



ADVANCES IN AGROECOLOGY

Subtle Agroecologies

Farming With the Hidden
Half of Nature

Edited by

Julia Wright



CRC Press
Taylor & Francis Group

Subtle Agroecologies

Advances in Agroecology

Series Editor:

Stephen R. Gliessman

University of California, Santa Cruz, California

Land Use Intensification

Effects on Agriculture, Biodiversity, and Ecological Processes

Edited by David Lindenmayer, Saul Cunningham, and Andrew Young

Agroecology, Ecosystems, and Sustainability

Edited by Nouredine Benkeblia

Agroecology

A Transdisciplinary, Participatory and Action-oriented Approach

Edited by V. Ernesto Méndez, Christopher M. Bacon, Roseann Cohen, and Stephen R. Gliessman

Energy in Agroecosystems

A Tool for Assessing Sustainability

Gloria I. Guzmán Casado and Manuel González de Molina

Agroecology in China

Science, Practice, and Sustainable Management

Edited by Luo Shiming and Stephen R. Gliessman

Climate Change and Crop Production

Foundations for Agroecosystem Resilience

Edited by Nouredine Benkeblia

Environmental Resilience and Food Law

Agrobiodiversity and Agroecology

Edited by Gabriela Steier and Alberto Giulio Cianci

Political Agroecology: Advancing the Transition to Sustainable Food Systems

Manuel González de Molina, Paulo F. Petersen, Francisco Garrido Peña, and

Francisco R. Caporal

Urban Agroecology

Interdisciplinary Research and Future Directions

Edited by Monika Egerer and Hamutahl Cohen

Subtle Agroecologies

Farming with the Hidden Half of Nature

Edited by Julia Wright and Nicholas Parrott

Food System Transparency

Law, Science and Policy of Food and Agriculture

Edited by Gabriela Steier and Adam Friedlander

Subtle Agroecologies

Farming With the Hidden Half of Nature

Edited by
Julia Wright

Contributed by
Nicholas Parrott



CRC Press

Taylor & Francis Group

Boca Raton London New York

CRC Press is an imprint of the
Taylor & Francis Group, an **informa** business

Front cover image: Art of Encounter, photomontage by Miche Fabre Lewin and Flora Gathorne-Hardy of Touchstones.
One of six images within 'First Know Food' series. www.touchstones.earth

First edition published 2021

by CRC Press

6000 Broken Sound Parkway NW, Suite 300, Boca Raton, FL 33487-2742

and by CRC Press

2 Park Square, Milton Park, Abingdon, Oxon, OX14 4RN

© 2021 Taylor & Francis Group, LLC

CRC Press is an imprint of Taylor & Francis Group, LLC

This book is available Open Access at <https://www.taylorfrancis.com/books/oa-edit/10.1201/9780429440939>, funded by The Westbank Trust and Coventry University.

The Westbank Centre Trust was created in 1979 to support projects that focus on education and research into the causes and treatment of ill health, and on the adoption of innovative, natural solutions to problems that touch on sickness and wellbeing. The Trustees are pleased to give support to this publication which they hope will be a useful contribution to ongoing conversation on these important topics.

Reasonable efforts have been made to publish reliable data and information, but the author and publisher cannot assume responsibility for the validity of all materials or the consequences of their use. The authors and publishers have attempted to trace the copyright holders of all material reproduced in this publication and apologise to copyright holders if permission to publish in this form has not been obtained. If any copyright material has not been acknowledged, please write and let us know so we may rectify in any future reprint.

Trademark notice: Product or corporate names may be trademarks or registered trademarks and are used only for identification and explanation without intent to infringe.

ISBN: 9781138339811 (hbk)

ISBN: 9780367768874 (pbk)

ISBN: 9780429440939 (ebk)

DOI: 10.1201/9780429440939

Typeset in Times

by codeMantra

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



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

Contents

List of Tables	xi
List of Figures	xiii
List of Boxes	xix
Acknowledgements	xxi
Editors	xxiii
Contributors	xxv
Introduction to the Book	xxix

Julia Wright

SECTION 1 Transformative Epistemological, Philosophical and Theoretical Frameworks

Chapter 1 Re-Enchanting Agriculture: Farming with the Hidden Half of Nature	3
<i>Julia Wright</i>	
Chapter 2 From the Mainstreaming of Western Science to the Co-Evolution of Different Sciences: Addressing Cognitive Injustice	21
<i>Bertus Haverkort</i>	
Chapter 3 Conversations with Nature Spirits: The Political Ecology of Power and Progress in Rural Zimbabwe	39
<i>Georgina McAllister and Mike Zeddy Chikukwa</i>	
Chapter 4 The Forgotten Ground: Recollecting the Primordial Harmony	49
<i>Joseph Milne</i>	
Chapter 5 Humans Are Humus: Using Eco-Psychology to Highlight the Language of Dualism and the Promise of the Non-Dual	59
<i>Travis Cox</i>	
Chapter 6 A New Science from a Historical Figure: Goethe as Holistic Scientist	71
<i>Isis Brook</i>	
Chapter 7 From Quantum Biology Towards Quantum Consciousness	81
<i>Jack Tuszyński</i>	
Chapter 8 Healing Our Relationship with Gaia through a New Thrivability Paradigm	89
<i>Anneloes Smitsman and Jude Currivan</i>	

SECTION 2 *The Intersection of Wave-Based Science and Agriculture*

- Chapter 9** Electromagnetic Fields Mitigate Adverse Effects of Environmental Stresses in Plants 101
Angel De Souza-Torres
- Chapter 10** Practical Uses of the Method of Epigenetic Regulation of Protein Synthesis in the Agricultural Field..... 111
Victor Prévost, Michel Duhamel, Pedro Ferrandiz, and Joël Sternheimer
- Chapter 11** Astronomical Rhythms in Biodynamic Agriculture: A Brazilian Case Study on the Yield and Quality of *Daucus carota* L. under Biodynamic Management 123
Pedro Jovchelevich
- Chapter 12** Electromagnetic Parameters Related to Plants and Their Microbiomes..... 131
Ed Moerman
- Chapter 13** Homeopathy Applied to Agriculture: Theoretical and Practical Considerations with Examples from Brazil 145
Pedro Boff, Rovier Verdi, and Leonardo Felipe Faedo
- Chapter 14** Effect of Low-Power Laser Biotechnology Pretreatment on Shooting and Initial Growth of White Mulberry and Sugarcane under Flood Stress..... 155
Sergio Rodríguez Rodríguez, Eduardo Ortega Delgado, Juan José Silva Pupo, Alexander Álvarez Fonseca, Medardo Ángel Ulloa Enríquez, and Luis Enrique Arias Basulto
- Chapter 15** Fluorescence Excitation Spectroscopy (FES) to Evaluate the Farming System's Impact on Food Quality 167
Jenifer Wohlers, Peter Stolz, Gudrun Mende, and Jürgen Strube (in Memoriam)
- Chapter 16** Picturing Vitality, the Crystallisation Fingerprint Method..... 179
Paul Doesburg

SECTION 3 *In Search of More Embodied Methodologies*

Chapter 17	Calibrating the Body: Embodied Research Strategies for Attuning to Subtle Information	191
	<i>Eline Kieft</i>	
Chapter 18	The Art of Food Rituals as a Practice in Sympoiethics	203
	<i>Miche Fabre Lewin and Flora Gathorne-Hardy</i>	
Chapter 19	The Systemic Constellations Method Applied to Agriculture	219
	<i>Melissa Roussopoulos</i>	
Chapter 20	Engaging in the Goethean Method: An Approach for Understanding the Farm?	229
	<i>Isis Brook</i>	
Chapter 21	Intuitive Farming: Heart-Based Decisions for Harmony in Agricultural Ecosystems	239
	<i>Saskia G. von Diest</i>	
Chapter 22	An Investigation of Sustainable Yogic Agriculture as a Mind–Matter Farming Approach	247
	<i>Janus Bojesen Jensen</i>	

SECTION 4 *Voices from the Field*

Chapter 23	The Etheric Realms as a Foundation for Exploring the Use of Radionics with the Biodynamic Preparations	259
	<i>Hugh Lovel</i>	
Chapter 24	The Subtle Life of the Bee and Its Importance for Humanity	269
	<i>Sabrina Menestrina</i>	
Chapter 25	Exploring a Dynamic Role for Water in Agriculture	279
	<i>Simon Charter</i>	
Chapter 26	Land Whispering: Practical Applications of Consciousness and Subtle Energy Awareness in Agriculture	293
	<i>Patrick MacManaway</i>	

Chapter 27 Rediscovering Ancient Pathways for Regenerative Agriculture 305
Charles Massy

Chapter 28 Experiences with the Metaphysics of Nature 315
Michael J. Roads

Biography of Contributors 323

Index 335

List of Tables

TABLE 0.1	Some Subtle Agroecological Practices (with corresponding chapter numbers in brackets).....	xxvii
TABLE 1.1	Comparison of Modernist with Indigenous Worldviews of Nature and of Farming.....	9
TABLE 9.1	Examples of Effects of Electromagnetic Fields of Plants Sown under Abiotic Stress Conditions	102
TABLE 9.2	Examples of Effects of Electromagnetic Fields of Plants Sown under Biotic Stress Conditions.....	106
TABLE 10.1	Evaluation Methods Used for Each of the Four Cases	113
TABLE 11.1	Deviations from the Trend Curve (%) of Fresh Mass of Roots (FMR) and Leaves (FML) and Dry Mass of Roots (DMR) of Carrots, According to the Different Lunar Rhythms, in 2005 and 2006.....	128
TABLE 12.1	Reduction and Oxidation in Relation to Plant Growth.....	134
TABLE 12.2	Range of Currents and Potential between Ground and Stem Base in Different Types of Trees or Plants	135
TABLE 13.1	<i>Materia Medica</i> for Some Farm Crops	150
TABLE 14.1	Mean Values of Foliar Bud Length (cm) and Root Aerenchyma Area (in μm^2) in Mulberry Seedlings, Acorazonada Variety, Treated with Laser for 10 Seconds and Evaluated under Flood (F) and Non-Flooded Stress (NF) in the Substrate, and the Control (No Laser Treatment and No Excess Moisture)	160
TABLE 14.2	Mean Values of Foliar Shoot Length (cm) and Root Aerenchyma Area (in μm^2) in Sugarcane Seedlings, Variety C90-469, Treated with Laser for 10 Seconds and Evaluated under Flood (F) and Non-Flooded Stress (NF) in the Substrate, and the Control (No Laser Treatment and No Excess Moisture)	161
TABLE 20.1	The Four Stage Goethean Approach and Related Human Faculties and Elements..	236
TABLE 22.1	Affirmations Used by SYA Farmers at Specific Farming Events.....	249
TABLE 22.2	Trial of Bread Wheat over One Season, Comparing (a) SYA, (b) Organic and (c) Non-Organic Methods of Agriculture	251
TABLE 22.3	Key Quantitative and Qualitative Benefits of SYA, as Described by Farmers.....	253



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

List of Figures

FIGURE 1.1	The conceptual frameworks of (a) industrial, (b) agroecological and (c) holistic farming.	12
FIGURE 2.1	The three worlds in indigenous sciences and their interactions.	26
FIGURE 2.2	Creating an enabling environment for endogenous development. (Source: Haverkort et al., 2003: 250.).....	28
FIGURE 2.3	Ritual in a rice field in Sri Lanka. (Photo credit: author's own.)	28
FIGURE 2.4	Agnihotra ceremony, India. (Photo credit: author's own.)	29
FIGURE 2.5	Pacha Mama ritual in the Andes. (Photo credit: author's own.)	30
FIGURE 2.6	Ceremony to seek ancestral support in Zimbabwe. (Photo credit: author's own.) ...	30
FIGURE 2.7	Consultation with the ancestors prior to adopting a new technology, Ghana. (Photo credit: author's own.)	31
FIGURE 2.8	Group of farmers burying cow horns, Staffordshire, UK. (Photo credit: Alysoun Barrett Bolger.).....	31
FIGURE 2.9	Scenario 1: marginalisation: suppression, substitution and selective inclusion. ...	34
FIGURE 2.10	Scenario 2: complementarity and co-evolution of different sciences.....	35
FIGURE 10.1	(a) Evolution of Esca-related mortality rate before and after genodiv use. (b) Esca-related mortality rate before and after genodiv use.....	115
FIGURE 10.2	Evolution of the Esca mortality rate compared to the average historical mortality rate ($N=91$ plots), 1,209,020 vine stocks on 260 ha total, CI 99%.	116
FIGURE 10.3	(a–e) Comparison of the evolution of Esca with and without genodiv treatment.	117
FIGURE 10.4	Number of mildew blotches on grapes, on each plot of five vines, as a function of the distance from the broadcasting device.	118
FIGURE 10.5	(a) Change in percentage of second-grade endives as a function of duration of exposure. (b) Evolution of endive yield as a function of exposure time.	118
FIGURE 10.6	Virus expression as a function of distance from the delivery device (where compliant signifies healthy).	119
FIGURE 11.1	Fresh mass of roots and leaves (kg, Y-axis) for the different dates of sowing (X-axis) in 2005.	127
FIGURE 11.2	The per cent deviation from the trend line of the fresh root and leaf mass and dry mass of roots (Y-axis) for the different sowing dates (X-axis) in 2005.	127
FIGURE 11.3	The per cent deviation from the trend line of the fresh mass of roots and leaves and dry mass of roots (Y-axis) for the different sowing dates (X-axis) in 2006.	128
FIGURE 12.1	Phase angle: alternating current (red line) lags 90° behind alternating voltage (blue line).	133

FIGURE 12.2	Resistance–capacitance (RC) circuits according to the revised model: (a,c) diagrams of barley plants with five root tips, (b,d) electrical equivalent networks of the root systems showing the location of the RC components, (a,b) RC circuits for a completely submerged root system and (c,d) RC circuits for a partly submerged root system. The sub-circuit that largely determines the capacitance is ringed to emphasise its importance. Note that the individual RC components can have different values.	136
FIGURE 12.3	Correlation between gram dry root weight per plant (X-axis) and phase angle (Y-axis).....	137
FIGURE 12.4	Simple LCR meter (a) and voltmeter (b) used for measurements of cucumber plants in pots. (c) The grounding probe and (d) a crocodile clamp on a needle inserted into the stem at the plant base.	137
FIGURE 13.1	Levels of coherence/similarities to help select what needs to be healed. (Adapted from Manzalini and Galeazzi, 2019)	149
FIGURE 14.1	Percentage of vegetative bud breaks in mulberry, variety Acorazonada, produced by the effect of two laser treatments (10 and 20 seconds) plus the control (graph a), assessed at 15 and 30 days from the initiation of treatments (graph b), and the combination of the two (graph c). Different letters indicate significant differences at $p < 0.05$ using Tukey’s test.	159
FIGURE 14.2	Percentage of vegetative bud break in sugarcane, variety C90-469, produced by the effect of two laser treatments (10 and 20 seconds) plus the control (graph a), assessed at 15 and 30 days from the initiation of treatments (graph b), and the combination of the two (graph c). Different letters indicate significant differences at $p < 0.05$ using Tukey’s test.	159
FIGURE 14.3	Histological cross section. (a) Mulberry root, Acorazonada variety, with laser application for 10 seconds in conditions of excess water; (b) mulberry root, Acorazonada variety, with no application of laser rays in conditions of excess water; (c) sugarcane root, variety C90-469, with laser application for 10 seconds in conditions of excess water; and (d) sugarcane root, variety C90-469, with no application of laser rays in conditions of excess water.....	161
FIGURE 15.1	Schematic overview of the FES measuring apparatus with 90° position between excitation illumination and emission detection by photomultipliers. The time sequence between excitation and emission is regulated by shutters. ...	169
FIGURE 15.2	Schematic illustration of the excitation and measuring interval and a characteristic declining curve of the delayed emission. Mw1 indicates the short-time emission, and R40 indicates the long-term emission.....	169
FIGURE 15.3	Differences between the wheat samples collected over 6 (O2 and K2) and 8 years (D2 and M), on the basis of mean values per year and farming system (standardised by year of harvest). Whiskers indicate standard error of the mean. D2=biodynamic; O2=organic; K2=conventional (manure+ mineral); M= mineral fertilisation only.	170
FIGURE 15.4	R40yellow/blue of whole apples and their seeds at different maturation stages. Whiskers indicate standard error of the mean. An increasing divergence of the induced emission of whole apples and their kernels during maturation was observed, these being indicated on the figure by the crossing of the lines.	171

FIGURE 15.5	R40yellow/blue of whole apples from different growing conditions (light intensity and application of biodynamic preparations).....	172
FIGURE 15.6	Fluorescence excitation spectrum of different kinds of samples: emission of leaves (dried crushed nettle leaves), of seeds (whole wheat kernels) and of citric acid. (Derived from Strube and Stolz, 2001a.).....	172
FIGURE 15.7	Emission intensity (R40yellow) of fermented whole cocoa beans from a cultivation trial. Whiskers indicate standard error of the mean.....	173
FIGURE 15.8	Differences between conventional and organic farming in cocoa beans in the relative emission intensity of R40yellow/blue.....	174
FIGURE 16.1	Product-specific crystallisation patterns of barley (left), tomato (middle) and white cabbage (right).....	181
FIGURE 16.2	Crystallisation patterns of the effect of milk processing: raw unprocessed milk (left) and the same sample after homogenisation at 50 bar (right)..	181
FIGURE 16.3	Crystallisation patterns of different ripening stages of vine tomatoes: unripe, little structure and condensed patterns (left); ripe, structure and cohesion (middle); and overripe, loss of structure and cohesion (right)..	182
FIGURE 16.4	Crystallisation patterns of fresh (left) and aged carrot juice (right, after 7 days of storage at 4°C).....	183
FIGURE 16.5	Enlarged details of crystallisation patterns of a wheat aging series. Left: fresh extract; middle: extract stored for 3 days at 4°C; and right: extract stored for 12 days at 4°C	184
FIGURE 16.6	Crystallisation patterns of 12-day-aged wheat extract originating from a long-term DOC field study (FiBL, CH). Photos bottom: whole images; and top: enlarged details. Biodynamic wheat (left), organic wheat (middle) and conventional wheat (right). (Images: J. Fritz, Uni Bonn, Germany).	185
FIGURE 18.1	Buddha resisting the temptation of Mara. (Image credit: Exotic India Art.)	204
FIGURE 18.2	<i>FieldTable</i> prepared for participant diners. (Image credit: Eva van Niekerk.) ...	208
FIGURE 18.3	Participants walking up the farm track to the entrance of the field. (Image credit: Eva van Niekerk.).....	208
FIGURE 18.4	The field shrine to <i>FieldTable</i> . (Image credit: Eva van Niekerk.).....	209
FIGURE 18.5	Being in silence to encounter the <i>genius loci</i> , the grazing cattle and the table of food. (Image credit: Eva van Niekerk.)	209
FIGURE 18.6	Reading <i>FieldTable</i> menu of dishes from the season's bounty. (Image credit: Eva van Niekerk.).....	210
FIGURE 18.7	A plate of locally and naturally grown 'bare awakening food' composed of: poached asparagus; brochettes of biltong, pickled beetroot and horseradish paste; marinated kohlrabi; broad beans with freshly made mayonnaise; salted lemon chard; fermented cabbage; butternut squash puree with oregano; grilled red spring onions; raw whole carrot and boiled egg in shell. (Image credit: Eva van Niekerk.).....	210
FIGURE 18.8	Participants conversing at <i>FieldTable</i> . (Image credit: Eva van Niekerk.).....	211

FIGURE 18.9	A young farmer sharing his passions and aspirations for change. (Image credit: Eva van Niekerk.).....	211
FIGURE 18.10	Tasting rosemary-infused water. (Image credit: Eva van Niekerk.).....	212
FIGURE 18.11	Breaking bread as a gesture of companionship. (Image credit: Eva van Niekerk.).....	212
FIGURE 18.12	Soil Shrine making visible examples of natural methods for increasing soil fertility through composting foodwaste and growing clover as a nitrogen-fixing plant. The sprigs of rosemary call us into remembrance. (Image credit: Eva van Niekerk.)	213
FIGURE 18.13	Leftover food emptied into a bokashi bin. This Japanese fermentation method prepares foodwaste to become a natural fertiliser for soil regeneration. (Image credit: Eva van Niekerk.).....	213
FIGURE 18.14	At the end of the meal, participants write about their experiences of <i>FieldTable</i> and reflect on how their hunger has been satisfied. (Image credit: Eva van Niekerk.).....	214
FIGURE 18.15	<i>FieldTable</i> was set up and completed in a day. (Image credit: Touchstones.)...	214
FIGURE 18.16	<i>FieldTable</i> manifests in 2016 as a convivial, local and agroecological narrative to counter the 1976 Union Carbide advert promising synthetic and genetically modified solutions to world hunger. (Image credit: Eva van Niekerk.).....	215
FIGURE 22.1	Bar chart showing yield (kg/ha) of wheat grain and stover from SYA, organic and non-organic treatments. (Adapted from Pandey et al. (2015).).....	252
FIGURE 23.1	The author in a field of maize undersown with soybeans with radionically applied biodynamic preparations and no other fertility inputs, in metre wide beds spaded into the soil food web. (Photo credit: Hugh Lovel).....	264
FIGURE 23.2	Field Broadcaster (left) and radionic instrument with cards (right). (Photo credit: author's own.)	265
FIGURE 24.1	'VITA NOVA' (New Life) by Julia Artico, Villa Maser, Treviso, Italy.	276
FIGURE 25.1	Spiral vortex geometry. (After Edwards, 2006.)	281
FIGURE 25.2	Spiral vortex. (Photo courtesy of Institute of Flow Science, Wilkens et al., 2005.).....	282
FIGURE 25.3	Spiral vortex in free water, viewed from above. (Photo credit: Simon Charter.).....	283
FIGURE 25.4	Ring vortex, smoke in air. (Photo credit: stock image from pinterest.com.)	283
FIGURE 25.5	Ring vortex viewed from the side, made using marker dye in water, pushed in a slow pulse from the tube below. (Photo credit: by kind permission Andreas Wilkens, Institute of Flow Sciences, Herrischried, Germany, www.stroemungsinstitut.de.)	284
FIGURE 25.6	Water falling into a pool by Leonardo da Vinci, circa 1511. Original drawing held in the Royal Library Windsor (no 12660). (Reproduction courtesy Royal Collection Trust/© Her Majesty Queen Elizabeth II 2020.)	284

FIGURE 25.7	Collapsing ring vortex in water, seen end-on, as it slowly encounters a perpendicular glass wall. Top left shows the almost undisturbed toroidal ring, which changes through the forms to the bottom right where the form is beginning to disperse. (Photo credit: by kind permission of the Institute of Flow Science. Wilkens et al., 2005.)	285
FIGURE 25.8	Rhythmic pattern of alternating vortices (also known as the Kármán vortex street). (Photo credit: Simon Charter.)	286
FIGURE 25.9	‘Malmo’ Flowform Design by John Wilkes, Nigel Wells and Nick Weidmann. (Photo credit: Imke Naudascher.)	288
FIGURE 25.10	‘Vortex’ Flowform Design, by John Wilkes, Nick Weidmann and Michael Monzies. (Photo credit: Simon Charter.)	289
FIGURE 26.1	Brussels sprouts eaten by dragon in Scotland.	296
FIGURE 26.2	Cancerous burls on spruce trees in Vermont.	297
FIGURE 26.3	Dry creek before.....	298
FIGURE 26.4	Wet creek after.	299



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

List of Boxes

BOX 1.1	Two Examples of Farming Practice Based on Indigenous Ontologies.....	13
BOX 2.1	Different Worldviews, Ways of Learning and Ways of Knowing.....	24
BOX 12.1	Explanation of the Usefulness of Different Electrical Parameters (Northolt et al., 2004: 56).....	139
BOX 16.1	The Crystallisation Method.....	180



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

Acknowledgements

It was Alice Oven of Taylor & Francis who made this book happen, through her proactive commissioning. The concept itself had already been brewing for a few years, and many people are integral to its development, including Michael Roads for awaking so many people to the metaphysics of nature, Hugh Lovel and Henk Kieft for their impetus on quantum agriculture, several colleagues and friends for enjoyable conceptual explorations, and all the inspiring practitioners from around the world. The international lockdown of 2020 provided the spaciousness for the book's completion.

