetic dimension, by becoming more adept at embodied practices that enable more conscious interaction with nature, and by re-evaluating our understanding of our place in the world, we might move towards the healing of the hemispheric rift or imbalance that McGilchrist, Baring and others have spelled out. Through the re-enchantment of agriculture, we may go a long way towards achieving the balance and harmony that contemporary, ecologically based farming movements are ultimately aiming for.

ACKNOWLEDGEMENTS

Thank you to George McAllister, Miche Fabre Lewin and Flora Gathorne-Hardy for helpfully commenting on earlier drafts of this chapter.

REFERENCES

Alliance for a Green Revolution in Africa. (2016) *Going beyond Demos to Transform African Agriculture: The Journey of AGRA's Soil Health Program*. Nairobi: AGRA.

Altieri, M.A. (1995) *Agroecology: The Science of Sustainable Agriculture*, 2nd Edition. Boulder, CO: Westview Press.

Altieri, M. and Toledo, V. (2011) The agroecological revolution in Latin America: Rescuing nature, ensuring food sovereignty and empowering peasants. *The Journal of Peasant Studies*, 38(3): 587–612.

Balfour, E.B. (1977) *Towards a Sustainable Agriculture - The Living Soil*. Address to an IFOAM Conference in Switzerland in 1977. Reproduced with permission from the Organic Gardening and Farming Society of Tasmania Inc© 1995, Canberra Organic Growers Society Inc. https://www.cogs.asn.au/, Available online: https://soilandhealth.org/wp-content/uploads/01aglibrary/010116Balfourspeech.html (accessed October 10th 2020, paras 41, 62).

Baring, A. (2020) *The Dream of the Cosmos: a Quest for the Soul*, 3rd edition. Dorset: Archive Publishing.

Barton, G.A. (2018) *The Global History of Organic Farming*. Oxford: Oxford University Press.

Barucha, Z. and Pretty, J. (2010) The roles and values of wild foods in agricultural systems. *Philosophical Transactions of the Royal Society B*, 365: 2913–2926.

BDCert (2012) *Demeter and Organic Production Standards, for the Use of Demeter and Related Trademarks*. Stroud: Biodynamic Association Certification. December 2012 edition. http://bdcertification.org.uk/wp/wp-content/uploads/2016/10/Organic-and-Demeter_Production-Standards.pdf (accessed September 10th 2020).

Berman, M. (1981) *The Re-Enchantment of the World*. Ithaca/London: Cornell University Press.

Burke, J. and Halberg, L. (2005) *Seed of Knowledge, Stone of Plenty: Understanding the Lost Technology of the Ancient Megalith-Builders*. San Francisco/Tulsa: Council Oak Books.

Caddy, E. (1978) *Foundations of Findhorn*. Moray: Findhorn Press.

Callicott, J.B. (1990) The metaphysical transition in farming: From the Newtonian-mechanical to the Eltonian ecological. *Journal of Agricultural Ethics* 3: 36–49.

Chief Dan George (2004) *The Best of Chief Dan George*. British Colombia: Hancock House Publishers.

Clunies-Ross, T. (1990) Organic food: Swimming against the tide. In Marsden, T. and Little, J. (eds.), *Political, Social and Economic Perspectives on the International Food System*. Aldershot: Avebury, pp. 200–214.

