



ADVANCES IN AGROECOLOGY

Subtle Agroecologies

Farming With the Hidden
Half of Nature

Edited by

Julia Wright



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This book is dedicated to Hugh Lovel (1947–2020)
pioneer of quantum agriculture and a gentle soul



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Editors

Julia Wright has a background in international research and development, seeking to integrate ecological (organic and permaculture) thinking into conventional agricultural systems and organisations, including in humanitarian settings. After studying at Trinity St David (University of Wales), Silsoe College (Cranfield University) and Wye College (London University), she worked for some years in South America before undertaking a PhD at Wageningen University, The Netherlands, on the coping strategies of the Cuban farming sector during the country's period of food and fuel shortages in the 1990s, resulting in the Earthscan publication *Sustainable Agriculture and Food Security in an Era of Oil Scarcity: Lessons from Cuba* (2009). Returning to the UK in 2003 to lead the International Programme of the organic NGO Garden Organic (formerly the Henry Doubleday Research Association), in 2011 she was involved in establishing the Centre for Agroecology, Water and Resilience at Coventry University, where she has since been developing a research programme in the applied discipline of Subtle Agroecologies.

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Introduction to the Book

Julia Wright

*If you talk to animals, they will talk with you
and you will know each other.
If you do not talk to them you will not know them
and what you do not know you will fear.
What one fears one destroys.**

THE NATURE OF THE INVISIBLE: RECONCILING SCIENCE AND SPIRITUALITY

This book examines the principles and practices of farming and food systems from the perspective that half of life is not visible to us. Everything that we know (and do not know) about the physical world has an invisible, subtle counterpart that has been scarcely considered in the farming practices or research of modernist cultures. Subtle Agroecologies is not a farming system in itself, but superimposes a non-material dimension upon existing, materially based agroecological farming systems.

By *visible*, we are talking about that which is physical and material, things that can be observed and measured. Seeing the world chiefly as matter, and also as operating according to mechanical laws, is characteristic of the Newtonian – Cartesian philosophical paradigm of sixteenth- and seventeenth-century Europe. Yet even during this period, philosophers and scientists were continuing to hold, explore and debate a range of other theories and beliefs of a non-material nature. Newton himself, for example, held deep theological interests covering alchemy, spirituality and lost Biblical works (Chambers, 2018), and historian John Brooke provides a fascinating account of how the development of the secular-material perspective held by modernist societies today was more a factor of politics and power than of being arrived at through scientific study (Brooke, 1991).

So what do we mean by *invisible* or non-material? It is that which we cannot see or initially perceive with our five basic senses, a dimension that may be described in secular terms as involving vibrational energy, consciousness, ether, sentience/intelligence and/or electromagnetic or sound waves/frequencies. Research advances continue to open up a broader and deeper understanding of this dimension, including through the disciplines of quantum mechanics, consciousness and phenomenological studies, bioelectromagnetics, chronobiology, sonochemistry, neuroscience and transpersonal psychology. Meanwhile, our lives are increasingly facilitated by the technological applications of such advances.

Independent of scientific advances is the belief in, and experience of, invisible realms and phenomena, ranging from the non-allopathic, energy-based medical systems and the practices of mindfulness and martial arts, to the innate societal recognition of human intuition and premonition. The majority of the world's cultures continue to regard the invisible dimension as a matter of course, and may perceive it as a spirit realm and/or involving subtle forces or entities (Berkes, 1999; Peat, 2005). Even in Western Europe where such a worldview appears not to be the norm and where such beliefs - and corresponding behaviours and practices - are commonly adopted from other cultures, relevant indigenous, place-based traditions are being reclaimed and revived, some having been forced to go underground during certain periods in history (see, e.g., Arlow and Adam, 2011; Marrable, 2019; Timmons, 2006; Uzzell, 2019).

* 'My Heart Soars' from *The Best of Chief Dan George*, copyright 2004 by Hancock House Publishers Ltd., ISBN 978-088839-544-3, used with permissions – www.hancockhouse.com.

Following this, the concept of Subtle Agroecologies holds two ontological perspectives that diverge from the secular-materialistic worldview. One is the basic existence of an invisible dimension to nature. The second concerns the nature of this dimension, as potentially involving not only light- and sound wave-based and magnetic field-based phenomena – some of which we now have the technology to capture and measure – but also more ethereal aspects of consciousness and/or spirit. The term spirit is variously interpreted, and here it is defined as a vital principle or animating force within all living things which is inextricably linked to consciousness (Smith, 2020). Also known as panpsychism – the view that everything has a mind – soul (Bruntrup and Jaskolla, 2017) – this definition of spirit holds resonance across indigenous cultures. Returning to Brooke's historical review of the relationship between science and spirituality, any conflicts between the two have, he reminds us, been overplayed and are simply a relatively recent development of Western Europe, instigated by political, social and economic factors (Brooke, 1991). This book takes an open minded approach to explore these concepts in the field of agriculture.

INTRODUCING THIS BOOK: THE CHALLENGES OF TRANSDISCIPLINARY AND ONTOLOGICAL DIVERSITY

Agriculture as a philosophy is eminently positioned to explore a range of existential questions relating to who we are, why we are here and the nature of reality, all grounded in the practicalities of farming. In his examination of mankind's sense of the sacred, Gregory Bateson argues that our spiritual sense arises from the recognition that we are part of nature and part of a creative wholeness and that it is only through this recognition that we may avoid ecological disaster (Bateson, 1987). Deep interaction with nature through the practice of farming provides the opportunity for this recognition to arise, and at the same time farming holds some of the keys to averting such disaster. For example, evidence from the organic farming sector shows that one does not have to hold sympathetic beliefs in order to start implementing more ecologically based farming practices, yet such practice may cause one's beliefs to change (Hall and Mogorodoy, 2001).

