

SPECIAL SECTION

Food geographies 'in', 'of' and 'for' the Anthropocene

Planetary food regimes: Understanding the entanglement between human and planetary health in the Anthropocene

Jonathan Beacham 

School of Management, University of
Bristol, Bristol, UK

Correspondence

Jonathan Beacham, School of
Management, University of Bristol,
Bristol, UK.
Email: j.beacham@bristol.ac.uk

Funding information

Research Councils UK >Biotechnology
and Biological Sciences Research
Council (Grant number: BB/
V004719/1). Research Councils UK
>Economic and Social Research
Council (Grant number: ES/T007206/1)

Abstract

Food regime theory provides a framework of continued and recurring interest to geographical perspectives in charting the contours connecting agri-food and capitalist political economy. Drawing principally on Marxian regulation theory, the analytical framework of food regime theory outlines three periodised regimes from the starting point of 1870 to the present day. Yet there remains ongoing and unresolved debate as to how we characterise the contemporary third regime – and whether it is a regime on its own specific terms or merely an enduring hangover from the second. I argue that an underacknowledged dimension of attempts to characterise the third regime lies in the conjoined relationship between human and planetary health, which the diagnosis of the Anthropocene encourages us to recognise amid tumultuous global environmental change. Given food regime theory's evasive relationship with ecological dynamics within its explanatory framework, I suggest that a “planetary” retheorisation of its central contributions is increasingly prescient. In considering the growing tensions and contradictions afflicting the contemporary regime, and using soy as a working example, I work through three central arguments. First, that a planetary retheorisation serves to reveal the way in which planetary dynamics shape social life, enabling – albeit never wholly determining – food regimes. Second, that what and how people eat in their dietary practices are of planetary significance, which has been to some degree marginalised within the production-centric analyses of food regime theory. Third, that the conceptual Anthropocene highlights how planetary and human health are intricately and inextricably connected, which food regime theory must better account for. I conclude by proposing that the explanatory potential of the contemporary third regime is being stretched, with contested trajectories and nascent contours raising questions around how we might understand quite what we are living through today.

KEYWORDS

Anthropocene, dietary change, food regimes, planetary turn

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

The information, practices and views in this article are those of the author(s) and do not necessarily reflect the opinion of the Royal Geographical Society (with IBG).

© 2021 The Authors. *The Geographical Journal* published by John Wiley & Sons Ltd on behalf of Royal Geographical Society (with the Institute of British Geographers)

1 | INTRODUCTION

This paper seeks to reconsider Food Regime Theory (henceforth FRT) in light of the growing salience of the Anthropocene diagnosis as a fundamental “step-change ... [in] the relationship of the human species to the natural world” (Hamilton et al., 2015, p. 3). I argue that while FRT as originally conceptualised by Harriet Friedmann and Philip McMichael (specifically see Friedmann & McMichael, 1989) has made significant and important contributions to understanding the historical contours connecting the political economy of capitalism and agri-food, its contributions might be productively extended. Here I suggest that FRT’s analytical framework ought to be brought into closer dialogue with recent calls for a “planetary turn” in the social sciences (Clark & Szerszynski, 2020). These calls emerge from growing recognition of the deep entanglements between the human – and the domain of the social – and the planetary (Willett et al., 2019). While I argue that FRT provides a valuable vantage point for geographical perspectives in exploring the global flows and power relations that constitute these differing historical regimes, I suggest that it has been markedly less successful in accounting for their ecological and biophysical foundations. This situation is problematic as the Anthropocene encourages us to recognise the way in which the planet has never simply provided a “neutral” backdrop to human activity but actively co-constitutes social life (cf., Krausmann & Langthaler, 2019). To develop this argument, I suggest that a planetary retheorisation of FRT invites greater recognition and exploration of their co-constitution through entangled biophysical and political-economic processes, “thinking with” the nascent contours of the contemporary third regime and its possible trajectories in the Anthropocene.

Retheorising FRT in this way is important if we are to fully grasp the planetary significance of the contemporary third regime and its wide-ranging implications both in and beyond agri-food. Despite FRT’s extensive influence and broad explanatory appeal for social scientific and geographical perspectives (Sage, 2013), little has been done to situate this significant body of literature in dialogue with the Anthropocene *qua* a geological epoch arrived at via humanity’s influence in shaping the “natural” planet and the functioning of Earth systems. Yet agri-food is one of, if not *the*, domain that most profoundly shapes humanity’s relationship with the planet, implicating everything from biogeochemical cycles, to the hydrological cycle, the fundamental characterisation of the world’s largest biomes, and far beyond (Foley et al., 2011; Reisman & Fairbairn, 2020).¹ This lack of dialogue is partly due to divergent theoretical underpinnings, with the conceptual Anthropocene emerging from a lineage in the natural sciences focused on the complex workings of Earth systems (Lorimer, 2016). FRT, in contrast, is grounded in the political economy perspective of Marxian regulation theory, which can be conceptualised as an “effort to develop a theory of the regulation of capitalism which isolates the conditions, rhythms and forms of its *social* transformation” (Aglietta, 2000, p.15; emphasis mine). Though FRT from its inception has sought to avoid an overly structuralist analysis pockmarking much Marxian political economy (Friedmann, 2017, p. 260), its central objective lies in “link[ing] international relations of food production and consumption to forms of accumulation broadly distinguishing periods of capitalist transformation since 1870” (Friedmann & McMichael, 1989, p. 95).² Yet if the changing regulation of capitalism is expressed through patterns of social transformation, this transformation is at one and the same time ecological. As humanity faces increasingly precarious and uncertain futures, the Anthropocene entails that this latter dimension can no longer be marginalised in our theorisations.