Clunies-Ross, T. and Hildyard, N. (2013) *The Politics of Industrial Agriculture*. London: Earthscan.
Conford, P. (2001) *The Origins of the Organic Movement*. Edinburgh: Floris Books.
Conford, P. (2002) The myth of neglect: Responses to the early organic movement, 1930–1950. *The Agricultural History Review*, 50(1): 89–106.
Conford, P. (2020) *Realising Health, the Peckham Experiment, its Descendents, and the Spirit of Hygiea*. Newcastle-upon-Tyne: Cambridge Scholars Publishing.
Conner, C.D. (2005) *A People's History of Science: Miners, Midwives and Low Mechanicks*. New York: Bold Type Books.
Cotter, J. (2003) Troubled harvest: Agronomy and revolution in Mexico, 1880–2002. *Contributions in Latin American Studies*. Westport, CT: Praeger.
Courtney, H.J. (2005) *What Is Biodynamics? A Way to Heal and Revitalise the Earth: Seven Lectures by Rudolf Steiner*. Great Barrington, MA: Steiner Books.
Cox, T. E. B. (2014) Transpersonal agroecology: The metaphysics of alternative agricultural theory. *Journal of Transpersonal Psychology*, 46: 35.
Critchlow, K. (1979) *Time Stands Still, New Light on Megalithic Science*. Edinburgh: Floris Books.
Duran, E. (2006) *Healing the soul wound: Counseling with American Indians and other native peoples*. New York: Teachers College Press. 208pp.
Edmunds, F. (2005) *An Introduction to Anthroposophy: Rudolf Steiner's World View*. Forest Row: Rudolf Steiner Press.
Einstein, A. and Infeld, L. (1938) *The Evolution of Physics: The Growth of Ideas from Early Concepts to Relativity and Quanta*. Cambridge: Cambridge University Press.
Elder, S. and Dauvergne, P. (2015) Farming for Walmart: The politics of corporate control and responsibility in the global South. *The Journal of Peasant Studies*, 42(5): 1029–1046.
Forbes, J.D. (2011) *Columbus and other Cannibals: The Wetiko Disease of Exploitation, Imperialism, and Terrorism*. New York: Seven Stories Press.
Fox, J.B. (2009) Indigenous science. A celebration of Pacific culture. *Cultural Survival Quarterly,* 33: 1.
Gliessman, S.R. (1998) *Agroecology, Ecological Processes in Sustainable Agriculture*. Boca Raton, FL: Lewis Publisher.
Gonzalez-de Molina, M. (2013) Agroecology and politics. How to get sustainability? About the necessity for a political agroecology. *Agroecology and the Transformation of Agri-Food Systems: Transdisciplinary and Participatory Perspectives*, 37(1): 45–59.
Goulding, K.W.T., Trewavas, A., and Giller, K.E. (2011) Feeding the world: A contribution to the debate. *World Agriculture*, 2(1): 32–38.
Haverkort, B., van 't Hooft, K., and Hiemstra, W. (eds). (2002) *Ancient Roots, New Shoots: Endogenous Development in Practice*. London: Zed Books Ltd.
Hill, S.B. (1991) Ecological and psychological prerequisites for the establishment of sustainable agriculture prairie communities. In Martin, J. (ed.), *Alternative Futures for Prairie Agriculture Communities*. Calgary: University of Calgary, 33 pp.
Howard, A. (1943) *An Agricultural Testament*. New York: Oxford University Press.
Howard, L. (1953) *Sir Albert Howard in India*. London: Faber and Faber Ltd.
Huambachano, M.A. (2019) Indigenous food sovereignty: Reclaiming food as sacred medicine in Aotearoa New Zealand and Peru. *New Zealand Journal of Ecology*, 43(3): 3383.
Hunter, J. (2019) *Greening the Paranormal, Exploring the Ecology of Extraordinary Experience*. Derby: August Night Press.
IPES-Food (2016) From uniformity to diversity: A paradigm shift from industrial agriculture to diversified agroecological systems. International Panel of Experts on Sustainable Food systems. Available online: http://www.ipes-food.org/_img/upload/files/UniformityToDiversity_FULL.pdf (accessed August 14th, 2020).
Jenkins, R. (2000) Disenchantment, enchantment and re-enchantment. *Max Weber Studies,* 1(1): 11–32.
Jerkins, D. (2012) *Spirit of the Land: Shumei Natural Agriculture Philosophy and Practice*. Koka: Shumei International Press.
Katerere, D.R., Applequist, W., Aboyade, O.M., and Togo, C. (2020) *Traditional and Indigenous Knowledge for the Modern Era. A Natural and Applied Science Perspective*. Boca Raton, FL/London/New York: CRC Press, Taylor & Francis Group.
Kieft, H. (2019) *Quantum Leaps in Agriculture: Exploring Quantum Principles in Farming, Gardening and Nature*. Mauritius: Lambert Academic Publishing.
Kimmerer, R.W. (2013) *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants*. Minneapolis, MN: Milkweed Editions.