A big thank you to all the contributors to this book; your courage and trust is appreciated. Also to Nick Parrott who stepped in to support the editing process; even so the first editor is responsible for the concept and directive content of the book.

Finally, thank you to Michel Pimbert, Director of the Centre for Agroecology, Water and Resilience at Coventry University, who has charmingly created a safe space in academia from which this offering emerges.

A VERY SPECIAL THANK YOU

With thanks to the Trustees of the Westbank Centre Trust (SC018608) for their generous donation towards the open access publication of these works.



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

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.

Dr Nicholas Parrott has been a freelance English-language editor since 2002, providing support to non-native English-speaking academics and NGOs for the publishing of books, articles, reports and doctoral theses on sustainability, agroecology and rural development. Prior to this, he was a research associate at the universities of Aberystwyth and Cardiff, and a European Parliamentary candidate for the UK Green Party. He has lived and worked in Wageningen, the Netherlands, and Brussels, Belgium, and is now based in Hendaye, south-west France. One of his most important works is *The Real Green Revolution: Organic and Agroecological Farming in the South* (Parrot and Marsden, 2002), which has been translated into multiple languages. His company has clients from around 20 different countries (www.TextualHealing.eu).



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

Contributors

Alexander Álvarez Fonseca

Center for Research, Services and
Environmental Technologies
Research Agricultural Institute ‘Jorge Dimitrov’
Bayamo, Cuba

Luis Enrique Arias Basulto

Department of Agricultural Production
Faculty of Agricultural Science
Plant Biotechnology Study Center
University of Granma
Bayamo, Cuba

Pedro Boff

Laboratory of Homeopathy and Plant Health of
Lages Experimental Station
Agricultural Research and Rural Extension
Agency of Santa Catarina State (EPAGRI),
Brazil
and
Interdisciplinary Post-graduate School
University of Planalto Catarinense
Lages, SC, Brazil

Janus Bojesen Jensen

Centre for Agroecology, Water and Resilience
Coventry University
Coventry, United Kingdom

Isis Brook

Crossfields Learning
Crossfields Institute
Stroud, United Kingdom

Simon Charter

Ebb and Flow Ltd
Nailsworth
United Kingdom

Mike Zeddy Chikukwa

Chikukwa Ecological Land Use Community
Trust (CELUCT)
Chimanimani, Zimbabwe

Travis Cox

Naropa University
Boulder, Colorado, USA

Jude Currivan

WholeWorld-View

Saskia G. von Diest

Department of Conservation Ecology and
Entomology
Stellenbosch University
Stellenbosch, South Africa

Paul Doesburg

Society for Cancer Research
Hiscia Research Institute
Arlesheim, Switzerland

Michel Duhamel

Genodics SAS
Paris, France

Miche Fabre Lewin

Centre for Agroecology, Water and Resilience
Coventry University
Coventry, United Kingdom

Leonardo Felipe Faedo

Agroveterinary Science Centre
Santa Catarina State University
Lages, SC, Brazil
and
Centre for Agroecology, Water and Resilience
Coventry University
Coventry, United Kingdom

Pedro Ferrandiz

Genodics SAS
Paris, France

Flora Gathorne-Hardy

Centre for Agroecology, Water and
Resilience
Coventry University
Coventry, United Kingdom

Bertus Haverkort

the Netherlands

Pedro Jovchelevich

Brazilian Association of Biodynamic
Agriculture
Brazil

Eline Kieft

Clover Trail
Winchester Institute for Contemplative
Education and Practice (WICEP),
University of Winchester
Winchester, United Kingdom
and
Centre for Agroecology & Water Resilience
(CAWR)
Coventry University
Coventry United Kingdom

Hugh Lovel

USA

Patrick MacManaway

United Kingdom

Charles Massy

Fenner School of Environment
and Society
Australian National University
Canberra, Australia

Georgina McAllister

Centre for Agroecology, Water
and Resilience
Coventry University
Coventry, United Kingdom

Gudrun Mende

Forschungsinstitut KWALIS gGmbH
Dipperz, Germany

Sabrina Menestrina

Anthroposophical Veterinary Medicine,
Medical Section, the Goetheanum
Dornach, Switzerland

Joseph Milne

University of Kent
Canterbury, United Kingdom

Ed Moerman

R&D Agronomic Development
Koppert Biological Systems
Berkel en Rodenrijs, the Netherlands

Eduardo Ortega Delgado

Faculty of Biology
Laboratory of Plant Physiology
University of Havana
Havana, Cuba

Victor Prévost

Genodics SAS
Paris, France

Michael J. Roads

Australia

Sergio Rodríguez Rodríguez

Faculty of Agricultural Science
Plant Biotechnology Study Center
University of Granma
Bayamo, Cuba

Melissa Roussopoulos

Independent Researcher
Forgotten Connections
United Kingdom

Juan José Silva Pupo

Faculty of Agricultural Science
Plant Biotechnology Study Center
University of Granma
Bayamo, Cuba

Anneloes Smitsman

EARTHwise Centre

Joël Sternheimer

Réseau Associatif de Chercheurs Indépendants
(RACHi)
Université Européenne de la Recherche
Paris, France

Angel De Souza-Torres

Faculty of Technical Sciences
Department of Physics and Mathematics
Granma University
Granma, Cuba

Peter Stolz

Forschungsinstitut KWALIS gGmbH
Dipperz, Germany

Jack Tuszyński

Department of Oncology
University of Alberta
Edmonton, Canada
and

Department of Physics
University of Alberta
Edmonton, Canada
and

DIMEAS

Politecnico di Torino
Torino, Italy

Medardo Ángel Ulloa Enríquez

Technical University of Cotopaxi
Latacunga, Ecuador

Rovier Verdi

Agroveterinary Science Centre
Santa Catarina State University
Lages, SC, Brazil
and

Centre for Agroecology, Water and Resilience
Coventry University
Coventry, United Kingdom

Jenifer Wohlers

Forschungsinstitut KWALIS gGmbH
Dipperz, Germany



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

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.*

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.

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).

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 Mogorody, 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 multidisciplinary 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 (**Wohlert 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 inter-species 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 worldviews, 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 agroecological 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.

REFERENCES

- Apud, I. (2017) Science, spirituality and ayahuasca: The problem of consciousness and spiritual ontologies in the academy. *Zygon*, 52(1): 100–123.
- Arlow, R. and Adam, W. (2011) The druid network. *Ecclesiastical Law Journal*, 13(1): 127–128.
- Armijos, C., Cota, I. and González, S. (2014). Traditional medicine applied by the Saraguro yachakkuna: A preliminary approach to the use of sacred and psychoactive plant species in the southern region of Ecuador. *Journal of Ethnobiology and Ethnomedicine*, 10(1): 26.
- Bateson, G. (1987) *Angels Fear: An Investigation into the Nature and Meaning of the Sacred*. London: Rider.
- Berkes, F. (1999) *Sacred Ecology*. Abingdon: Taylor & Francis.
- Brooke, J.H. (1991) *Science and Religion, Some Historical Perspectives*. Cambridge: Cambridge University Press.

- Bruntrup, G. and Jaskolla, L. (2017) *Panpsychism: Contemporary Perspectives*. New York: Oxford University Press.
- Buzzell, L., Chalquist, C., Orr, D.W., Roszak, T., Gomes, M.E. Macy, J., Andrews, C. and McKibben, B. (2009) *Ecotherapy: Healing with Nature in Mind*. Berkeley, CA: Counterpoint Press.
- Cajete, G. (2000) *Native Science, Natural Laws of Interdependence*. Santa Fe, NM: Clear Light Publishing.
- Capra, F. (2016) *The Systems View of Life: A Unifying Vision*. Cambridge: Cambridge University Press.
- Chambers, J. (2018) *The Metaphysical World of Isaac Newton: Alchemy, Prophecy and the Search for Lost Knowledge*. Rochester, VT: Destiny Books.
- Currivan, J. and Laszlo, E. (2017) *The Cosmic Hologram: In-Formation at the Center of Creation*. Rochester, VT: Inner Traditions.
- Damery, P. (2011) The enclosed garden: Underlying principles of Jungian analysis and biodynamic agriculture. *Culture and Psyche*, 5(2): 102–116.
- EIP-AGRI (2018) Agricultural Knowledge and Innovation Systems: Stimulating Creativity and Learning. EIP-AGRI Brochure Agricultural Knowledge and Innovation Systems. European Commission, https://ec.europa.eu/eip/agriculture/sites/agri-eip/files/eip-agri_brochure_knowledge_systems_2018_en_web.pdf (accessed September 5th 2020).
- Hall, A. and Mogyorody, V. (2001) Organic farmers in Ontario: An examination of the conventionalisation argument. *Sociologia Ruralis*, 41(4): 400–422.
- Kellert, S.R. (2008) Biophilia. *Encyclopedia of Ecology*, 4: 247–251.
- Klocek, D. (2013) *Sacred Agriculture, the Alchemy of Biodynamics*. Great Barrington, MA: Lindisfarne Books.
- Lackey, N.Q., Tysor, D.A., McNay, D., Joyner, L., Baker, K.H. and Hodge, C. (2019) Mental health benefits of nature-based recreation: a systematic review. *Annals of Leisure Research*. DOI: 10.1080/11745398.2019.1655459.
- Lloyd, G.E.R. (1968) *Aristotle: The Growth and Structure of his Thought*. Cambridge: Cambridge University Press.
- Macy, J. (2009) The greening of the self. In Buzzell, L. and Chalquist, C. (eds), *Ecotherapy: Healing with Nature in Mind*, pp. 238–245. Berkeley, CA: Counterpoint Press.
- Marrable, T. (2019) Becoming shamanic: How do people talk about their experiences of finding shamanism as a spiritual practice? *The Future of the Study of Religious and Spiritual Experience: 50th Anniversary of the Religious Experience Research Centre*. 1st–3rd July 2019, Lampeter Campus, University of Trinity St David. Compilation of Abstracts. P.16.
- Marti, E. (2018) *The Etheric: Broadening Science through Anthroposophy, Volume 2: The World of Formative Forces*. Forest Row: Temple Lodge.
- Peat, F.D. (2005) *Blackfoot Physics: A Journey into the Native American Universe*. Boston, MA: Weiser Books.
- Pimbert, M. (2018) Democratising knowledge and ways of knowing for food sovereignty, agroecology and biocultural diversity. In Pimbert, M. (ed), *Agroecology and Biocultural Diversity: Constructing and Contesting Knowledge*, pp. 1–65. London: Earthscan, Routledge, Taylor & Francis.
- Ramprasad, V. (2012) Manure, soil and the Vedic literature: Agricultural knowledge and practice on the Indian Subcontinent over the last two millennia, Chapter 12. In Jones, R. (ed), *Manure Matters: Historical, Archaeological and Ethnographic Perspectives*, 173–181. Abingdon: Taylor & Francis Group.
- Schmutz, U., Lennartsson, M., Williams, S., Devereaux, M. and Davies, G. (2014) *The Benefits of Gardening and Food Growing for Health and Wellbeing*. Coventry: Garden Organic. DOI: 10.13140/RG.2.1.3703.5289.
- Smith, T. (2020) The common consent argument for the existence of nature spirits. *Australasian Journal of Philosophy*, 98(2): 334–348.
- Teather, E.K. and Chow, C.S. (2000) The geographer and the Fengshui Practitioner: So close and yet so far apart? *Australian Geographer*, 31(3): 309–332.
- Timmons, S. (2006) Witchcraft and rebellion in late seventeenth-century Devon. *Journal of Early Modern History*, 10(4): 297–330.
- Uzzell, J. (2019) Gods, wights and ancestors: The varieties of pagan religious experience at ancient sacred sites. *The Future of the Study of Religious and Spiritual Experience: 50th Anniversary of the Religious Experience Research Centre*. 1st–3rd July 2019, Lampeter Campus, University of Trinity St David. Compilation of Abstracts. P.10.
- Wan Ho, M. (2008) *The Rainbow and the Worm: The Physics of Organisms*. Singapore: World Scientific Publishing Co.



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

Section 1

*Transformative Epistemological,
Philosophical and Theoretical
Frameworks*



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

1 Re-Enchanting Agriculture

Farming with the Hidden Half of Nature

Julia Wright
Coventry University

CONTENTS

Prelude: Something Happened in a Hot Tent in Telangana	3
Introduction: The Stranglehold of the Industrial Worldview	4
Towards Understanding the Cognitive Factors behind the Industrial Worldview.....	6
The Blind Spot of Contemporary, Ecologically Based Farming Systems	8
Harmony and Balance: The Indigenous Relationship of People, Land and Nature.....	8
Do Ecologically Based Farming Systems Fully Embrace Indigenous Praxis?.....	10
Introducing Subtle Agroecologies: Farming with the Hidden Half of Nature.....	12
The State-of-the Art of Subtle Agroecologies.....	13
Towards a Definition of Subtle Agroecologies.....	15
Conclusion	16
Acknowledgements.....	16
References.....	16

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=rV6JtEXyks>, 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

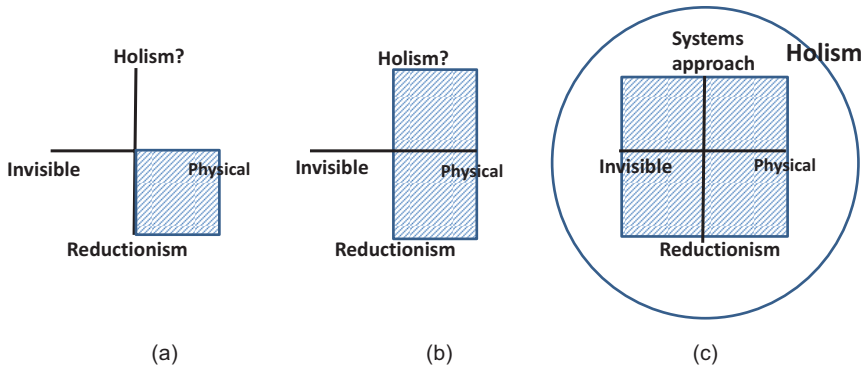


FIGURE 1.1 The conceptual frameworks of (a) industrial, (b) agroecological and (c) holistic farming.

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), Liljebblad 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.

ACKNOWLEDGEMENTS

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

REFERENCES

- Alliance for a Green Revolution in Africa. (2016) *Going beyond Demos to Transform African Agriculture: The Journey of AGRA's Soil Health Program*. Nairobi: AGRA.
- Altieri, M.A. (1995) *Agroecology: The Science of Sustainable Agriculture*, 2nd Edition. Boulder, CO: Westview Press.
- Altieri, M. and Toledo, V. (2011) The agroecological revolution in Latin America: Rescuing nature, ensuring food sovereignty and empowering peasants. *The Journal of Peasant Studies*, 38(3): 587–612.
- Balfour, E.B. (1977) *Towards a Sustainable Agriculture - The Living Soil*. Address to an IFOAM Conference in Switzerland in 1977. Reproduced with permission from the Organic Gardening and Farming Society of Tasmania Inc© 1995, Canberra Organic Growers Society Inc. <https://www.cogs.asn.au/>, Available online: <https://soilandhealth.org/wp-content/uploads/01aglibrary/010116Balfourspeech.html> (accessed October 10th 2020, paras 41, 62).
- Baring, A. (2020) *The Dream of the Cosmos: a Quest for the Soul*, 3rd edition. Dorset: Archive Publishing.
- Barton, G.A. (2018) *The Global History of Organic Farming*. Oxford: Oxford University Press.
- Barucha, Z. and Pretty, J. (2010) The roles and values of wild foods in agricultural systems. *Philosophical Transactions of the Royal Society B*, 365: 2913–2926.
- BDCert (2012) *Demeter and Organic Production Standards, for the Use of Demeter and Related Trademarks*. Stroud: Biodynamic Association Certification. December 2012 edition. http://bdcertification.org.uk/wp-content/uploads/2016/10/Organic-and-Demeter_Production-Standards.pdf (accessed September 10th 2020).
- Berman, M. (1981) *The Re-Enchantment of the World*. Ithaca/London: Cornell University Press.
- Burke, J. and Halberg, L. (2005) *Seed of Knowledge, Stone of Plenty: Understanding the Lost Technology of the Ancient Megalith-Builders*. San Francisco/Tulsa: Council Oak Books.
- Caddy, E. (1978) *Foundations of Findhorn*. Moray: Findhorn Press.
- Callicott, J.B. (1990) The metaphysical transition in farming: From the Newtonian-mechanical to the Eltonian ecological. *Journal of Agricultural Ethics* 3: 36–49.
- Chief Dan George (2004) *The Best of Chief Dan George*. British Columbia: Hancock House Publishers.
- Clunies-Ross, T. (1990) Organic food: Swimming against the tide. In Marsden, T. and Little, J. (eds.), *Political, Social and Economic Perspectives on the International Food System*. Aldershot: Avebury, pp. 200–214.