While we return to this point later, recent years have seen growing interest in FRT’s explanatory potentialities, with the framework furthered in various directions (see, e.g., Campbell, 2009; Evans et al., 2012; Pritchard, 2009). As Sage (2013) convincingly demonstrates, the pliability of FRT within its broad explanatory scope is one of its significant strengths, with his account focusing on the shifts that have enabled a geographically uneven spread of “Western” diets premised on “energy-dense, nutrient-poor ‘pseudo foods’ ... comprising high levels of vegetable oils, animal fats, sugar and salt” (Sage, 2013, p. 76).³ In the contemporary third food regime, Sage suggests that these forms of malconsumption sit directly alongside malnutrition, exemplifying the strange antinomies of the third regime. While Patel (2008) quips that the world is divided into a “stuffed” global North and “starved” global South, such an understanding is problematised by shifting dietary practices in countries including China and India, which demonstrate growing appetites for meat and dairy respectively. Given these nuanced efforts to understand and characterise the human consequences of the third regime, this account must be reconciled with those that note how the status quo does not simply impact our own health – as in Sage’s malconsumption – but also confers profound implications for the future of the planet (Willett et al., 2019).

I argue that this is why it is important to bring FRT into dialogue with the conceptual Anthropocene. Despite some notable attempts to try and tease out the ecological foundations of food regimes (Campbell, 2009), these perspectives arguably do not go far enough in their recognition of the Anthropocene as an age in “which human activity has discernibly affected the Earth’s global functioning to such an extent it is now operating outside the range of any previous natural variability” (Wright et al., 2018, p. 456). It is at this juncture that this paper seeks to make its central contribution,

acknowledging the “provocation [of the Anthropocene] to think social life *through* the Earth” (Clark & Szerszynski, 2020, p. 13; emphasis in original). I argue that a regime-orientated approach does not merely help to illuminate the ways in which capital coalesces through specific configurations to reinvigorate patterns of capital accumulation, but it additionally reveals how planetary dynamics come to be inculcated within trajectories that exceed – or perhaps elide – their political-economic foundations.

This paper proceeds as follows. First, I expand on these initial considerations by detailing the main contributions of FRT, offering a brief characterisation of the three regimes in the process. Noting the oddly marginalised position of the ecological foundations of the regimes within these discussions, I then shift to considering theorisations that have offered constructive interjections within FRT to attempt to fill this gap. In doing so, I pay particular attention to Hugh Campbell's important contributions. Arguing that FRT must better account for the planetary, I turn to considering the case of soy in greater depth. I argue that soy is critical to understanding the third regime and its deleterious impacts on human and planetary health. Finally, considering the possible trajectories engendered by this situation, I draw the paper to a close by outlining where the third regime might lead as a growing variety of counter-logics to the status quo continue to gain traction.

2 | TRACING FOOD REGIMES

While for this paper it is not necessary to offer a fully comprehensive genealogy of FRT (for such an account, see McMichael, 2009), it is nonetheless useful to briefly characterise the development of the three regimes. As Friedmann and McMichael outline in their pivotal *Sociologia Ruralis* paper (see Friedmann & McMichael, 1989), the first regime (1870–1914) was premised on the “culmination in the colonial organization of precapitalist regions” (Friedmann & McMichael, 1989, p. 95) within a new international “world economy.” This regime saw long-established legacies of colonialism formalised through capitalist social relations, with “wage foods,” primarily wheat and meat, fuelling accelerating capitalist development in a Western European context. The emergence of specialised production methods (e.g., the plantation mode of production) entrenched the uneven nature of development resulting from flows from the global South to North within this regime. Though FRT has been critiqued for failing to fully theorise the demise of the first regime (see Bernstein, 2016), a combination of European conflict, agricultural crisis and economic depression in the early to mid-20th century led to a fundamental shift in patterns of capital accumulation. Magnan (2012) has convincingly argued that the first regime instead came to a gradual end from 1925 to 1945, with the second regime coalescing in the context of US hegemony after the Second World War. Though finding many continuities with the first in terms of bringing agri-food further in line with the logic of industrialised capitalism, there were critical differences. The second entrenched productivist modes of agriculture in the USA, emphasising quantity over quality, redirecting enormous surplus outputs to the global South in the form of “food aid.” This has thereby led Pechlaner and Otero (2010) to ask if this may be better characterised as the “surplus regime.” As the so-called Green Revolution took hold – an ironic label given the profound social and ecological costs associated with this era (Horlings & Marsden, 2011; see also Shiva, 2016) – agri-food became increasingly mechanised and industrialised with attendant technological advancements as well as being undergirded by strong state support.

