5 The science question in alternative agricultures

Zero budget natural farming and the emergence of agronomical pluralism in India*

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Western philosophers are in very wrong confident mentality that, only they, have absolute truth. But, it is not correct. There is only [one] absolute philosophy that is Indian philosophy.

(Palekar 2013: 21)

Introduction

In the shadow of Kerala's much-noted organic policy (Thottathil 2014), a more radical natural farming movement has become active. Followers of charismatic farmer-cum-scientist Subhash Palekar practice 'Zero Budget Natural Farming' (ZBNF) or 'Zero Budget Spiritual Farming,' an alternative agronomy that is based on the activation of microbial life in the soil via a revival of putatively 'ancient' farming methods and technological innovations by their 'guru' Palekar. Aiming for near complete self-sufficiency of farmers' households, Palekar and his disciples are outspoken critics of mainstream agricultural sciences, government run agronomical extension and everything that is associated with modern industrial agriculture and its global food. They counter these with utopian visions of rural self-sufficiency, prosperity and abundance that are actualised through heterodox practices based on fermentation and the centrality of native cows.

This chapter deals with the epistemological, political and practical complexities of the critiques of science expressed in ZBNF. Their rejection of soil science, agricultural engineering, development ideologies and the workings of the global agro-food system is complicated by their dual positionality as small-holder farmers who are dependent on and practice science and technology on a daily basis and as historical subjects who – for good reasons – trace the decline of Indian agriculture to colonialism and Western 'geopolitics of knowledge' (Mignolo 2002). These farmers call their knowledge and practice 'natural farming' or *prakṛti kṛṣi* in Malayalam,[1] in contrast to organic farming (*jaiva kṛṣi*) and what they call 'chemical' farming (*rāsa kṛṣi*). They participate in a complex epistemological and ontological project of recuperating vitality, multispecies togetherness, symbiotic processes and prosperity

in a dying and degraded world of smallholder agriculture. However, they feel this relational and ecological vision can only be achieved by a fundamental break with mainstream science, agronomy and development and through the exposure of a 'Western conspiracy' against Indian agriculture. It is thus a dual project of ecological repair and place-based critique, a simultaneous struggle for epistemic identity and a viable livelihood. The ontological politics of Natural Farming result in what I call agronomical pluralism, which can be understood as the competition of more than one agronomical system and the resultant need for farmers to navigate this plurality of choices and their respective claims to truth. Like other onto-epistemological pluralisms described by anthropologists, most notably medical pluralism (cf. Leslie 1980) and legal pluralism (cf. Benda-Beckmann 2002), agronomical pluralism manifests as a hierarchical opposition of established or 'mainstream' science-cum-practice and complementary or alternative science/practice.

The ontological quality of this project involves doing agriculture differently – sensing, inhabiting and dwelling in ways on the farm and cultivating modes of care that allow for fully relating to soils, plants, insects, animals and even microbes. Regenerative ways of farming, they sense, have the potential to affectively and economically transform precarious lifeworlds into self-sufficient, autonomous and abundant worlds of life. I have written elsewhere about the practices of natural farming, the context of agrarian crisis that contributed to their rise and the novel relationships with native cows in Zero Budget Natural Farming (Münster 2015a, 2016, 2017a). In this contribution I want to focus on the epistemic side of this alternative agriculture movement – its critiques of science, state and the West: how does this natural farming movement discursively articulate questions of authenticity, belonging and attachment to place in relation to transcultural flows of knowledge, science and scientism? How does the movement position its agronomical innovations in relation to the sciences and engineering involved in contemporary agriculture? What specific epistemic space do they carve out for their movement in confronting the encroachments of colonialism, global capitalism, Indian nationalism and the biopolitics of development in their livelihoods? What are the positive uses of science for the onto-epistemological project of cultivating a new ecological agriculture of the future in a postcolonial landscape?

My aim is to show the historical and place-based nature of Palekar's critique of science that responds to the political ecology of 'productivist' (Wilson and Rigg 2003) agriculture. Zero Budget Farming challenges conventional or mainstream agriculture with many of the same arguments shared by scientists, activists and farmer-activists in the highly transcultural and cosmopolitan fields of agroecology, alternative and organic farming, which have emerged since the beginning of the twentieth century (for an institutional history see Lockeretz 2007; Thirsk 2000) and largely in response to the externalities of industrial agriculture. I thus hope to show the ambivalent position of science in ZBNF. On one hand, it is seen as a foreign occupying

force, responsible for deskilling farmers and the colonisation of traditional lifeworlds. On the other hand, recent biological sciences (microbiology, ecology, soil science) are also an inspiration for the ecological renewal of agriculture, the restoration of relationships of care between humans, animals, plants and microbes and the reskilling of farmers with knowledge about soils and other interdependent ecosystems in agriculture. The onto-epistemological project of ZBNF is thus one of critique and recuperation.

On methodology

This chapter is based on several mid-ranging periods of ethnographic fieldwork among smallholder farmers in Wayanad, Kerala, since 2008. I had first visited Wayanad district in order to study the historical changes in the agrarian landscape and how they contributed to crisis and farmer suicides (Münster 2015b). At the agrarian frontier of Wayanad, located at the frontier of settler cash-crop farming and wildlife conservation, decades of plantation monocropping, chemical biocides and commercial cultivars have produced an 'environment of crisis' (Münster 2017b), in which people involved in extractive agriculture experience increasing precarity, debt and the destruction of their agro-environments. In the context of the agrarian suicide crisis, Subhash Palekar's Zero Budget Farming was a beacon of hope that could provide a plausible answer to questions of how to continue living as agriculturalists on a damaged planet.

