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Farming

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Farming has become increasingly visible in recent years, following a growing public interest in how food is produced. Anthropologists have been studying farming since the founding of the discipline. This entry summarises the origins of farming and agricultural intensification before analysing three themes of the social anthropology of farming. First, farming is dependent on relations of power and capital. Second, farming is deeply engaged with social relations of value, race, and gender. Third, farming has a deep engagement with the physical environment in ways that are generative and relational. New themes in the anthropology of farming include a focus on farm workers and the question of how farming fits into three theories of epochal planetary change in which the dominant influences on the environment and climate are human activity, capital, and plantation agriculture.

Introduction

Food and agriculture are a central and sustaining element of human life both physiologically and socially. Agriculture has also had a major environmental impact. It has transformed much of the U.S. Great Plains and Brazilian Cerrado into fields of grain, and is at least partially to blame for wildfires that threaten the Amazon rainforest and West Papuan forests. It follows that farming has maintained a place of focus within socio-cultural anthropology and archaeology. The root of the term ‘farmer’ is ‘one who collects taxes’ and other duties, and ‘farm’ originally referred to a total rent payment (Donald 1867), but farming is broadly defined as the process of doing agriculture and animal husbandry. It includes the cultivation of plants and the raising of livestock for food, feed, fibre, and sometimes fuel. Academics make sense of farming in different ways. Agronomists often study conservation and how to maximise food production. Economists frequently ask themselves how farmers respond to markets, incentives, and costs. Rural sociologists and anthropologists tend to focus on the meanings and relationships of farming. Historically, anthropologists have focused on non-Western, pre-industrial societies, and sociologists on Western, industrial settings, though scholars from both disciplines have blurred these lines. Anthropologists continue to centre on meaning and relationships, but also ask holistically how markets and capital, the physical environment, and social meaning all come together.

Agricultural cultivation is a co-dependent process that involves humans, plants, soils, and animals. It drives and complements systems of exchange, whether through market exchange at farmers markets, large-scale commodity sales and barter, or reciprocal gift exchange between neighbours and within communities. It

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depends on social relationships with business partners, kin, farm workers, and neighbours. Even seemingly anonymous global soy markets, involving large-scale farmers and multinational agribusinesses, often depend on the trust-based exchange of commodities for agricultural inputs (Wesz Jr. 2014). Farming also modifies plants and animals through domestication and transforms landscapes and soils. It is done both at the scale of local ecologies and communities and at the scale of national agricultural policies and global markets. For reasons of simplicity, this entry divides this multiplicity of the anthropology of farming into three categories of study – the politics and economics of farming (including questions around power, work, and capital), its meaning and social values, and the socio-biological and socio-environmental aspects of farming and food.

Anthropology has always engaged with agrarian people. Proponents of agricultural anthropology, i.e. the comparative, holistic, and cross-temporal study of human interactions with technology, ecologies, and society through agriculture, write that '[v]irtually every manifestation of agriculture ranging from shifting cultivation to modern industrial farming has been subject to anthropological study' (Rhoades & Rhoades 1980: 10). Anthropologists tend not to study agriculture in isolation. Even the most technologically-advanced and capital-intensive farming systems are situated in environments of soil, water, and light as well as in social relationships. Thus, anthropologists tend to build on a holistic view of farming, which allows them to understand farmers and farm communities in a way that highlights their relations with plants and soil, markets and reciprocal exchange networks, and society and state.

Today, fewer and fewer people are directly involved in agriculture. In the United States, economic output from agriculture as a sector leads only educational services and arts, entertainment, and recreation.[1] The global economic transition from farm work to industrial wage labour is driven by the global integration of markets and migration networks (Nash 1994) as well as rising agricultural productivity and mechanization that increase labour productivity and reduce labour demand for farming (Janssen 2018). Yet we still see references to farming everywhere we look today. Talk show hosts and journalists tell us which 'superfoods' to eat and which kinds of food are exacerbating hunger in peasant communities (McDonell 2015); trips to the grocery store may include biographies and portraits of the farmers who grew the kumquats on display; popular television programs embed critiques of capitalist and industrial agriculture in their plots (Specht 2013); and we are invited to 'vote with our money' to transform broken food systems (Pollan 2006). As the author and activist Michael Pollan brought to the attention of many Western consumers, the foods we eat are increasingly abstracted from place, people, and even plants. A disconnect between consumers and farmers and a growing interest in how food is grown may thus go hand in hand. This distance has brought distrust, and thus consumers want to know if animals were mistreated, crops were genetically modified, or if their shopping list will threaten Indigenous communities or distant rainforests. This growing awareness and concern for food and farming have drawn renewed interest in the anthropological study of food and agriculture. Fortunately, the origins, expansion, and impacts of agriculture have been hotly debated by

anthropologists since the founding of the discipline.