This situation, however, did not last. The 1960s saw what Bernstein describes as a “fault line” (Bernstein, 2016, p. 621) widening between national economies and the transient flows of global capital, with this fault line intensifying through the emergence of neoliberal governance in the 1970s. With agriculture gradually losing its central position in US trade policy, and rising oil prices causing state debt to grow, Friedmann and McMichael trace an “overriding shift ... from state to capital as the dominant structuring force” (1989, p. 112). The late 1970s have thus been suggested to play host to the emergence of a more ambiguous or nebulous third regime, which continues to the present day. Debate continues as to whether this might more aptly be conceptualised as the corporate (McMichael, 2012); corporate–environmental (Friedmann, 2005), or neoliberal (Pechlaner & Otero, 2010) food regime. As Levidow suggests, these descriptors offer “contending narratives [which] justify different trajectories for agro-food transition” (2015, p. 76). For the sake of brevity, and leaving the question of these “contending narratives” deliberately open, Atkins and Bowler (2001) note three critical differences between the second and third regime: (1) increasingly vertically integrated agri-food corporations that have “now outgrown the regime that spawned them” (Friedmann, 1993, p. 52); (2) controversies around the growing role of biotechnology (particularly GMOs); alongside (3) accelerating processes of dietary change and consumer fragmentation. In short, attempts to characterise the regimes remain ongoing and contested, rather than settled areas of debate. A dimension worthy of further consideration in these debates lies in the ecological foundations of food regimes, to which we now turn in greater depth.

3 | FOOD REGIMES AND THEIR ECOLOGICAL FOUNDATIONS

As one of the more influential commentators attempting to redress the limitations of FRT within this contested space, it is particularly prescient to turn here to Hugh Campbell's work (see variously Campbell, 2009, 2016; Campbell & Dixon, 2009; Campbell et al., 2017; Evans et al., 2012). Given that regimes are, by their very definition, constituted through historically contingent patterns of capital accumulation, the focus for FRT has at times risked an arguably evasive relationship with their ecological foundations. Campbell notes how this political-economic grounding of Friedmann and McMichael's original theorisation entailed that it was only in the years that followed that a "space opened up ... for discussion of ecological dynamics" (2009, p. 313). Campbell's critical appraisal attempts to situate the ecological dimensions of food regimes not as epiphenomenal, but instead as foundational to the task of understanding and characterising them. As Campbell continues, the colonial legacies underpinning the first regime enacted "complex and consequential relationships – *ecologies at a distance* – that would eventually breach a series of ecological thresholds" (2009, p. 313; emphasis in original). Yet, intriguingly, the specificities of this historical period entailed that the consequences were borne out in equally distanced and geographically uneven ways, with the rapidly industrialising Western European countries that benefitted remaining protected by virtue of distance. As Krausmann and Langthaler argue, this regime was in effect an "offshoring" or "externalization of agricultural production" (2019, p. 90), fuelling economic development in countries such as England far beyond the possible scope of national agricultural production. Given that FRT and its analysis are methodologically as much about temporary crystallisations of patterns of capital accumulation as the exogenous and endogenous forces that transform them, Campbell notes Friedmann's (2005) acknowledgement that the ecological consequences of the first regime being "held at arm's length" could only endure for so long without throwing the entire regime into a state of disarray (Campbell, 2009, p. 313).

As we have already traced, this disarray nonetheless contributed to the formation of the second regime. The ecological foundations of this regime have been considered in much greater depth than the first, given the centrality of the Green Revolution within it (see, e.g., Biel, 2016; Hetherington, 2020; Patel, 2013). Here the intensification of agricultural activity and growing dislocation from seeming "natural" limits to productivity could only be sustained – and further intensified – if the associated costs were continually externalised. Significantly, that the geographical locus of the second regime was the USA brought these implications closer to home, rather than pushed outwards to a postcolonial periphery as in the first. For the USA, the other side of rampant agricultural overproduction therefore lay in "impacts on biodiversity, air quality, water quality and soil" and, in notable difference to the crises of the first regime, "emerging evidence of [interrelated] threats to human health ... like Alar residues on apples, E coli outbreaks, salmonella in eggs and Mad Cow Disease" (Campbell, 2009, p. 314; see also Hetherington, 2020). These conjoined and entangled crises – of the human and the planetary – have only intensified in the decades that have followed.⁴