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

- King, F.H. (2004) *Farmers of Forty Centuries, Permanent Agriculture in China, Korea, and Japan*. New York: Dover Publications Inc.
- Klocek, D. (2013) *Sacred Agriculture, the Alchemy of Biodynamics*. Great Barrington, MA: Lindisfarne Books.
- Kohler, F., Holland, T.G., Kotiaho, J.S., Desrousseaux, M., and Potts, M.D. (2019) Embracing diverse worldviews to share planet Earth. *Conservation Biology*, 33(5): 1014–1022.
- Lang, T. (2004) *Food Wars: The Global Battle for Mouths, Minds and Markets*. Abingdon: Routledge.
- Levy, P. (2013) *Dispelling Wetiko, Breaking the Curse of Evil*. California: North Atlantic Books.
- Liljebblad, J. and Verschuuren, B. (eds) (2019) *Indigenous Perspectives on Sacred Natural Sites: Culture, Governance and Conservation*. London/ New York: Earthscan/Routledge.
- Lovel, H. (2014) *Quantum Agriculture: Biodynamics and Beyond*. Blairsville, Georgia: Quantum Agriculture Publishers.
- Macy, J. and Brown, M.Y. (2014) *Coming Back to Life: The Updated Guide to the Work That Reconnects*. Gabriola: New Society Publishers.
- Marsden, M. (1988) The natural world and natural resources. Māori value systems and perspectives. Resource Management Law Reform Working paper 29, Part A. Wellington: Ministry for the Environment.
- Marshack, A. (1972) *The Roots of Civilisation*. London: Weidenfeld & Nicolson Ltd.
- Marti, E. (2017) *The Etheric, Broadening Science through Anthroposophy. Volume I: The World of the Ethers*. Forest Row: Temple Lodge Publishing.
- Mashingaidze, S. (2016) Cosmovision and African conservation philosophy: Indigenous knowledge system perspective. *Environmental Economics*, 7(4): 25–33.
- McGilchrist, I. (2019) *The Master and His Emissary, the Divided Brain and the Making of the Western World*, New Expanded Edition. New Haven, CT/London: Yale University Press.
- McKanan, D. (2018) *Eco-Alchemy, Anthroposophy and the History and Future of Environmentalism*. Berkeley: University of California Press.
- Merchant, C. (1990) *The Death of Nature: Women, Ecology, and the Scientific Revolution*. San Francisco, CA: Harper One.
- Mesa-Lago, C. (1998) Assessing economic and social performance in the Cuban transition of the 1990s. *World Development*, 26(5): 857–876.
- Mollison, B. (1996) *Travel in Dreams: 'One Fat Foot after Another': The Autobiography of Bill Mollison by Bill Mollison*. Stanley: Tagari Press.
- Mollison, B. and Slay, M.R. (2013) *Introduction to Permaculture*. Stanley: Tagari Publications.
- Moore, A. (2011) *Stone Age Farming: Tapping Nature's Subtle Energies for Your Farm or Garden*. Victoria: Python Press.
- Morton, J. (2014) Britain's Last Witch Trial. News. The Law Society Gazette. 29th September 2014. Available online: <https://www.lawgazette.co.uk/obiter/britains-last-witch-trial/5043624.article#:~:text=It%20will%20be%2070%20years,nine%20months%20in%20May%201944> (accessed June 28th 2020).
- Orr, D.W. (1991) *Ecological Literacy: Education and the Transition to a Postmodern World*. New York: State University of New York Press.
- Pandey, S.T., Verma, O., Kewalanand, Pandey, D.S., Gill, S., Patel, J.C., Patel, G.N., Patel, D.M., Patel, B.T., Patel, B.B., Patel, D.S., Patel, I.S., Patel, R.N., Singh, N.K., and Thakur, D.M. (2015) Yogic farming through Brahma Kumaris Raja yoga meditation: An ancient technique for enhancing crop performance. *Asian Agri-History* 19(2): 105–122.
- Peat, F.D. (2005) *Blackfoot Physics: A Journey into the Native American Universe*. Boston, MA: Weiser Books.
- Pfeiffer, T., Mack, J.E., and Devereux, P. (eds.) (2007) *Mind before Matter: Visions of a New Science of Consciousness*. Hampshire: O Books.
- Pierotti, R. (2011) The world according to Is'a: Combining empiricism and spiritual understanding in indigenous ways of knowing. In Anderson, E.N., Pearsall, D., Hunn, E. and Turner, N. (eds.), *Ethnobiology*. Hoboken, NJ: Wiley-Blackwell, pp. 65–89.
- Pimbert, M. (2018) Democratising knowledge and ways of knowing for food sovereignty, agroecology and biocultural diversity. In Pimbert, M. (ed.), *Food Sovereignty, Agroecology and Biocultural Diversity, Constructing and Contesting Knowledge*. London/New York: Routledge.
- Ponisio, L.C. and Erlich, P.R. (2016) Diversification, yield and a new agricultural revolution: Problems and prospects. *Sustainability*, 8: 1118.
- Posey D.A. (1998) The 'balance sheet' and the 'sacred balance': Valuing the knowledge of indigenous and traditional peoples. *Worldviews*, 2(2): 91–106.

- Pour, M. E., Hobbi, M., Ghasemi, H., and Nazari, M. (2016). Plausible mechanisms by which ultrasonic waves affect seeds. *Plant Breeding and Seed Science*, 74(1): 85–92.
- Ramprasad, V. (2012) Manure, soil and the Vedic literature: Agricultural knowledge and practice on the Indian Subcontinent over the last two millennia, Chapter 12. In Jones, R. (ed.), *Manure Matters: Historical, Archaeological and Ethnographic Perspectives*. Abingdon: Taylor & Francis Group.
- RCS. (2020) Quantum leap workshop series. RCS Australia. <https://www.rcsaustralia.com.au/products/family-business/graduate-services/quantum-physics/> (accessed September 10th, 2020).
- Rickard, S. (2019) *Plant Protection Products: The Value of Their Contribution to Lowering UK Household Expenditure on Food and Drink*. Peterborough: Crop Protection Association. <https://cropprotection.org.uk/media/1153/sean-rickard-food-prices-report-final.pdf>.
- Röling, N.G. and Jiggins, J. (1998) The ecological knowledge system. In Röling, N.G. and Wagemakers, M.A.E. (eds.), *Facilitating Sustainable Agriculture*. Cambridge: Cambridge University Press.
- Rosset, P. and Altieri, M. (2017) *Agroecology: Science and Politics. Agrarian Change & Peasant Studies Book 7*. Rugby: Practical Action Publishing.
- Roszak, T. (1992) *The Voice of the Earth*. New York: Simon and Schuster.
- Sait, G. (2003) *Nutrition Rules: Guidelines from the Master Consultants*. Yandina: Soil Therapy Pty Ltd.
- Sevilla Guzmán, E. and Woodgate, G. (2013) Agroecology: Foundations in agrarian social thought and sociological theory. *Agroecology and Sustainable Food Systems*, 37(1): 32–44.
- Sinclair, M. and Thompson, M. (2001) *Cuba Going Against the Grain: Agricultural Crisis and Transformation*. Washington, DC: Oxfam America.
- Small-Wright, M. (1993) *Perelandra Garden Workbook: A Complete Guide to Gardening with Nature Intelligences*. Virginia: Perelandra.
- Smith, J. (2008) *Intangible Heritage (Key Issues in Cultural Heritage)*. Abingdon: Routledge.
- Sonnenfeld, D.A. (1992) Mexico's "Green Revolution," 1940–1980: Towards an environmental history. *Environmental History Review*, 16(4): 28–52.
- Spangler, D. (2010) *Subtle Worlds: An Explorer's Field Notes*. Traverse City, MI: Lorian Press.
- Sprunt, J. (2006) Biodynamic agriculture: Adaptability and sustainability for farmers around the world: Case studies from Northeast India. In Kristiansen, P. and Kemp, C. (eds.), *Third OFA National Organic Conference "Organics - Solutions to Climate Change"*, Sydney, Australia 2006. Queensland: Organic Federation of Australia, pp. 86–94.
- Steiner, R. (1924) To all members: The meetings at Koberwitz and Breslau. *Anthroposophical Movement*, 1: 9–11.
- Steiner, R. (1928) *The Story of My Life*. London: Anthroposophical Publishing Co.
- Steiner, R. (1993) *Agriculture: Spiritual Foundations for the Renewal of Agriculture*. East Troy, WI: Bio-Dynamic Farming & Gardening.
- Tchombe, T.M.S. and Lukong, T.E. (2018) Dynamics of indigenous socialization strategies and emotion regulation adjustment among NSO early adolescents, North West region of Cameroon. *International Journal of Humanities Social Sciences and Education (IJHSSE)*, 3(8): 86–124.
- Teixeira Da Silva, J.A. and Dobránszki, J. (2016) Magnetic fields: how is plant growth and development impacted? *Protoplasma*, 253(2): 231–248.
- Tuhiwai Smith, L. (2012) *Decolonising Methodologies, Research and Indigenous Peoples*. London/ New York: Zed Books.
- UNDRIP (2007) United Nations declaration on the rights of indigenous peoples. G.A. Res. 61/295. September 13th, 2007. https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2018/11/UNDRIP_E_web.pdf (accessed June 30th 2020).
- van der Ploeg, J.D., Barjolle, D., Bruil, J., Brunori G., Costa Madureira, L.M., Dessein, J., Dragg, Z., Fink-Kessler, A., Gasselini, P., Gonzalez de Molina, M., Gorlach, K., Jürgens K., Kinsella, J., Kirwan, J., Knickel, K., Lucaso, V., Marsden, T., Maye, D., Migliorini, P., Milone, P., Noe, E., Nowak, P., Parrott, N., Peeters, A., Rossid, A., Schermer, M., Ventura, F., Visser, M., and Wezel, A. (2019) The economic potential of agroecology: Empirical evidence from Europe. *Journal of Rural Studies*, 71: 46–61.
- Vorley, B. (2003) *Food Inc. Corporate Concentration from Farmer to Consumer*. London: UK Food Group/IIED.
- Voss, A. and Wilson, S. (2017) *Re-Enchanting the Academy*. Auckland: Rubedo Press.
- Whitewashed Hope: a message from 10+ indigenous leaders and organisations. (2020) Open source document bit.ly/IndigenousWorldViews (accessed November 24th 2020).
- Wright, J. (2009) *Sustainable Agriculture and Food Security in an Era of Oil Scarcity, Lessons from Cuba*. London: Earthscan.

- Wright, J. (2019) A call for the biodynamic movement to come out about spiritual, non-material farming philosophy and practice. In Wahl, V., Hach, A., Sommer, S., Derkzen, P., Brock, C., Fritz, J., Spengler-Neff, A., Hurter, U., and Florin, J.-M. (eds.), *Evolving Agriculture and Food: Opening up Biodynamic Research. Contributions to the 1st International Conference on Biodynamic Research*, September 5th to 8th 2018, Dornach, Switzerland. Dornach: Section for Agriculture, p. 105.
- Yunkaporta, T. (2020) *Sand Talk: How Indigenous Thinking Can Save the World*. San Francisco, CA: HarperOne.

2 From the Mainstreaming of Western Science to the Co-Evolution of Different Sciences

Addressing Cognitive Injustice

Bertus Haverkort

Retired agricultural development specialist and author

CONTENTS

Introduction: Cultures, Worldviews and Sciences	21
Understanding Mind and Matter	22
Agricultural Practices from Different Worldviews	23
Specific Agricultural Practices	27
Sri Lanka: Mantras, Yantras and Kems	28
Agnihotra in India	29
Sacrifices and Festivals in the Andes	29
Seeking Ancestral Support in Africa	29
Harmonising the Earth and Cosmic Forces in Europe	29
The Trans-Cultural Notion of Science and Its Co-Evolution	31
Scenarios for Inter-Science Relations: From Domination to Complementarity	33
Possible Challenges and Opportunities	34
Redefining the Role of Universities	34
Dealing with the Strong and Weak Points within the Dominant Forms of Knowledge	36
Challenging the Dominant Worldview and Epistemology	36
Conclusion: Dialogues between and about Sciences	36
References	37

INTRODUCTION: CULTURES, WORLDVIEWS AND SCIENCES

Presently, the mainstream, Western-based (or modern) sciences are taught, developed and applied in all corners of the globe and have a very strong position because of the attribution of their effectiveness, reliability, applicability and their funding and recognition by the main private and public actors. Yet, till today there is still a great diversity of ways in which different people in different cultures acquire and process knowledge and formulate their own sciences. How people actually know and handle knowledge depends on the worldviews of particular knowledge communities, and the methods they use for learning, their logic and values. Even though mainstream sciences often displace local (or native or indigenous) sciences, a considerable number of local sciences are still being applied, and reproduce themselves despite their marginal position. Over the last two decades, there are a number of initiatives that aim at

revitalising local knowledge systems – and local sciences – and these search for complementarity and synergy between different sciences.

These initiatives assert not only that global diversity has a physical and biological component, but also that cultural and scientific diversity is also important. In different parts of the globe, indigenous and local experts publish about the scientific basis of their knowledge systems: in New Zealand (Bishop, 1998; Tuhiwai Smith, 1999), Canada (Battiste, 2005), the USA (Barnhardt and Kawagley, 2005; Cajete, 2000; Mihesuah and Wilson, 2004), South America (Rist and Delgado, 2009), Africa (Millar et al., 2006) and India (Balasubramanian and Nirmala Devi, 2006). A great number of research and educational programmes are emerging that aim at revitalising local knowledge traditions, and these seek a complementary relationship with other sciences. These range from the United Nations University Institute of Advanced Studies – Indigenous Knowledge Initiative, and the Inter-institutional Centre for Indigenous Knowledge located in the College of Education at Pennsylvania State University, which comprises more than 20 indigenous knowledge resources centres in North and South America, Europe, Asia, Africa and Oceania, to the Indigenous Women's Network that was founded in 1985 and has a journal of the same name. These indigenous scholars, researchers and institutions address questions such as the following:

- What are the worldviews, basic principles, values and methods according to which learning takes place in different cultural environments?
- What are the strengths and weaknesses of different sciences and what can be done to increase the effectiveness and innovative character of these ways of learning?
- How can the marginalisation and suppression of local sciences be addressed? And
- How can complementarity and co-evolution of sciences be achieved?

Proponents of this approach take the position that neither experiences and methods from minority cultures nor those of the mainstream approach are inherently the most appropriate to explain reality and/or to develop technologies that improve quality of life. The latter may be used to complement local learning processes, but they should not replace them, as is often the case. Exchange between different sciences, and co-evolution rather than domination and substitution are seen as important.

UNDERSTANDING MIND AND MATTER

Amongst the different worldviews and sciences that exist today, reality is considered and understood in different ways. Globally, a divide can be observed between those who believe that reality is made up of only one basic substance (*monists*) and those who believe that reality is made up of two different substances (*dualists*).

Monists focus either on matter or on mind. *Materialism* asserts that mind is basically a result of biochemical processes. This position is dominant in modern Western paradigms. Within monism, positions that consider reality to be based on spiritual or mental principles are labelled as *idealism*. These positions are often held in non-Western cultures, and specifically so in the Vedic tradition. Modern science has been struggling with the relation between monism and dualism. It is mostly accepted that both realities exist (dualism), but in their research practice, modern scientists address only the quantifiable, which is the material reality.

During the Enlightenment period, the foundations of scientific reasoning were laid by various traditions, including Empiricism by Francis Bacon (1561–1626), Rationalism by Descartes (1596–1650) and Mechanism by Newton (1642–1727). The development of Evolutionism by Darwin (1809–1882) and Classical Economics by Adam Smith (1723–1790) emerged from this scientific revolution with major implications for the worldviews and the way social systems were considered and organised.

Rene Descartes believed in the possibility to reach absolute truth through scientific knowledge. His approach was based on the belief that all aspects of a complex phenomenon can be

understood by reducing them to their constituent parts, a process called atomisation. He made a clear distinction between mind and matter and replaced the notion of the divine plan of the Creator with a mathematical order of nature. Descartes understood humanity as composed of two independent substances: body and mind. But, he thought that it was only the ratio and quantification of objective phenomena that could lead to good knowledge. During the Enlightenment, the dominant worldview became *materialistic*: in order to make reality researchable, it became necessary to separate mind from matter, humankind from nature and subject from object. The only thing that could objectively be observed and experienced was matter, and so mind became considered as *terra incognita* by scientists, a tradition that continues to this day. This Cartesian science has a linear view of time, a mechanistic notion of cause and effect. It values quantity more than quality and is organised into highly specialised and atomised disciplines. The theory of evolution, based on the notion of ‘survival of the fittest’, has been translated over to economics as the mechanism of competition between commercial entities where the ‘winner takes all’. Human traits such as altruism, friendship, cooperation, love and affection have been attributed less importance than competition, individuality, aggression and conquest. This has led to a justification of political and economic domination and acceptance of cultural and biological extinction as part of the price for progress.

Since the colonial period, this version of Western-based science, in combination with Western religions, was disseminated in the South and, to a certain extent, it substituted the various – often animistic – indigenous knowledges, sciences and belief systems. The latter were declared inferior, backward and superstitious and were regarded as a bottleneck to modernisation and development, as were the pre-Enlightenment belief systems in the North.

Western science has led to impressive technologies and highly productive systems of agriculture and industry, impressive medical achievements and communication systems. But it has not fulfilled its promises to serve human needs and allow progress for all. The widespread application of modern technologies has definitely improved food production, health systems and labour conditions in parts of the globe, but not the entire globe. Where it has worked well has often been at the expense of some categories of people. In southern countries, the overlapping categories of women, rural people and peasant farmers have suffered most.¹ Advancements in modern technology have not led to global peace, ecological stability and social or psychological well-being. Nor have they led to the eradication of widespread hunger or poverty, not even in northern countries, where in spite of affluence, pockets of poverty exist amongst certain communities, and where food systems also cause a serious problem through affluence: obesity and environmental and climatic impacts. This situation justifies a search for new worldviews and scientific methods that challenge Western knowledge’s claim to exclusive universality, and a great number of organisations and movements are engaged in this effort. An illustration of the diversity of worldviews and ways of learning is presented in Box 2.1, with some insights from India, Ghana and Bolivia.

AGRICULTURAL PRACTICES FROM DIFFERENT WORLDVIEWS

From the year 2000 to 2012, two different international programmes have carried out action research to strengthen indigenous knowledge and practices and to enhance endogenous development (development from within). These programmes covered 16 different countries worldwide: Bolivia, Mexico, Guatemala, Chile and Colombia, Ghana, Kenya, Zimbabwe, Uganda and South Africa, Norway, the Netherlands, India, Sri Lanka, Nepal and Indonesia. The first programme was COMPAS, a programme in which several NGOs and a number of universities carried out fieldwork.

¹ For a comprehensive overview and critical analysis of the role of peasantry in Peru, Italy and the Netherlands, see van der Ploeg (2008).

BOX 2.1 DIFFERENT WORLDVIEWS, WAYS OF LEARNING AND WAYS OF KNOWING

India: In the Vedic tradition, the real world and the fundamental principles upon which life systems are organised are different from those in the West (Balasubramanian and Devi, 2006). Reality is a continuum of matter, mind and consciousness. Vedic knowledge has a notion of 9 existential principles, 41 qualities and 5 types of action, upon which, for example, the Ayurvedic health system is based. The term Akasha refers to the unifying energy inherent in all four elements (earth, air, water and fire) in nature and thus also in every living creature. Essentially, it is the all-encompassing spirit energy. In this worldview, all entities can learn, and learning is not limited to the use of the five senses. It takes place through a combination of sensory perception, intuition, inference and teachings of seers or gurus. If the mind is free from prejudices (lust, anger, greed, intoxication, delusion and jealousy), it can learn from within. Meditative techniques and yoga are used in addition to ancient written texts in the pursuit of knowledge for liberation and Enlightenment. Lessons from previous lives can also play a role. In India, traditional knowledge and practices coexist parallel with mainstream knowledge. Ayurvedic hospitals coexist with hospitals based on Western medicine.

Latin America: The Andes: Studies by AGRUCO (AGRUCO 2001; COMPAS-AGRUCO 1998) revealed that in the Andean worldview, the natural, social and spiritual worlds are united. Sacred time–space (Pacha Mama) goes beyond the physical or socio-economic domains. There is a spiral notion of time that is not separated from space (territory); the first ordering principle is relation; everything is related and this leads to a reciprocal relationship between humans, animals, plants, rocks, water, wind, sun, moon and stars. These relations are embodied in astronomy, rituals and fiestas. In these cultures, learning takes place by experiencing the relationship between the human, the natural and the spiritual worlds. ‘It is through our connection with Pacha Mama that we learn’ (Millar et al., 2006). Learning from within is based on intuition and lessons from nature. More than being interested in mechanical explanations of ‘how things are’, there is an emphasis on the question ‘why things are’. In asking ‘why’, the interaction between the human, the material and the spiritual world is taken as a given; questions of moral and ethics play an important role, as human behaviour can have a direct influence on the natural and spiritual worlds. In the Andes, traditional and mainstream knowledge have a so-called syncretic relationship. Some traditional concepts have been redefined by mainstream to fit their frame of reference, but continue to be used in the traditional communities. The notion of Pacha Mama has been replaced by Gaia, sometime in combination with the Virgin Mary.

Africa: In the worldview of the Dagaba people in Northern Ghana, the world is made up of ancestors, the living and the not-yet-born, and nature is sacred (Millar et al., 2006). Within this worldview, there is a hierarchy between divine beings, spiritual beings, ancestors, living human beings and natural forces. Nature provides habitats for human and spiritual entities. Time is cyclic and goes from the present to the past. Ancestral spirits have powers that can be used in both negative and positive terms. In the present-day African reality, one can observe two coexisting systems of beliefs and knowledge: traditional and modern. The modern system is formally accepted, but the traditional system persists often in an underground way. The traditional systems are labelled as satanic by imported religions and as superstitious by mainstream scientists. Both traditional and mainstream sciences are based on specific values, logic and interpretation of cause–effect; this often leads to different choices about lifestyle, spirituality and practices of farming and health. In addition, the ways of learning are different. In the traditional African view, learning implies being receptive

to the teachings of those who have lived before us, the elders, and reading the signals of the spiritual world expressed in nature. Also here, the emphasis of learning is more on ‘why things are than on how things are’.

The West: In the ‘Enlightenment’ view, knowing is based on measuring and the use of the five senses. Rational logic, materialism, mechanism and self-interest of the individual or group are strong ordering principles through which Western people comprehend reality. There is also a perceived duality, expressed in dichotomies such as mind–matter, creator–created, man–nature and object–subject. Science is organised and developed in separate disciplines. In this materialist and mechanistic view, learning is done by subjects that are separate from objects, and quantifiability is important. The emphasis of research and of learning is on ‘how things are’: how a certain effect is caused within the laws of physics or other sciences. In the ‘Postmodern’ view, the world is regarded more from a holistic perspective, where uncertainty, diversity, chaos and self-regulation, and synergy are seen as ordering principles. It takes distance from or relativises generic principles and universal science. Sources of knowing include Pre-Enlightenment views, new scientific insights from quantum mechanics and transdisciplinarity, systems thinking, chaos theory, social learning and a diversity of ways of knowing and ways of learning from non-Western cultures.