This chapter, however, despite being informed by my fieldwork among farmers, focuses mostly on the guru of the movement, Palekar, whom I have encountered in ZBNF training camps, in his books and all over the internet (on various social media platforms and websites).[2] I will focus on his published (Palekar 2010b, 2011) writings. Palekar mostly speaks English when addressing farmers in South India, and his written texts are often identical to what and how he performs on stage (and how he spoke to me on the one occasion I was able to interview him in 2014). I have resisted the temptation to 'translate' Palekar's English into (my Germanic version of) Standard English in the hope that these verbatim quotes may convey a good sense of his oral style and rhetorical force. This unfiltered, raw and uncorrected stream of Maharati-inflected English seems to be deliberate and part of Palekar's populist agenda. As he explains in the preface to his first book, he had 'reader farmers' in mind when writing it, 'who cannot speak English but can read a simple no literal English. So, they will accept this rustic or boorish English language, no doubt. I have not written these books for Professors, Doctors, Scientists, Barristers or so-called Intellectuals. So, please, sorry' (Palekar 2010b: 11).

Critique of science: confronting the mainstream

In February 2014, I participated a five-day workshop on Zero Budget Natural Farming, or *celavillātta prakṛti kṛṣi* in Malayalam, in the South Indian

town of Nilambur (Kerala). Subhash Palekar was going to teach this workshop in person. I had first met his followers in Wayanad much earlier, some 150 committed farmers who had been learning about this technology since 2008 when Palekar taught a similar workshop in Wayanad, followed by a second workshop in the district in 2012. Kerala came relatively late to the movement, which is much larger in other parts of South India, most notably in Karnataka. Many farmers of Wayanad participated in the workshop in Nilambur – which is the neighbouring district – and made camp in the auditorium for the duration of the course.

The Nilambur workshop had the character of a revival meeting for peasant farmers. It was hosted in a large multi-purpose auditorium in the outskirts of town at the foothills of the Western Ghats, geographically located below Wayanad district, but historically it was also a region of settler migration. The auditorium seated several hundred farmers from across Kerala, members of women's self-help groups (*Kudumba Shree*), agricultural officers and other members of the interested public in long rows of white plastic chairs. The workshop lasted long hot days from morning to evening interrupted only by a vegetarian lunch break and 'coffee breaks' without coffee (Palekar pushes his followers to break the habits of drinking tea, coffee and milk). Most of the day was thus spent listening to Palekar on stage.

Palekar speaks in a very energetic and captivating style and mostly in English, which another person on stage struggles to translate to Malayalam after every other sentence. Palekar's speech is full of irony and puns. He calls Justus von Liebig (1803–1873), the nineteenth-century pioneer of soil chemistry, 'Mr. Lie Big,' renames biodynamic farming 'bio-dynamite farming,' refers to the Green Revolution as 'suicide revolution' and mocks the incompetence of extension officers with little anecdotes. Occasionally he interrupts his lectures and calls his audience to order shouting, 'Are you understood?!,' to which his audience replies with an enthusiastic 'Yes!' (see also Münster 2014).

Palekar holds a BSc in agronomy and is a farmer himself. According to his scattered autobiographical statements, he developed his heterodox agronomy in the years 1989 to 1995 on his farm in his native Maharashtra. He spent these years studying Vedas, Western sciences and organic farming methods. Most importantly, he conducted experiments on his farm until he found his system of natural farming and the recipes for his central 'miracle preparations,' which he calls *jīvāmṛta* (Sanskrit: nectar of life) and *bijāmṛta* (seed nectar). Before Palekar lets his audience in on his findings and his methodology he spends the first two days debunking all other methods of farming, the Green Revolution and agriculture science. He decries the 'scandal' of vermicomposting as practiced by organic agriculture which robs Indian soil of fertility and lectures on incompetent and corrupt agriculture universities, which 'should be closed.' He warns his audience to keep away from 'demonic' substances (chemical fertilizers, pesticides), 'demonic' species (*Bos taurus* or 'foreign cows,' the 'destructor beast' and *Eisenia*

foetida, which is the earthworm used in vermicomposting), hybrid seeds and 'demonic' technologies (biotechnology and the 'demon tractor'):

> This tractor is a demon, which destroys your future. This tractor does not give you milk, dung or urine, but it drinks Diesel, which is not prepared in any factory, which is lifted through the stomach of the earth and which is created before crore of years, by buried forests under the earth by means of earthquake and volcanoes.
>
> (Palekar 2011: 20)

Wayanad's farmers respond particularly emotionally to Palekar's repeated references to rural suicides and the increase in dreaded diseases, most notably cancer. After many years of prosperity from cultivating pepper and other high-value cash crops, Wayanad had become a 'frontier in ruins' (Münster 2017b). The former frontier of agrarian settler migration had entered a situation of crisis, caused, among other factors, by the ill-effects of speculative monocropping and chemical inputs on the health of soils and humans. Many farmers subsequently lost their entire plantations to pathogens, cancer is on the rise and farmers are trapped in loan and pesticide treadmills (Münster 2015c). For farmers it is quite clear that they have been ill advised by the 'government' [*sarkkār*]. Palekar is quite precise in pointing to the specific origin of agricultural extension work in India:

> Who guides the farmers to purchase these inputs? Agricultural Universities? Yes! Agricultural Universities! If, it is proved that, there is no any necessity to purchase or to use these inputs, so also, then, are Agricultural Universities misguiding the farmers? Yes! So, the guidelines of the Agricultural Universities are straight responsible for the debt. And debt is straight responsible for the suicides of the farmers.
>
> (Palekar 2010a: 5)

In my earlier work on farmers' suicides, I have recorded many voices that criticise if not betrayal by extension workers then at least their indifference and 'uselessness.' Wayanad's farmers can thus relate to statements like this one, which was paraphrased several times during the workshop:

> Millions of farmers have committed suicides and these suicides waves are continued and are increasing. Every year millions of people are dying by increasing deathful diseases. Increasing cost of production by means of chemical farming and organic farming is the main cause for farmer's suicides, and poisonous food and polluted air, water are the main causes for deathful diseases of both farmers and consumers; which is given by both chemical and organic farming.
>
> (Palekar 2013: 8)

Natural farming's promise of hope through a restoration of joy and fascination in farming has to be seen in relationship to farmers being affected by declining incomes, forced exits from agriculture, deteriorating health, the disappearance of familiar species and a general sense of abandonment by the same state agronomy that used to encourage them to take up commercial agriculture and new technologies. Living through agrarian crisis has put the hegemony of Green Revolution agronomy for many in question and opened up the possibilities for agronomical pluralism. Experimenting with alternative agronomies and their claims to a decolonial 'Indian' science contests the knowledge, practices and materialities disseminated by agricultural offices and other institutions of state extension work. Palekar and his followers are radically opposing what they call agrarian mainstream.

Mainstream agriculture refers to 'prescribed agricultural practices within conventional systems. [. . .] [It] is underpinned by a productivist logic with established supply chains and formal institutions and actors' (Maye 2016). Under this global productivist regime, agricultural science and research, as well as state and industry support, is exclusively geared towards the expansion of production, quantitative growth, increase of yield, and the intensification of chemical and capital inputs (Puig de la Bellacasa 2015). The Green Revolutions of the 1960s have brought productivist regimes to many countries in Asia – installed to combat hunger and to win the Cold War. Here is what Palekar has written about the 'violent, unscientific, inhuman, barbarous, demonic, atrocious, ferocious, monstrous Green Revolution' (2010b: 13): '[it] is a world-wide pre-planned conspiracy to exploit our rural economy, natural resources like soil, water, environment and existence of living being' (2010b: 37).

For actual devotees of Palekar, ZBNF entails a change of personality as well as a change in the culture of farming. Palekar camps double as revival meetings in which farmers were repeatedly invited to stand up, raise their right arm and solemnly vow to transform themselves from being a 'demon destroyer of nature' to a 'saint protector of nature.' In Palekar's words:

> While practicing Zero Budget spiritual Farming in your farm, there will be a beginning of dramatic and miracle changes in your behaviour automatically. You will be internally changed. [. . .] Your bad habits i.e. drinking the liquor, gambling, eating non-vegetarian, waist, falsehood, defilement also will be continuously run away from you. Absolute cultivation of mind. Spiritual farming means to overall change you yourself. The internal change and external change simultaneously.
>
> (Palekar 2010b: 186)

Appachan, a Syrian Christian settler of Wayanad with whom I talked long hours about his conversion to natural farming (Münster 2017b), emphasised the great importance of the aspects of ZBNF that are unrelated to agriculture: the 'simple lifestyle,' the withdrawal of coffee, vegetarian food and the

daily appreciation of life on his farm. To Appachan ZBNF has been realised in the almost-utopian terms set out by Palekar: 'Natural farming is a self-developing, self-nourishing and self-sufficient farming. So, in this system, there is no any human made exploitation. There is no any chance for it. It is a pain free, care free, loan free, passion free[3] farming' (Palekar 2010b: 194).

This vision stands in stark contrast to the image Palekar and his followers have of mainstream farming and its support nexus of state and science. Agriculture science is one 'branch' of the great Western 'exploiter system.'

Scientism, ecology and displaced knowledge in modern agriculture

Agriculture is indeed an ancient empirical science in which cultivators have innovated and engaged in seasonal experiments on the basis of vast knowledge about their environment. As Henke puts it: 'In this sense, science and agriculture share a practical interest in a kind of mastery of the world, disciplining and systematizing it into a form that reduces but does not quite eliminate uncertainty' (Henke 2008: 6). Much of farmers' knowledge, however, is practical, experiential, tacit or embodied knowledge (see Wulf, this volume). Agriculture as science has thus as much affinity to knowledge as it has to skill and practice. There is thus a point to be made that scientistic and economistic imaginings constitute a new quality of scientification in agriculture with the power of alienating producers from their own capacities of practical research. Chemical farming, in Palekar's words, 'carries you from life to suicide, from creation to destruction, from knowledge to ignorance [. . .] from affluence to poverty. Chemical Farming is Allopathic farming' (Palekar 2010b: 193).

Historically speaking, agriculture has been a relative late-comer to the scientification of human lifeworlds. Compared with human bodies, for example, whose study in medical tracts is among the oldest in the history of science (Foucault 2008 [1973]), agriculture became the focus of scientific attention only in nineteenth-century Europe. But agrarian science and engineering had epochal consequences. Vaclavc Smil (2001) has called the Haber-Bosch synthesis of ammonia and nitrogen one of the most important technological inventions of all human history, as it made chemical fertilizers and hence the contemporary growth in world populations possible. Scientism in agriculture has had close connections to threats on human lives and responses to crises such as famines. If we define scientism as 'the misuse of the language of science, and its aura of predictive certainty, to portray certain political and economic visions as being inevitably true, natural and triumphant' (Douglas 2009), then the question is, what is the particular political, economic, aesthetic vision that is rendered inevitable by techno-scientific interventions in agriculture? Defenders of the Green Revolution have always argued that it was all about hunger and poverty and continue to accuse its critics of 'antiscience zealotry' (Borlaug 2000). On the other hand, its most outspoken critics have called the Green Revolution a project of the Cold War (Cullather 2013).