By comparison to the second, the third regime's contested status within the literature presents difficulties in characterising its distinct ecological foundations. Questions around whether it represents a regime proper or is merely an enduring hangover of the second regime remain (for a fuller consideration, see Pritchard, 2009). Importantly, however, Campbell suggests that the third regime is playing host to increasingly powerful social movements "seek[ing] to reconfigure the 'orderings' of the socio-ecological engendered by conventional agro-food" (Goodman et al., 2012, p. 51). These include Alternative Food Networks (AFNs) and food sovereignty movements which further food "from somewhere" *contra* the placeless food "from nowhere" characteristic of mainstream productivism (Bové & Dufour, 2001). Without wishing to rehearse longstanding debates about the transformative capacities of these movements (for a fuller discussion, see Holt Giménez & Shattuck, 2011), Campbell's food "from somewhere" evokes discourses of resilience by recognising the "centrality of strong ecological signals and feedbacks in enabling positive social adaptive responses to shocks and threats" (Campbell, 2009, p. 314).

While an important interjection and contribution to FRT, Campbell's curious choice to frame the third regime in cybernetic terms – through a language of signals, feedbacks, and "shocks" – risks raising more questions than answers. After all, such an understanding risks reinforcing a problematic separation of the social, on the one hand, and the ecological on the other. I suggest that such a separation is increasingly untenable, and that we must reconsider these understandings of the third regime. After all, the Anthropocene diagnosis – as an age in which humans have paradoxically become a "force of nature" – encourages us to think instead in terms of their conjoined relationship. As the recent and highly publicised EAT-Lancet report on food in the Anthropocene (Willett et al., 2019) notes, regimes of capital accumulation can never be wholly dislocated from the planet, and thus by extension the "boundaries ... [which] define the safe operating space for environmental systems and processes" (Willett et al., 2019, p. 461). I argue that the growing urgency

surrounding this recognition, taken alongside the continued contestations around how we characterise the third regime, entails that we must find ways to better theorise and situate the planet within FRT.

4 | TOWARDS A “PLANETARY TURN”

In contrast with these ecologically inflected readings, thinking planetarily about food regimes necessitates theorising them as phenomena that result, as Clark and Szerszynski suggest, from the “active conjoining of powers from across the different parts of the Earth: human, more-than-human, fully inhuman” (Clark & Szerszynski, 2020, p. 15). This emphasis on “conjoining” therefore rests on recognising more-than-human agencies that actively constitute our world, breaking down conceptual efforts to neatly divide the “social” and “ecological” as distinct and discrete. To provide a grounded example, Krzywoszynska’s exploration of soil makes an important contribution in arguing that framing soil as an instrumental “resource” to be used risks ignoring the “indispensability of non-human lives to the creation and maintenance of human life and its environments” (2019, p. 2). Without recognising these agencies and finding new ways to relate to the world in which we live, humanity risks undermining the conditions that make life possible (Puig de la Bellacasa, 2015).

This point tacks with Szerszynski’s (2018) argument that a planetary turn is therefore a fundamental effort to rethink tendencies at the very core of the social sciences. Treating the social as bounded and meaningful on its own terms and therefore epistemologically divisible from Earth system processes is increasingly untenable in the Anthropocene, and we must re-think tendencies that exempt humans from the biophysical environments in which we live. The diverse scholarship that has flourished around the Anthropocene points to the ways in which such an understanding was not only misguided from the outset but also increasingly requires rethinking in an age where our precarious futures will be so profoundly shaped by complex and precariously balanced Earth systems that, once shifted by wider human activities and “in motion,” risk irreversibly and drastically altering wider biophysical conditions.

My intention here is not to provide a full review of the Anthropocene scholarship, nor to consider the many wide-ranging implications of these calls for a planetary turn for Western thought. Such tasks are beyond the bounds of this paper. I suggest that the aim here is more modest, and instead follows these provocations to consider how retheorising FRT in a planetary way may enable better understandings of the third regime and where its trajectories may take us. To do this, I focus on a crop that is particularly significant for understanding the third regime: soy. I suggest that while the expansion of soy production in recent decades may be explained by political-economic dynamics within the rubric of FRT, such an explanation risks eliding planetary dynamics that cannot be simply appended to this account but must be taken at its core.