This book could have taken many philosophical directions and it is beyond the physical scope of one volume to comprehensively cover such a vast subject. Instead, the book makes a solid contribution through the presentation of a collection of curated essays or chapters, to serve as both a foundation stone and inspiration for subsequent research on the invisible dimension of agriculture. Each contributor to the book has written a stand-alone chapter, and contributing to this book does not mean that she or he ascribes to any or all of the other contributions, coming as they do from a range of different perspectives. The contributors span 12 countries across 5 continents, comprising Australia, Brazil, Canada, Cuba, France, Germany, the Netherlands, South Africa, Switzerland, the UK, the USA and Zimbabwe. Care has been taken to include contributions not only from experienced researchers but also from early-career and doctoral scholars.

Sustainable farming requires the farmer to be a Jack- or Jill-of-all-trades, holding knowledge in many subject areas, and the main challenge of this book has been to manage this multi- and transdisciplinary nature and the resulting content. Transdisciplinarity in the research context works both between and across the disciplines, as well as *beyond* them (Pimbert, 2018). This book therefore encompasses academic and industry contributors from the natural and social sciences as well as the arts and humanities. In terms of going beyond the formal academy, the Agricultural Knowledge System serves as a useful epistemological framework to identify the agricultural knowledge sources as well as the knowledge processes, flows and interactions between all stakeholders involved – farmers and their households and communities, as well as researchers, advisors, enterprises, NGOs and so on (EIP-AGRI, 2018). Science takes just one seat around this table; it is the farmers and growers, and others in their communities, who are the real experts of, and decision-makers about, their own agroecosystems based on local agroclimatic and sociocultural conditions. This book suggests that farmers and others working close to the land are also the interlocutors with another source of knowledge: the hidden half of nature. Nature as a primary knowledge source has yet to be

included in Agricultural and Ecological Knowledge Systems frameworks. Yet sourcing knowledge and making sense of it, for the farmer, may involve not only standard reasoning, experiencing, sensory perceiving and communicating with other humans, but also, as we will see, conscious intention, intuition, direct knowing or communication with the other-than-human.

This transdisciplinary context, and the fact that many of the topics explored in this book have not yet been widely researched, has necessitated extending the range of book contributors beyond the formal research academy. The knowledge holders include skilled practitioners or practitioner-researchers who are quite literally operating in the field, and their non-academic contributions in this book provide very different ontological perspectives or lenses through which the concept of Subtle Agroecologies may be approached.

In this book, the challenges of multidisciplinarity and ontological diversity rested to a large extent with the contributors themselves. With such a broad potential readership, they were required to write as if for the layperson rather than for others in their particular discipline, and this necessitated setting aside discipline-specific terminology or an assumed prior knowledge of the subject. In some instances, the setting aside of ontologically-specific terminology was also required. Therefore, some of what is communicated in these pages may be simplified versions of what contributors would share amongst their own peer groups.

BOOK OVERVIEW: A CONTRIBUTION OF PHILOSOPHIES, TECHNOLOGIES, METHODOLOGIES AND PRACTICE

The book's content is organised into four clusters or sections. The first section is dedicated to providing a range of philosophical and theoretical perspectives as a 'way in' to this subject. The second section demonstrates existing, pioneering, commercial, largely wave-based applications in agriculture. The third explores innovative and appropriate methodologies for researching and working with the hidden half of nature, whilst the fourth and final section is dedicated to the non-academic voices of practitioners who are working directly in agriculture and associated fields.

SECTION 1: TRANSFORMATIVE EPISTEMOLOGICAL, PHILOSOPHICAL AND THEORETICAL FRAMEWORKS

This section, and the whole book, kicks off with a provocative look at what may be behind the secular materialistic approach of the agricultural sector (Chapter 1, **Wright**). Drawing from the works of two contemporary scholars of neurobiology and psychology, the chapter explores how Western European culture and society may be a product of a left hemisphere-dominant brain and how this irregularity, along with the widespread denigration of the feminine, may be both the cause – and hold the keys to a way out of – the current industrial, secular-materialist paradigm, a way out that would necessarily include the revival and reclaiming of whole-brain, indigenous worldviews. Through a critical examination of modernist, ecologically-based farming movements, it deduces that to date, their science and taught practice also stems from this paradigm. The chapter introduces the concept of Subtle Agroecologies as a means of re-enchanting or reviving ecologically-based agriculture and argues that through its application, we might not only desist from harming nature but might also be better equipped to co-create more harmonious farming futures.