It set up cooperation between indigenous organisations and development organisations. The most important point was to understand and articulate the worldviews and values of the indigenous people and then to design and test practical ways to strengthen local knowledge. The second programme, CAPTURED, aimed to develop educational material and research methods for universities in their role of enhancing endogenous development.

The results of these programmes (COMPAS, 2007; Haverkort et al., 2003; Haverkort and Reijntjes, 2006) revealed the following:

- In all countries, major changes in political autonomy, demography, economic and cultural integration, technological innovations, exposure to mass media and degradation of environmental resources have taken place and are leading to an erosion of indigenous cultures, knowledge and cosmovisions.
- At the same time, despite the South’s apparent acceptance of the dominant technologies, beliefs and values, below the surface a persistent core of indigenous culture survives and a wealth of indigenous knowledge on natural resource use still exists. This determines the values and decision-making of rural populations.
- Many cosmovisions of indigenous farming communities are based on a holistic concept: the reality in which farming takes place generally encompasses the natural world, the human world and the spiritual world (see Figure 2.1). Mankind, the spiritual world and nature are often seen as having a reciprocal relationship. If nature is not treated well, it may react by treating the people badly, through, for example, a plague, a drought or a bad harvest. If the spirits are respected, they will ensure a good life for living creatures. People, therefore, look upon farming not only as an activity in the natural world, but also as an activity in the spiritual world.
- Peoples’ understanding and description of the spiritual world is frequently rich, diverse and structured. It is experiential and can be based on the teachings of persons with visions, such as spirit mediums or shamans. It can be expressed in classical texts such as the Vedas, or in linguistic or artistic symbols. The spiritual world is seen as containing both a creative force and a destructive force. There may be a polarity of good and bad forces, and there are

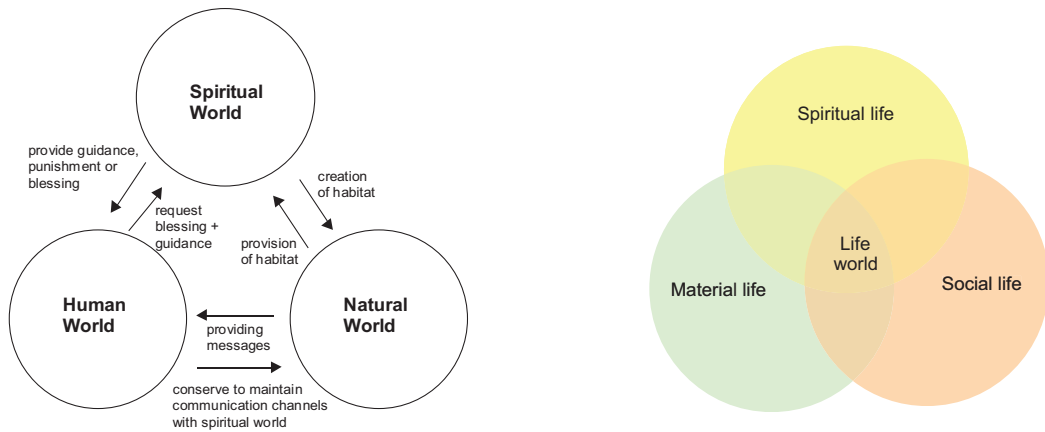


FIGURE 2.1 The three worlds in indigenous sciences and their interactions.

often different spiritual beings such as gods, spirits and ancestors. These spiritual beings may express themselves in nature and through living creatures.

- In many cosmovisions, nature is considered sacred. This finds its expression in concepts like Mother Earth, sacred mountains, rivers, trees and animals. Animals, plants and especially trees are often considered to be linked with the spiritual world and should be treated with respect. The sacred character of nature and the spirituality of the people often lead to the need to conduct rituals during agricultural activities. Some of these relate to spiritual beings or ancestors.
- Cosmic influences are frequently dealt with by using astrological information that determines the moments when different agricultural activities can take place. Thus, in many cases, the agricultural calendar and the ritual calendar are linked and they guide social, natural and spiritual activities.
- Indigenous communities organise themselves on the basis of their cosmovision. Many indigenous institutions regulate the use of land, water and biological resources as well as the way farmers learn, teach and experiment. Traditional leaders often combine their political powers with spiritual skills and functions.
- The way farmers learn and experiment is based on their own concepts, values and criteria.
- Many development activities and conventional systems of education and technology development neglect or reject the importance of cosmovision, culture and indigenous knowledge and suggest the superiority of dominant Western science. This Western scientific system tends to be less holistic and more materialistic than indigenous knowledge systems.
- There is no reason to romanticise cosmovisions. It cannot be concluded that indigenous cosmovisions and traditional practices have always been effective in preventing the overexploitation of soils, overgrazing, deforestation, pollution of water, erosion or environmental disaster. Nor have they always led to maintaining social stability or equity. Indigenous knowledge is not always equally spread in the communities, and some persons may monopolise and misuse certain knowledge.
- For development organisations to be effective, there is a need for them to support endogenous development. This is development that is based on locally available biological and physical resources and the values and knowledge of the local population. This implies a good understanding of the diversity of cultures and the characteristics and dynamics of indigenous knowledge systems and cosmovisions; cooperation with traditional leaders; an appreciation of the potentials and limitations of locally available resources

for agriculture, health and nature management, and of their possible role in the local economy; and finally, a diversity of approaches to endogenous development that can be applied by local NGOs and governmental organisations for research and development. The partners of the COMPAS and CAPTURED programmes agreed that ‘development’ should be understood from the perspective of native cosmovision that implies the integration of spiritual life in social and material life. Yet there was a clear difference in the way that the different partners, acting as development agencies, could work with them. In the traditional communities in Bolivia and Ghana and the tribal areas in India, traditional cosmovisions are still quite intact.

- Agricultural production involves biophysical as well as spiritual activities. The agricultural calendar and the ritual calendar coincide. Here, the only way to have a good relationship with the rural population is to understand and appreciate their cosmovision and collaborate with indigenous institutions. In the rural areas in India, in Sri Lanka and in Peru, the traditional cosmovisions have been subjected to considerable erosion and it is difficult to get a good picture of rural people’s cosmovision. There is a mixture of traditional and modern ideas that may differ from village to village and from year to year. In these areas, it was noticed that in initial discussions with farmers, traditional concepts were frequently not expressed. However, after further probing beyond the surface, many elements of the traditional cosmovisions gradually began to emerge. Farmers are used to the fact that outside agencies do not understand, respect or tolerate traditional practices or cosmovisions. Therefore, they talk with the outsider with empathy, in the language or concepts they think the outsider appreciates. They have learned that outsiders do not appreciate their cosmovision, and thus, they do not openly express their own concepts and views. There is reason to assume that in traditional societies, but also in countries where traditional cosmovisions are subject to erosion, traditional cosmovision and spirituality are more widespread and prevalent than assumed by outsiders in general. This means that working with traditional institutions is relevant and requires tact and social skills. In the Netherlands and Norway, and to a certain extent also in central Mexico, it seems that traditional cosmovisions and spirituality have almost completely disappeared. In these countries, there is a widespread discontent about the materialistic way of modern farming and a small number of farmers want to restore agriculture’s spiritual vision. In such cases, indigenous institutions may no longer exist and, therefore, new institutional allies may have to be sought.
- In essence, the partners concluded that a focus on rural people’s cosmovisions can make it possible to reconnect their work with indigenous knowledge in its full significance. Farmers interpret (agricultural) development and define their relationships with outside agencies from within the context of their cosmovision. Development workers are thus challenged to go beyond validating indigenous technical knowledge. Farmers’ concepts of life – and the practices based on them – are a reality to which they must relate. This relationship can only be genuine when respect is given to the unknown concepts and traditional institutions. It also provides an opportunity for mutual learning.

The above lessons have been used to build a model for activities to enhance endogenous development (Figure 2.2).

SPECIFIC AGRICULTURAL PRACTICES

More in-depth studies in Sri Lanka, India, Ghana, Zimbabwe and Bolivia shine a light on specific agricultural practices where the spiritual dimension of the worldviews is being addressed.

Some practical examples are provided in Figures 2.3–2.9 below.

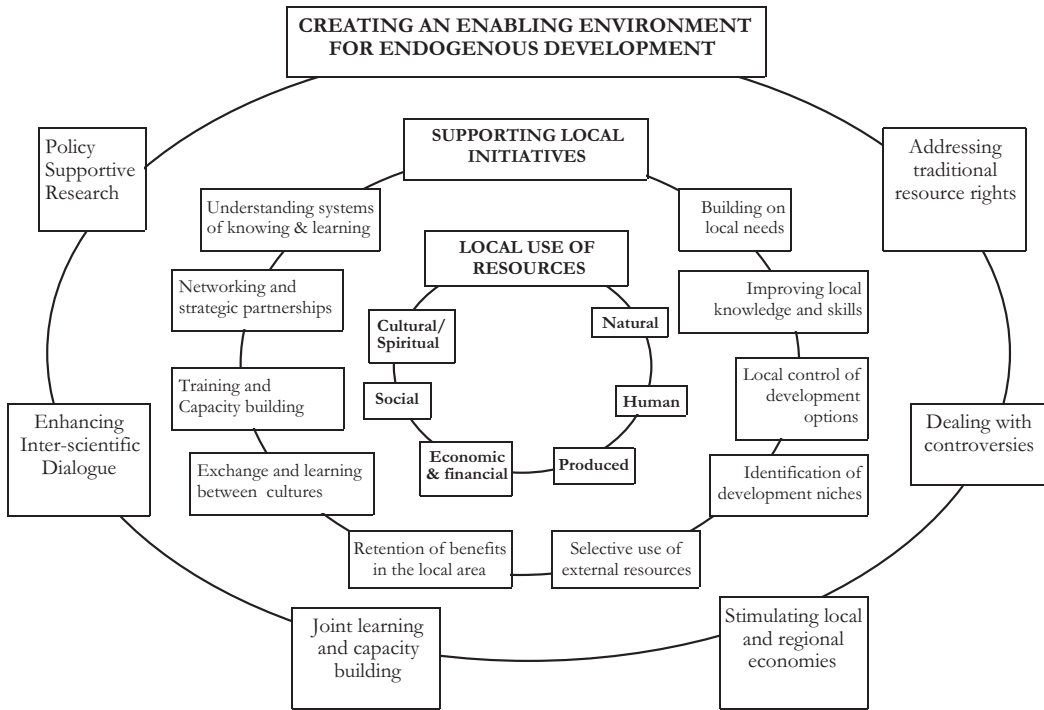


FIGURE 2.2 Creating an enabling environment for endogenous development. (Source: Haverkort et al., 2003: 250.)

SRI LANKA: MANTRAS, YANTRAS AND KEMS

A ritual in a rice field in Sri Lanka: a combination of mantras, meditation and sacrifices performed by a shaman. He has to live a pious life. The ritual is a commitment of people to the rice field and its natural environment, and a pledge for each being to play its role in the mutual process of coexistence and to avoid taking more than a fair share.



FIGURE 2.3 Ritual in a rice field in Sri Lanka. (Photo credit: author's own.)

AGNIHOTRA IN INDIA



FIGURE 2.4 Agnihotra ceremony, India. (Photo credit: author's own.)

The leader of a farmer's group, Mr Perushotama Rao, performs a fire ritual, Agnihotra. Fire will purify the environment and allow for harmonious relations between plants, animals and human beings. Twice a day a mixture of ghee and rice will be put on the fire. Mr Rao chants a number of mantras, meditates and creates a vibration that causes a healthy environment.

SACRIFICES AND FESTIVALS IN THE ANDES

In the Andes, it is common to have rituals in the field to honour Pacha Mama and to establish and reinforce linkages between the land, the vegetation, the animals and people. There are specific rituals for strengthening the links with llamas, with potatoes or with other traditional crops. These are the moments when people celebrate community life amongst themselves.

SEEKING ANCESTRAL SUPPORT IN AFRICA

In Zimbabwe, a spirit medium asks the blessing of the ancestors for a tree planting programme and mediates between the living and the dead to consult the ancestors and to build on their knowledge and wisdom.

In Northern Ghana, a soothsayer is consulted to ask the ancestors advice and permission for adopting a new technology. Animal and vegetative sacrifices are performed to mobilise magical powers.

HARMONISING THE EARTH AND COSMIC FORCES IN EUROPE

Biodynamic farmers in Europe use preparations in the form of cow horns filled with silica to mobilise cosmic forces.



FIGURE 2.5 Pacha Mama ritual in the Andes. (Photo credit: author's own.)



FIGURE 2.6 Ceremony to seek ancestral support in Zimbabwe. (Photo credit: author's own.)



FIGURE 2.7 Consultation with the ancestors prior to adopting a new technology, Ghana. (Photo credit: author's own.)



FIGURE 2.8 Group of farmers burying cow horns, Staffordshire, UK. (Photo credit: Alysoun Barrett Bolger.)

THE TRANS-CULTURAL NOTION OF SCIENCE AND ITS CO-EVOLUTION

Modern philosophers of science such as Popper, Kuhn, Latour and Feyerabend have each on their own, but especially in their combination, challenged the foundations of mainstream science and dismantled the idea of exclusive claims to universality. It goes beyond the scope of this chapter to delve deep into these (postmodern) notions of science. But in a very brief way, one can reflect on the following generalisations:

- Scientific knowledge is only an approximation to the truth. This approximation can be pursued by trial and error only (Popper, 1980, 1965).
- Scientific development should be as a social process in which the worldviews held by scientists and the social process of developing scientific activities should be understood.

Real new knowledge emerges if the validity of the dominant paradigms is broadly being challenged and is replaced by new paradigms (Kuhn, 1962).

- Scientific facts are not in the first place objectively true; they are rather the result of agreement within the scientific community. This means that negotiation, networking and lobbying to get social recognition for the results of the research in the form of its publications are all important aspects of scientists' work (Latour and Woogar, 1979).
- Objective science is an illusion, as all observation, perception and interpretation are based on more or less deficient instruments and theories. What is considered to be a 'fact' is basically an agreement within a school of scientists. There is not one universally valid method of research, and the monopolistic claims to truth of conventional science are not justified. The history of sciences shows that there are different roads towards truth. Western science is one and only one of the possible sciences, and it is time to correct scientific arrogance and scientific imperialism. Exporting Western sciences and technologies has not exclusively brought well-being to indigenous peoples. We should stop the one-way traffic and rather go for a mutual learning process (Feyerabend, 1975).

Based on the reflections and positions of these philosophers of science, and building on the insights of indigenous scholars, CAPTURED has chosen the following definition of science:²

Science is a body of knowledge formulated within a specific worldview. It emerges from specific methods of learning and producing knowledge and uses a consistent theoretical framework that includes assumptions, general principles and theories. It involves an active role of a specific knowledge community that has reached consensus on validity of knowledge. The knowledge acquired and the resulting science are products of a social process and are always limited and subject to modification in the light of new data, information and insights.

The plurality of worldviews and ways of learning can lead to a plurality of sciences. The degree to which ontological positions and sources of knowing differ from each other determines the degree of compatibility and/or complementarity of different sciences. A joint learning process or dialogue between different forms of knowing would be impossible or meaningless if the sciences involved exclude each other. Even if the basic assumptions and methods may seem incommensurable, complementarity may be sought. The CAPTURED programme does not aim at integrating the different ways of knowing into one universal system of research and education. Rather, its focus is to understand the diversity, the differences, possible contradictions and controversies. It looks for revitalisation of the different ways of knowing and co-evolution and possible communalities, complementarities and synergy.

On the basis of this definition, the CAPTURED programme suggested that we look at a science as having a certain expression in each of the following basic elements:

- *The Ontology (or Worldview)*: The way the people see themselves and their relation with the rest of the cosmos: the worldview
- *The Gnoseology (or Methodology)*: Methods for learning, experimenting and teaching. It is obvious that the way of learning is a directly related to the worldview.
- *The Epistemology (or the Theoretical Framework)*: The way knowledge is organised: its logic, theoretical frameworks and paradigms.
- *The Axiology (or Values)*: The moral and aesthetic values of the people.
- *The Knowledge Community*: The experts, leaders, healers, guides and the way they carry out peer reviews, have debates and discourses on worldviews, methods, theories and values and agree on accepting or rejecting them.

In every culture, people have explicitly or implicitly formulated these notions and are engaged in these knowledge-related processes, and therefore, we assume that in different cultures and different

² This definition and a discussion on the co-evolution of sciences have been elaborated in Haverkort et al. (2012).

professional communities, different sciences exist. Some of these sciences are considered as rigorous in certain ways, and others may be considered as being weak in one or more aspects. The aim of the dialogue is to support each other in overcoming the weaknesses.

The plurality of worldviews, through methods of learning, in values, in conceptual frameworks and in ways to assess and review knowledge gained, can lead to a plurality of sciences. The degree in which ontological positions and sources and methods of knowing differ from each other determines the degree of compatibility and/or complementarity of different sciences. A joint learning process or dialogue between different forms of knowing would be very difficult if the basic elements of the sciences involved contradict each other.

The appreciation of the diversity of cultures and worldviews offers a wide range of opportunities for exchange and dialogue. Intercultural contacts can lead to domination and control, and thence to the disappearance of cultures and ways of knowing. But, if the intercultural contacts take place with respect, it can also lead to mutual learning and synergy. Respect does not imply the unconditional acceptance of all differences. It implies the willingness to listen, openness to learn and to be responsive, and the capacity to criticise when necessary (Fay, 1999).

COMPAS and CAPTURED provide a platform for intra- and intercultural and intra-/and inter-/scientific dialogues. Intra-cultural/scientific dialogues take place between persons that are from a particular culture and share a similar knowledge base, whereas intercultural/scientific dialogues take place between persons with a different cultural and scientific background. These exchanges can contribute to a co-evolution of cultures and sciences. In this process, no science is considered *a priori* superior or inferior. Traditional knowledge is not romanticised and Western knowledge not rejected because of its dominant position. Each science involved is stimulated to develop and improve its methods and theories based on its own dynamics as well as on interaction with other systems of knowing.

The Objectives of Inter-Scientific Dialogues Are as Follows:

- to strengthen and revitalise the marginalised sciences;
- to look for synergy and opportunities for mutual learning as well as for contradictions and exclusions;
- to question, challenge and criticise each other in order to determine those aspects of the science and value systems that need modification and improvement; and
- to balance the power and financial resource base of the different sciences.

The epistemological interpretation of the different Asian, African and Latin American and European knowledge systems, their ways of learning and experimenting and their mutual relationships needs further attention. Therefore, it is important to continue to systematise and make more explicit the concepts and theories behind indigenous forms of knowledge in order to share and improve on them as part of a possible co-evolution of the diversity of sciences.

SCENARIOS FOR INTER-SCIENCE RELATIONS: FROM DOMINATION TO COMPLEMENTARITY

Complementarity and co-evolution of sciences can only be obtained if the research methods and parameters used are not solely based on those of the dominant or on those of traditional science. The research needs to enhance the ownership, effectiveness and innovativeness of the different sciences involved and to include attention to worldviews, methods, theories, values and knowledge communities. All the research being carried out in the CAPTURED programme focused on these aspects, with the main research tools being transdisciplinary research (Nicolescou, 2004, 1998), action research and indigenous methodologies (Denzin et al., 2008). In all cases, methods and parameters of different scientific traditions are combined, and the knowledge communities of both mainstream and local sciences are involved in the design, implementation and follow-up of the research.

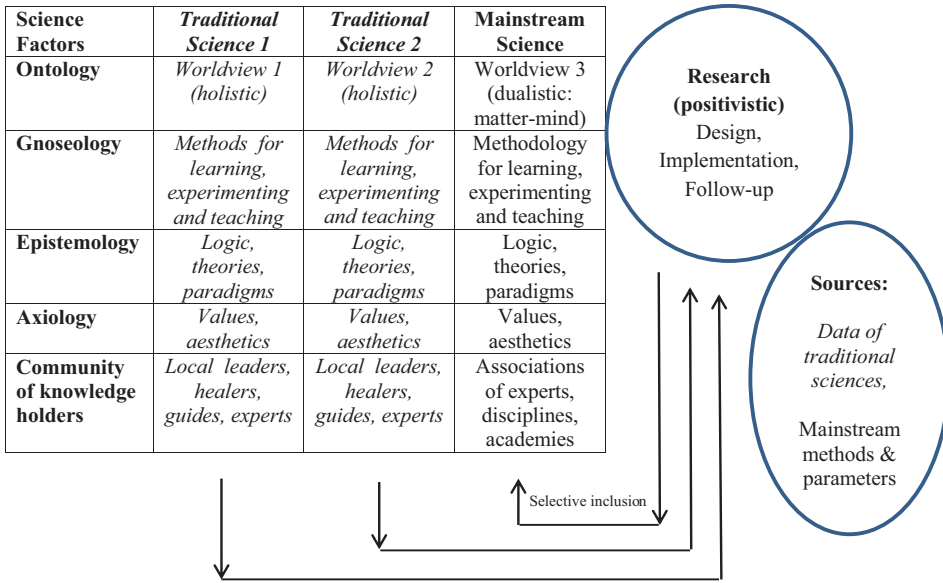


FIGURE 2.9 Scenario 1: marginalisation: suppression, substitution and selective inclusion.