5 | SITUATING SOY IN THE THIRD REGIME

Soy is far from an arbitrary choice for such a discussion, and I suggest that its history provides a lens of critical importance to the discussion here. The global production of soybeans has increased drastically in the four decades from 1978 to 2018 (Hospes, 2010). As Patel and Moore quip, while soy may therefore be characterised as the “paradigmatic neoliberal crop” (2017, p. 166), it might alternatively be framed as the paradigmatic crop of the third food regime. Importantly, the third regime captures more than just the rollout of neoliberal governance. FAOSTAT data show that in 1978 global soybean production occupied 46.4 million hectares, producing a total output of 75.4 million tonnes. In 2018, by comparison, 124.9 million hectares produced a total output of 348.7 million tonnes. Land use for soybean production has therefore increased by a factor of 2.6 during this period, with output increasing by a factor of 4.6. While during this period the USA remained the largest national producer, the story of soy reveals the significance of the emergence of “new” agricultural countries. Brazil produced 117.9 million tonnes in 2018, just below the USA, which produced 123.7 million tonnes. As Goldsmith (2008) traces, significant efforts in the USA in the 1950s adapted soy to lower latitudes of the Southern states, where the bulk of poultry farming is located, in order to provide farmers with cheap, protein-rich feed. Brazilian researchers further adapted soy to suit lower latitudes. The “bundling” and locking in of these contingent technological and economic processes would thus serve to establish Brazil, decades later, as an agricultural superpower in geopolitical terms (Brannstrom et al., 2012). Furthermore, the development of genetically modified “Roundup Ready” soy by Monsanto, designed to be tolerant to glyphosate herbicide, ensured that soybeans could be grown in these monocultures with little in the way of labour input and at unprecedented scales (Hetherington, 2020). If these trajectories continue, Brazil appears likely to become the largest global soybean producer within the next decade (Araújo et al., 2019). Yet these

shifts confer many “dark sides,” with Brooke and Otter suggesting that the monocultures of hitherto unknown scale in which soy is grown represent the “defining mark of Anthropocene ecologies” (Brooke and Otter, cited in Hetherington, 2020, p. 4).

Yet examining these trends on the supply-side does not wholly explain *why* soybean production has ramped up so drastically in recent decades. As a native crop of East Asia, the direct human consumption of soy has historically been largely limited to tofu, tempeh, and soymilk. As a prime example of agri-food “complexes” connecting disparate commodities, approximately 80% or more of global soybean production is used as animal feed (Guthman, 2015). As Hoelle (2017) traces, Brazil is again significant here, with the bulk of its soy either exported to China as pig feed or used to feed the expanding national poultry industry. This situation leads Hospes to wryly note that the question for global agri-food governance is no longer “can we feed the hungry?” but ‘can we feed the animals?’” (2010, p. 349). The forms of industrial agriculture enabled by crops like soy are profoundly changing the planet as we know it: today, the planetary biomass of livestock is approximately 14 times that of “wild” mammals, with this magnitude set to continue growing (Bar-On et al., 2018).

The vast majority of soybeans being used to feed animals in the production of meat is, in basic metabolic terms, remarkably inefficient (Sabaté & Soret, 2014). The broiler chicken, as Coles (2016) notes, is relatively efficient, with an approximate Feed Ratio Conversion (FRC) of 2:1, i.e., each kilogram of meat requires two of feed. The production of pork and beef is significantly less efficient, with approximate FRCs of 6:1 to 13:1 respectively (Sabaté & Soret, 2014). At their most fundamental, these political economies serve to remove calories that might be directly consumed by humans, inefficiently cycling them through the material bodies of animals in their production. For perspectives such as Hansen and Jacobsen (2020), cheap soy has therefore contributed to the “meatification” of diets, which, as with much of this discussion, plays out in geographically uneven ways. The growing demand for meat in many East Asian countries is symptomatic of these shifts, with “Chinese average annual per capita meat consumption increas[ing] more than eighteen-fold from 1961 to 2013, reaching 61.05 kgs” (2020, p. 10). Though per capita these levels remain low by comparison with more “developed” countries, these trajectories arguably represent “the core of the unsustainability of global food and agriculture” (2020, p. 14). Efforts to mitigate the damage associated with these trends have not been successful. For example, the certification of soy through “eco-label” schemes such as the Roundtable on Responsible Soy in Brazil have had limited uptake (van der Ven et al., 2018). This, to a great extent, is because soy remains “completely ‘invisible’ to the ultimate purchaser” (Virah-Sawmy et al., 2019, p. 221), consumed largely “by proxy” through the metabolic processes that produce the meaty bodies of animals.

These difficulties around reforming soy production must be situated within what is now a wider set of struggles. As Soendergaard (2018) notes, growing reliance on fertilisers in Brazilian soy monocultures has led to struggles between “land grabbing” agri-businesses (McMichael, 2012) and indigenous communities. As a notable example, in 2010 geologists discovered a significant potash deposit near Autazes, a municipality in the Amazon basin west of the Madeira River. As a significant net importer of potassium to be used as agricultural fertiliser, the discovery of this deposit was of enormous significance for Brazilian agribusiness. The Madeira River is already used to transport soy from the most significant soy-producing state, Mato Grosso, towards the Amazon for onwards shipment around the world. As a result, much of the necessary infrastructure is already in place to transport the potash to soy-producing areas. Yet a significant barrier to this is the fact that the location for the potash mine lies in indigenous territory, representing yet another chapter in the history of indigenous Amazonian struggle against the extractivist logics of increasingly powerful and politically influential agri-businesses (Baletti, 2012). Though there is no telling how such struggles may play out, they appear likely to intensify and serve as a timely reminder of the ways in which the geological histories of the planet become inculcated within the contemporary food regime.