Origins of agriculture

With the first agricultural revolution around 12,000 years ago, humans began cultivating and raising their food. This period was also associated with sedentary lifestyles, an increasingly complex division of labour, and the development of art. Early studies of the origins and expansion of agriculture focused on the factors that led humans to shift livelihood strategies, in particular from a nomadic to more sedentary life. These studies focused on environmental factors, population pressure, and co-dependent plant, animal, and human interactions. Marginal Zone theory, for example, proposes that humans turned to agriculture when optimal zones for hunting and gathering could no longer support growing human populations (Binford 1968). Groups of people may have migrated to less abundant zones, where hunting and gathering were insufficient for their survival, and adopted agricultural production. Early animal husbandry may have begun when communities enclosed and fed animals that foraged in gardens (Linares 1976). Marginal Zone theory also suggests a mutual process of domestication that rendered humans and animals interdependent. Evolutionary models of agriculture similarly describe the co-dependency and co-evolution of people and plants as a relationship in which people gain a source of food and plants (Rindos 1984). Critics of Marginal Zone theory claim that it is environmentally deterministic and does not account for cultural and social factors such as power, leadership, or social institutions (Bender 1978; Hayden 1990). A 'feasting model' of domestication credits technological advancement (i.e. new fishing technologies, mass seed-collecting techniques, and practices of food processing and storage) for the origins of agriculture. These techniques may have enabled individuals to create a food surplus and then distribute the food strategically through feasts to gain prestige and power (Hayden 1990).

Anthropologists also ask how agriculture became intensive. Intensive agriculture tends to involve shorter fallow periods between crops, an increased use of labour (by humans or machines), and a more intensive use of other inputs such as seeds, fertilisers, or irrigation (Netting 1993). Some writers relate the intensification of agricultural production and animal domestication to a social evolutionary frame of human history. They may, for example, argue that the intensification of human-managed ecologies is a sign of cultural and technological progress (Childe & Daniel 1951). However, a more common approach in anthropology today is to ask how and why agriculture became intensive, without necessarily relating this to normative notions of societal progress. Agricultural communities may, for example, adapt intensive agricultural production strategies to feed growing populations, avoid famines, or respond to ecological constrains (Bruno 2014). Moreover, markets and state coercion have often induced farmers to intensify production, obliging them to shift towards cash crop production to improve household wellbeing (Finnis 2008) or to meet coercive state tribute or tax demands (Godoy 1984). Farmers' capacity to increase production yields means that anthropologists have been sceptical of Malthusian theories postulating that

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overpopulation leads to famine (Boserup 1965).

Later work showed that agricultural intensification also depended on certain agro-ecological conditions (Stone & Downum 1999). For example, a region with low or highly variable precipitation or infertile soils may not merit intensification or agricultural production at all. Communities do not necessarily respond to food shortages by intensifying production when the local ecology cannot support intensive agriculture. Instead, they may respond through political action, such as limiting land access to specific ethnic or kin groups (Stone & Downum 1999). Neither is intensification of farming directly correlated with yield increases. In the late 1970s, Clifford Geertz developed the term 'agricultural involution' to describe the growing social complexity and intensification of human agricultural labour that comes under outside pressure. The term places social change at the intersection of agricultural change and political and economic environments (Geertz 1970). Geertz showed that, along with population growth, it was three centuries of Dutch colonialism (from the seventeenth century) and the introduction of new crops and technologies (i.e. transplanting, land preparation, and double cropping) which increased overall agricultural production in Indonesia. Yet, production continued to be labour-intensive and labour productivity remained stagnant. The notion of agricultural involution considers population density, colonialism, and technology together. Thereby it holistically describes the social and physical causes of agricultural intensification.