Below, two different scenarios for relating sciences are presented:

Scenario 1: This leads to marginalisation and suppression of local sciences, to substitution by mainstream knowledge and selective inclusion of traditional knowledge in the mainstream, shown in Figure 2.9. This may lead to underground or parallel knowledge systems, to syncretism and/or rebellion or resistance.

Scenario 2: This leads to complementarity, synergy and co-evolution of different sciences, as shown in Figure 2.10.

Assessment of traditional sciences by the mainstream in a one-way process (as shown by the arrows in Figure 2.9). Mainstream research uses positivistic models with mainstream parameters to assess traditional technologies. It may include those elements of local knowledge in its system which are considered positive according to the researchers’ parameters, with no feedback to traditional sciences. This often leads to marginalisation, suppression and substitution, ‘going underground’, syncretism and resistance.

Flows of data and research results to and from all sciences are shown by the arrows in Figure 2.10.

The involvement of actors in the design, implementation and follow-up is defined by protocols and codes of conduct. Inter-science dialogue leads to complementarity, synergy and co-evolution. Research methods can be both quantitative and qualitative and should also involve information exchange and dialogues between social actors such as artists, religious leaders, syndicates, political, emancipatory and environmental movements, business and minorities.

POSSIBLE CHALLENGES AND OPPORTUNITIES

CAPTURED concluded that there are a number of approaches that together could contribute furthering inter-scientific dialogue that involves local communities, NGOs, universities and regional and international organisations.

REDEFINING THE ROLE OF UNIVERSITIES

A prime condition for successful cooperation of these actors will be a relationship between actors that is horizontal as far as possible and is characterised by mutual interest and confidence. Hence,

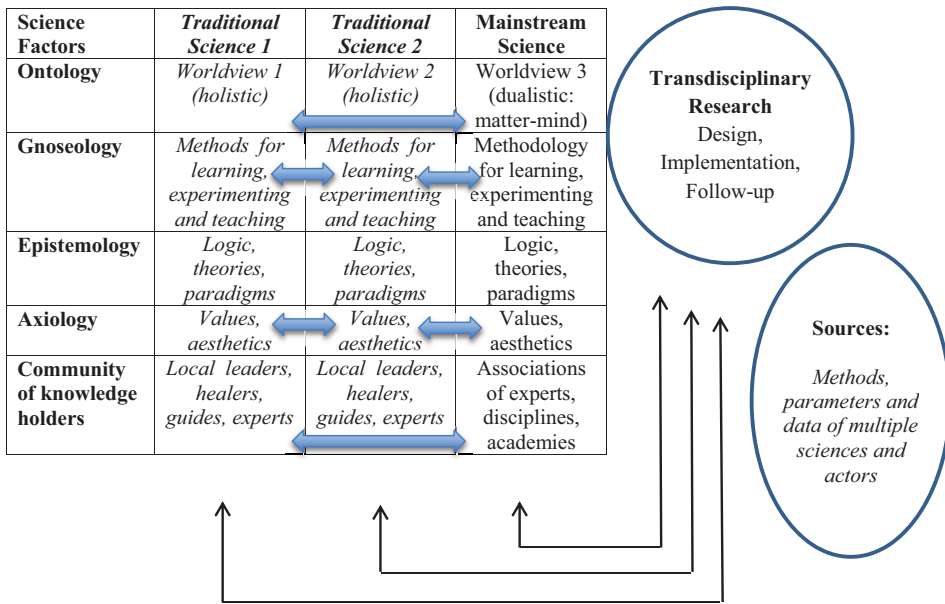


FIGURE 2.10 Scenario 2: complementarity and co-evolution of different sciences.

the first step to take is to critically analyse and reconstruct the different relationships as they currently exist. Field staff and researchers working with rural people have to make clear that their role is not that of an external agent who comes with a certain message or technology to be transferred. Learning with and from local people, and working on the basis of their cosmology, implies that the outsiders accept the rules of the game as expressed by the communities. The traditional codes for hospitality, confidence building, respect and communication have to be accepted and obeyed. This may mean procedures of selection and processes of initiation, and participation in rituals that have a different cultural background and meaning for local people than for outsiders.

Universities have to accept the fact that their conventional knowledge has its limitations, and also have to accept that their role in this process is predominantly one of learning. Their funding agencies have to get used to downward accountability. The communication and interaction will not only be about conventional professional subjects, but will also involve spiritual and cultural aspects, and a lot will depend on good social relations and skills. This means that the role of supporting people and organisations changes radically: instead of teaching local people how to resolve their manifold problems, they concentrate on learning from local people as the basis for exploring possible synergies between different forms of knowledge. External actors become companions and animators of communications within and between different groups related to endogenous development. This requires a process of personal preparation, where the conventional professional standards, attitudes and skills are scrutinised and modified where necessary.

It is important to find out to what extent local communities are already engaged with the dominant system. Is it possible to describe the relationship of the local culture and way of knowing with the formal/dominant system in the area? Can we learn from the community how they have managed to survive/change and co-evolve with the dominant/formal system? How do they do it? And, how shall NGOs, universities or other supporting organisations relate to that, and deal with this when certain value differences between ‘us’ and ‘them’ become clear? What are the possibilities and limitations for intercultural dialogue?

DEALING WITH THE STRONG AND WEAK POINTS WITHIN THE DOMINANT FORMS OF KNOWLEDGE

The basic hypothesis of this chapter is that Western knowledge is just one of the possible forms of knowledge. It is not universally applicable. It has its own strengths and weaknesses. An intercultural dialogue based on mutual confidence and horizontal relationships can only take place if all partners involved are prepared to have a self-critical attitude. There are considerable theories and reflections on the character of Western science. In the battlefield of knowledge, debates are held on issues such as objectivity versus subjectivity; universalism versus relativism; specialisation and disciplinarity versus holism or transdisciplinarity; quantitative methods and qualitative methods; and neo-positivism and actor perspectives. Hence, it is clear that also within the dominant 'scientific tower', there are different perspectives and positions. Western knowledge applied to agriculture or health practices has great impact across the globe. It has led to impressive results, but it has not been able to solve all problems related to food security, health, poverty, environmental sustainability and peace. Therefore, there is a perspective for intercultural and inter-scientific dialogue, on condition that Western science also accepts its limitations and is interested in finding ways to deal with them. The balance between sources of knowing—rationality, quantification and the material world, on the one hand, and empathy, intuition, sense and meaning, on the other—needs to be explored and, where necessary, corrected. Non-Western scientific traditions can offer a lot to Western science, and the other way around.

CHALLENGING THE DOMINANT WORLDVIEW AND EPISTEMOLOGY

The dominant/mainstream/Western worldview is biased in its dualistic and materialist orientation, and this bias contributes to the existing global ecological, social and spiritual problems. Human behaviour leading to these crises has its roots in the dominant values and the way knowledge and technologies are produced. There is a clear link between the dominant scientific knowledge and the way economic development is governed by the laws of capital (Molenaar, 2006).

As the dominant worldview is at least partly responsible for the poly-crisis in the world, it is being challenged from several angles. More and more the conventional, materialistic and science-based approaches to development are being questioned, and innovative individuals, citizen groups, scientists and policy makers are presenting new ideas on how things can be done.

CONCLUSION: DIALOGUES BETWEEN AND ABOUT SCIENCES

The insight is emerging that we should look at worldviews, sciences and values, not as universal, where in the end one of the options will turn out to be the best, but as expressions of a pluralist reality. In this view, intercultural dialogues, mutual learning and co-evolution of the diversity of sciences are important. But then, how can we form rules for understanding and exchange between individual knowledge systems? To what extent can we expect contradiction, synergy or complementarity between different forms of knowledge? How can we make an exchange between, for example, Maya knowledge, Shona knowledge, Hindu and Buddhist knowledge, European and global knowledge beneficial for the participants?

Two conditions have been suggested (Klein, 2005) for a fruitful dialogue:

- Acceptance of pluralism, and
- Symmetry in power and resources.

The different partners in the dialogue need to accept that, even though they believe that (considering possible limitations) their own view is probably the best option for their own context, other views may be relevant for other contexts. In other words, there may be more than one way to interpret, study and understand reality.

Symmetry in power, in prestige and in access to human and financial resources will avoid a situation where a dominant system determines the rules of the game. Local knowledge may be weaker

than mainstream knowledge as the result of historic processes that have led to the discrimination of local knowledge or asymmetric funding of research. But local knowledge should not be assessed by applying the criteria and methods used by mainstream science.

In the current international scientific arena, the rhetoric around the acceptance of pluralism and symmetry is far from the reality. The West has a dominant position in the globe: economically, militarily, ideologically and scientifically; and this makes acceptance of pluralism and symmetric relationships with non-Western systems very difficult.

For inter-scientific cooperation, it is important to have a formulation of the characteristics of different ways of knowing (in terms of the ontology, gnoseology and epistemology) and a self-assessment of the relative strengths and weaknesses of each knowledge system. This could coincide with an assessment of the power relations between the systems involved. During a conference on intra- and inter-scientific dialogue, AGRUCO and Latin American COMPAS partners concluded that intra-cultural dialogue and a revitalisation of indigenous knowledge are preconditions for inter-scientific dialogues (Delgado and Escobar, 2006).

This means that for each scientific tradition that takes part in inter-scientific cooperation, its own worldview should be formulated by the holders of that view themselves. The way of learning should be made explicit and should be the basis on which an epistemology can be formulated. This is not a simple process; it involves different actors, may require time and resources and may lead to confusion or frustration or reveal internal differences.

The *objectives* of the intra- and inter-scientific dialogues are as follows:

- To understand, describe and exchange the epistemologies and paradigms of the sciences involved.
- To strengthen and revitalise marginalised sciences by providing them sufficient space to flourish in knowledge institutions.
- To determine the strengths, limitations and comparative advantage of each science.
- To look for synergy and opportunities for mutual learning as well as for contradictions and exclusions.
- To question, challenge and criticise each science in order to determine those aspects of the science and value systems that need modification and improvement.
- To promote policies that facilitate balancing the power and financial resource base of the different sciences.

Today, the mainstream 'knowledge space' in institutions for education, research and development is largely dominated by Western science, its values and its epistemic frame. This impoverishes not only the knowledge sector but also development programmes that are based on one dominant knowledge system. The epistemological interpretation of the different Asian, African and Latin American and European knowledge systems, their ways of learning and experimenting and their mutual relationships needs urgent attention, if we are to diversify and enrich both the world's knowledge space and development action. Therefore, it is important to systematise and make more explicit the concepts and theories behind indigenous forms of knowledge in order to share them as part of a possible co-evolution of the diversity of sciences.

REFERENCES

- AGRUCO (2001) *Cosmovision Indigena y Biodiversidad en America Latina - Seminario Latinoamericano en Cochabamba*. Bolivia: Biodiversidad – Sustento y Culturas, 28 Abril de 2001.
- Balasubramanian, A.V. and Nirmala Devi, T.D. (eds.) (2006) Traditional knowledge systems of India and Sri Lanka. *Papers Presented at the COMPAS Asian Regional Workshop on Traditional Knowledge Systems and Their Current Relevance and Applications*, 3–5 July 2006, Bangalore. COMPAS series on Worldviews and Sciences 5. COMPAS/CIKS September 2006.

- Barnhardt, R. and Kawagley, A.O. (2005) Indigenous knowledge systems and Alaska Native ways of knowing. *Anthropology and Education Quarterly*, 36(1): 8–23.
- Battiste, M. (2005) *State of Aboriginal Learning*. Ottawa, ON: Canadian Council on Learning, 75 pp.
- Bishop, R. (1998) Freeing ourselves from neo-colonial domination in research: A Maori approach in creating knowledge. *International Journal of Qualitative Studies in Education*, 11: 199–219.
- Cajete, G. (2000) *Native Science: Natural Laws of Interdependence*. Santa Fe, NM: Clear Light Publishers.
- COMPAS (2007) *Learning Endogenous Development, Building on Bio-Cultural Development*. London: Practical Action Publishers/ETC Foundation.
- COMPAS-AGRUCO (1998) *Plataforma para el Dialogo Intercultural Sobre Cosmovision y Agricultura*. Cochabamba: Plural-CID.
- Delgado, F. and Escobar, C. (eds.) (2006) *Dialogo Intercultural e Intercientifico, Para el Fortalecimiento de las Ciencias de los Pueblos Indigenas Originario*. COMPAS and AGRUCO. La Paz: Edicion Plural.
- Denzin, N.K., Lincoln, Y.S., and Smith, L.T. (2008) *Handbook of Critical and Indigenous Methodologies*. London: Sage Publications.
- Fay, B. (1999) *Contemporary Philosophy of Social Sciences; a Multicultural Approach*. Malden, MA: Blackwell Publishers.
- Feyerabend, P.K., (1975) *Against Method; Outline for an Anarchistic Theory of Knowledge*. London: New Left Books, 375 p.
- Haverkort, B. and Reijntjes, C. (eds.) (2006) *Moving Worldview: Reshaping Sciences, Policies and Practices for Endogenous Sustainable Development*. Leusden: COMPAS, Maastricht: ECDPM, and Bern: CDE.
- Haverkort, B., van t Hooft, K., and Hiemstra, W. (2003) *Ancient Roots, New Shoots: Endogenous Development in Practice*. Leusden: COMPAS and London: Zed Books.
- Haverkort, B., Delgado Burgoa, F., Shankar, D., and Millar, D. (eds.) (2012) *Towards Cocreation of Sciences: Building on the Plurality of Worldviews, Values and Methods in Different Knowledge Communities*. Bangalore: Nimby Books, 291 p.
- Klein, G.K. (2005) Three centuries of global population growth: A spatial referenced population (density) database for 1700-2000. *Population and Environment*, 26(4): 243–367.
- Kuhn, T. (1962) *The Structure of Scientific Revolutions*. Chicago, IL: University of Chicago Press.
- Latour, B. and Woogar, S. (1979) *Laboratory Life: The Construction of Scientific Facts*. Beverly Hills, CA: Sage Publications.
- Mihesuah, D.A. and Wilson, A.C. (2004) *Indigenizing the Academy; Transforming Scholarship and Empowering Communities*. Contemporary Indigenous Issues Series. Lincoln: University of Nebraska Press, 246 p.
- Millar, D., Kendie, S.B., Atia Apusigah, A., and Haverkort, B. (eds.) (2006) *African Knowledges and Sciences: Understanding and supporting the ways of knowing in Sub-Saharan Africa*. COMPAS Series on Worldviews and Sciences 3. Leusden, The Netherlands, Navrongo and Cape Coast, Ghana: Comparing and Supporting Endogenous Development (COMPAS), University of Development Studies (UDS), University of Cape Coast (UCC).
- Molenaar, P.C. (2006) Psychophysical dualism from the point of view of a working psychologist. *Erkenntnis*, 65(1): 47–69.
- Nicolescou, B. (1998) The transdisciplinary evolution of the university, condition for sustainable development. *International Congress 'Universities Responsibilities to Society'*, International Association of Universities, Chulalongkorn University, Bangkok, Thailand, November 12–14 1997. Paris: CIRET, Rencontres.
- Nicolescou, B. (2004) Toward a methodology foundation of the dialogue between technoscientific and spiritual cultures. In Morena, L.M. (ed.), *Differentiation and Integration of Worldviews: Philosophical and Religious Experience*. Saint Petersburg: Eidos.
- Popper, K. (1965) *Conjectures and Refutation: The Growth of Scientific Knowledge*. London: Routledge.
- Popper, K. (1980) *The Logic of Scientific Discovery*. London: Hutchinson and Co.
- Rist, S. and Delgado, F. (2009) Strengthening endogenous knowledge production through intercultural dialogue. In: Hoffmann, V., Christinck, A., and Lemma, M. (eds.), *Handbook: Rural Extension: Examples and Background Material*. Weikersheim: Margraf Publishers, vol. 2: 346–353.
- Tuhiwai Smith, L. (1999) *Decolonizing Methodologies: Research and Indigenous Peoples*. London/New York: Zed Books.
- van der Ploeg, J.D. (2008) *The New Peasantries; Struggles for Autonomy and Sustainability in an Era of Empire and Globalisation*. London and Sterling, VA: Earthscan.

3 Conversations with Nature Spirits

The Political Ecology of Power and Progress in Rural Zimbabwe

Georgina McAllister
Coventry University

Mike Zeddy Chikukwa
Chikukwa Ecological Land Use Community Trust (CELUCT)

CONTENTS

Introduction.....	39
The Landscape and Its People.....	40
Changing Relationships with the Landscape.....	41
Culture Laced with Power.....	42
The Role of More-Than-Human Interactions in Generating Change.....	43
Arriving at Place.....	44
Coming Together on the Land to Heal the Past.....	45
Conclusion: Connecting the Dots.....	46
References.....	48

INTRODUCTION

In this chapter, we present a discussion between a community activist and a political ecologist who reconnected high in Zimbabwe’s remote Eastern Highlands, drawn together by Cyclone Idai, the most devastating to ever have hit Zimbabwe. The breath-taking backdrop to our discussion belies the hidden, but no-less dramatic, erosion of bio-cultural diversity, knowledge and social connection shaped by the colonial project since the end of the nineteenth century. This effectively paved the way for the persistence of coercive power relations into independence, and their tangible effects - land grabbing and livelihood loss, structured poverty and dependence, leaving people chronically exposed to disasters, political opportunism and conflicts. In this context, farming approaches that reconnect people to one another and their landscape are seeking to make meaning, restore collective agency, and heal the scars left by societies’ most destructive tendencies. Yet the coercive, and sometimes violent environments where these approaches are being re-imagined are rarely conducive to connectivity and healing. Our discussion explores the spirits that inhabit the natural world, the mixed blessings of a crisis, and its capacity to create moments of reflection within which to re-imagine our world afresh.

In picking our way through the complexities of this remote place, this first disembodied voice comes from a so-called ‘rational’ political ecology perspective to both narrate the context and explore how power shapes our relationship with the environment and each other, while the second

embodied voice – italicised – comes from a ‘more-than-human’ perspective that is embedded, and wholly invested, in a traditionalism that holds the tripartite relationships between people, ecology and spirit world as sacred. While our ‘voices see through different eyes’, they often converge, as if reflecting an interior conversation, with all its inherent concurrence and discordance. As the conversation unfolds, we explore how both are understood in relation to layered and complex relationships and what this means for people farming across landscapes in Zimbabwe today.

Our starting point is a shared recognition of these interconnections, and that the rational technocratic approaches that have come to dominate through a dogmatic belief in the primacy of science often devoid of people, and the relentless developmentalism it perpetuates, have not historically served people, nor the ecology upon which they depend. Through this conversation that interweaves the inherent contradictions between traditionally wielded power, patriarchy and patronage, we attempt to arrive at a better understanding of traditional belief and its practices, and the powerful dissonances, synergies and energies they generate.

THE LANDSCAPE AND ITS PEOPLE

We first met when George started her doctoral research in Chikukwa in 2016. I was her impromptu cultural guide, advising on how to dress and address others, according to our customs. As we walked across the landscape, visiting the sacred ruins of our ancestors’ first settlement, a dawn ‘Jickenisheni’ drumming convergence as the sun rose over the mountains, and a rain making ceremony at the top of the watershed, we shared stories. We talked about how the Chikukwa clan came to be – how our forefather, Nzvinzvi, arrived from afar on the wing, in the form of ishwa, a flying ant. The ishwa is our clan’s totem which, in our African tradition, we are forbidden to harm. Long before we heard of Aladdin and his flying carpet, our tradition was rich with stories of how Nzvinzvi took to the sky, riding on a winnowing basket carrying out heroic deeds to protect the community from wrongdoings.

The remote enclave of Chikukwa sits at the end of the winding ungraded road before the mountains rise towards the Mozambique border. Chikukwa’s ten villages sit between a transboundary conservation area and Zimbabwe’s once-thriving forestry belt, the creation of each having shaped a history of evictions, land struggles and waves of cross-border migration that has defined local politics and ongoing land tensions. Despite the imposition of the border that formally divided the lands of the Gaza Nguni people under the Anglo-Portuguese Treaty of 1891, this now transnational community regularly crosses the porous border for ceremonial gatherings and rituals that reconnect its five villages in Mozambique. As such, Chikukwans remain one clan, sharing the same dialect and a royal family with a deep lineage, headed by Chief Chikukwa.

Together, our clan elders and the spirit medium visit a shrine in Mozambique called Maate to communicate with the ancestors, to ask the High God Mwari for protection against threats, such as drought, crop pests and diseases. Only after successive droughts are monetary donations collected for messengers to take sacred seed to the most important shrines as an offering.

Fanning across the steep hillsides, Chikukwa’s villages are fed by natural springs that have traditionally supported food production in home gardens. Chikukwa’s altitude, soils and rainfall conditions, where temperatures rarely fall below 3°C, are ideal for a range of crops, from coffee and tree crops (fruit and nuts) to vegetables and cereals. Until 2019, seasonal rain-fed agriculture was centred largely on maize production on the wetlands alongside the Musapa River, which flows through the Chimanimani Gap and on into Mozambique. One night, in March 2019, the alluvial soils that made this riverine environment so productive were washed away when the arrival of Cyclone Idai devastated the landscape for 3 days, depositing half the expected annual rainfall in only 12 hours, replacing soils with rivers of boulders from the surrounding mountains. Over these few days, 40% of cultivable land and 52% of seed were lost (Chatiza, 2019), placing further strain on resources and relationships in this populous mountain region.