6 | CONTESTED TRAJECTORIES

On the one hand, the picture painted by this exploration of the critical role of soy in the contemporary food regime may seem bleak, commensurate with FRT’s wider tendency to further a “culture of pessimism ... [given] the broader structural forces of capitalism” (Campbell & Dixon, 2009, p. 264). Though tracing the future contours of a food regime as it is “in process” is a necessarily speculative task, given that the ways in which it “will eventually unfold [are] not yet clear” (Burch & Lawrence, 2009, p. 277), FRT has sought to position contemporary shifts characterising the third regime within “a larger restructuring of capitalism” (Friedmann, 2005, p. 229). Yet as the above discussion shows, to fully understand

and characterise the third regime, we must understand the way in which these contradictions are playing out, developing, and ultimately deepening at a planetary level.

Critically, the deepening of these contradictions will have conjoined impacts for humans and the planet. Given that monocultured soy production is, in many capacities, a “necessary condition” by which to understand the contemporary patterns of meatification of diets in countries such as China and Brazil, these shifting dietary practices are already having profound consequences for human health. Epidemiological increases in coronary heart disease, certain cancers, and type II diabetes follow (Potter, 2017), emphasising the profound consequences of these diets amid growing malconsumption (Sage, 2013). Yet as Elser and Bennett (2011) note, these impacts are conjoined with the planetary, given that the inherent inefficiencies associated with using soy to enable meat and dairy-heavy diets have drastically impacted biogeochemical cycles, particularly of nitrogen and phosphorus (see also Westhoek et al., 2014). Furthermore, it is important to recognise that these outcomes are understood as non-linear and processually conjoined. As Whitmee et al. (2015) outline, the ways in which humanity has shifted the planet in the Anthropocene heralds an era in which ecological changes lead to various “impairments,” including climate change, changes in land use, desertification, and biodiversity loss. These have diverse impacts on health, including direct health effects (e.g., floods, heatwaves, pollution); ecosystem-mediated health effects (e.g., infectious disease risk, reduced food yields, and impacts on mental health); alongside indirect, deferred, and displaced health effects (e.g., displacement, conflict, inappropriate adaptation and mitigation). In sum, while historical food regimes necessarily and always have had impacts for human and planetary health, contemporary shifts are serving to reveal the increasingly entangled and complex nature of this relationship.

Taken as a whole, I suggest that these reflections have deep implications for understanding and characterising the third regime and its possible trajectories. In contrast with FRT’s aforementioned pessimistic tendencies, Hugh Campbell’s important diagnosis of the third regime identifies “new set[s] of counter-logics ... stretching out from the main cloth” (2009, p. 318), chiefly through social movements and drives towards food “from somewhere.” Importantly, that such movements are gaining traction is a vital reminder that food regimes *change*. On the one hand, the striking images of monocultured soy crassly imposed where biodiverse landscapes once stood is a striking exemplification of the vicissitudes of short-sighted capitalist extractivism; an Anthropocene in which humans appear as little more than “rapacious earth eaters” (Buck, 2015, p. 371). But further examination of the critical role of soy in the third regime suggests that it may – albeit in an emergent way – represent a terrain in which other sets of counter-logics are coalescing. For example, a recent report published by the European Coordination Via Campesina and Eco Ruralis (see Chancellor, 2018) shows that soy grown in European polycultures in line with agro-ecological principles is in practice more productive per hectare than the monocultures of South America. Furthermore, it is what is *done* with this soy once it is produced that is important. In contrast with the geographically uneven processes of intensifying meatification, technological advancements allowing for soy to resemble increasingly “authentic” meat and dairy analogues have advanced in recent years, with markets for so-called “flexitarian” consumers seeking to reduce their reliance on animal agriculture set to continue expanding (Sexton et al., 2019).

While plant-based alternatives clearly ought not to be uncritically accepted as a “silver bullet” resolving the planetary contradictions of meatifying diets, they show a more critically optimistic dimension of FRT as attempts to enact different ways of “doing” food grow. For example, Foley et al.’s account (2011) notes that 16 major crops – including soy – which mainly feed animals in inefficient metabolic processes, if used for “human food consumption only ... [would lead to] a 28% increase in food availability, or the equivalent of a 49% increase in dietary energy for human consumption” (Sabaté & Soret, 2014, p. 481). Further, within their meta-analysis, Fresán and Sabanté (2019) note that considered purely in terms of greenhouse gases, ovo-lacto-vegetarian and vegan diets contribute between 35% and 49% less when contrasted with the typical reference diet, while also having a less significant impact on biogeochemical flows. While I do not intend to present these claims as exhaustive evidence of the ways in which the planetary contradictions of the third regime are neatly resolving themselves – if anything, trends suggest that they will intensify further – they nonetheless attest to both the growing diversity and traction of counter-logics within this regime. As the diagnosis of the Anthropocene attests, questions around whether these counter-logics will strengthen or abate in the third regime are increasingly prescient considerations, with profound implications for the trajectory of the planet.