Agronomy, in the narrow sense as the technoscientific research in agriculture, has been historically deeply entangled with European colonialism (Brockway 2002) and the development of global food regimes since the mid-nineteenth century (Friedmann 2005). The publication of German chemist Justus von Liebig's seminal work *Organic Chemistry and Its Application to Agriculture and Physiology* (1840), for example, is inextricably linked to the 'Guano mania' of 1840s: Liebig had recommended the use of Guano as the best source of nitrogen, a scientific statement that contributed significantly of the 'age of guano,' in which the Guano islands off the coast of South America became an essential material part of the first global food regime that provided cheap food for the industrial revolution in Europe (Mann 2011; Friedmann 2005). Colonial botanical gardens have been key research institutions for the expansion of tropical plantation crops across the colonial world. The globalisation of cultivars like rubber, tea or coffee has been synonymous with Green Revolution research and extension.

With the introduction of the Green Revolution in 1966, each state in India was given a centrally funded State Agriculture University as part of the National Agricultural Research System. In 1971 the Kerala Agricultural University (KAU) was founded, incorporating two earlier state-run institutions, the Agricultural College and Research Institute at Vellayani, and the College of Veterinary and Animal Science at Mannuthy.[4] Since then, the state of Kerala has installed a wide network of research and extension institutions. Kerala Agricultural University includes six colleges, six regional agricultural research stations (RARS), seven KVK, 15 research stations and 16 research and extension units across the state.

As became evident in my research on farmers' suicides (Münster 2012, 2015a, 2015b), rural publics in India are increasingly unhappy with recommendations and 'packages of practices' regarding agriculture. The agriculture officers and the researchers at Wayanad's KVK and RARS stations did little to discourage farmers from shifting to monocultures and overusing chemicals and were seen as helpless when it came to fighting the pathogens and drought that ruined so many fields in Wayanad. The Research and Extension has to a great extent lost legitimacy among small-scale producers. During the Nilambur workshop, small farmers would cheer for statements like Palekar's calls to 'boycott all the techniques of Agricultural Universities' and his sentiment that 'Agricultural Universities have no any right to say that chemical farming is a science and truth. It is a fraud' (2013: 15).

Recuperation: soil ontologies in natural farming

> One way to live and die well as mortal critters in the Chthulucene is to join forces to reconstitute refuges, to make possible partial and robust biological-cultural-political-technological recuperation and recomposition.
>
> (Haraway 2016: 101)

Palekar and other contemporary and historical critics of the '"actually existing" science' (Kloppenburg 1991) of agronomy and of techno-scientific interventions in agricultural production have much in common: rejection of an increasing chemicalisation of agriculture in favour of biological dynamics, critique of the mechanical understanding of soil fertility and plant health in favour of symbiotic and microbial processes, uneasiness about the loss of tacit and local/traditional knowledge in processes of deskilling and loss of biocultural diversity and dismay at the increasingly exploitative integration of small farms in industrial complexes 'upstream' and 'downstream' of farming (Levins and Lewontin 1985), among numerous further issues.

Despite the shared concerns among activists and critics of agriculture, I hope to be able to show that Palekar's position of critique is also very specific and differs from many other alternative agricultures – permaculture, biodynamic, organic – in its insistence that agrarian technoscience is not so much a hybrid of high-modernism (Scott 1998) and capitalist development but first of all 'Western,' 'foreign' and alien to India. As a matter of fact, alternative agricultures are also part of the foreign exploiter system:

> Friends, attention please, *how much dangerous is chemical farming, more dangerous is this Organic or Biodynamic or Sustainable Farming*. These alternative farming systems are more exploiter than Green Revolution techniques. We have to strongly protest against these alternatives. These both, chemical and organic farming systems are a pre-planned array or conspiracy arranged by this exploiter system.
>
> (Palekar 2010b: 39)

Subhash Palekar's movement is embedded in an emerging field of agronomical pluralism in India. Zero Budget Natural Farming is arguably the largest and most successful among several alternative agronomical systems emerging in India that call themselves natural farming and work towards a specifically Indian system of agriculture. These communities of oppositional theory and alternative practice are united in their rejection of Green Revolution agriculture, in the widest sense of the word, on one hand and the conventionalisation trends in the certified organic agriculture on the other. Such groups reject certified organic as Western import for its reliance on export, NGO support and its compatibility with mainstream sustainable development thinking. The diverse Indian alternative agricultures have to do epistemic work to find their proper balance between an embrace of Western science and a revival of Indian agronomical heritage. There seems to be a shared tendency to glorify the agrarian past and traditional ecological knowledge, also known as TEK, as is evident in this statement from Claude Alvares' popular Organic Farming Sourcebook:

> In contrast [to the Green Revolution], agricultural practice in India dates back more than 4,000 years. Indian agriculture therefore could be

> called a self-sustaining agriculture simply because it has maintained soil fertility over this enormously huge period of time. This is permaculture at its best.
>
> (Bajaj and Srinivas 1996: 10)

Alternative agriculture movements beyond organic operate across India with highly variegated numbers of followers and impact. Their oppositional understandings of agriculture and practices of farming have complex transcultural influences that include Mahatma Gandhi's (1869–1948) ideas of rurality and ascetic lifestyle (Jodhka 2002); the agrarian ecocritique of Rachel Carson (1907–1964), Albert Howard (1873–1947) and Masanobu Fukuoka (1913–2008) and the travelling technologies of alternative agriculture movements like Permaculture or Biodynamic farming. Palekar is also only one among several charismatic agrarian gurus of natural farming in India; other important names include L. Narayana Reddy, Shripad Dabholkar (1924–2001), G. Nammalvar (1938–2013) and Baskar Save (1922–2015), who each innovated their own style of farming and have regional groups of followers. It may not come as a great surprise that Palekar rejects them all:

> They have given the name for their alternative technology as 'Organic Farming,' 'Eco Friendly Farming,' 'Agro Ecological farming,' 'Jaiva Krishi,' 'Alternative Farming,' 'Sustainable Farming,' 'Saawaya Krishi,' 'Aero Greens Technology,' 'Biodynamic Farming,' 'Rhishi Krishi Technology,' 'Agnihotra Farming,' 'Rekki Farming' and so on. All these techniques are alternative techniques, but unnatural and non-scientific techniques.
>
> (Palekar 2010b: 120)

The reason for rejecting them – being unnatural – points to the central theorem in the recuperative side of Palekar's system: the nature of nature.