Chapter 2 (**Haverkort**) takes forward the issue of indigenous knowledge and worldviews through the lens of the need for cognitive justice. It asserts that local ways of knowing are expressions of science on their own, being based on a specific worldview, methodology of learning, epistemology and values of their own knowledge community. Identifying the commonality amongst these worldviews of three dimensions – the spiritual, social and material – it provides examples of the spiritual dimension of agricultural systems from different cultures. The chapter suggests that a constructive combination of a diversity of sciences holds greater potential to address the multifaceted problems

the world is facing than a sole reliance on mainstream science and concludes by outlining how inter-science cooperation may function. Chapter 3 (**McAllister and Chikukwa**) continues with the critique of developmentalism, structured as a series of musings between a community activist and a political ecologist in Zimbabwe's Eastern Highlands. Lamenting the erosion of bio-cultural diversity, knowledge and social connection through colonial interventions since the end of the nineteenth century, it suggests how farming approaches that reconnect people to one another and their landscape are being undermined by coercive power relations and sometimes violent environments. Yet throughout this persists the community knowledge of the spirits that inhabit the natural world, the ancestors and the sacred places, and the need to preserve and maintain relationships with these. In particular, the relationship between mermaids and the recent devastating cyclones is discussed, demonstrating the striking coexistence of different worldviews.

Chapter 4 (**Milne**) turns to a thoughtful philosophical reflection on reconnecting with the ancient sense of nature as originally intuited in cosmological myths and later with the rise of Greek philosophy. It demonstrates how the rational and the ethical were once always connected, and that these provided a society with its sense of being part of nature and of the greater cosmic order. Focusing on the example of ownership and right use of property, it traces the rise of natural law in the Middle Ages and how the emergence of the mechanistic vision of nature in the seventeenth century led to Western society losing its participatory relationship with nature, with the consequences of commercial exploitation and environmental abuse. It concludes on a positive note with the reminder that all people have an innate sense of the whole and a moral call to live in harmony with nature. Chapter 5 (**Cox**) takes the example of soil to explore non-dualism from an eco-psychology perspective. This chapter suggests that the current move in the environmental humanities to develop a fuller picture of human relationships to soil will be thwarted if it doesn't overtly challenge the assumptions of modern dualistic culture. Building on previous works that discuss human relationships to both 'inner soil' and 'outer soil', it proposes eco-psychology as a framework not only to highlight the problematic assumptions that inform many modern perspectives about soil, but also to provide an alternative way forward which includes, simultaneously, acknowledging soil on its own terms, encouraging human relationships with soil and understanding humans as soil. It concludes by proposing three non-dualistic frameworks for consideration: eco-feminism, Buddhism and indigenous perspectives. Similarly, calling for a new kind of science and perspective for seeing the world, Chapter 6 (**Brook**) proposes the alternative scientific methodology of Johann Wolfgang von Goethe, which countered both the prevailing vitalism and mechanistic ways of seeing the world which dominated the science of his time (1749–1832). This chapter explains how Goethe's approach was of an informed holism that did not reject science but aimed to direct its path towards a more sensitive appreciation of the generative power of nature, which he called a 'delicate empiricism'. Using human faculties such as imagination and intuition, Goethe's approach could inform new ways of engaging with the environment, such as through agroecology. The link between Goethe and Rudolf Steiner (the initiator of biodynamic agriculture) and phenomenology is explained, and the chapter also introduces the work of cytogeneticist Barbara McClintock (discoverer of the transposition of genes). Shifting to methodology in the hard natural sciences, Chapter 7 (**Tuszyński**) brings the quantum perspective to the table. It presents a historical overview of the development and application of quantum physics methodology to various fields of science beyond physics, especially biology and consciousness, and explains how, in recent years, individual biological phenomena such as photosynthesis and bird navigation have been experimentally and theoretically analysed using quantum methods, building the conceptual foundations for quantum biology. Quantum concepts have also been employed to explain metabolism and how processes scale with body size and with each other. The chapter explains how several proposals, especially the Orch OR hypothesis, have been put forth in an effort to introduce a scientific basis to the theory of consciousness, and discusses the merits and potential extensions of these approaches. The final chapter in this section (Chapter 8, **Smitsman and Currivan**) rounds up by proposing a way to heal our relationship with Gaia by offering a wholeworld-view that addresses the many fragmented perspectives of our world and life and offers a more unified understanding of what has now become the greatest existential challenge our species has ever faced

at this scale. The wholeworld-view is explored through the study of infodynamics, which focuses on informational patterns and content that reveal deeper implicit dimensions that inform and underlie our manifest physical world. The chapter ends with an exploration of the infodynamics of living systems as thriving systems, and how this can be applied to the design principles and processes for developing the agroecological farming systems of tomorrow.