While understanding that the destructive energy of the cyclone was generated by the warming currents jostling over the Indian Ocean, it is said by some that these currents were spawned by a jostling for control between two mermaids, producing immense pressure. When one mermaid lost, she fled up the Mozambique Channel, drawing the power of the cyclone with her to Zimbabwe.

In cultures globally, often depicted holding a mirror, mermaids are portentous in holding up a mirror to humankind. They can be displeased or antagonised at being disturbed, for instance, by pollutants or people of ill will. A water spirit that is considered neither good nor bad, s/he perhaps represents the antagonistic duality that exists within humanity, through which we may better understand ourselves and our relationship with nature.

A mermaid could pull you down and hold you in her deep pool, from where, if fortunate enough to be released after days, or even years, you would emerge enlightened. So despite her reputation for destruction, mermaids are spirits of good fortune. The force of the cyclone, while doing damage to landscapes, lives and livelihoods, created more pools and eddies to play host to new mermaids. Like the returning biodiversity, she provides a vision of hope for the future.

CHANGING RELATIONSHIPS WITH THE LANDSCAPE

The heart of our Mwari spiritual landscape lies in the Matopos Hills of south-western Zimbabwe where the vast granite rocks, piled seemingly precariously one on top of the other, attract impressive lightening and rainstorms. These rocks are said to be stitched onto the land – the needles having created the seams through which the water flows, and from which rivers below are formed. We believe that the pools inside the rocks of the Matopos contain the rain clouds and are identified as the source of all water.

Home to the High God Mwari, there are a number of important shrines within the Matopos Hills, the most senior of which is Njelele (or Matonjeni). The interior landscape of the shrines, still visited by emissaries from across Zimbabwe, Zambia and South Africa, is thought to represent the source of all social and biological life – with perennial pools, streams, trees, ancient San rock art and the rocks themselves from which the Voices emanate. In this way, shrines are ‘the nucleus of a living and active landscape’ (Zvaba, 1988 in Ranger, 1997: 22). Mwari adepts (or oracles) wear traditional leopard skins, sweep the shrines by hand, use stone tools to cut the grass and are forbidden to farm or trade. As messengers of Mwari, their instructions involve obligations to, and relationship with, the landscape.

This way of life has long been under attack from the ‘civilising’ forces of Christianity¹ and the not-unconnected technocratic implementation of conservation and pursuance of economic development. Michael Drinkwater referred to this as the ‘colonisation of the lifeworld of the Africa people in Zimbabwe’ that has led to the marginalisation of traditional religion and its adherents (1991: 107). With the march of settler colonialism and the growth of actively confrontational missions, many believed that God had left Njelele, and so the Voice could no longer be heard. What took place has been described as a form of ‘ideological warfare ... about the definition of community, patterns of production and hence about landscape’ (Ranger, 1999: 53). At the heart of this lay the early role of Christian missions to liberate people from the superstitions and coercive tendencies of customary authorities, headed by Chiefs, and promote agricultural modernisation for the creation of an entrepreneurial class. This was to lead to progressive nationalist thought and, inexorably, to national liberation. By the time of the liberation war, between 1964 and 1979, rain ceremonies (*makoto*) were still performed, but fewer people consulted the adepts. After 1980, intricate farming traditions fell into further

¹ Native Commissioners of the settler Rhodesian state in the nineteenth century allocated a religion to their area – having been influenced or lobbied by whichever was the dominant mission. Many Africans therefore became, by default, followers of a particular denomination, while they and/or others were directly influenced by mission teachings.

decline as identities were politicised beneath the layered struggles taking place between genders and generations, the new state and its curtailment of traditional authority (Alexander, 2014; Kriger, 1988), and the competing nationalisms that continue to define Zimbabwe's socio-political landscape today.

Despite these historico-political pressures on traditional belief systems, and the dissonance they created, particularly for Christians, many rural livelihoods today remain largely grounded in the indivisibility of the tripartite relationship between people, nature and the spirit world inhabited by the ancestors (Gonese et al., 2003).

For traditionalists like myself, and some Christians, traditional practice and belief continue to moderate resource-use through rules, relationships and norms, within which peoples' identity, cosmology and knowledge are deeply embedded.² Today, we may still collect and mix together open pollinated, drought-tolerant small grains before taking them to the shrine to soak in the waters to ask the ancestors for protection.

However, many of those dispossessed of their land and landscapes have suffered lost connections to knowledge and tradition, reinvented them around new lineage structures or renounced them in favour of monotheism and/or capitalism. And, just as agrarian change shaped reciprocal labour-sharing practices out of necessity, those practices embedded in social relations and place that enable responsiveness to change or stress (Richards, 1989) have, over time, been further eroded by social division, corruption and mistrust.

You see, to damage our ecology is to undermine human existence. In this way of knowing, being and meaning-making for knowledge production, our African religion enhances and generates self-confidence, provides meaning and direction and is a source of dynamism and creativity.

According to one African proverb, "Our world is like a drum; strike any part and the vibration is felt all over" ... ringing in the ears of the ancestors, the owners of the land' (Tarusarira, 2017: 408). Despite the association of traditionalism, for many, with the customary forces of domination, for Tarusarira it also has the capacity to increase one's ability to resist exploitation and domination. And so, in rural communities across Zimbabwe, Chikukwa included, where these rituals and relationships persist – having been recovered or reinvented to varying degrees – they do so syncretically with Christianity.

Many people, sometimes reluctantly, still observe chisi or the Chief's day, our traditional day of rest for the soil, as a mark of respect for the ancestors that reside there. They are reluctant because they are sanctioned and may be fined by traditional leaders, many of whom are also Christian converts.

CULTURE LACED WITH POWER

These contestations and the idiomatic expressions of suffering can be seen in the more recent adoption of climate narratives. For Wilson (1995), this demonstrates the use of discourses to serve different interests, from which one can draw a direct line between coercive state control, conservation and farming. When laid over Zimbabwe's agrarian question, these interrelated discourses are just as likely to be employed for the benefit of one group over another within any given community. Yet, the complex and artful negotiations that incorporate many competing local interests and narratives can also be seen in the blending of indigenous knowledge, contemporary permaculture and spiritual resource governance. This is echoed in Moore's (1996) exposition of material deprivations and symbolic ancestral claims which, when creatively fused and adapted in defence of livelihood, culture and environment, produce cultural meaning that can be employed effectively as a form of resistance to external (state) interference. In this way, 'the micro-politics of resource struggles are animated by local history, mediated by cultural idioms, and gendered through the different practices [that] men and women have pursued in defence of local livelihoods' (Moore, 1996: 140). And it is the relationship with these livelihood resources that has, over time, become politicised and marred by endemic corruption, with customary leaders and elected politicians leveraging their position to consolidate patronage networks in return for loyalty, at others' expense.

² See also Bernard (2003).

THE ROLE OF MORE-THAN-HUMAN INTERACTIONS IN GENERATING CHANGE

This conversation hosted at the Chikukwa Ecological Land Use Community Trust, a small community-generated organisation that emerged in 1991, when some residents noticed that their village spring was drying up, seems prescient.

This group would meet to discuss and plan their actions, working side by side to replant the steep water catchment with indigenous trees, and to create awareness of the need to protect these areas. The springs and pools below hold special significance as sacred places in which water spirits and mermaids reside and, if disturbed, will abandon the spring so that the water will stop flowing. According to our custom, it is forbidden to clean black pots (used for cooking) or to use soap when washing in the springs.

From a Western rationalist perspective, this links deeply held spiritual beliefs with practical water quality considerations for downstream users.

As may be the case, nonetheless, this re-linking of the cultural, spiritual and ecological from the outset ensured that the group had the support of the Chief, who later gifted 1 hectare (ha) of land for the development of our permaculture centre.

The drought and cyclone that followed in 1992 also had a devastating effect in Chikukwa. This dramatic event, while far less destructive than the more recent cyclone, served as a catalyst for change.

With more people joining the voluntary workforce to rehabilitate our landscape, much of the knowledge travelled from household to household, farmer to farmer, with many developing their home plots with orchards depending on rainwater catchment patterns, and sharing and adapting skills.

In this way, traditional knowledge and wisdom was blended with exogenous strategies and ideas through extended networks.³

As our reputation grew, we generated funds by training others, and our community was able to support its own projects. Indigenous trees and woodlots were planted, with seed collected from different areas. Erosion gullies were filled with stones and planted with wattle. Chikukwa's terraces took shape from contoured swales with raised bunds planted with vetiver grass, and bananas, previously thought impossible to grow, are now a major crop for consumption and trade. As terracing reduced soil loss, yield improvements were quickly apparent; and the introduction of trees led to increased availability of diverse foods.

These patterns, mapped from previous crises, are important for the recollection of our historical memory – thought to have been washed away by the 2019 cyclone, again leaving people exposed and vulnerable to manipulation. Yet, nothing ever stands still.

Successive events since Zimbabwe's independence in 1980 have seen the population of Chikukwa expand exponentially, with people bringing with them different faiths and cultural norms. Some were workers stranded after the collapse of the logging industry and de-industrialisation in 2003, while others were Chikukwans from Mozambique who arrived after the 2001 designation of the Transfrontier Conservation Area. Further migratory flows resulted from the politically motivated urban clearances of 2005.⁴ Those arriving with few farming skills placed significant pressure on fuel wood resources. This period is viewed as one of significant social–ecological disruption in Chikukwa.

In 1991, before the other pressures, they had already started misbehaving ... they cut down trees in sacred spaces and even around springs. There was an old mbuya [grandmother] looking after

³ Zimbabwe was also an early adopter of agroecology, since Australian permaculturalist Bill Mollison was invited to host the first workshop in Harare by a pioneering group of concerned teachers with links to Chikukwa in 1988.

⁴ Referred to colloquially as the 'tsunami' due to its wide social impacts, Operation Murambatsvina ('to clean out the filth') is thought to have directly evicted 700,000 people, with 2.4 million people nationally affected by the resulting rural migration (Potts, 2006).

the springs [as the keeper]. But it was because of the clearing in water catchment areas, and due to lack of knowledge. People were just cutting trees for farming – it was bare. There was much less water. The history and links were lost as people died – and the new owners didn't have that understanding. It was not just new people coming in. Some were not respecting the elders. Then [in the 2000s] they took advantage when the Chief passed away – some took other peoples' fields, and cut down trees, and even destroyed the contour ridges ...They didn't value what we had built.

What is described here began in the post-independence period characterised by the rapacious liquidation of natural assets, when *freedom farming* became commonplace as an expression of popular resistance to customary coercion and state control (Mukamuri, 1995a) and the interrelated struggles for rural authority. Migration undoubtedly led to changing cultural norms governing social–ecological relationships and associated practices. But so too has the loss of farming knowledge as a result of earlier (semi-)proletarianisation, beginning with colonial interventions and evictions into the present day. With a continuation of these colonial productivist logics that aimed to project the modernity of a newly independent Zimbabwe, the 'liberation initiatives have found it very difficult to 'unthink' the epistemologies created by others' (in Murisa and Chikweche, 2015: XX). These factors have combined to fundamentally alter social–ecological relationships and, with it, the land-use practices that continue to shape change in Chikukwa.⁵

Where Chikukwa's permaculture-inspired projects and programmes sought a somewhat pragmatic and purposive approach, we both wonder whether something fundamental was missed with regard to the human–nature spirit connections. Or maybe the community was resistant and unwilling to hear anything of traditional ways, that is until they were visited by the cyclone over those three destructive days of March 2019.

Yes, this is possible. So, in an attempt to reconnect people through our peace and sustainable farming programmes, I began an Indigenous Knowledge Systems (IKS) initiative, as a response to the erosion of knowledge, landscape and trust, including declining trust in our traditional leadership. This initiative aims to re-engage the community in the preservation of bio-cultural diversity, through an ongoing exploration that accepts the dynamic nature of traditions and practices, and the power inequities that can be engendered, to begin a conversation about the changes people want.

Based at an open-sided thatched meeting house, the initiative aspires to map sacred places alongside keystone species, and to revalue knowledge about indigenous plant lore, ritual and healing practices. This includes the introduction of elements of mindfulness artfully blended with cultural thought and practice. These seemingly innocuous processes nonetheless meet some resistance.

In times of change and uncertainty, it also aspires to bridge our religious, political and generational divides to improve understanding, to repair community cohesion in the face of more recent threats and to restore the community's deep connection with our spirit ecology.

As the community seeks to make meaning from the devastation, we turn to deep-rooted questions of what has been lost and how to rehabilitate not only the landscape, but the community's connections with the nature spirits.

ARRIVING AT PLACE

So it was, in March 2019 and within days of the passing of Cyclone Idai that isolated the community from the outside world for 2 weeks, that two strangers appeared on foot with a message.

Each through their dreams had been guided, like wise men from afar, to visit with Chief Chikukwa and instruct him to prepare a ceremony, involving the surrounding Chiefs, to appease the nature

⁵ As a result of these population and resource-use pressures, the steeply deforested slopes were increasingly unable to retain their soils and nutrients. The lack of infiltration resulted in poor groundwater storage and erosion, with large gullies beginning to open up and channelling fast-flowing water and landslides down towards homesteads and villages, resulting in consistently poor harvests.

spirits with rapoko [finger millet], a culturally important small grain collected and offered during makoto. To the astonishment of many, some of the chiefs came empty-handed, breaking with tradition. Soon after the ceremony, involving over 150 people, the strangers left. No one ever saw them again or knew their names.

After the meeting, when our traditional leaders consulted the most important spirit medium in the Southern Africa region, Sekuro Matota, it was revealed that the nature spirits were angry and needed to be cooled down. He pointed to areas of Chimanimani that had been particularly hard-hit, and whose Chiefs had turned their backs on traditional practices and on their chiefly function, as many see it, to unite their communities – instead reverting to the punitive strategies they have become some accustomed to. This ran alongside accusations that those same Chiefs were diverting the grains traditionally collected from community members who worked collectively at the Zunde raMambo (the Chief's or 'king's' field) to feed the most vulnerable, and were instead feeding their own families or supporters, or selling them for personal gain. Each chieftaincy was therefore instructed to visit sites with strong energy centres, many of which had been long neglected, and to hold a ceremony involving their entire communities. In appeasing the nature spirits of our damaged landscapes, these events were also called to rebuild the unity and trust that has been eroded in our community over decades. Some chiefs acted on this, while others did not.

Patterns of cultural introspection and spiritual renewal, seen through an historical lens, as with the ebb and flow of sociocultural, socio-political and natural crises, have most often followed intense periods of drought (Maxwell, 1995, 2005). The search for answers can result in moral panics aligned with the loss of cultural traditions – responsibilities for which are commonly laid at the door of, and felt most keenly by, women (McAllister, 2018). With every wave to re-establish fading traditions come new attempts to reinvent the past to remake tradition, or reinforce existing power relations. As with Christian–Traditionalist relationships and practices, the by-now well-worn practice of syncretic blending for broad-based appeal and legitimacy is well established. Herein, the re-establishment of a tripartite relationship plays out on a political tightrope. If critical of government, growing political opposition can result in rumours that delegitimise a movement's authenticity and, if too skewed towards traditionalism, can meet with opposition from power-holders in established churches. As recounted by Mawere and Wilson (1995) of the expansion of the Mbuya Juliana cult⁶ after the devastating 1992 drought, such attempts also run the risk of co-option by the narrow interests and agendas of traditional leaders to recover eroded political authority through the reclaiming of ritual practice and tradition.

There is no clear line between traditionalists and Christians. In fact, many of our traditional leaders, and indeed Chiefs, are also observant Christians, leading to accusations by traditionalists that they have 'lost their way'.

What perhaps links both is that they are regularly courted by, and part of, entrenched political patronage networks that hold these ecologies of violence very much in place. The complex alliances of convenience formed to variously resist, comply and/or transgress this equilibrium, while vital for everyday survival, can at once undermine popular support and spiritual authority for the core messages of social–ecological unity.

COMING TOGETHER ON THE LAND TO HEAL THE PAST

In an era of increasing climate disruption, the cyclone is just the latest in a long line of destructive events – seen through the microcosm of this one community.

We are living with the effects of our past – colonisation was intended to disempower – to disconnect people from their world, and to sow not seeds of harvest, but division. Before, you could be

⁶ Mbuya Juliana became a cult figure across Zimbabwe, preaching to vast gatherings about a return to traditional culture, and environmental values and farming practices. She claimed to have emerged, with her newfound wisdom, from the grips of a mermaid.

under a tree and ask for food. It wasn't magic; it was a strong connection between the creator and the people.

Within historical memory, trees on cropland were forbidden, seen as hampering productivity. The punishment for such agricultural transgressions was imprisonment. People were even ordered to remove sacred fig trees that were not only indicators of water, but providers of abundance during drought years, and under which communities would gather (Mukamuri, 1995b). The loss of these sacred places, the ritual of sharing, spending time talking about what happened in the past, and learning from and connecting through each other's innate spirituality are still keenly felt.

Folk stories can be written down and documented, but these are our stories, to be repeatedly communicated across generations. The loss of spaces for communication is the same as losing the power of communication. As these stories that guide people through times of change and upheaval are lost, memory is wiped, and the ground for division is sown.

Concerns about the loss of sacred woodland and the pollution of sacred springs connect to concerns about destructive farming practices and the loss of intricate land-use systems associated with riverine gardens, dryland farming and livestock rotations. They relate also to how farmers use intentionality to celebrate or to give thanks, in the field or at home.

When planting seeds, we are not simply planting in the ground, but placing them in different parts of the field as an offering. In the same way, before eating, we remove our shoes and place the grain around different corners of the home. The food is cooked without salt, as a mark of purity and respect. We believe that these rituals protect the home and fields from damage.

In 2017, an infestation of the moth larvae of the fall armyworm, *Spodoptera frugiperda*, damaged some 150,000 ha of maize and millet in Zimbabwe (FAO, 2017) and led to a state of national emergency. Many farmers were advised to use a pesticide or experiment with integrated pest management, while others deposited sharp lacerating sand in the central core of the emerging leaves that harbours the larvae, to great effect.

In Chikukwa, on the first reports of fall armyworm in 2018, a ceremony was arranged. The larvae were collected by hand and placed in a calabash before being taken to a sacred pool where ceremonial songs were sung, and the calabash was left overnight. The following morning, no larvae were found in anyone's field across the community, which remained free of fall armyworm for the rest of the season. The effectiveness of this traditional response seemed as surprising to the community as the process may seem to outsiders. Nonetheless, the response to why it was effective rests with a belief in the power of actions that benefit the collective. This is because, when the rain falls, it doesn't fall on one man's field. When a disaster attacks, it doesn't just attack one man or one woman.

On returning to the question about authentic spirituality in context, one of us is reminded of the challenges closer to home. Our conversation has highlighted the disconnect between leaders failing to honour their commitments, protect important spaces, undertake their duties fairly and transparently and support the needs of all in a non-partisan way. Life in this beautiful yet troubled microcosm may not be as different as we, elsewhere, may like to believe.

CONCLUSION: CONNECTING THE DOTS

The moment that you use your intention to work the land – you are aware of the life in the soil. And at that moment, you give value to where you are standing. Self-awareness needs time and honesty to oneself, and trust between people to explore these things openly. It calls on us to learn to listen to the landscape – to the suffering of the earth, to the rivers and trees and to the anger of the nature spirits – now only ever heard above the avarice and poverty during a gasping drought or raging cyclone. Finding ways of listening to, and within, our ecosystem is more important than ever.

These connections are celebrated through the embodied performance of rituals that have dynamically responded to changes over time and generation. Just perhaps, we ponder, in the search for engaged social relationships in these fragile environments, a new syncretism with agroecology is emerging: one that blends the spiritual importance of small grains with their drought tolerance and nutritional benefits; sees climate change narratives as one with the disruption of complex ecosystems, complete with sacred pools and coppices; and seeks to rebuilt trust and failing community structures by respecting and upholding principles of equity and social justice. While perhaps naïve to suggest that anywhere will be free of power reproduction and the structures it perpetuates, it does hold the potential to reinvigorate a sense of efficacy and optimism to effect, albeit cautious, change.

Here, we ponder the value of social farming in re-forging relationships through which social-ecological change may be negotiated and alternative sources of agency and identity may be cultivated to transcend these deeply entrenched patterns of division and (self-)destruction. Moments of renewal are an important articulation of a deeply held dissatisfaction with an equilibrium that holds poverty and marginalisation in place. Yet this comes with a recognition that these same calls to tradition risk co-option by the very forces that benefit from that equilibrium.

I see spirituality as one – it's the source. You talked about re-imagining and revaluing – it's like connecting the dots. We're lucky that we still have dots to connect. But only just, they are disappearing before our eyes. Just look where we are George – we could be the richest people!

Somewhere between the destructive power of cyclones and the popular anger that resulted in the destruction of 'freedom farming' as a popular reflex against coercive power is the collective will to help the landscape and its hosts to regenerate – building bridges, figuratively and literally, that reconnect peoples across landscapes to mobilise knowledge and build new alliances.