> Which is in existence in the nature is natural and which is not in existence in nature is unnatural. [. . .] What is natural, it will be not certified by Agricultural University or Organic University or any third party. It will be certified only by the Nature. Nature will define. Nature can discuss with it's mouth, in its language. What is nature's language? Forest trees are the forest's language.
>
> (Palekar 2013: 60)

Palekar's Nature (capital n intended) is based on an idealised forest as a model ecosystem. In the forest, he claims, we can observe plants growing and bearing countless fruits without any interference by humans. In the same way, natural farming has to follow the example of the forest: 'How nature is self-developing, self-nourishing and self-sufficient, our Spiritual Fanning

is also self-developing, self-nourishing and self-sufficient' (Palekar 2010b: 184). And in the forest plants don't need any farm-management techniques, mainstream or organic, in order to bear fruit: 'That means, both chemical and organic farming are totally absent in the nature' (Palekar 2013: 15). Observing forests is also the preferred scientific method: 'What are existed in the nature are the knowledge, science, truth and non-violence. Forest is the nature. Nature is the system of the God, eyes of the God' (2013: 14).

The scorn and bile Palekar has reserved for the sciences and biologies of mainstream farming are mirrored by his exuberant praise for the techniques and multispecies assemblages enrolled in Natural Farming. He activates all his poetic capacities when he speaks of 'beautiful and marvellous biodiversity,' the grace of native cows, their urine and dung and the amazing liveliness of soil or compares the necessity for mulching to the need for covering the body of your mother with a *saree*. His wit is then also sometimes combined with ironical anthropomorphism, like when he calls microbes nature's 'input industries' that have been given 'contracts' by God to fix nitrogen, or speaks of 'Potash the wanderer'. When it comes to his allies in the fields of academia, he has no issue speaking the language of science and even claims that certain principles are 'basic science' or have been 'proven by science.' On stage, he lectures extensively in the 'scientific' language of nutrient cycles, microbial symbioses between plants and bacteria, nitrogen fixing, soil biota, phosphate solubilising bacteria, mycorrhiza and so on. Palekar's system of farming, which I have summarised in more detail elsewhere, rests on the principle of consciously designing farm plots for multiple crops and maximum diversity of species. The 'five layer Palekar model' (Palekar 2010a) follows Palekar's principle that plants do not compete for water but only for sunlight and hence arranges plots vertically for the best utilisation of sunlight and shade.

The main onto-epistemological shift happens when natural farmers learn a novel appreciation of soil as a living thing or, as Palekar puts it, as *annapurna*, mother soil. ZBNF is all about building and maintaining the health and fertility of soil with the help of microbial agents. The microbial turn in soil care is a remarkable shift from mainstream practices in Wayanad. Soil care is a fundamentally relational activity that requires humans, cows, plants and microorganisms to work symbiotically for mutual benefit. The cows of ZBNF need to be absolutely native, *dēśi* cows as Palekar calls them or *nāṭan paśu* in Malayalam. Only *Bos indicus*, they claim, have the miraculous high microbial count in their dung and urine that makes it possible to cultivate 30 acres with one cow. As the movement is vegan, the cows are only kept for their excrements (Münster 2017b). The excrements are then fermented for several days with sugar, water and pulses into Palekar's 'miracle preparation' *Jiwamrita* (*jīvāmṛta* – Sanskrit for 'nectar of life'.

> Jiwamrita is an Amrit. Jiwamrita is a deathless, immortal beatitude of nectar. Jiwamrita has not only a microbial saturation; it has a spiritual

> power, make the soil saturated and spiritual, make the crops saturated and spiritual, make the food eater (naturally grown) nutrition saturated and spiritually saturated, powerful, potent, valiant, a mighty person. Jiwamrita is not only a culture; it is a message of God. Jiwamrita is a saver, protector of the life.
>
> (Palekar 2013: 131)

When applied to the soil, Jiwamrita (*jīvāmṛta*) does not act as a fertiliser – which means it is not absorbed by the plants. Instead, it feeds and activates the soil microorganisms: 'countless beneficial and effective microbes are divided speedily and activated; soil becomes bio-diversitically saturated, soil becomes alive animate; all creative forces and spiritual forces are activated in the soil' (Palekar 2010b: 128). Microorganisms in turn attract (native) earthworms, who in turn cycle macronutrients from deep layers of the soil to topsoil. Earthworms and microbes feed on the organic matter that is placed as mulch cover onto the ground. This entire process produces humus near the roots and feeds the plants with nutrients. Plants grow and feed humans with healthy and nourishing grains and vegetables.

These technologies are of course specified and refined by Palekar and his followers to suit the needs of particular crops and landscapes. But the transformation of practices and subjectivities actualises a recuperative ontology of care. One could call it a post-anthropocentric relational ontology of agriculture. It is all about letting 'nature' do the work and realising an agriculture of abundance in which farmers stand on an 'ocean of nutrients' under their feet that simply needs to be activated by allowing processes and principles to unfold that naturally occur in forest ecologies. However, ZBNF is also about the claim that only native biologies (cows, earthworms, seeds, microbes) have the capacity to recuperate India's rural health and prosperity. And it is also about the claim that India had agriculture figured out thousands of years ago, with god Krishna as the first agricultural scientist (Palekar 2010b: 165) and that the Golden Age was destroyed by a conspiracy of foreign colonial forces.