SECTION 2: THE INTERSECTION OF WAVE-BASED SCIENCE AND AGRICULTURE

This section comprises eight chapters that draw chiefly from empirical studies in the applied natural sciences, about techniques and technologies that are in commercial practice in the agri-food sector. It starts with a review of the mitigating effects of electromagnetic fields on plants sown under environmental stress conditions in Cuba (Chapter 9, **De Souza-Torres**). Focusing on static and alternating magnetic fields and pulsed fields in the range of extremely low frequencies, it shows how they exhibit a mitigating effect on key impact factors including drought, salinity, ultraviolet light, heavy metal toxicity, high temperatures, pathogens, bacteria, fungi and viruses. They do this by improving seed vigour, plant growth, water relations, photosynthesis, accumulation of biomass and concentration of defence secondary metabolites, and reducing free radicals and oxidative stress due to the activation of plant defence mechanisms. Shifting to the impact of sound waves on plant growth, Chapter 10 (**Prévost et al.**) explains how the emission of acoustic waves of a quantum nature during gene expression in living organisms may be predicted through the discipline of genodics. Using this approach and without the use of any other inputs, it describes experiments and treatments undertaken in France to address grapevine trunk diseases in viticulture, and in particular Esca, a destructive disease of the woody tissues of grapevine, as well as bacterial and virus diseases in market gardening. The results of some of these treatment projects on vines, endives and courgettes are provided, indicating a significant reduction in the impact of pathogens on agricultural production, and confirming the reliability of the method as a no-input treatment for plant pathologies for a more rational agriculture. Chapter 11 (**Jovchelevich**) moves to Brazil and skywards to consider the influence of astronomical rhythms on the yield and quality of carrot roots sown on different dates under biodynamic management. It commences by providing examples of the use of ethno-astronomy in the South, as well as selected scientific research on the influence of the moon on plants and animals including in biodynamic agriculture. Field trials were carried out over two periods on a biodynamic farm in Botucatu, São Paulo State, and the effects associated with planting at specific lunar positions were measured by the deviations from the trend curve. Although several characteristics were evaluated, dry root mass was the only one that, in the contrast between averages, showed significant results in the two periods of the experiment and suggested that sowing during the synodic new phase produced better results than sowing during other lunar phases. Returning to electromagnetic parameters, Chapter 12 (**Moerman**) presents a snapshot of the work that scientists have undertaken on electromagnetic phenomena in plants. It gives a brief explanation of the measurable electric parameters and which of those look the most promising to expand the growers' toolbox for monitoring plant growth and to provide better information to support decisions. It also discusses bioelectric methods that can help with simple and cheap comparisons of product health quality. These methods help to change the notion that plant growth is only about physiology, yet more in-depth and systematic work is needed. The chapter concludes by reflecting on the lack of commercial breakthroughs in this sector.

Research on agro-homeopathy (Chapter 13, **Boff et al.**) is included in this section because its working principle appears to involve the action of electromagnetic waves. Providing an integrated account of the nature, effectiveness and potential of homeopathy for sustainable agriculture, it commences with an overview of the science of homeopathy and the art of healing throughout history. It then looks at homeopathic preparations and their modes of action, addressing controversial issues through the scientific literature. The contribution of homeopathy to sustainable agricultural systems is reviewed, including for family farmers, animals and plants, with practical examples from Brazil.

The case is made for the inclusion of homeopathy in the debate on, and practice of, agroecology and its social commitment, providing further insights into the multifunctional character of agriculture. Chapter 14 (**Rodríguez Rodríguez et al.**) presents research on the effects of the use of low-power laser pretreatment on shooting and initial growth of mulberry and sugarcane crops under flood stress. These two crops are commercially important in Cuba, and many areas where they are grown are prone to flooding which can have damaging impacts in the early stages of plant growth. In a completely random design, cuttings of both species with two different laser exposure times (10 and 20 seconds) were evaluated after 15 and 30 days. After 30 days, shoots that were exposed to a laser for 10 seconds were placed in flooded and non-flooded substrates. The results indicated that exposure of the shoots for 10 seconds to the laser beams gave the best results in terms of the number of buds sprouted, and in flooding conditions caused a greater elongation of the bud and increased the spongy plant tissue. These results indicate the potential for producing a physical method of seed priming on an industrial scale. Also concerning light frequencies, Chapter 15 (**Wohlers et al.**) explores how to evaluate a farming system's impact on food quality using the method of Fluorescence-Excitation-Spectroscopy (FES). This technique analyses the emission of light from a sample in order to provide biochemical information, and thus may be used as a measurement in food quality assessments. The chapter presents the historical background of the development of the methodology based on previous research into mitogenetic radiation and biophotons, and also a description of the measurement devices. Food produce grown under organic, biodynamic and conventional farming systems are compared from three scientifically controlled field experiments (wheat in Switzerland, cocoa beans in Bolivia and apples in the Netherlands). The results are used to explain the epistemology and the specific quality criteria which may be evaluated by FES, including product-specific or species-specific emission spectra, expression of specific maturation, plant development stages, organisational performance, and aspects of the integrity of the plant and its resilience to stay healthy. Finally in this section, Chapter 16 (**Doesburg**) also explores food quality, in this case through the crystallisation fingerprint method which is concerned with vitality through an organism's ability to self-organise and form signature patterns. Although not directly wave-based, this approach manages to capture the somewhat elusive nature of vitality and is being applied in commercial practice. The method of copper chloride crystallisation with additives is based on the generation and subsequent evaluation of dendritic crystallisation patterns (i.e. 'fingerprints'), which emerge when an aqueous cupric chloride solution is crystallised on a glass plate in the presence of a water-soluble additive (the sample). Existing research demonstrates the potential of this method to study the effect of food processing, the livestock feeding regime and farming system in a broad range of agricultural products. Trained panels have been able to correctly assign encoded samples to the farming system from which they came (conventional, organic, biodynamic) based on the degree of decomposition perceived in the crystallisation patterns. Conceptually, this relates to estimating the sample's degree of self-organisation in the sense of 'resilience' (its elasticity or capacity to cope with challenges) in response to the controlled ageing of the sample.

Overall, these exceptional examples and their impacts draw attention to how little investment or effort has yet been made into exploring and mainstreaming such benign applications in the food and farming sector.