Perhaps what joins our conversation is a drive for a socially engaged and authentic, yet quiet and non-confrontational, form of activism. The boundaries here are not always clear and, we agree, have yet to unfold. Where activists tend to rush in, action generated through connections to spirit requires room to breathe and accumulate. Our motivations converge under the increasingly urgent need to recover lost knowledge, to open up and explore different pathways.

Where historical memory is thought to have been washed away by the cyclone, people are more exposed than ever to coercion, be it political or religious, in pursuit of power and influence. Reconstructing our world in new ways requires the recovery of memory. Ritual practice can play an important role in this critical reconnection. Critical, because this is surely not about tightly reconstructing the past, but finding new ways in which the past can better explain the present and inform the future. Critical, because this requires open dialogues about what is retained, what is left behind, what is dynamically co-constructed and by whom.

Ultimately, we are creative creatures, and we have been recreating and redesigning our traditions for millennia.

As ever-more extreme weather events are projected globally and predictions of the worst drought on record since 1992 for Zimbabwe's coming 2020 farming season (Manatsa, 2020), we both wonder whether this small community will find the energy to artfully challenge patterns of degradation, and to collectively re-imagine the long-broken social contract to turn the tide.

Crises are nothing if not traumatic yet magical moments that inspire human reflection, in concert with our rich knowledge ecologies, and call on our creative powers to re-imagine our world afresh.

One of us is reminded of the words of an esteemed agricultural extension specialist that 'nothing worthwhile has ever been achieved without an element of coercion'.⁷ Yet one could equally argue that nothing at all effective or durable has ever been achieved with coercion. Historically, the uptake

⁷ Informal conversation with national university professor, 28 November 2019.

of farming techniques and technologies has been utterly rejected unless deeply imbedded in existing knowledge. Hence, if history has taught us anything at all, it is perhaps that the art of syncretism has sustained, whomever marshals it, to mobilise and drive change. So it continues, in Zimbabwe and beyond, that we are left swimming against a powerful tide. And just perhaps, out of these crises, we may all emerge from the depths of that pool more enlightened.

REFERENCES

- Alexander, J. (2014) Things fall apart, the centre can hold: Processes of post-war political change in Zimbabwe's rural areas. *Occasional Paper*, 8: 131–162. Oxford: University of Oxford.
- Bernard, P.S. (2003) Ecological implications of water spirit beliefs in Southern Africa: The need to protect knowledge, nature, and resource rights. *USDA Forest Service Proceedings RMS*, 27: 148–153.
- Chatiza, K. (2019) Cyclone Idai in Zimbabwe: An analysis of policy implications for post-disaster institutional development to strengthen disaster risk management. Oxfam Briefing Paper, November 2019. Oxford: Oxfam GB.
- Drinkwater, M. (1991) *The State and Agrarian Change in Zimbabwe's Communal Areas*. New York: Springer.
- FAO (2017) Fall army worm outbreak, a blow to prospects of recovery for Southern Africa. *FAO Regional Office for Africa*. Briefing, February 2017. <http://www.fao.org/africa/news/detail-news/en/c/469532/> (accessed November 30th, 2019).
- Kruger, N.J. (1988) The Zimbabwean war of liberation: Struggles within the struggle. *Journal of Southern African Studies*, 14(2): 304–322.
- Manatsa, D. (2020) Drought looms over Zimbabwe. *The Herald*. <https://www.herald.co.zw/drought-looms-over-southern-africa/> (accessed January 4th, 2020).
- Mawere, A. and Wilson, K. (1995) Socio-religious movements, the state and community change: Some reflections on the Ambuya Juliana cult of southern Zimbabwe. *Journal of Religion in Africa/Religion en Afrique*, 25: 252.
- Maxwell, D. (1995) The Church and Democratisation in Africa: The case of Zimbabwe. In: Gifford, P. (ed.), *The Christian Churches and the Democratisation of Africa*. Leiden: EJ Brill, pp. 108–129.
- McAllister, G. (2018) Cultivating social-ecological relationships at the margins: Agroecology as a tool for everyday peace formation in fragile environments. Unpublished PhD thesis. Coventry: CAWR, Coventry University.
- Moore, D. (1996) Marxism, culture, and political ecology: Environmental struggles in Zimbabwe's Eastern Highlands. In: Peet, R. and Watts, M. (eds.), *Liberation Ecologies: Environment, Development, Social Movements*. London: Routledge, pp. 125–147.
- Mukamuri, B.B. (1995a) Local environmental conservation strategies: Karanga religion, politics and environmental control. *Environment and History*, 1(3): 297–311.
- Mukamuri, B.B. (1995b) Making sense of social forestry. PhD thesis, Tampere: University of Tampere.
- Murisa, T. and Chikweche, T. (2015) *Beyond the Crisis: Zimbabwe's Prospects for Transformation*. Harare: Weaver Press.
- Potts, D. (2006) 'Restoring order'? Operation Murambatsvina and the urban crisis in Zimbabwe. *Journal of Southern African Studies*, 32(2): 273–291.
- Ranger, T.O. (1997) Making Zimbabwean landscapes: Painters, projectors and priests. *Paideuma: Mitteilungen zur Kulturkunde*, Bd 43: 59–73. Frankfurt: Frobenius Institute.
- Ranger, T.O. (1999) *Voices from the Rocks: Nature, Culture and History in the Matopos Hills of Zimbabwe*. Oxford: James Currey.
- Richards, P. (1989). Agriculture as a Performance. In: Chambers, R., A. Pacey, A. and Thrupp, L. (eds), *Farmer First: Farmer Innovation and Agricultural Research*. London: Intermediate Technology, pp. 39–43.
- Tarusarira, J. (2017) African religion, climate change, and knowledge systems. *The Ecumenical Review*, 69(3): 398–410.
- Wilson, K.B. (1995) 'Water used to be scattered in the landscape': Local understandings of soil erosion and land use planning in southern Zimbabwe. *Environment and History*, 1(3): 281–296.

4 The Forgotten Ground

Recollecting the Primordial Harmony

Joseph Milne
University of Kent

CONTENTS

The Primordial Sense of Order	49
Orders of Truth.....	50
Narrative Consciousness and Teleology	50
The Ethical Relation with Nature	51
Justice and Nature	52
Nature as Intelligent.....	52
The Natural Inclination to Responsible Knowledge.....	53
The Natural Virtues	54
Natural Law	54
Ownership and Right Use	55
The Rise of the Proprietorial Self	56
The Commodification of Nature	57
Recollecting the Primordial Harmony	57
References.....	58

In the old days, all living creatures, from the biggest animal to the tiniest bug, lived side by side with the People in total peace and friendship (Cherokee) (Kerven, 2018: 140).

THE PRIMORDIAL SENSE OF ORDER

Since most ancient times, the human race has pondered its place in the great order of things. The earliest written records are myths. These ancient myths tell of how at the beginning all the different creatures lived together in harmony. In one form or another, a great order ruled everywhere, either through a natural wisdom of all creatures or through divine beings who presided over the world. Other myths tell of how the world came into existence from a primordial being, such as the *Purusha* in the Hindu Vedas. In some myths, there was darkness and nothing before anything came into being; in some, there was perpetual ice; in some, there were gods in the heavens but no living creatures on earth till they made them; and in some, there was a great void or chasm out of which arose the world and all beings. The beginning time in some was a Golden Age, a time in which gods and the people lived in harmony and there was no vice and all the earth was shared in common.

Whether these ancient myths conceived the world as always existent in a primordial time, or whether the world arose or was made by divine beings, or from the breaking of the cosmic egg, or from the great ocean, or from the original void, or the progeny of the marriage of heaven and earth, they each give the cosmos a story, a narrative. As the philosopher Paul Ricoeur has shown, narrative understanding is foundational to human consciousness. We initially grasp the world as

an unfolding event, and through this, we situate ourselves and derive our own sense of being and meaning (Ricoeur, 1991: 99). At its simplest, narrative has two aspects, an empirical and a mythical. History seeks the ‘true’ relation of events, while story embodies ‘imaginative’ events. Yet ‘story’ can equally tell what is true, as Aristotle says of tragedy: ‘Poetry, therefore, is a more philosophical and a higher thing than history: for poetry tends to express the universal, history the particular’ (Aristotle, 1932).

ORDERS OF TRUTH

‘True’ has many dimensions of meaning, though there has been a tendency since the Enlightenment to grant ‘truth’ only to a single so-called ‘objective’ dimension. But this objective dimension is itself founded on a presupposed narrative compartment towards reality. Nevertheless, any approach to the world seeks to ‘tell it as it is’ and to be truth-bearing. And such ‘telling’, of putting into speech or representation, is rooted in narrative consciousness, and this cannot be circumvented. Every such speaking or representing is in some sense an act of bearing witness to the world. Human consciousness spontaneously seeks to give account of the world and reality, to bring what is seen before itself and to reflect on what is so and what is not so. This is the case whether it is the exchange of mere gossip or the elaboration of a scientific theory. In recounting these things, we express a fundamental characteristic of human nature – as the being who tells of things and who becomes a community through such telling of things. Human accounting and bearing witness situate us in society, and society in the cosmos. Thus, Aristotle distinguishes the human being from all other species as having language (*logos*), and it is this that makes the political being (Aristotle, 2012: 1253A: 10).

It is from this ‘mythic consciousness’, the fundamental intuition of the order of things, that Greek philosophy emerged. Plato’s famous quarrel with the poets was not because he held the accounts of Homer and Hesiod to be untrue, but because they spoke true things without a real understanding of them. They spoke ‘out of their minds’, possessed by a divine madness. This divine madness is perfectly legitimate, and the poet cannot make true poetry without it:

If anyone comes to the gates of poetry and expects to become an adequate poet by acquiring expert knowledge of the subject without the Muses’ madness, he will fail, and his self-controlled verses will be eclipsed by the poetry of men who have been driven out of their minds.

Plato (1997)

Granting that, it is part of the work of the philosopher to bring into reflection and articulation an order of truth that lies in the deepest memory of the soul, or which belongs to the nature of consciousness itself.

NARRATIVE CONSCIOUSNESS AND TELEOLOGY

The narrative consciousness is also grounded in a sense of the ‘whole’, or what we may call the ‘cosmic sense’. What unfolds in narrative, or in becoming, unfolds within a totality, embracing reality as a whole, so it is natural to seek the lawful order of things. Here, we may say that the scientist, the philosopher and the poet all work on the same ground, acknowledging universal laws and a coherence to the order of things – even if that coherence always remains beyond full grasp. What is important is that, for the ancient philosophers, the sense of a ‘whole’ and an order to things belongs to the nature of consciousness itself and this is presupposed by all enquiry into the nature of the order of things.¹

Two further factors arise from the sense of the whole which are held by the ancient philosophers: the intuition of a *teleological* order of nature and an *ethical* sense of our relation with the world

¹ For a detailed philosophical discussion of the human sense of cosmos, see Rémi Brague, *The Wisdom of the World: The Human Experience of the Universe in Western Thought* (2003).

(Blanchette, 1992). These two cannot be entirely separated. This is because it is assumed in ancient thought that the coming into existence of reality is both *purposeful* and essentially *good*. For Plato, the good precedes being and illuminates the truth of things. It is also what all things naturally seek in coming into being in the fullness of their potential. There is a teleological order to the universe as a totality, while each particular thing seeks its completeness within the total order and according to its own nature. As Collingwood observes in *The Idea of Nature*:

The world of nature is thus for Aristotle a world of self-moving things, as it is for the Ionians and for Plato. It is a living world: a world not characterised by inertia, like the world of the seventeenth-century matter, but by spontaneous movement. Nature as such is process, growth, change. This process is a development, i.e. the changing takes successive forms α , β , γ , ... in which each is the potentiality of its successor.

Collingwood (1960: 82)

Understanding nature in this manner, as self-moving, means that its efficient and final causes lie within itself:

And Aristotle arrives at this conception of an immaterial efficient cause by reflection on the fact of development: for development implies *nisus*, that is, a movement or process not merely oriented towards the realization in bodily form of something not yet realized, but actually motivated by the tendency towards such realization. The seed only grows at all because it is working at becoming a plant; hence the form of the plant is the cause not only of its growing in that way but of its growing at all, and is therefore the efficient cause as well as the final cause of its growth.

(ibid: 84)

This *nisus* or inclination of living things towards their natural ends is often assumed in practical experience, even if not theoretically. For example, we may see from experience that every living thing strives towards perfect health and maturity. Medicine remains founded on this principle, even if it is not theoretically acknowledged. It is unfortunate that this teleological understanding of nature was discarded in the seventeenth century in the attempts of the new sciences to escape scholastic Aristotelianism, owing to the rejection of the authority of the Church and the ancient philosophers and the rise of nominalism,² as, for example, we see in Bacon's *The New Atlantis*. This also meant the overthrow of any hierarchical or sacred conception of the order of nature. Human mastery over 'nature's secrets' became the new aim of knowledge. Later, as a more mechanistic view of nature took hold, any notion of 'purpose' or 'final causality' was entirely eliminated from scientific theory (Lear, 2011). The motion or activity of things was explained by the mechanical effects of one thing upon another, or through outside forces moving them, so that nothing possessed its own cause or moved from its own nature.³ The notion of 'purpose' or 'natural ends' was relegated to human subjectivity. And with the elimination of teleology, any ethical conception of the natural order of things becomes impossible. The so-called 'impartial' study of nature rendered nature itself impartial. The mechanistic theory projects itself *upon* the observed on the assumption it is disclosing the order of things.

THE ETHICAL RELATION WITH NATURE

However, even if nature is conceived as neither teleological nor tending to some good, the ethical relation of the human species with nature cannot so easily be set aside, least of all with climate change demanding both a rational and an ethical response. Just as human consciousness grasps

² For a detailed study of this shift in thinking, see Michael Gillespie, *The Theological Origins of Modernity* (2009).

³ For a detailed discussion of how the ancient notion of teleology was discarded in the Enlightenment, see Stephen G. Salkever, *Finding the Mean* (1990: 21–36).

reality narratively and is grounded in an intuition of wholeness, so also it has an ethical sense, a sense that a natural good belongs to everything and that human action is responsible to this. In the Middle Ages, this awareness was termed *synderesis* (Aquinas, 1920: 1a:79). This informed the practical reason, the reasoning that informs action, as distinct from the intellectual reason. All human action was understood to have an ethical aspect. When Aristotle defined human nature through language (*logos*), mentioned earlier, he also remarks that:

...speech is for disclosing what is advantageous and what is harmful, and so too what is just and what is unjust. For this is distinctive of human beings in relation to the other animals, to be alone in having a perception of good and bad, just and unjust, and the rest, and it is an association involving these things that makes a household and a city.

Aristotle (2012: 1253A: 10–19)

For Aristotle, as for Plato, human society arises through the sense of justice and injustice. It is this that makes the human animal both social and political. Hence, politics is concerned with law and jurisprudence. But also, and most important, for Aristotle human society is natural (Trott, 2014), as much a part of nature as any other part. One might almost say that society comes into being so that justice can be seen and said.⁴ It was Thomas Hobbes who first conceived of society as an ‘artificial’ creation and outside nature, although Hobbes derives his view from the ancient sophists who also held that ‘justice’ was a purely human construct with no foundation in nature. But for Plato and Aristotle, human beings are naturally just, in the sense that they are only truly human when just.

JUSTICE AND NATURE

For Plato and Aristotle, the question of the nature of justice is a foundational question, inseparable from the ontological question, not simply for philosophy, but for human existence as such. The question of justice goes beyond the social and political domains and extends to nature as a whole, more so if society is itself part of nature. The right way of human life is to live justly in relation to all things. This comes as a responsibility of the capacity to reflect upon all things. Human consciousness not only has a sense of the whole, but this sense of the whole situates human beings within the whole as their natural dwelling place. Seen in this way, it is clear that justice for the ancient Greeks was not merely a matter of individual opinion but rather something belonging to the entire order of the cosmos.⁵

NATURE AS INTELLIGENT

Plato views the cosmos as intelligent, rational and therefore intelligible. One way Plato demonstrates this is by showing a correspondence between human reason and the order of the heavens and how, by perceiving the rational order of the heavens, the human soul is brought into harmony with itself:

God invented and gave us sight to the end that we might behold the courses of intelligence in the heaven, and apply them to the courses of our own intelligence which are akin to them, the unperturbed to the perturbed; and that we, learning them and partaking of the natural truth of reason, might imitate the absolutely unerring courses of God and regulate our own vagaries. The same may be affirmed of speech and hearing: they have been given by the gods to the same end and for a like reason. For this is the principal end of speech, whereto it most contributes.

Plato, Timaeus (1937: 47c–d)

⁴ For a detailed discussion of the Greek conception of law founded in the unity of society, see Otto Gierke, *Association and Law: The Classical and Early Christian Stages* (1997).

⁵ For Plato’s refutation of the various false opinions of justice, see *Republic* Book 1.

That the human senses should be related to the nature of things is itself not so strange. But that there should be a purpose to perception that is related to the proper work of intelligence runs counter to the modern notion of the autonomy of human intelligence and the belief that it can stand, as it were, outside the world looking in.⁶ But as soon as it is acknowledged that the cosmos itself is rational and intelligent, then it is clear that human intelligence cannot dissociate itself from the cosmos any more than the body can dissociate itself from the biosphere. On the contrary, it has to be understood as in some sense participating in it, or as ‘partaking of the natural truth of reason’, as Plato puts it.⁷

The notion of applying the ‘courses of intelligence in the heaven’ to ‘the courses of our own intelligence’ is not simply a poetic manner of speaking. It indicates that human intelligence can align itself with the truth of things with which it has a direct kinship. That alignment goes beyond the capacity simply to give accurate descriptions of things. To align with the truth of things belongs as much to practical reason as to intellectual reason. It ‘regulates’ the intelligence by conforming it to the cosmic intelligence or reason. When ordered in this manner, the soul is brought into harmony with itself. According to Plato’s anthropology, that means that the rational, the spirited and the appetitive parts of the soul are brought into concord with one another and can therefore act truthfully and virtuously.⁸ Otherwise, disorder exists between the parts of the soul, what Plato calls ‘vagaries’.

THE NATURAL INCLINATION TO RESPONSIBLE KNOWLEDGE

Seen in this way, our natural inclination to the truth of things, our desire to enquire, arises from the rational relation of the soul with the rational order of reality itself. There is a continuum between nature and thought. Thus, Aristotle opens his *Metaphysics* with the observation that:

All human beings by nature stretch themselves out toward knowing. A sign of this is our love of the senses; for even apart from their use, they are loved on their own account, and above all the rest, the one through the eyes.

Aristotle (2002: 980a: 21)

And what the mind seeks through the senses is wisdom. Yet the mind must reach out of itself in order to be itself. When the order of things is apprehended, there is a correlation between outward perception and inward reflection. We might even say that, through being present and perceptible, nature confers the gift of self-reflection upon human intelligence. The Greek word for truth is *aletheia*, meaning ‘unconcealing’. Nature at once conceals and reveals itself. Truth cannot be taken by force, but offers itself to rightly oriented intelligence and reverential intention.⁹

This way of seeing the relation between human intelligence and the rational order of things raises the question of human responsibility towards nature as a whole. Aristotle poses the question: ‘One must also consider in which of the two ways the nature of the whole contains what is good and what is best, whether as something separate, itself by itself, or as the order of the whole of things’ (Aristotle, 2002: 1075a). That is to say, does the ‘good’ lie simply in the whole as such, or in some principle ordering the whole? Or are the ‘whole’ and its principle the same? For what can lie beyond the whole? In asking these questions, we are brought to consider how the ‘being’ and the ‘good’ of things are related, or if, ultimately, they are separate. Such metaphysical questions are more easily approached when the responsibilities of the human person are considered in relation to the whole.

⁶ For a philosophical discussion of why nature cannot be properly accounted for if consciousness is omitted, see Thomas Nagel, *Mind & Cosmos* (2012).

⁷ For a comprehensive study of Plato’s ethics and cosmology, see Gabriela Roxana Carone, *Plato’s Cosmology and Its Ethical Dimensions* (2005).

⁸ For Plato’s elaboration of the tripartite soul, see *Republic* IV: 435–442.

⁹ The consequences of seeking to take truth by force are famously captured in the story of building the tower of Babel in Genesis 11:1–9, and how this destroys the power of speech, the essential human characteristic.

Cicero, taking up this question from a Stoic perspective, conceives of this responsibility in a number of steps:

In order to have value, a thing must either be itself in harmony with nature or else be the means of procuring something which is so. All objects, then, that are in accordance with nature are relatively choiceworthy on their own account, while their opposites have negative value and call for rejection. The primary duty is that the creature should maintain itself in its natural constitution; next, that it should cleave to all that is in harmony with nature and spurn all that is not; and when once this principle of choice and rejection has been arrived at, the next stage is choice, conditioned by inchoate duty; next such a choice is exercised continuously; finally, it is rendered unwavering and in thorough agreement with nature; and at that stage the conception of what good really is begins to dawn within us and be understood.

Cicero, De Finibus, III, 20–21, in Hicks (2018: 80)

Contrary to the Enlightenment notion that ‘fact’ and ‘value’ cannot be related, Cicero here shows how the value of anything is to be judged by its integrity or coherence within itself or its harmony with nature as a whole. Every creature has a duty to maintain its integrity, and while the other creatures do this spontaneously through natural inclination, human nature must take up that obligation consciously and deliberately. To elect to ‘cleave to all that is in harmony with nature’ (Cicero, *ibid*) is a rational act of aligning thought and action to the greater whole. It is at once a moral and a rational act. Cicero considers holding to action of this kind to be the human duty, and only then can a true understanding of the good begin to be realised.