Conclusion

Among farmers in Wayanad the need to take consequential decisions has proliferated. Agricultural practices cannot be taken for granted anymore and the recommendations by scientific trustees have lost parts of their trustworthiness. Farmers who were used to making high-stakes decisions, for example about which crop to cultivate, what seed to choose or where to lease additional land, are now increasingly confronted with a new set of choices: how to cultivate and which style of farming to follow. This situation I call agronomical pluralism. In the choice between chemical, organic and natural farming – to name only the broad categories – economic, moral and ethical considerations intersect.

Zero Budget Natural Farming's critique of Green Revolution science and the recuperative efforts of this heterodox agronomy allow us to draw a variety of conclusions about agronomical pluralism. First, agronomical pluralism is not a liberal pluralism of peaceful coexistence. Slightly overstating the case, the opening quote to this chapter may be interpreted to indicate that Palekar replaces the violence of Western scientism with the chauvinism of Hindu supremacy. He counters putative Western claims to universal 'absolute' truth with the equally disturbing (and false) claim that 'there is only [one] absolute philosophy [and] that is Indian philosophy' (Palekar 2013: 21). Palekar is also less than generous when it comes to evaluating the merits of other alternative agronomies, such as permaculture or biodynamic farming. He even considers other 'Indian' natural farming systems to be demonic or at least wrong. Farmers, however, are much less rigorous. In Wayanad, many practitioners of ZBNF have trialled a variety of alternative agronomies, before adopting Palekar's system. The spirit of trialling and experimenting prevails among many of them. Among farmers other practices are not so much regarded as categorically wrong but simply as not needed anymore, too costly or too much work. Essentialist claims to the putative purity of indigenous, traditional or local have been effectively deconstructed (Agrawal 1995) as 'invented space of authenticity' (Gupta 1998: 229). Palekar's statement thus exemplifies Akhil Gupta's point about the dangers of a politics of purity and continuity: 'Discussion or efforts to "preserve" indigenous knowledge end up privileging certain kinds of knowledge over others' (1998: 289). My hope is that the case of Palekar's blunt and outspoken nationalist rhetoric may open up future conversations about environmentalism and questions of belonging. ZBNF may serve as a magnifier of the 'false consciousness of place' (Plumwood 2008) and the reliance on unhelpful purities and unacknowledged nationalisms that may be part of agrarian environmentalisms in more subtle ways.

The second conclusion to be drawn about agronomical pluralism is that it has to relate to the sciences and does so in ambiguous ways. Palekar does not reject science categorically. On the contrary, whenever he finds support for his microbial ontology of soil health, he is eager to cite scientific journals. Palekar's very specific style of both rejecting and selectively embracing science and technology may be articulated in a backward-looking and chauvinistic idiom, but it is not unlike the position held by many critical scholars in Science and Technology Studies who on one hand reject Big Agriculture, Big Science and Big Capital (cf. Haraway 2016) and on the other celebrate speculative possibilities of cutting edge science, such as the of 'homo microbis' (Sagan 2013) or the biology of 'ecological evolutionary developmental worlding and unworlding' (Haraway 2016: 97). When I challenged Palekar in the one interview he gave me about the many commonalities I see between his teachings and permaculture principles he responded that this was obvious, as there is only 'one Nature.' The science question is then less a question of science versus traditional knowledge but

rather which sciences are supposed to take a lead in honing our understanding of agronomy.

My aim has been to go beyond the deconstruction or 'exposure' of nativist discourses in agrarian environmentalism. I hope to have been able to show that Zero Budget Farming is also a valuable contribution to theoretical and practical problems regarding food and agriculture in the contemporary world. ZBNF seems to work really well for farmers and their other-than-human companions. The Wayand farmers who have adopted it, whether partially or fully, attest to its efficacy, to increased yields and availability of healthy and tasty food and to reduced costs and labour requirements. But most importantly, they are certain that it has restored their pleasure for working the field without having to handle toxic substances. To the environmental humanities, questions of belonging, ecological nationalism, epistemic violence, transcultural knowledge, imperial science and the scientification of lifeworlds remain critical issues – but so are processes of symbiosis, coevolution, fermentation and nitrogen cycling, which have yet to be integrated into critical cultural theory. Just like Zero Budget farmers, the social sciences and humanities face questions of how they 'ought to relate to science, technology, engineering, and medicine (STEM) subjects' (Castree 2014). As geographer Castree puts it, 'It's become a burning question in the world of "global change science" of late because the scope, scale, and magnitude of the human impact on Earth is unprecedented' (2014).

Subhash Palekar and his followers in Wayanad district do not inhabit a straightforward positionality. On one hand, the critique embodied in these alternative agriculture movements stands in a long genealogy of postcolonial critiques of scientific interventions in the name of 'development' (Kapadia 2002), 'high modernism' (Scott 1998) and 'progress.' It is an undeniable fact that in the field of agriculture scientific interventions have displaced well-adapted situated practices, skills, knowledge and species (cultivars and breeds) for uniform 'Package of Practices,' simplified and productivist logics of cultivation and novel biotechnologies of seeds, fertilizers and livestock breeds. Palekar and other natural farmers do the work of recuperation.