SECTION 3: IN SEARCH OF MORE EMBODIED METHODOLOGIES

This section turns to the social sciences and humanities to explore a range of more embodied methods for connecting with the hidden half of nature. Chapter 17 (**Kieft**) dives straight in by examining the means by which the body can be used as a research instrument in order to attune to subtle information. Assuming an animist perspective in which everything in nature is imbued with a spark of life, soul or consciousness, it proposes ways to educate the body in order to perceive such 'intangible' aspects of the natural world. Divided into three parts, the chapter first

discusses the existence of different forms of information all around us, then examines views on exchange between the human body and environment and subsequently articulates the necessity of widening our epistemology beyond cognition to include other ways of knowing and learning through immersion, feeling and intuition. Finally, it offers a practical approach for reawakening a multi-levelled literacy that includes body, heart, mind, consciousness, and intuition, movement and nature, in order to empower people who work with nature on a daily basis. Chapter 18 (**Fabre Lewin and Gathorne-Hardy**) considers the art of ritual as a means of creatively unfolding life with each other and the planet – which it terms sympoiethics – through the inextricable connection between nature and culture. It develops a case study of a participatory food ritual that took place in South Africa, as an emergent process with local communities, energies and the other-than-human. This performative event engaged participants in interdependent exchanges with the living food cycle by making visible the life-giving connections between humans and the sentient Earth. This chapter explores how, within the context of agroecological food cultures, the ritual offered a safe and convivial haven to attend to social, ecological and food justice issues. It concludes by suggesting that the recovery of food rituals may stimulate transitions towards new approaches, responsibilities and actions that foster an ethics of care in the everyday. The next chapter, Chapter 19 (**Roussopoulos**), considers another method, that of Systemic Constellations, and how it may be applied to agriculture. It charts the evolution of the method through to the early 2000s, when practitioners began to address questions about human/ecological systems. A series of case studies illustrate this form of Constellations, known as Nature Constellations (NCs), and explore the conundrums it raises. Research indicates that NCs can access accurate information about the animals and plants within ecosystems, effectively becoming a form of two-way interspecies communication, and can also generate creative solutions not easily reached through more linear methods. Further, the approach is in itself a unique form of research into agroecosystems, capable of adding to agricultural knowledge.

The history of Goethean inquiry has already been explored in the first section of this book, and the next chapter, Chapter 20 (**Brook**), applies this method as an approach for understanding the farm. The Goethean method is presented in an accessible series of practical steps towards a deeper relationship to any aspect of the farm. At the heart of this method, human faculties such as imagination and intuition may be developed in a disciplined way that allows them to play an insightful role in a holistic understanding of the land and of ourselves. For agroecology, the Goethean method can give a fresh view of land and how it can be worked with – what its needs are and how to enter into collaboration with it. The chapter concludes by stressing that this need not replace other forms of exploration but may accompany them for a fuller understanding of the being that we collaborate with when we engage with land. Chapter 21 (**von Diest**) takes up the subject of intuition as a means for better on-farm decision-making. It provides evidence that many farmers rely on intuition for practical decisions, often preferring this to technology-based decision support tools. The chapter explores the practical benefits of intuitive farming as well as the methods available for developing intuition. These methods highlight the importance of personal development and the transformative potential of this approach on the farmer. The final chapter in this section (Chapter 22, **Bojesen Jensen**) investigates Sustainable Yogic Agriculture (SYA), a farming approach from India that is based on a combination of physical and metaphysical (mind–matter) practices. The chapter provides an overview of SYA, its meditation-based and physical methods and possible effects and then discusses its potential for uptake, taking into consideration research evidence on the mind–matter relationship. Evidence indicates the positive effects of using SYA not only on farm performance but also on social dimensions. The chapter concludes that, the core SYA technique is simple and low cost, and as such may be particularly appropriate for organic and agroecological smallholder farmers worldwide.

This section has emphasised the potential of the human being as sensory instrument, a communicator with nature and a conscious influencer of both research and practice.

SECTION 4: VOICES FROM THE FIELD

This final section steps outside of the formal research academy to showcase voices from the field: individual practitioners who have ploughed their own furrows to explore humans' relationship with nature including for the purpose of agriculture. Coming from a variety of non-mainstream world-views, they provide examples of the practical, positive impacts of subtle agroecological phenomena and techniques on the physical-material dimension of agriculture and related fields, as well as describing their own unique journeys outside of the mainstream academic or industry pathways.

Chapter 23 (**Lovel**) considers the etheric realms as a foundation for exploring the use of radionics with the biodynamic preparations. It weaves a story that starts with an overview of the advance of Western science, from Kant's empirical realism through to the emergence of quantum theory and how this tends to support Goethe's concept of subjective reality. It explains how Scottish physician Maxwell developed the concept of an ether as an extremely fine stationary field which supports the propagation of light and electromagnetic frequencies, a concept which hasn't since been disproved. This provides a backdrop for relating the author's own learning experiences when developing his market garden, during which he took up the practice of applying biodynamic preparations as well as the concept of the soil food web. The chapter explains how the author's experiments with radionics – a technology based on the wave or etheric aspect of nature – have enabled him to be more efficient and effective through applying the biodynamic preparations as wave patterns. In this sense, according to the author, the farm can be viewed as a living organism that breathes and grows in cycles to become increasingly alive and coherent within its boundaries.