King, F.H. (2004) *Farmers of Forty Centuries, Permanent Agriculture in China, Korea, and Japan*. New York: Dover Publications Inc.

Klocek, D. (2013) *Sacred Agriculture, the Alchemy of Biodynamics.* Great Barrington, MA: Lindisfarne Books.

Kohler, F., Holland, T.G., Kotiaho, J.S., Desrousseaux, M., and Potts, M.D. (2019) Embracing diverse world-views to share planet Earth. *Conservation Biology*, 33(5): 1014–1022.

Lang, T. (2004) *Food Wars: The Global Battle for Mouths, Minds and Markets.* Abingdon: Routledge.

Levy, P. (2013) *Dispelling Wetiko, Breaking the Curse of Evil*. California: North Atlantic Books.

Liljeblad, J. and Verschuuren, B. (eds) (2019) *Indigenous Perspectives on Sacred Natural Sites: Culture, Governance and Conservation*. London/ New York: Earthscan/Routledge.

Lovel, H. (2014) *Quantum Agriculture: Biodynamics and Beyond.* Blairsville, Georgia: Quantum Agriculture Publishers.

Macy, J. and Brown, M.Y. (2014) *Coming Back to Life: The Updated Guide to the Work That Reconnects.* Gabriola: New Society Publishers.

Marsden, M. (1988) The natural world and natural resources. Māori value systems and perspectives. Resource Management Law Reform Working paper 29, Part A. Wellington: Ministry for the Environment.

Marshack, A. (1972) *The Roots of Civilisation.* London: Weidenfeld & Nicolson Ltd.

Marti, E. (2017) *The Etheric, Broadening Science through Anthroposophy. Volume 1: The World of the Ethers.* Forest Row: Temple Lodge Publishing.

Mashingaidze, S. (2016) Cosmovision and African conservation philosophy: Indigenous knowledge system perspective. *Environmental Economics*, 7(4): 25–33.

McGilchrist, I. (2019) *The Master and His Emissary, the Divided Brain and the Making of the Western World*, New Expanded Edition. New Haven, CT/London: Yale University Press.

McKanan, D. (2018) *Eco-Alchemy, Anthroposophy and the History and Future of Environmentalism.* Berkeley: University of California Press.

Merchant, C. (1990) *The Death of Nature: Women, Ecology, and the Scientific Revolution.* San Francisco, CA: Harper One.

Mesa-Lago, C. (1998) Assessing economic and social performance in the Cuban transition of the 1990s. *World Development,* 26(5): 857–876.

Mollison, B. (1996) *Travel in Dreams: 'One Fat Foot after Another': The Autobiography of Bill Mollison by Bill Mollison.* Stanley: Tagari Press.

Mollison, B. and Slay, M.R. (2013) *Introduction to Permaculture.* Stanley: Tagari Publications.

Moore, A. (2011) *Stone Age Farming: Tapping Nature's Subtle Energies for Your Farm or Garden.* Victoria: Python Press.

Morton, J. (2014) Britain's Last Witch Trial. News. The Law Society Gazette. 29th September 2014. Available online: https://www.lawgazette.co.uk/obiter/britains-last-witch-trial/5043624.article#:~:text=It%20will%20be%2070%20years, nine%20months%20in%20May%201944 (accessed June 28th 2020).

Orr, D.W. (1991) *Ecological Literacy: Education and the Transition to a Postmodern World.* New York: State University of New York Press.