Regardless of the relative merits and pitfalls of intensification, farming communities may decline to pursue agricultural intensification. Swidden farmers in Indonesia, for example, carefully balance land, labour, and time as they apply their 'unique knowledge of their environment and how to exploit it' (Dove 1985: 384). Similarly, British colonial farming practices were not rejected by West African farmers out of ignorance, but out of a preference for their own agronomically-derived and tested practices (Richards 1985). Risk management, market incentives or lack thereof, and political and social structures all co-determine if families will pursue agricultural intensification (Stone 2001). State and colonial governments, for example, have pushed intensification through both the violent enforcement of colonial demands and semi-voluntary enrolment in green revolution agriculture, which began worldwide in the 1960s and consolidated in the 1970s (Franke 1974).

Relatedly, agriculture may seem to sit at the end of an evolution from hunting and gathering to pastoralism to farming, but people may choose to avoid agriculture and sedentism in favour of mobility and flexibility. Hunting and gathering communities can enjoy greater amounts of leisure time than farming communities (Sahlins 1972). Marshall Sahlins' theory of the 'original affluent society' proposes that hunter-gatherers can satisfy their everyday needs without agriculture. They may eschew the benefits of intensive farming in favour of the lower labour demands that come with hunting and gathering. While the caloric output per person tends to be greater in farming communities, this involves trade-offs. Agricultural production requires more work, necessitates sedentary lifestyles, and often reduces nutritional diversity. Life without

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agriculture can demand less work per person and it can provide access to a diverse and nutritious diet (Lee 2017). Alternatives to sedentary agriculture also provide political benefits. Populations of farmers in the Highlands of Southeast Asia pursue mobile forms of farming to avoid state control (Scott 2010). The members of these mobile communities plant crops that require little care and can be left in the ground for long periods of time. They cultivate land that is difficult to access, but easy to find cover in. Using this style of 'escape agriculture', farmers may adapt their crops, labour, and fields to escape the state surveillance and control that settled, sedentary agricultural farming communities cannot avoid.

Agriculture is closely linked to the development of states and societies. In the Southern Moche State in the arid Moche Valley of Peru, agriculture depended heavily on irrigation systems – the control of which afforded a centralised, expansive state (Billman 2002). Extensification (or, the expansion of farmland area under cultivation) and intensification of agriculture in the Alps of Europe in 1000 AD required clearing forest to extend arable land and reducing the fallow period to intensify production. Both processes were directed by land-controlling elites who used the profits of increased production to consolidate their control of territory and people (Wolf 2010). Sociologists have similarly argued that agriculture reflects and guides the power of state systems in the present day (Friedman & McMichael 1989). Agriculture can increase the amount of calories produced per person and make sedentary life more viable, yet it also enables the control of society by states (Scott 2017).

The origins of agriculture, causes of intensification, and the relation between the rise of agriculture and the rise of states and societies are important milestones in human history. They tell us how we as a human race became who we are today. The way anthropologists debate and find evidence for these milestones also says a lot about the discipline as a whole. Anthropologists trace the comparative origins of agriculture to human processes of population growth and migration in industrial and agrarian societies, but also to non-human processes in which plants and animals developed co-dependence with humans. Agricultural intensification is a response to population pressure but also to political pressure, and it always remains dependent on political developments as well as considerations of risk, value, and agro-ecologies. The following sections discuss three ways in which anthropologists engage with agriculture today: political economy, meaning-making in agriculture, and engagements with natural environments.

Political economy: power and capital

A key anthropological contribution to the study of farming is placing that activity within relations of power and capital. We see the importance of power in the origins and implications of agricultural intensification as well as in the everyday realities of farming today. Debates on the nature of agrarian change under capitalism, or the 'agrarian question', begin with Marx's *Capital* (Marx & Engels 1967) and continue through the development of Marxist thought (see Kautsky 1988; Lenin 1964; Chayanov 1966). The agrarian question asks what happens to peasants and farmers in a capitalist economy. Karl Marx proposed two

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pathways for the peasantry: that they will eventually become wage labourers, or that they will become a collective political unit (Akram-Lodhi & Kay 2010a). The first pathway is largely a transition from peasantry into wage labour with a few landowners rising to a new 'rural middle class' and 'completing the transition to a fully capitalist mode of production' (Akram-Lodhi & Kay 2010a). The second pathway would be a gradual coalescence of peasants into a collective political unit of agricultural production on a national scale (Akram-Lodhi & Kay 2010a). Today the agrarian question tackles similar questions of how peasants and small farmers engage with and resist capital, but with greater attention to how these struggles intersect with other criteria such as gender and ecology (Akram-Lodhi & Kay 2010b).