Chapter 24 (**Menestrina**) delves into the subtle life of the bee and its importance for the proper functioning of ecosystems. It explains how poor breeding practices, as well as agrochemical and electromagnetic pollution, have weakened their health status. The chapter stresses that we need to re-learn about bees: their intricate life, their social organisation and their role as biological indicators of the dangers facing humanity. It also advocates new approaches to bee-friendly beekeeping and for everyone to help create a bee-friendly world, because the needs of bees are increasingly understood as being aligned to our needs. Chapter 25 (**Charter**) considers another essential part of nature and agriculture, in the form of the dynamic role of water. It seeks to make sense of some unconventional ways of working with water in agricultural practice, in particular the rhythmic stirring or 'dynamisation' used in biodynamic farming, but also other methods used to support animal, plant and soil life. To do so, it examines the basis for understanding the healthy development or 'forming' in living organisms and then looks closely at the way water forms itself in flow. Whether exploring from the conceptual perspective of projective geometry or a perceptual perspective of Goethean observation, the same principles are arrived at of the spiritual working in the physical, perceptible world. Dynamisation is examined in terms of water's changing relationships to its spatial environment, and the movement of water induced in Flowform vessels is also explored and their use within agriculture is discussed. Questions are raised regarding research into life processes and the reproducibility of results.

Chapter 26 (**MacManaway**) explores the practice of land whispering as the practical application of consciousness and subtle energy awareness in agriculture. The author explains how he was raised with an understanding that all of nature is, at source, a vibrational, interactive intelligence, with our physical, experiential world being a reflection and expression of that vibrational content and tone. The chapter discusses and provides examples of five modalities: communication with the 'spirit realms'; understanding earth meridians; engaging with elemental consciousness; engaging with nature spirit consciousness; and healing and renewal of residual human energies. Following this, Chapter 27 (**Massy**) reflects from a farmer's perspective on a farm training event held by the previous author (MacManaway). The author compares the material in the course with his own experiences, those of other farmers in Australia, and the worldviews of Australian indigenous communities, reflecting on subtle energy, its uses in the

form of geomancy or dowsing, the use of field towers and broadcasters and indigenous totems and nature spirits. The final chapter in this section, and in the book, Chapter 28 (**Roads**), offers thoughtful anecdotes on experiencing the metaphysics of agriculture. The author explains how he learned many of the deeper insights of Nature whilst farming in Tasmania, based on his understanding that all space and matter is energy, all energy is information, and this energy is consciousness. The chapter describes some of the author's metaphysical experiences as a dairy farmer in Tasmania, and then a beef producer, after which he went on to become an organic farming consultant. He explains how the farmer is the very matrix of the land being farmed and that every thought and emotion stirs the holistic energy of the farm, affecting everything from the micro-organic life in the soil, every plant that grows and all the livestock, with farmers therefore having the greatest responsibility of anyone.

WHAT NEXT? OUTSTANDING SUBJECT AREAS FOR RESEARCH

This collection of works provides some intense coverage of a relatively small number of thematic areas, whereas the scope of the hidden half of nature is, to all intents, limitless. Nevertheless, five salient subject areas are highlighted here, that arose as patterns through the chapters and that require more attention than was possible in this book. These subject areas are as follows:

- a more in-depth understanding of the identified subtle agroecological practices, including their impacts,
- perspectives and writings on subtle practices from indigenous authors,
- the theoretical and conceptual underpinnings and mechanics of Subtle Agroecologies,
- an exploration of Rudolf Steiner's cosmological framework in relation to both indigenous epistemologies and quantum science, and finally,
- the potential impact of practising Subtle Agroecologies on the human practitioner.

First and foremost – given that Subtle Agroecologies is grounded in the practice of farming – each of the subtle techniques suggested in Chapter 1 requires exploring in more detail. Almost all of these techniques have been touched upon in this book and are provided in Table 0.1 along with the chapter numbers in brackets.

The use of feng shui and of plant psychoactives are included in this list but are not mentioned in the book. The 4,000-year-old practice of feng shui seeks to establish harmony between people and nature, and as an umbrella term it involves several of the other techniques listed, including sacred geometry, dowsing and astrology (Teather and Chow, 2000). The use of plant psychoactives is also included here as a technique to facilitate communication with the other-than-human. It was, and still is, widely used in indigenous cultures (Armijos et al., 2014) and is going through a revival in modernist ones (Apud, 2017).

These subtle techniques can and should be explored from the practical perspective of their physical-material effects on, and interactions with, food and farming systems, as demonstrated by the contributions in Section 2. They can also help to deepen our understanding of phenomena that we cannot see. Chapter 24, for example, refers to research exploring how the flowers of a plant use sound vibrations to detect and respond to pollinator bees in their vicinity, and in Chapter 12 we learn how electrons influence the direction of plant growth as well as influencing plant geometry. Some negative impacts of industrial agriculture also show up at subtle levels. In Chapter 16, for example, copper chloride crystallisation images reveal that heavy doses of synthetic fertilisers prevent the crop from fully developing into the mature adult stage which results in it becoming more susceptible to disease and more limited in the extent to which it forms the nutrients and aromas that affect our taste perception. Both Chapters 23 and 24 allude to the disruptive impacts of electromagnetic wave pollution on living organisms, with Chapter 23 linking this to disorganisational forces in the etheric realm, an area that has been scarcely recognised, let alone researched.