THE NATURAL VIRTUES

To live with this kind of resolution is to live virtuously. The virtues are the ancient ground of ethics, as distinct from modern deontological ethics. The virtues¹⁰ bring order to the inner being and enable right action. According to Zeno, they establish at once individual autonomy and the capacity to act in harmony with nature:

The goal of all these virtues is to live consistently with nature. Each one enables a human being to achieve this [goal] in his own way; for [a human] has from nature inclinations to discover what is appropriate and to stabilize his impulses and to stand firm and to distribute [fairly]. And each of the virtues does what is consonant [with these inclinations] and does its own job, thus enabling a human being to live consistently with nature.

Inwood and Gerson (2008: 26)

Just as the mind has an inclination to reach out to knowledge and understanding, as Aristotle says in the opening of his *Metaphysics*, so likewise it inclines to the good and to knowledge of the good. These are the ‘inclinations to discover what is appropriate’, as Zeno puts it. And again, as Aristotle says, the human being desires not only to live, but to live well (Aristotle, 2002. 1095a: 15–22).

NATURAL LAW

Gathering together our observations on the primordial sense of the whole, the narrative sense, the teleological order of nature, and the ethical sense and intuition of the good, we can trace how this integrated way of considering reality gave birth to the great tradition of Natural Law. This tradition shaped the thought and way of life in the Middle Ages until it finally succumbed to the mechanistic vision of the world in the seventeenth century. The break with the Natural Law tradition severed the relationship of the true and the good, the rational and the ethical, in both the sciences and politics.

¹⁰ Primarily, the four cardinal virtues of prudence, courage, justice and temperance.

The seminal text of Natural Law transmitted through the Middle Ages was from Cicero's *De Republica*:

There is indeed a law, right reason, which is in accordance with nature; existing in all, unchangeable, eternal. Commanding us to do what is right, forbidding us to do what is wrong. It has dominion over good men, but possesses no influence over bad ones. No other law can be substituted for it, no part of it can be taken away, nor can it be abrogated altogether. Neither the people nor the senate can absolve us from it. It wants no commentator or interpreter. It is not one thing at Rome, and another thing at Athens: one thing to-day, and another thing to-morrow; but it is a law eternal and immutable for all nations and for all time.

Cicero (2017: 33)

According to this tradition, all people have an innate knowledge of this immutable law. It is expressed in the universal desire for justice – justice in the sense of things being in harmony with truth and their proper ends. This conception of justice belongs to nature itself, ruling even the animals in their instinctual inclinations, and perceived by the human mind as the ‘reason’ inherent in nature. It is the ‘unwritten law’ behind any formulation of civil laws or codified legal system. Any manmade law is recognised as law only so far as it is in harmony with the Natural Law.

It is this law that informs human nature of its proper relation with society and with nature. And this in turn gave birth to the ancient understanding of ‘right use’ or appropriate ends of things. For Aristotle, the appropriate end of the polis is not simply living together, but living together well or beautifully. This is possible only when citizens are virtuous (Aristotle, 2012, 1278b: 20–30; 2002; 115b:12–13, 1122b: 6–7). Indeed, only the virtuous life may be regarded as forming citizenship since a citizen is one who has forethought for the common good. ‘For that which has the power to foresee by thinking is naturally ruling and naturally mastering’ (Aristotle, 2012: 1252a: 31). Such foresight is based on the perception that the whole has primacy over the parts: ‘And a city is more primary by nature than the household, and more primary than each of us, for the whole is necessarily more primary than its parts’ (Aristotle, 2012: 1253a: 12–21).

OWNERSHIP AND RIGHT USE

To live well or beautifully therefore means regarding all action and use of things in terms of the good of the whole. The question of right use therefore precedes the question of ownership. This applies to the proper use of wealth and directly to our human relationship with the land, the earth, and with the provisions of nature. Properly speaking, no part of nature may be ‘owned’ by anyone. The land is the free gift to all creatures just as the air, water and sunshine. The Roman poet Ovid laments how this wisdom was lost with the passing of the Golden Age:

The earth itself, which before had been, like air and sunshine,
A treasure for all to share, was now crisscrossed with lines
Men measured and marked with boundary posts and fences.

Ovid (2004: I/134–36)

The Stoic philosopher Seneca also wrote of the Golden Age before this was lost:

The social virtues had remained pure and inviolate before covetousness distracted society and introduced poverty, for men ceased to possess all things when they began to call anything their own ... How happy was the primitive age when the bounties of nature lay in common and were used freely; nor had avarice and luxury disunited mortals and made them prey upon one another. They enjoyed all nature in common, which thus gave them secure possession of public wealth. Why should I not think them the richest of all people, among whom was not to be found one poor man?

Seneca (2007: 90)

In the Middle Ages, property in land was understood to exist ‘legally’ but not according to Natural Law.

Community of goods is ascribed to the natural law, not that the natural law dictates that all things should be possessed in common and that nothing should be possessed as one’s own: but because the division of possessions is not according to the natural law, but rather arose from human agreement which belongs to positive law.

Aquinas (1920: IIa-IIae, q. lxvi, art. 2)

According to Natural Law, there can be no ownership of what nature provides freely for all. The legal arrangement was simply pragmatic. It assured that property would be cared for as an owner would wish to use it to advantage. But this was qualified by the concept of right use, which meant that all property, not only land, should be employed in such ways as contributed to the common good.

The second thing that is competent to man with regard to external things is their use. On this respect man ought to possess external things, not as his own, but as common, so that, to wit, he is ready to communicate them to others in their need.

(ibid)

This meant that, should anyone be destitute, they were free to take whatever they needed from those with sufficient. The law of theft was suspended and Natural Law re-established (*ibid*). The modern conception of ‘absolute ownership’, which allows an owner to dispose of private property however they please, even to destroy it, did not exist. There is a clue in the word ‘private’ which means to be separated from the whole, to be alienated, from which ‘privation’ is derived. Thus, private ownership implied separation of both property and person from society and from nature. In other words, law in the Middle Ages implied duties to the community and to nature, as distinct from rights which make claims open community and nature. Natural Law understands the human person as *already a participant* in the community, while modern rights law understands the human person as *contracting into* community.¹¹

THE RISE OF THE PROPRIETORIAL SELF

This ancient understanding seems to be natural to indigenous societies, such as the Kalahari Bushmen, the North American Indians or the Australian Aboriginals, for whom landownership has no meaning. The modern West has lost this natural relation to the world. With the rise of individualism, the sense of community has been eroded, and this has given rise to the ‘proprietary self’ – the self conceived in terms of extended ownership.¹² Almost the whole of modern economic theory is built upon the notion of ownership, of acquiring and consuming, rather than responsible use.¹³ Modern westerners define themselves in terms of self-ownership and the notion that ownership confers absolute right of disposal (Locke, 1969). The ancient prohibition against suicide, for example, was based on Natural Law which regarded the biosphere as outside ownership. Ownership can only ever be a legal arrangement, a part of positive law, but not of Natural Law.¹⁴

¹¹ For a discussion of the rise of ‘subjective rights’ to property in the late Middle Ages, see Annabel S. Brett *Liberty, Right and Nature* (1997).

¹² For a full discussion of this, see C. B. Macpherson, *The Political Theory of Possessive Individualism: Hobbes to Locke* (2011).

¹³ For an illuminating discussion of medieval economic teaching, see Christopher Franks, *He Became Poor* (2009).

¹⁴ A powerful critique of Locke’s theory of private ownership of land is given in 1832 by Thomas Rutherforth in his *Institutes of Natural Law: Being the Substance of a Course of Lectures on Grotius de Jure Belli et Pacis* (2016: Chapter 3, X).

The modern proprietorial relationship with the land distorts our relationship with nature, reducing it to a mere ‘economic resource’, rather than our habitat shared with all other creatures (Leopold, 1949). This raises the question of extending ownership to minerals, plants or genetic material. It also raises the question of the proper relation of research to the community and the ‘privatisation’ of knowledge. Plato condemns the sophists for demanding payment for their teaching since learning or wisdom cannot be a private possession nor a means of exploitation. By its very nature, knowledge is infinitely distributable.

THE COMMODIFICATION OF NATURE

With the rise of economics as a discrete discipline in the seventeenth century, despite its early merits, there has been an ever-increasing tendency to view the world and society commercially. This has been reinforced by the reductive mechanistic worldview of the Enlightenment. In his seminal work, *The Great Transformation*, Karl Polanyi traces how the market economy gradually divided itself off from the medieval community and its traditions, where exchange of goods had been part of the social structure. This led to the commodification of land, labour and money (Polanyi, 2001). Thus, exchange became driven by profit-making and commerce became parasitic on community, rather than enhancing the social structure and serving the common good. The medieval understanding of right use of property vanished from economic theory, preserved now only in Catholic social teachings.¹⁵ The commodification of land, labour and money is a clear example of the separation of the ethical aspect of the community’s relation with the natural order. Merchandising became the new narrative, while dwelling on the land became merely instrumental.¹⁶

Plato and Aristotle regard the reduction of life to ‘money making’ as corrosive of human character and destructive of community. ‘The life of money making is a type of compulsory activity, and it is clear that wealth is not the good being sought, since it is instrumental for the sake of something else’, says Aristotle (2002: 1096a: 1–10). And even more strongly Plato says ‘thus, for the sake of money, they try utterly to destroy private individuals and whole households and cities’ (Plato, 1980: 909b). What matters for the good of the *polis* is that its citizens value ‘justice in the soul’ above all other possessions:

...nor, again, should I take counsel about it with the so-called diviners, who in one way or another will advise me to take what was deposited in the earth. Because I would never benefit as much in money by taking the property as I would increase in substance as regards virtue of the soul and what is just by not taking it, I would thereby have acquired a better possession than that possession, and in a better part of me, by honoring the acquisition of justice in the soul before that of wealth in property.

Plato (1980: 913b)

RECOLLECTING THE PRIMORDIAL HARMONY

The order of the soul and the proper human relation to the earth are, as we have seen, bound together. Justice – the great measure which all societies in all ages recognise – has the peculiar character of being at once an inward virtue and an external virtue, relating human nature to itself and to the world. It follows from this that if a society adopts an unjust relation with the natural world, then citizens will suffer internal turmoil and discontent. Human fulfilment and living in harmony with nature are inextricably bound together. While the prevailing narrative fails to recognise this, most ordinary people do recognise that we are part of a ‘great whole’ and ought to live in harmony

¹⁵ See Pope Leo xiii *Rerum Novarum* (1891), the first encyclical to address the exploitation of labour, yet flawed with a contradictory mixture of Natural Law and Lockean economic theory. Nevertheless, later social encyclicals have preserved the concept of right use.

¹⁶ See Melissa Lane, *Eco-Republic: Ancient Thinking for a Green Age* (2011), for a discussion of how adopting a Platonic model of society can respond to the modern environmental crisis.

together and with nature. There is a kind of primordial memory awakened of the cosmic order and our place within it as expressed in the ancient myths. As Ricoeur says:

For it is only when it is threatened with destruction from without or from within that a society is compelled to return to the very roots of its identity; to that mythical nucleus which ultimately grounds and determines it.

Ricoeur (1991: 584)

REFERENCES

- Aquinas, T. (translator: Fathers of the English Dominican Province) (1920) *Summa Theologiae*. Cincinnati, OH: Benziger Brothers.
- Aristotle (translator: Butcher, S.H.) (1932) Poetics IX, 1451b. *Aristotle's Theory of Poetry and Fine Art*. London: Macmillan.
- Aristotle (translator: Sachs, J.) (2002a) *Nicomachean Ethics*. Newburyport, MA: Newburyport Focus Publishing.
- Aristotle, (translator: Sachs, J.) (2002b) *Metaphysics*. Santa Fe, NM: Green Lion Press.
- Aristotle (translator: Sachs, J.) (2012) *Politics* 1253A. Newburyport, MA: Focus Publishing.
- Blanchette, O. (1992) *The Perfection of the Universe According to Aquinas: A Teleological Cosmology*. University Park, PA: Penn State Press.
- Brague, R. (2003) *The Wisdom of the World: The Human Experience of the Universe in Western Thought*. Chicago, IL: The University of Chicago Press.
- Brett, A.S. (1997) *Liberty, Right and Nature*. Cambridge: Cambridge University Press.
- Carone, G.R. (2005) *Plato's Cosmology and Its Ethical Dimensions*. Cambridge: Cambridge University Press.
- Cicero, (translator: Featherstonhaugh, G.W.) (2017) *De Republica III.XXII*. New Delhi: Alpha Edition.
- Collingwood, R.G. (1960) *The Idea of Nature*. Oxford: Oxford University Press.
- Franks, C. (2009) *He Became Poor*. Grand Rapids, Michigan/Cambridge: William B Eerdmans Publishing Company.
- Gierke, O. (1997) *Association and Law: The Classical and Early Christian Stages*. Toronto: University of Toronto Press.
- Gillespie, M.A. (2009) *The Theological Origins of Modernity*. Chicago, IL: The University of Chicago Press.
- Hicks, R. (2018) *Stoic and Epicurean*. New Jersey: Franklin Classics.
- Inwood, B. and Gerson, L.P. (2008) *The Stoics Reader*. Indianapolis, IN: Hackett Publishing Company.
- Kerven, R. (2018) The origin of sickness and medicine. In *Native American Myths*. Northumberland: Talking Stone. pp. 140–152
- Lane, M. (2011) *Eco-Republic: Ancient Thinking for a Green Age*. Oxford: Peter Lang.
- Lear, J. (2011) *Aristotle: The Desire to Understand*. Cambridge: Cambridge University Press.
- Leopold, A. (1949) The Land Ethic. In *A Sand County Almanac*. Oxford: Oxford University Press. pp. 201–226.
- Locke, J. (1969) *Second Treatise on Civil Government*. London: Awnsham Churchill.
- Macpherson, C. B. (2011) *The Political Theory of Possessive Individualism: Hobbes to Locke*. Oxford: Oxford University Press.
- Nagel, T. (2012) *Mind and Cosmos*. Oxford: Oxford University Press.
- Ovid, (translator: Raeburn, D.) (2004) *Metamorphosis*. Harmondsworth: Penguin Classics.
- Plato, (translator: Jowett, B.) (1937) *The Dialogues of Plato*, Volume I. New York: Random House.
- Plato, (translator: Pangle, T.) (1980) *The Laws of Plato*. New York: Basic Books.
- Plato, (translator: Nehamas, A. and Woodruff, P.) (1997) Phaedrus 245a. In Cooper, J.M. (ed.), *Plato: Complete Works*. Indianapolis, IN: Hackett Publishing Company. pp. 506–556.
- Polanyi, K. (2001) *The Great Transformation*. Boston, MA: Beacon Press.
- Ricoeur, P. (1991) The human experience of time and narrative. In Valdés, M.J. (ed.), *A Ricoeur Reader: Reflection and Imagination*. London: Harvester Wheatsheaf. pp. 99–116
- Rutherford, T. (2016) *Institutes of Natural Law; Being the Substance of a Course of Lectures on Grotius de Jure Belli et Pacis*, 2nd edition. Clark, NJ: The Lawbook Exchange.
- Salkever, S.G. (1990) *Finding the Mean*. Princeton, NJ: Princeton University Press.
- Seneca, (translator: Inwood, B.) (2007) *Selected Philosophical Letters*. Oxford: Oxford University Press.
- Trott, A.M. (2014) *Aristotle on the Nature of Community*. Cambridge: Cambridge University Press.

5 Humans Are Humus

Using Eco-Psychology to Highlight the Language of Dualism and the Promise of the Non-Dual

Travis Cox
Naropa University

CONTENTS

Eco-Psychology	60
Modern, Western Concerns for Soil: Good Intentions, Problematic Language.....	60
From ‘Inner Soil’ to Being Soil	62
Humans as Humus: An Eco-Psychological Look at Human/Soil Relationships	63
Other Non-Dual Perspectives: Buddhist, Eco-Feminist and Indigenous	66
Conclusion	67
References.....	68

In 2010, As a PhD student in Sustainable Agriculture at Iowa State University, USA, I had the opportunity to take the institution’s first organic agriculture class. During the course of the semester, a soil scientist from the National Soil Tilth Lab gave a guest lecture. In that lecture, she revealed that she was pioneering some of the first comprehensive research on soil biology, after 30 years of working at the Lab. Up until that point, the Lab’s research was based on the assumption that soil was strictly a medium in which to grow plants using chemical amendments.

Fortunately for the biosphere, this assumption is increasingly coming under scrutiny as science is finding an inconceivable amount of invaluable life present in the soil. Soil scientist Elaine Ingham, formerly Lead Scientist for the Rodale Institute, uses the term *soil food web* as a way of expressing the biotic nature of soil. Even individuals concerned primarily with economics, such as the Slow Money group from Boulder, Colorado, are becoming aware of the necessities of the living soil. This is typified by the soil themed issue of their annual journal for Winter 2017/2018 (Tasch, 2018).

Rising to the challenge, the environmental humanities research field has also taken up the gauntlet. Environmental philosophy has been attempting to elevate ‘dirt’ from its lowly status by making philosophical arguments for its consideration as soil. However, when these arguments have their basis in the unquestioned assumptions of modernity, do they go far enough in encouraging the kinds of relationships *with* soil that will be necessary for the regeneration thereof, and concomitantly for the survival of civilisation through the twenty-first century?

It is the premise of this chapter that an eco-psychological look at soil, especially in eco-psychology’s non-dual form, would benefit individuals who are looking to begin a healthy, holistic relationship *with* soil. A simplistic, yet valuable characterisation of this non-dual relationship between humans and the natural world has its genesis in the origins of the word *human*, which shares the same root as *humus*. Indeed, *Adam* in Hebrew shares a root with the words for ground, earth and soil.

This chapter will expand on the work of Patzel (2009), from an edited volume by Landa and Feller, *Soil and Culture*, in which he utilises the application of archetypal images from Jungian

psychology to explore scientists' relationship to the 'outer soil' as a way to understand scientists' 'inner soil'. This chapter will use eco-psychology, in its transpersonal, non-dual form, as a way to examine human relationships *with* soil, going beyond the various dualistic ways of relating in order to explore the furthest reaches of the holistic view – the non-dual – while simultaneously acknowledging other pathways to non-dualism, including eco-feminism, Buddhism and indigenous perspectives.

ECO-PSYCHOLOGY

There is a distinct possibility that many people reading this chapter will not have a working understanding, much less a relationship, with the discipline of eco-psychology. This is undoubtedly largely owing to the fact that eco-psychology is still currently in its infancy, with the term itself not being introduced until 1992 and the 'official' discipline being established years later. But it is also, in part, owing to the amorphous nature of what the discipline actually is and does. The easiest way to define eco-psychology may be the intersection of ecology with psychology: with ecology informing psychology (because the discipline of ecology came after the founding of psychology) and psychology assisting ecology. It can do so by using psychology to encourage practices and approaches that are effective in changing behaviour in people who are already 'sympathetic to the cause', as well as helping to 'diagnose' and 'analyse' the reasons why so much of humanity is ecocidal, and also to offer options for 'therapy' for those who are unable to see the necessity for change.

Eco-psychology can, however, be much more than that; so much so that it has been criticised as bordering on a handicap, since the field itself is so broad that it defies definition. The author of this essay does not subscribe to this criticism but rather embraces the potential ambiguity as the very thing that allows for eco-psychology and its potentiality to enter into the realm of the non-dual. There are many aspects to eco-psychology. The implications of embodying ecological interconnectivity can be disorienting. Yet at the same time, it provides a lens through which we can examine the ecocidal disconnection of many modern cultures and institutions, and also offers tools to change individual attitudes, thereby changing these cultures and institutions from ecocidal to life-affirming and life-enhancing ones and helping to heal the biosphere in numerous ways.

Eco-psychology does all of these things by functioning at the level of a worldview. Operationally, eco-psychology is simultaneously grounded within ontology, epistemology, axiology, sociology, anthropology and ecology (Hedlund-de Witt, 2013). This same maddening pluralism, if properly understood, can lead individuals to a non-dual experience, which may prove to be one of eco-psychology's greatest assets: a lived experience of the unity of humans and humus.

MODERN, WESTERN CONCERNS FOR SOIL: GOOD INTENTIONS, PROBLEMATIC LANGUAGE

Within modern academia, initial attempts to rescue soil from being 'treated like dirt' unfortunately, but expectedly, were undertaken while operating under false conceptions of nature, and in the particular case of soil: a mechanistic, anthropocentric, dualistic perspective. While I acknowledge the value of all attempts to reconnect with soil, I argue for a non-dual, eco-psychological worldview in order to accomplish the aim of a holistic reconnection, in ways similar to other non-dual worldviews (e.g. eco-feminism, Buddhism, systems thinking and First Peoples' perspectives). For a broader analysis of industrial and alternative agricultural worldviews, see Cox (2014).

Fouke (2011) argues that moral concern should be extended to soil, based on an argument from *nearness*, in which the microbial ecology of the human gut is directly informed by, and in some way mirrors, soil microbial ecology. Thus, since human existence is dependent on both of these communities – and has even been partially defined by them in an evolutionary sense – it behoves modern humans to eschew thinking about soils instrumentally, because in some ways we are soil.