7 | CONCLUSION

Since its inception, FRT has provided a deeply valuable framework for agri-food geographers as a diagnostic approach to understanding the complex interrelationship between agri-food and the political economy of capitalism. Its pessimistic

and at points overly structuralist tendencies notwithstanding, Campbell and Dixon more hopefully recognise that the various shifts across differing regimes also “show[s] that *the system can change*” (2009, p. 264; emphasis in original). Yet given FRT’s theoretical approach and analysis through historical periodisation, its contribution has been somewhat limited on several fronts, including its engagement with the ecological and biophysical foundations of the different regimes. Furthermore, its production-centrism has risked an evasive analysis at other stages in the “value chain,” particularly consumption and processes of dietary change (an important exception being Sage, 2013).

Here I have argued that the Anthropocene forces us to recognise the planetary significance of food regimes, with soy providing a particularly prescient working example for this discussion. As the crop perhaps most centrally undergirding geographically uneven processes of dietary fragmentation, meatification, and malconsumption, the story of soy is remarkable. Enormous increases of the production of soy within the third regime have enabled states of affairs that serve to degrade both human and planetary health, which I have suggested are increasingly conjoined in complex and non-linear ways. While these contestations around soy appear likely to intensify, the question of what and how people eat – and its planetary implications – are set to become increasingly important areas of debate. FRT at its most mutable provides an important framework for understanding the possible trajectories of the third regime within the Anthropocene, illuminating whether the growing antinomies of the third regime might eventually coalesce in a new regime grounded in the entangled recognition of human and planetary health, or in a different configuration altogether.

ACKNOWLEDGEMENTS

The author would like to thank the Themed Section guest editors for their guidance and engagement with earlier versions of the paper, as well as the enormously constructive comments of an anonymous peer reviewer, which helped to improve the paper considerably. This research was supported by the Economic and Social Research Council (grant reference ES/T007206/1) and the Biotechnology and Biological Sciences Research Council (BB/V004719/1). All remaining errors are mine.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this paper as no datasets were generated or analysed during the current study.

ORCID

Jonathan Beacham  <https://orcid.org/0000-0001-8684-3719>

ENDNOTES

- ¹ For example, the possible reclassification of the Amazon as a savannah biome (Lovejoy & Nobre, 2019).
- ² By foregrounding capitalism in its analysis, FRT tacks more closely with perspectives that advocate the Capitalocene (see notably Moore, 2017). My argument here is that these differing “cenes” capture different phenomena and thus ought not to be framed as offering competing explanations. Conversely, I suggest that FRT might develop a more constructive dialogue with Anthropocene scholarship to a much greater degree than Capitalocene scholars have, to date, acknowledged.
- ³ “Western” here is synonymous with “neoliberal” in other accounts (see, for example, Otero et al., 2015).
- ⁴ A timely example of this lies in the growing recognition of the role of agri-food in the creation of new interfaces for novel zoonotic diseases (Ma et al., 2020). Hence, we might add the COVID-19 pandemic to Campbell’s list.

REFERENCES

- Aglietta, M. (2000) *A theory of capitalist regulation: The US experience*. London, UK: Verso.
- Araújo, M.L.S.de, Sano, E.E., Bolfe, É.L., Santos, J.R.N., dos Santos, J.S. & Silva, F.B. (2019) Spatiotemporal dynamics of soybean crop in the Matopiba region, Brazil (1990–2015). *Land Use Policy*, 80, 57–67. <https://doi.org/10.1016/j.landusepol.2018.09.040>
- Atkins, P.J. & Bowler, I.R. (2001) *Food in society: Economy, culture, geography*. London, UK: Arnold.
- Baletti, B. (2012) *Ordenamento Territorial: Neo-developmentalism and the struggle for territory in the lower Brazilian Amazon*. *Journal of Peasant Studies*, 39(2), 573–598. <https://doi.org/10.1080/03066150.2012.664139>
- Bar-On, Y.M., Phillips, R. & Milo, R. (2018) The biomass distribution on Earth. *Proceedings of the National Academy of Sciences USA*, 115(25), 6506–6511. <https://doi.org/10.1073/pnas.1711842115>
- Bernstein, H. (2016) Agrarian political economy and modern world capitalism: The contributions of food regime analysis. *The Journal of Peasant Studies*, 43(3), 611–647. <https://doi.org/10.1080/03066150.2015.1101456>
- Biel, R. (2016) *Sustainable food systems: The role of the city*. London, UK: UCL Press.
- Bové, J. & Dufour, F. (2001) *The world is not for sale: Farmers against junk food*. London, UK: Verso.