TABLE 0.1**Some Subtle Agroecological Practices (with corresponding chapter numbers in brackets)**

Agro-homeopathy (13)	Astronomy/Planting calendar (11)	Biodynamic preparations (1, 23)
Bio-electromagnetism (9, 12, 14, 15)	Eco-alchemy (23)	Dowsing (26, 27)
Feng shui/geomancy	Interspecies communication (19, 26, 27, 28)	Intuition/direct knowing (17, 20, 21, 26, 28)
Love (28)	Mantras/chanting (22)	Paramagnetism (1, 27)
Prayer/intention (22, 26)	Radionics (23)	Resonances (26)
Ritual (18)	Sacred geometry (13, 16, 23, 25)	Sound/ultrasound (10)
Teacher plants/ psychoactives	Water dynamisation (25)	

Yet the impact of subtle techniques on both material and invisible dimensions of the farming and food system is only part of their reason for being. As Wohlers et al. explain in Chapter 15, ‘Research also shows that the use of biodynamic preparations may result in enhanced product quality... The term “may” is used here rather than “does” because the biodynamic preparations do not work like standard industrial inputs, such as nitrogen fertiliser, and thus should not be compared to or treated as such. The preparations enhance quality in the way that is appropriate for each given situation; they encourage growth and enable other possibilities without forcing the plant’. This implies that the impact of these techniques is situation-specific, and in addition may also be dependent on the presence of the human being involved, as is stressed by Boff et al. in relation to homeopathy (Chapter 13) and Charter in terms of the challenges of replicating trials of subtle influences of living things (Chapter 25). By limiting our choice of research objects to phenomena that can be replicated in trials, and by not considering the potential interference of the research subject, we are limiting both the scope of the research and our understanding of reality. Following this, two further functions of the application of subtle techniques are suggested, firstly to enable the development and refining of specific abilities and faculties of the human being, including awareness and intuition (as described in Chapters 17, 21 and 22), and secondly to bring holistic balance and harmony to the agroecosystem, one that is so valued by indigenous cultures (Chapters 1, 2 and 4).

Inherent in the above is the need for more involvement and contributions on subtle farming techniques from indigenous writers themselves (Chapter 3 goes some way towards this through a co-authored dialogue on the indigenous practices of communities in Chikukwa, Zimbabwe). There is a gap in the literature, and Chapter 1 explains how much of this knowledge has historically been passed down through oral rather than written tradition. Chapter 1 also describes how such practices have multiple functions and may not necessarily relate solely to agriculture, such as the Indian tradition of Panchakavya, a concoction of animal products that 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 (Ramprasad, 2012). Moreover, food acquisition in indigenous cultures is not solely dependent on settled agriculture, and indigenous authors have tended to explore their cosmologies and epistemologies in relation to nature and the environment rather than directly to agriculture. From New Mexico, Cajete (2000) is an exception, describing gardening, farming and hunting activities as including prayer, ritual, negotiations with nature spirits, totemic relationship with animals, and the importance of a sense of place, as well as more material activities including advanced plant breeding and knowledge of herbal medicines. He explains, ‘The Native garden involved a deep understanding of “practiced” relationship. Therefore, Native gardens were as much a mythic-spiritual-cultural-aesthetic expression of tribal participation and relationship with nature as was Native art, architecture and ceremonialisation. The technology of Native farming was only one dimension of such practiced relationship’ (2000: 131).

Moving on from farming practice, another subject area requiring more attention is the theoretical and conceptual underpinnings and mechanics of Subtle Agroecologies. In this book, Chapter 7 makes a valiant contribution from the perspective of quantum biology and relationship to quantum consciousness, identifying some of the unexplained features of consciousness as including free will or intuitive processes, the subjective flow of time, and non-locality including paranormal connections from human to human or to non-human. Some of these unknowns are addressed in other works on unified theories of life (e.g. Capra, 2016; Currivan and Laszlo, 2017; Wan Ho, 2008). In particular, *Blackfoot Physics* (Peat, 2005) explores the interface between quantum science and indigenous cosmologies and epistemologies. A theoretical physicist, Peat discusses sacred mathematics, time, sacred vibrations and indigenous science amongst other issues. Applying these concepts to the agricultural context would advance our understanding of what is at play and in particular our handling of consciousness, and would provide indications of how we might otherwise conduct research if mechanistic criteria, such as the previously discussed challenges around reproducibility and replicability, are inappropriate in the context of subtle agroecological techniques.

The work of Rudolf Steiner and the biodynamic farming method that he founded run like a thread throughout this book, from both an epistemological and a practical perspective. This is unsurprising given that, as Chapter 1 explains, biodynamic agriculture is the chief modernist farming approach to work out of a cosmology that embraces the invisible dimension and advocates the practice of subtle farming techniques. That Steiner shares a similar worldview with indigenous cultures has been noted by other authors such as Marti (2018) and Klocek (2013). A novel contribution to this subject area would be an exploration of Steiner's cosmological framework in relation to indigenous epistemologies, to quantum science and to consciousness studies. For example, Steiner's worldview encompasses an etheric realm, one that he identified as a subtle area existing between the physical and spiritual from whence emerges the formative forces of life that enable coherence (Marti, 2018). The concept of ether has existed since Greek times as material that fills the region of the universe above the terrestrial sphere (Lloyd, 1968), and was explored by Scottish physicist James Maxwell (1831–1879) as an extremely fine stationary field which supports the propagation of light and electromagnetic waves. Chapter 23 points out that whilst Maxwell's theory of a universal fixed etheric field was disproved, the notion of an ether has not been, and several chapters in this book refer to formative forces or system's coherence. A deeper understanding of ether in relation to agriculture would be a crucial component in advancing Subtle Agroecologies.