Power and capital operate on different scales, from local communities to global commodity flows. Farming communities, for example, are shaped by the scale and type of agriculture practiced nearby. Large-scale, industrial farming has at times been associated with less vibrant forms of community life, centralised economic activity, and greater dependency on large capital providers and the political power of the state. Communities associated with small-scale, less capital-intensive farming tend to attract more diverse small businesses and may develop a richer community life (Goldschmidt 1978). That said, farming communities can also reinforce capitalist values of farming. During the 1980s US farm crisis, in which falling commodity prices and farm debt led to widespread farm foreclosures, neighbours blamed each other for falling into debt and losing their farms (Dudley 2002). Elsewhere during the same crisis, farmers often eschewed 'traditional' values of farming, such as land stewardship, deeply-held religious beliefs, and family-centred decision making, in favour of individualism and profitmaking (Barlett 1993). At a global scale, sugar creates relations of power and capital, linking Caribbean sugar plantations and the rise of industrial work in Europe. The early use of slave labour on sugar plantations and later exploitation of Caribbean farmworkers created cheap sugar, which in turn sustained a growing industrial working class in Great Britain (Mintz 1985). Importantly, while this entry focuses on farming, Sidney Mintz' work shows the importance of considering food consumption and farming together.

We also see the impact and power of capital in terms of the essential means of agricultural production: seeds, labour, soil, and other inputs. Plant breeding in the Americas has culminated in a mostly undemocratic seed economy. Traditions of local plant breeding, seed saving, and seed exchange have here become dominated by state-supported breeding centres which focused on productivity and market demands. The seed economy has subsequently become governed by multinational seed companies that restrict seed saving or exchange, selling seeds as technological packages along with pesticides and other agro-chemicals (Kloppenburg 2005). Multi-national agribusinesses have often privatised seeds and plant genetics, restricting not only access to seeds but also the ability for farmers to replant them. Further, technological innovations such as genetically engineered seeds and pesticides tend to create treadmills of dependency in which farmers become increasingly reliant on agribusinesses for inputs and expertise (Stone & Flachs 2018). Alternatively, rural communities have reversed this trend by creating seed saver networks

to develop, preserve, and share seeds that are suitable to local agro-ecoystems and diets. These networks often support garden landscapes over monocultures, reciprocal exchange over market exchange, and low-input agriculture over high-input agriculture (Nazarea 2005).

While the corporate control of seeds shows the imposition of corporate power, anthropologists also consider how such power is resisted by activists and farmers (Fitting 2010). Participatory, democratic seed exchanges may have the potential to slow and even reverse the active dispossession of farmers and create new forms of 'seed sovereignty' (Kloppenburg 2010). At the same time, participatory plant breeding programs may harbour the potential to not only create access to seeds, but to also breed seeds specifically suited for farmers' agro-ecologies (Almekinders, Thiele & Danial 2007). Seed saving among Tharaka farmers in Kenya, for example, contributes to crop diversity, but depends on strong social organisation for seed exchange (Laberyrie *et al*. 2014).

Agrochemicals such as soil fertilisers or products that kill plant weeds (herbicides), insect pests (insecticides), and fungal diseases (fungicides), have become a seemingly unavoidable part of the farming landscape. Yet the impacts of their production and use are longstanding and far-reaching, as shown by the pesticide plant disaster in Bhopal, India in 1984. The plant's explosion, which resulted from lax safety design, poisoned the air of Bhopal and killed thousands, while leaving long-term health risks for the survivors (Fortun 2001).