Engaging the ecological nationalism of Palekar, the humanities are also always reminded that agriculture is fundamentally about life and material-semiotic nature-cultures, thus realities beyond ideas, culture and language. Agriculture is about growing plants and raising animals on a multispecies farm. Its study is thus a field that invites a bridging of the divide between humanities and sciences not only by bringing the humanities to bear on science (as Science Studies) but by reading sciences like ecology and microbiology in order to rethink ontological assumptions within the humanities. The Indian natural farming movement that I studied resonates strongly with recent trends in environmental humanities (inspired by some trends in the sciences) to develop an affective, materialist, vitalist and more-than-human ontology of the world.

However, theoretical and ethical traps are manifold in an ontological politics that combines biophilic relationality with place-based identity politics.

Palekar frames his critique of the State-Capital-Science nexus in obscurantist idioms of conspiracy theories, cultural nationalism and Hindu chauvinisms. He counters the justified critique of the violence of hybridisation with a celebration of native cows that brings him very close to forces of the Hindu Right. But perhaps it is a mistake to overemphasise the implicit theories of culture, history and belonging in interpreting Palekar. Such a reading is after all not innocent of the structural power of Orientalism. Perhaps it would be better to give Palekar the benefit of the doubt that his essentialism is a strategic deployment of nativism and traditional knowledge and that in the end only practices and results matter. This pragmatic translation is what his Malayalee followers, among whom I did fieldwork, seem to do. Farmers in Wayanad translate or sanitise Palekar's sweeping claims about spirituality, ancient Hindu wisdom and total disinvestment from state-run extension into a pragmatic methodology with the potential of recuperating agrarian livelihoods. Perhaps it is because many of them are Syrian Christian settlers with tenuous claims of belonging to this frontier landscape that they tend to translate ZBNF into a mere technology based on recommendations and recipes rather than a (Hindu) spiritual renewal of farmers' subjectivities. In any case, I hope that this case has the potential to instigate a perhaps inconvenient but certainly necessary debate about ecology and belonging.

Notes

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1 Malayalam is the language spoken in Kerala. English is widely used in Kerala when speaking about farming methods, owing perhaps to the fact that Palekar does speak in English to his audience and that organic farming was earlier introduced by Non-Governmental Organisations and certifying bodies with strong transnational ties. ZBNF is hence most commonly known as *zero budget krşi* in Wayanad.

2 Subhash Palekar runs his own website, which also features video lectures he has given (http://palekarzerobudgetspiritualfarming.org, accessed 15 November 2013). The online presence of his community followers is also vast.

3 In the context of Palekar's writings, the notion of 'passion free' refers to Indian yogic tradition of freedom from passions and attachments as a goal for an ascetic lifestyle. It does not refer to boring farming without passion.

4 For the history of KAU see www.kau.in/basic-page/about-kerala-agricultural-university, (accessed 10 December 2016).

References

Agrawal, Arun. 1995. 'Dismantling the Divide Between Indigenous and Scientific Knowledge', *Development & Change* 26(3): 413–439. doi:10.1111/j.1467-7660.1995.tb00560.x.

Bajaj, Jitendra K., and M. D. Srinivas. 1996. *Annam Bahu Kurvīta: Recollecting the Indian Discipline of Growing and Sharing Food in Plenty*. Madras: Centre for Policy Studies.

Benda-Beckmann, Franz von. 2002. 'Who's Afraid of Legal Pluralism?' *Journal of Legal Pluralism and Unofficial Law* 37: 37–82.

Borlaug, N. E. 2000. 'Ending World Hunger: The Promise of Biotechnology and the Threat of Antiscience Zealotry', *Plant Physiology* 124(2): 487–490. doi:10.1104/pp.124.2.487.

Brockway, Lucile H. 2002. *Science and Colonial Expansion: The Role of the British Royal Botanic Gardens*. New Haven, CT: Yale University Press.

Castree, Noel. 2014. 'Dangerous Knowledge and Global Environmental Change: Whose Epistemologies Count?' *EnviroSociety Blog*. www.envirosociety.org/2014/11/dangerous-knowledge-and-global-environmental-change/ (accessed 10 January 2017).

Cullather, Nick. 2013. *The Hungry World: America's Cold War Battle Against Poverty in Asia*. Cambridge, MA: Harvard University Press.

Douglas, Richard M. 2009. 'The Green Backlash: Scepticism or Scientism?' *Social Epistemology* 23(2): 145–163. doi:10.1080/02691720902962805.

Foucault, Michel. 2008 (1973). *The Birth of the Clinic: An Archaeology of Medical Perception*. New York: Vintage.

Friedmann, Harriet. 2005. 'From Colonialism to Green Capitalism: Social Movements and Emergence of Food Regimes', in Frederick H. Buttel and Philip McMichael (eds.), *New Directions in the Sociology of Global Development*, 227–265. Research in Rural Sociology and Development, vol. 11. Amsterdam: Elsevier.

Gupta, Akhil. 1998. *Postcolonial Developments: Agriculture in the Making of Modern India*. Durham, NC: Duke University Press.

Haraway, Donna J. 2016. *Staying with the Trouble: Making Kin in the Chthulucene. Experimental Futures: Technological Lives, Scientific Arts, Anthropological Voices*. Durham, NC: Duke University Press.

Henke, Christopher. 2008. *Cultivating Science, Harvesting Power: Science and Industrial Agriculture in California. Inside Technology*. Cambridge, MA: MIT Press.

Jodhka, Surindar S. 2002. 'Nation and Village: Images of Rural India in Gandhi, Nehru and Ambedkar', *Economic & Political Weekly* 37(32): 3343–3353.

Kapadia, Karin (ed.). 2002. *The Violence of Development: The Politics of Identity, Gender & Social Inequality in India*. London: Zed Books.