Pandey, S.T., Verma, O., Kewalanand, Pandey, D.S., Gill, S., Patel, J.C., Patel, G.N., Patel, D.M., Patel, B.T., Patel, B.B., Patel, D.S., Patel, I.S., Patel, R.N., Singh. N.K., and Thakur, D.M. (2015) Yogic farming through Brahma Kumaris Raja yoga meditation: An ancient technique for enhancing crop performance. *Asian Agri-History* 19(2): 105–122.

Peat, F.D. (2005) *Blackfoot Physics: A Journey into the Native American Universe*. Boston, MA: Weiser Books.

Pfeiffer, T., Mack, J.E., and Devereux, P. (eds.) (2007) *Mind before Matter: Visions of a New Science of Consciousness.* Hampshire: O Books.

Pierotti, R. (2011) The world according to Is'a: Combining empiricism and spiritual understanding in indigenous ways of knowing. In Anderson, E.N., Pearsall, D., Hunn, E. and Turner, N. (eds.), *Ethnobiology.* Hoboken, NJ: Wiley-Blackwell, pp. 65–89.

Pimbert, M. (2018) Democratising knowledge and ways of knowing for food sovereignty, agroecology and biocultural diversity. In Pimbert, M. (ed.), *Food Sovereignty, Agroecology and Biocultural Diversity, Constructing and Contesting Knowledge*. London/New York: Routledge.

Ponisio, L.C. and Erlich, P.R. (2016) Diversification, yield and a new agricultural revolution: Problems and prospects. *Sustainability,* 8: 1118.

Posey D.A. (1998) The 'balance sheet' and the 'sacred balance': Valuing the knowledge of indigenous and traditional peoples. *Worldviews*, 2(2): 91–106.

Pour, M. E., Hobbi, M., Ghasemi, H., and Nazari, M. (2016). Plausible mechanisms by which ultrasonic waves affect seeds. *Plant Breeding and Seed Science*, 74(1): 85–92.

Ramprasad, V. (2012) Manure, soil and the Vedic literature: Agricultural knowledge and practice on the Indian Subcontinent over the last two millennia, Chapter 12. In Jones, R. (ed.), *Manure Matters: Historical, Archaeological and Ethnographic Perspectives.* Abingdon: Taylor & Francis Group.

RCS. (2020) Quantum leap workshop series. RCS Australia. https://www.rcsaustralia.com.au/products/family-business/graduate-services/quantum-physics/ (accessed September 10th, 2020).

Rickard, S. (2019) *Plant Protection Products: The Value of Their Contribution to Lowering UK Household Expenditure on Food and Drink*. Peterborough: Crop Protection Association. https://cropprotection.org.uk/media/1153/sean-rickard-food-prices-report-final.pdf.

Röling, N.G. and Jiggins, J. (1998) The ecological knowledge system. In Röling, N.G. and Wagemakers, M.A.E. (eds.), *Facilitating Sustainable Agriculture*. Cambridge: Cambridge University Press.

Rosset, P. and Altieri, M. (2017) *Agroecology: Science and Politics. Agrarian Change & Peasant Studies Book 7.* Rugby: Practical Action Publishing.

Roszak, T. (1992) *The Voice of the Earth.* New York: Simon and Schuster.

Sait, G. (2003) *Nutrition Rules: Guidelines from the Master Consultants.* Yandina: Soil Therapy Pty Ltd.

Sevilla Guzmán, E. and Woodgate, G. (2013) Agroecology: Foundations in agrarian social thought and sociological theory. *Agroecology and Sustainable Food Systems*, 37(1): 32–44.

Sinclair, M. and Thompson, M. (2001) *Cuba Going Against the Grain: Agricultural Crisis and Transformation*. Washington, DC: Oxfam America.

Small-Wright, M. (1993) *Perelandra Garden Workbook: A Complete Guide to Gardening with Nature Intelligences.* Virginia: Perelandra.