Alternative markets (e.g. fair trade, organic, and bird-friendly farming) break the binary distinction between corporate vs. non-corporate agriculture. Here, commercial production practices may replace pesticides and synthetic fertilisers with integrated pest management and soil conservation practices. Anthropologists have filled a critical role in understanding these markets by asking who benefits from them, what effect they have on environmental health and economic sustainability, and whether these markets tame or deepen market forces. Farmers markets in the United States have expanded as farmers seek out reliable local markets and consumers hope to support local farming and know where their food comes from. However, like conventional markets, direct trade often involves a host of middlemen, such as processers and inspectors, and coalitions of busy farmers and distracted consumers face a difficult task in challenging conventional food systems (Janssen 2017). Some anthropologists warn that if alternative markets do not create new political possibilities, then they may only be another way of commodifying social and environmental life (Guthman 2007). The ethnographic study of fair trade thus challenges the potential of labelling initiatives for empowering farmers. Labelling tends to come with strict standards for farmers and little oversight for food companies who sell fair trade goods (Lyon & Moberg 2010). Origin labels for such goods as tequila and mezcal (Bowen 2015) or Darjeeling tea (Besky 2013) distinguish products from generic commodities, but fail to address many of the underlying historical and sociopolitical structures that affect farmers and farmworkers. Lastly, organic farming can today be part of industrialised farming, with only some minor differences from conventional agriculture (Guthman 2004). Ethnographic studies thus

demonstrate the challenges of disrupting commodified flows of capital. Thinking holistically about how alternative markets work in the context of government policies, historical trajectories, and on-the-ground farming practices lends nuance and depth to how we understand them.

In recent years, land has come into focus for academics, as the threat of a global 'land grab' grows (Borras *et al*. 2012; White *et al*. 2012). The term 'land grab' refers to the large-scale purchase of land, often by foreign corporations, in countries of the Global South. This is a concern for land accessibility as well as national sovereignty. The land grab often dispossesses farming communities of land, sometimes through violent means, and it frequently leads to deforestation, as tracts of forest are converted to agricultural land. Anthropologists may themselves be financially entangled in these processes. For example, TIAA, a pension fund that manages retirement accounts for most U.S.-affiliated anthropologists, has become a major landowner in Brazil, whilst being denounced for environmental destruction and human rights violations (Farthing 2017).[2] Even here, resistance is possible. Groups such as the Brazilian Landless Workers Movement foment both civil society political action and direct land transfers to support local farming and resist land dispossession (Wolford 2010).

Finally, farming knowledge has come into focus as a form of power as well. Agricultural extension agents have long used money and political influence as tools of imposing industrialised and modern farming practices (Arce & Long 1992). They continue to frame scientific Western agricultural knowledge as expertise and Indigenous knowledge as a form of ignorance (Mitchell 2002). State agencies for agricultural research and extension, and private corporations' research and development departments, invest in knowledge production and dissemination and tend to focus on cash crops and exportable goods. Anthropologists often work to de-centre this knowledge by studying alternative ways of doing and knowing agriculture. They frequently advocate for the incorporation of and respect for Indigenous knowledge in rural development (Sillitoe 2006) and on many occasions they work to recognise non-industrial farming practices and knowledge as legitimate (e.g. González 2001).

Culture: meaning and identity

Farming is always imbued with cultural and social connections, a fact that is increasingly recognised in the study of food production. Agronomists can explain how much nitrogen is necessary to grow a high yield of corn, but anthropologists show that, for example, farmers may use ideas of hot and cold to inform their use of manure (González 2001). Economists can show that cultivating crops without using any kind of tillage saves farmers time and money, but anthropologists may find that, for farmers, tillage practices demonstrate their hard work, skill, and masculinity. In agriculture, as in other industries, meaning and collective identities are connected to work and practice (Holland *et al*. 2001). Gender, race, and class also structure how farmers perform agriculture and how they access land, credit, and agricultural knowledge.

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Anthropologists thus often foreground the importance of meaning-making, identity, and the value of agriculture to people.