Kloppenburg, Jack. 1991. 'Social Theory and the De/Reconstruction of Agricultural Science: Local Knowledge for an Alternative Agriculture', *Rural Sociology* 56(4): 519–548. doi:10.1111/j.1549-0831.1991.tb00445.x.

Leslie, Charles. 1980. 'Medical Pluralism in World Perspective', *Social Science & Medicine. Part B: Medical Anthropology* 14(4): 191–195. doi:10.1016/0160-7987(80)90044-7.

Levins, Richard, and Richard C. Lewontin. 1985. *The Dialectical Biologist*. Cambridge, MA: Harvard University Press.

Lockeretz, William (ed.). 2007. *Organic Farming: An International History*. Wallingford: CABI (accessed 26 January 2017).

Mann, Charles C. 2011. *1493: Uncovering the New World Columbus Created*. New York: Knopf.

Maye, Damian. 2016. 'Examining Innovation for Sustainability from the Bottom Up: An Analysis of the Permaculture Community in England', *Sociologia Ruralis* 1–20 (online first). doi:10.1111/soru.12141.

Mignolo, Walter D. 2002. 'The Geopolitics of Knowledge and the Colonial Difference', *The South Atlantic Quarterly* 101(1): 57–97.

Münster, Daniel. 2012. 'Farmers' Suicides and the State in India: Conceptual and Ethnographic Notes from Wayanad, Kerala', *Contributions to Indian Sociology* 46(1–2): 181–208. doi:10.1177/006996671104600208.

———. 2014. 'A Letter to Subhash Palekar, Natural Farmer', *Rachel Carson Center Perspectives* (6): 23–26. www.jstor.org/stable/26241285 (accessed 20 November 2019).

———. 2015a. 'Agrarian Alternatives: Agroecology, Food Sovereignty and the Reworking of Human-Environmental Relations in India', *Rivista Degli Studi Orientali Nuova Serie* 88(Supplement 2): 233–250.

———. 2015b. 'Farmers' Suicide and the Moral Economy of Agriculture: Victimhood, Voice, and Agro-Environmental Responsibility in South India', in Ludek Broz and Daniel Münster (eds.), *Suicide and Agency: Anthropological Perspectives on Self-Destruction, Personhood and Power*, 105–125. Studies in Death, Materiality and the Origin of Time. Farnham and Burlington, VT: Ashgate.

———. 2015c. '"Ginger Is a Gamble": Crop Booms, Rural Uncertainty, and the Neoliberalization of Agriculture in South India', *Focaal: Journal of Global and Historical Anthropology* 71: 100–113. doi:10.3167/fcl.2015.710109.

———. 2016. 'Agro-Ecological Double Movements? Zero Budget Natural Farming and Alternative Agricultures After the Neoliberal Crisis in Kerala', in B. B. Mohanty (ed.), *Critical Perspectives on Agrarian Transition: India in the Global Debate*, 222–244. New Delhi: Routledge.

———. 2017a. 'Zero Budget Natural Farming and Bovine Entanglements in South India', *Rachel Carson Center Perspectives* (1): 25–32. www.jstor.org/stable/26241413.

———. 2017b. 'Frontier in Ruins: Internal Colonization and the Making of an Agricultural Landscape in South India', in P. Zemisch, et al. (eds.), *Soziale Ästhetik, Atmosphäre, Medialität: Beiträge aus der Ethnologie*, 97–107. Münster: Lit.

Palekar, Subhash. 2010a. *Five Layer Palekar Model's: Mixed Lashyadhisha Pattern. (Part 2 Coconut, Areca Nut, Black Pepper, Coffee, Cocoa, Vanilla, Rubber, Pine Apple, Oil Palm, Cashew Nut)*. Amravati, Maharashtra: Amol Subhash Palekar and Amit Subhash Palekar.

———. 2010b. *The Philosophy of Spiritual Farming: Zero Budget of Natural Farming – Part 1*, fifth revised renewal ed. Amravati, Maharashtra: Zero Budget Natural Farming Research, Development & Extension Movement.

———. 2011. *The Symbiosis of Spiritual Farming: Zero Budget Natural Farming – Part 3*. Amravati, Maharashtra: Zero Budget Natural Farming Research, Development & Extension Movement.

———. 2013. *The Principles of Spiritual Farming: Zero Budget Spiritual Farming – Part 2*. Amravati, Maharashtra: Amol Subhash Palekar and Amit Subhash Palekar.

Plumwood, Val. 2008. 'Shadow Places and the Politics of Dwelling', *Australian Humanities Review* 44: 139–150. doi:10.4135/9781848607873.n17.

Puig de la Bellacasa, María. 2015. 'Making Time for Soil: Technoscientific Futurity and the Pace of Care', *Social Studies of Science* 45(5): 691–716.

Sagan, Dorion. 2013. *Cosmic Apprentice: Dispatches from the Edges of Science*. Minneapolis: University of Minnesota Press.

Scott, James C. 1998. *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*. New Haven: Yale University Press.

Smil, Vaclav. 2001. *Enriching the Earth: Fritz Haber, Carl Bosch, and the Transformation of World Food Production*. Cambridge, MA: MIT Press.

Thirsk, Joan. 2000. *Alternative Agriculture: A History from the Black Death to the Present Day*. Oxford: Oxford University Press.

Thottathil, Sapna E. 2014. *India's Organic Farming Revolution: What It Means for Our Global Food System*. Iowa City: University of Iowa Press.

Wilson, Geoff A., and Jonathan Rigg. 2003. 'Post-Productivist' Agricultural Regimes and the South: Discordant Concepts?' *Progress in Human Geography* 27(6): 681–707. doi:10.1191/0309132503ph450oa.

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