Smith, J. (2008) *Intangible Heritage (Key Issues in Cultural Heritage).* Abingdon: Routledge.

Sonnenfeld, D.A. (1992) Mexico's "Green Revolution," 1940–1980: Towards an environmental history. *Environmental History Review*, 16(4): 28–52.

Spangler, D. (2010) *Subtle Worlds: An Explorer's Field Notes.* Traverse City, MI: Lorian Press.

Sprunt, J. (2006) Biodynamic agriculture: Adaptability and sustainability for farmers around the world: Case studies from Northeast India. In Kristiansen, P. and Kemp, C. (eds.), *Third OFA National Organic Conference "Organics - Solutions to Climate Change",* Sydney, Australia 2006. Queensland: Organic Federation of Australia, pp. 86–94.

Steiner, R. (1924) To all members: The meetings at Koberwitz and Breslau. *Anthroposophical Movement*, 1: 9–11.

Steiner, R. (1928) *The Story of My Life*. London: Anthroposophical Publishing Co.

Steiner, R. (1993) *Agriculture: Spiritual Foundations for the Renewal of Agriculture.* East Troy, WI: Bio-Dynamic Farming & Gardening.

Tchombe, T.M.S. and Lukong, T.E. (2018) Dynamics of indigenous socialization strategies and emotion regulation adjustment among NSO early adolescents, North West region of Cameroon. *International Journal of Humanities Social Sciences and Education (IJHSSE)*, 3(8): 86–124.

Teixeira Da Silva, J.A. and Dobránszki, J. (2016) Magnetic fields: how is plant growth and development impacted? *Protoplasma*, 253(2): 231–248.

Tuhiwai Smith, L. (2012) *Decolonising Methodologies, Research and Indigenous Peoples*. London/ New York: Zed Books.

UNDRIP (2007) United Nations declaration on the rights of indigenous peoples. G.A. Res. 61/295. September 13th, 2007. https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2018/11/UNDRIP_E_web.pdf (accessed June 30th 2020).

van der Ploeg, J.D., Barjolle, D., Bruil, J., Brunori G., Costa Madureira, L.M., Dessein, J., Drągg, Z., Fink-Kessler, A., Gasselini, P., Gonzalez de Molina, M., Gorlach, K., Jürgens K., Kinsella, J., Kirwan, J., Knickel, K., Lucaso, V., Marsden, T., Maye, D., Migliorini, P., Milone, P., Noe, E., Nowak, P., Parrott, N., Peeters, A., Rossid, A., Schermer, M., Ventura, F., Visser, M., and Wezel, A. (2019) The economic potential of agroecology: Empirical evidence from Europe. *Journal of Rural Studies*, 71: 46–61.

Vorley, B. (2003) *Food Inc. Corporate Concentration from Farmer to Consumer.* London: UK Food Group/IIED.

Voss, A. and Wilson, S. (2017) *Re-Enchanting the Academy.* Auckland: Rubedo Press.

Whitewashed Hope: a message from 10+ indigenous leaders and organisations. (2020) Open source document bit.ly/IndigenousWorldViews (accessed November 24th 2020).

Wright, J. (2009) *Sustainable Agriculture and Food Security in an Era of Oil Scarcity, Lessons from Cuba*. London: Earthscan.

Wright, J. (2019) A call for the biodynamic movement to come out about spiritual, non-material farming philosophy and practice. In Wahl, V., Hach, A., Sommer, S., Derkzen, P., Brock, C., Fritz, J., Spengler-Neff, A., Hurter, U., and Florin, J.-M. (eds.), *Evolving Agriculture and Food: Opening up Biodynamic Research. Contributions to the 1st International Conference on Biodynamic Research*, September 5th to 8th 2018, Dornach, Switzerland. Dornach: Section for Agriculture, p. 105.

Yunkaporta, T. (2020) *Sand Talk: How Indigenous Thinking Can Save the World*. San Francisco, CA: HarperOne.