For example, notions of what constitutes 'good farming' connect farm work to a farmer's reputation and standing in a community. Being considered a good farmer can be used to control in-group colleagues and also assert authority and legitimacy against other groups. Industrial farmers attribute social value to industrial practices and landscapes – claiming a certain rationality and cultural value as well as a concrete benefit of 'feeding the world' (Burton 2004). White farmers in Zimbabwe may claim to be good farmers to legitimise their calls for land access. They argue that their stewardship of the land and farming skills (expressed in technical know-how and yield maximization) give them more legitimate claims to the land and to the identity of being farmers than Indigenous or Black farmers may have (Suzuki 2018). Holdeman Mennonites in Brazil also connect moral frames of being good farmers, good family members, and good community members by limiting land holdings within their communities to better distribute land and by limiting the use of GPS-guided precision farming technology and large machinery (Ofstehage 2019).

Racism, sexism, and nationalism also affect farming life. They may exclude people from farming by limiting land access, access to credit, and land extension. For example, Black farmers in the United States still fight for land and basic inclusion (Grim 1995) while Black farmers' cooperatives and unions have in the past struggled for the rights of southern tenant farmers and supported alternative agricultural visions and practices (White 2017). Black farmers thereby not only fight for the right to farm: they also work for recognition of their farming expertise and experience, paralleling and contributing to the struggle for civil rights (McCutcheon 2019). American Indian farmers equally fight for the right to farm on their own terms while often facing condescension and pressure to adopt white farmer attitudes and practices (Biolsi 2018). In Latin America, farmer-to-farmer exchanges support and enrich alternative ways of farming, resisting dominant trends of modernising agriculture and supporting collective identities of *campesino* (peasant) agriculture (Holt-Giménez 2006).

Gender, masculinity, and femininity equally structure farming and are structured by it. Farming masculinities may be moulded to fit concepts of modern agriculture. For example, in the United States farm labour has become increasingly centred on men as family farms have transformed from dispersed family labour and decision-making to production dominated by single individuals (Barlett 1993). Peggy Barlett argues that as agriculture has become more of a business-centred activity focused on profit, men in heterosexual farm families have excluded women from both farm work and decision-making. More recently, the image of farming masculinity has shifted away from productivist markers like straight crop rows, weed-free fields, and high yields, to financial markers such as profitability, total acreage, and media presence (Bell *et al*. 2015; Ofstehage 2018a). Farmers who do not conform to this vision of agriculture can be subject to ridicule or dismissed as hobby farmers. Women farmers are particularly under pressure to demonstrate their business savvy, leading them to understate concerns for the environment, community, and family

(Ofstehage 2018a). An alternative to agrarian and industrial masculinities, driven by the sustainable agriculture movement, values cooperation, avoids discourses of 'toughness', and readily experiments with new farming technology and practices (Barlett & Conger 2004).

Conceptions of gender linked to agriculture change over time. For example, historically in Andean agriculture, men were often tasked with field-based agriculture and women with pastoral work. As Andean agriculture became more intensive and commercial, soil degradation increased and crop fields cultivated by men encroached upon pastures and common spaces tended by women (Paulson 2003). The changes in Andean agriculture show how economic, ecological, and gender changes are connected and shape each other. Women farmers in the United States face significant institutional, interactional, and symbolic barriers to becoming independent (Keller 2014). US women dairy farmers, for example, have faced barriers when applying for farm credit, in everyday interactions with other (often male) farmers, and even in claiming an identity as a farmer and not as someone's wife, as a gardener, nor as a hobby farmer. They work to deconstruct the heteronormative figures of the farmer as man and farm-wife as woman in a family unit of gendered labour. They also build new femininities around alternative agricultures of stewardship, community, and work (Shisler & Sbicca 2019). Since concepts such as 'farmer', 'good farmer' or 'farming masculinity' are collectively defined, they remain open to the creation and defense of alternative understandings of gender.

More recent studies suggest that, beyond agricultural practices and attitudes, different ontologies of agriculture may exist. Oil palm cultivation in West Papua is commonly framed in Western worldviews as a conflict between local Indigenous groups and agribusiness. However, to local Marind people the palm itself is a malevolent, anti-social person that haunts dreams (Chao 2018). To take a second example, settler colonialism can be rightly viewed as a conflict over land, belonging, and property. Yet this interpretation may betray fundamental differences in how white settlers and Indigenous communities relate to land (Burow, Brock & Dove 2018). Indigenous communities simultaneously fight for the right to access land and against anyone owning land as property. Thus, conflicts and differences in land use, land ownership, conservation, and degradation can extend beyond struggles over resources or values. Ontological struggles over land ownership and resource use question whether land can be owned at all, or if life can be defined through resources. They speak to broader conflicts between different ways of being in the world, speculative futures, and on-going experiences.