The final subject area requiring further exploration is the potential impact on the human practitioner of practising Subtle Agroecologies. The physical, mental and emotional health benefits of simply being in nature are well documented (Buzzell et al., 2009; Kellert, 2008; Lackey et al., 2019) as are of being physically active through food growing (Schmutz et al., 2014). Practising Subtle Agroecologies may do more than add to these benefits, through the impacts of developing soft skills around deep listening and observation, meditation, intuition and a heightened mental and bodily awareness, as many of the chapters in Sections 3 and 4 elucidate. Chapter 22, for example, points to the spiritual, physiological, psychological and emotional benefits provided by (on-farm) meditation. Looking to other texts, in order to fully utilise the biodynamic farming methods, Klocek (2013) asserts the need for constant self-development, as well as a continually deepening relationship with the whole of nature including plants, animals and the weather. Biodynamic practitioner and Jungian analyst Patricia Damery echoes this view, describing the similarities between Jungian analysis and biodynamic agriculture, and the new consciousness that both offer for the physical world and for the development of thinking. Damery (2011: 114) explains:

Biodynamics has offered me an alternative, developed way to incorporate spirit into our farming practices, to temper our overly rational agriculture driven by profit and efficiency with a conscious holding of feminine relatedness to that which is not human. For me, the forum Biodynamic farming has afforded has also been a natural and necessary next step in my own path of individuation.

Cajete's aforementioned description of Native gardening and farming as a 'practised relationship' also reflects this dynamic, co-evolving process between human and nature.

Might this increase in conscious awareness, in being more 'in touch' with our thoughts, feelings and intuitive processes, as well as being more connected to and experiencing more of nature's sentience, fundamentally transform us at the systemic level of our inner selves and thus our own worldviews, which in turn would reflect in transformed beliefs and behaviours around nature, food and farming? One scholar who has spent her life exploring such virtuous cycles, through developing frameworks for personal and social change, is ecological systems theorist Joanna Macy. In her essay *The Greening of the Self* (2009), Macy explores the profound shift in identification that takes place when we extend our limited sense of self to encompass the things and beings of the natural world we depend on. Macy contends that, through inner work that faces head on the reality of the destruction of our biosphere and that explores more of the experiential, phenomenal world, we are moved beyond the separate ego and are lifted onto another systemic level that recognises the interconnectedness of all things. Then, she suggests, it becomes in our natural self-interest to interact in harmony with nature, rather than for moralistic, altruistic or regulatory reasons. Is this the promise that Subtle Agroecologies might hold?

IN CONCLUSION: RESEARCH TO RECLAIM THE INVISIBLE

This book lays a foundation stone for the discipline of Subtle Agroecologies, a nexus of indigenous epistemologies, multidisciplinary advances in wave-based and ethereal studies, and the science and practice of sustainable agriculture. As discussed in Chapter 1, Subtle Agroecologies is not then a farming system in itself, but superimposes a non-material dimension upon existing, materially based agro-ecological farming systems. Research into Subtle Agroecologies may be described as the systematic study of the nature of the invisible world as it relates to the practice of agriculture, through adapting and innovating with research methods and in particular with those of a more embodied nature. Such research may take a reductionist, single-gaze focus on, for example, increasing crop and livestock yields or reducing the incidence of pests and diseases, or a wide-angled vision of simultaneous, multiple factors and concerns, all based on an ethics of care and with the overall purpose of bringing and maintaining balance and harmony. Such research is an open-minded inquiry, its grounding being the lived experiences of humans working on, and with, the land over several thousand years to the present.

By reclaiming and reinterpreting the perennial relationship between humans and nature, the implications, if followed through, are paradigm shifting and would, it is suggested, enable a co-evolution of the farm with the farmer. They would not only herald a new wave of more sustainable farming techniques based on, for example, electromagnetic and sound wave technologies, but could also change our whole relationship with nature to one of real collaboration rather than control. By working with subtle, vibrational fields, becoming more adept at embodied methods of research and practice, and communicating with nature, we may move towards the healing of ourselves as well as of the planet.

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Section 1

*Transformative Epistemological,
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1 Re-Enchanting Agriculture

Farming with the Hidden Half of Nature

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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

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 wholesale 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 proletarianisation 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 IFOAM³ 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=rV6JtEXyxs>, 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

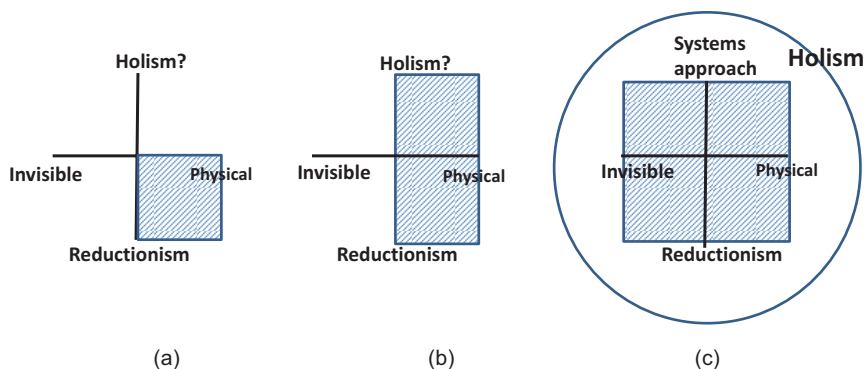


FIGURE 1.1 The conceptual frameworks of (a) industrial, (b) agroecological and (c) holistic farming.

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 parapsychical, 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.

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