Environment: animals, climate, and soil

The anthropological study of farming has roots in human ecology: that is, in the study of the relationships between people's political and economic lives and their natural environment. In earlier years, this meant the study of relatively closed agricultural systems and a focus on how culture impacted ecologies. A classic environmental ethnography about the Tsembaga Maring of New Guinea, for example, described a complex

socio-ecological system of swidden (or slash and burn) agriculture which balanced fallow periods, pig population, acreage, and food calorie production. This complex system was managed by an intricate ritual cycle that connected spirits to the physical realities of the environment (Rappaport 1967).

Recent trends in anthropology emphasise plant and animal relationships, relationships with a changing climate, the idea that there is a two-way connection between ecologies and humans, and the possibility that their interplay may be generative of altogether new realities. In general, this can be seen as a shift from understanding linear relationships of action and 'feedback' to describing more complex relationships. It may also be a shift from the impact of humans on humans in food and agriculture to the impact of humans on non-human actors, worthy of study in their own right.

Taking such a more-than-human approach to ecologies that foregrounds non-human agency decentres people in order to better understand how humans and non-humans affect each other and change together. The Carolina Piedmont pig, for example, is a breed of pig that fetches a high market value, and is considered much more than a mere economic or natural resource. They are descended from hogs native to the Canary Islands and brought to North America by Spanish explorers, later to be abandoned on Ossabaw Island off the coast of the state of Georgia, where they became feral. Later, these pigs were driven from this island for threatening loggerhead turtles, and some ended up in farms in the Piedmont region of North Carolina. Today they are prized for their flavour, 'authenticity', and ability to thrive on marginal land (Weiss 2016). These pigs are the product of the Spanish conquest, their own biological adaptations to living in a marginal environment, government policies enacted to protect an endangered species, and the work of small farmers in North Carolina. This raises a methodological issue: while participant observation and ethnographic interviews with human subjects are incredibly valuable tools, an adequate description of the ecological complexities of agriculture may require 'multispecies ethnography' (Kirksey & Helmreich 2010; Ogden, Hall, & Tanita 2013). Seeking to understand how humans and non-humans act collectively may entail studying the lifecycle of farm animals that co-exist with human populations, or studying the interaction of fungi and plants that make crops grow well. This focus on change, emergence, and multispecies agency has inspired anthropologists to consider plants and animals as agents within production systems rather than as resources. They are changed by human action, but also change human action and thought.

Climate change is an unavoidable component of understanding how farmers engage in plant and animal production. Comparative and social studies of human adaptation and mitigation of climate change takes into account human adaptability to climate changes, but also humans' attempts to reverse or slow them (Orlove 2005). Anthropologists document agricultural adaptations to climate change (such as seeking cooler fields at higher elevations, changing planting dates, or planting different crops) as well as cultural impacts of climate change. In Peru, for example, highland farmers are cultivating fields at higher elevations and selecting different seeds to adapt. Cultural institutions like the reciprocal work arrangements known

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as *ayni*, as well as seed sharing, support this transition (Sayre, Stenner & Argumedo 2019). Anthropologists may be positioned to facilitate adaptation to climate change, but their interventions are limited by local crop preferences, power dynamics, and ecological conditions other than climate change (Siregar & Crane 2011). In any case, they must understand the importance of sociocultural systems in climate change engagement, tensions between normative positions and adaptation, and how climate modeling interacts with everyday aspects of livelihoods (Crane 2010).

In moving toward an understanding of agriculture as a generative and relational process, anthropologists focus on more than just animals. Take the example of soil. Soil structures farmers' lives and is structured by them (Kawa 2016). It is also subject to care or lack thereof, and soil care has material consequences, such as degradation or conservation (de la Bellacasa 2015). Soils are, in a very real way, generated by human activity, not just degraded or affected. For example, the soils of the Brazilian Cerrado are some of the oldest in the world, and humans played at least a partial role in creating them through repeated wildfires. Today, industrial farmers in the region fertilise these soils intensively. Large-scale farmers describe the land as wasteland and consider themselves experts who can convert a barren desert to a fertile breadbasket (Ofstehage 2018b). Yet the soil also induces farmers to change farming practices. In the Cerrado case, large-scale farmers adopt conservation tillage to reduce soil moisture loss in arid areas and learn to apply calcium carbonate to increase the soil pH. The farmers in this case use this encounter with the soil to create narratives of progress and expertise, claiming a role in improving the land and becoming expert farmers themselves. Land is generated out of biological and material ecosystems as well as forces of the state and capital in ways that shape how well-capitalised and technologically-advanced famers engage with it (Li 2014). Such relational aspects are reflected in studies that ask how alternatives to industrial agriculture can promote new interactions with soil, plants, and animals.

Looking forward

Two important trends in the literature on farming are studies of migrant farm workers and the situation of agriculture in times of epochal planetary change. Anthropologists have a rich history of studying farm labour on which recent scholarship builds. Seth Holmes followed migrant workers who fled Oaxaca due to violence and lack of jobs to labour camps on a Washington berry farm (Holmes 2013). His work connects the everyday lives of farmworkers to health, commodity markets, racism, and work. Similarly, in Brazil's Northeast, landless farmers are recruited by intermediaries with kin and community relations to work on sugar cane plantations under dangerous conditions for little pay (de Menezes, da Silva & Cover 2012). Migrant sheepherders in Wyoming also work in a precarious and dangerous position as often undocumented workers. On top of that, they need to re-learn to shepherd under capitalist, business-oriented conditions and in a new natural environment (Krögel 2010). In India, the privatization of former commons has pushed landless farmers to migrate within the country and become farmworkers; their

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internal migration places greater pressure on local landless farmers (Breman 1985). In each of these cases, landlessness and market conditions drive migrants out of rural farming communities and into wage labour. They may at times own land or support communal ties in their original rural communities. Migrant farmworkers in the United States, for example, may work to support coffee farms in Veracruz (Núñez-Madrazo 2007).

Anthropologists working with agricultural labourers increasingly decentre the farm site as they follow the flow and lives of mobile workers. Rural Indian farm workers are not only living in the countryside, but in moving in and out of agrarian and industrial work, they often get fired and hired with little notice (Breman 1996). The movement of farmworkers from Mexico to the United States is more of a circuit than a migration. Migrants from small agricultural communities of Veracruz, Mexico choose to migrate North in response to worsening coffee incomes back home and a scarcity of workers to harvest the coffee in the US (Griffith *et al*. 2017). Their incomes from precarious work in the United States then subsidise coffee farms in their home of Veracruz and, having few long-term permanent contracts and facing unfriendly immigration policies, their work in the United States remains temporary.

Studies of farming and agriculture in anthropology are also placing farming within the context of epochal planetary change characterised differently as the 'Plantationocene', 'Capitalocene', and 'Anthropocene'. Donna Haraway (2015) suggests that world agriculture is becoming abstracted from place as plants, workers, and land are abstracted from local contexts and brought together again in contemporary plantations. She and other feminist political ecologists call our era the 'Plantationocene', to describe this abstraction and mobility of people and plants as well as the racialised work on plantations and farms (Haraway *et al*. 2016). Similar work shows that plantation farms are characterised by relationships of fixity in which labourers create enduring relationships with each other and the land (Besky 2017) and flexibility in which farm owners commodify land, work, and plants (Ofstehage 2018b). Jason Moore characterises the current era as the 'Capitalocene', as he finds it's driven not by human activity in general, but capitalist human activity. Building on the theory that capitalism may lead to environmental collapse (also known as 'metabolic rift'), he suggests that the on-going destruction of land and other means of production is not critical for capital, but rather increases the commodification of life and expands capital further (Moore 2012). Socio-ecological crisis in the Capitalocene may expand commodity frontiers as farmers look for cheaper land and labour. The 'Anthropocene', or the global era defined by human activity, is also made manifest in farming. This happens differently across distinctive farming landscapes as farmers everywhere have specific encounters and interactions with landscapes. Everywhere, they leave the land and themselves changed (Mathews 2018). As this recent work demonstrates, studies of farming can be informative of far more than food production – we learn about markets, work, environment, value, race, and gender in the way farming is and is not done.

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