- Brannstrom, C., Rausch, L., Brown, J.C., de Andrade, R.M.T. & Miccolis, A. (2012) Compliance and market exclusion in Brazilian agriculture: Analysis and implications for “soft” governance. *Land Use Policy*, 29(2), 357–366. <https://doi.org/10.1016/j.landusepol.2011.07.006>
- Buck, H.J. (2015) On the possibilities of a charming Anthropocene. *Annals of the Association of American Geographers*, 105(2), 369–377. <https://doi.org/10.1080/00045608.2014.973005>
- Burch, D. & Lawrence, G. (2009) Towards a third food regime: Behind the transformation. *Agriculture and Human Values*, 26(4), 267–279. <https://doi.org/10.1007/s10460-009-9219-4>
- Campbell, H. (2009) Breaking new ground in food regime theory: Corporate environmentalism, ecological feedbacks and the ‘food from somewhere’ regime? *Agriculture and Human Values*, 26(4), 309–319. <https://doi.org/10.1007/s10460-009-9215-8>
- Campbell, H. (2016) In the long run, will we be fed? *Agriculture and Human Values*, 33(1), 215–223. <https://doi.org/10.1007/s10460-015-9639-2>
- Campbell, H. & Dixon, J. (2009) Introduction to the special symposium: Reflecting on twenty years of the food regimes approach in agri-food studies. *Agriculture and Human Values*, 26, 261–265. <https://doi.org/10.1007/s10460-009-9224-7>
- Campbell, H., Evans, D. & Murcott, A. (2017) Measurability, austerity and edibility: Introducing waste into food regime theory. *Journal of Rural Studies*, 51, 168–177. <https://doi.org/10.1016/J.JRURSTUD.2017.01.017>
- Chancellor, C. (2018) *The trouble with soy: The threats to small-scale producers across Europe*. [online]. Cluj Napoca: European Coordination Via Campesina (ECVC) and Eco Ruralis. <https://www.eurovia.org/wp-content/uploads/2018/08/Report-The-trouble-with-soy-2018-compressed.pdf>. [Accessed 9th February 2021].
- Clark, N. & Szerszynski, B. (2020) *Planetary social thought: The anthropocene challenge to the social sciences*. Oxford, UK: Polity Press.
- Coles, B. (2016) The shocking materialities and temporalities of agri-capitalism. *Gastronomica: The Journal of Critical Food Studies*, 16(3), 5–12. <https://doi.org/10.1525/gfc.2016.16.3.5>
- Elser, J. & Bennett, E. (2011) Phosphorus cycle: A broken biogeochemical cycle. *Nature*, 478(7367), 29–31. <https://doi.org/10.1038/478029a>
- Evans, D., Campbell, H. & Murcott, A. (2012) A brief pre-history of food waste and the social sciences. *The Sociological Review*, 60(2), 5–26. <https://doi.org/10.1111/1467-954X.12035>
- Foley, J.A., Ramankutty, N., Brauman, K.A., Cassidy, E.S., Gerber, J.S., Johnston, M. et al. (2011) Solutions for a cultivated planet. *Nature*, 478(7369), 337–342. <https://doi.org/10.1038/nature10452>
- Fresán, U. & Sabaté, J. (2019) Vegetarian diets: Planetary health and its alignment with human health. *Advances in Nutrition*, 10(S4), 5380–5388. <https://doi.org/10.1093/advances/nmz019>
- Friedmann, H. (1993) The political economy of food: A global crisis. *New Left Review*, 197, 29–57.
- Friedmann, H. (2005) From colonialism to green capitalism: Social movements and the emergence of food regimes. In: Buttel, F.H. & McMichael, P. (Eds.) *New directions in the sociology of international development*. Amsterdam, Netherlands: Elsevier, pp. 227–264.
- Friedmann, H. (2017) Towards a natural history of foodgetting. *Sociologia Ruralis*, 57(2), 245–264. <https://doi.org/10.1111/soru.12144>
- Friedmann, H. & McMichael, P. (1989) Agriculture and the state system: The rise and decline of national agricultures, 1870 to the present. *Sociologia Ruralis*, 29(2), 93–117. <https://doi.org/10.1111/j.1467-9523.1989.tb00360.x>
- Goldsmith, P.D. (2008) Soybean production and processing in Brazil. In: Johnson, L., White, P. & Galloway, R. (Eds.) *Soybeans: Chemistry, production, processing, and utilization*. Urbana, IL: AOCS Press, pp. 773–798. <https://doi.org/10.1016/B978-1-893997-64-6.50024-X>
- Goodman, D., DuPuis, E.M. & Goodman, M.K. (2012) *Alternative food networks: Knowledge, place and politics*. New York, NY: Routledge.
- Guthman, J. (2015) Binging and purging: Agrofood capitalism and the body as socioecological fix. *Environment and Planning A: Economy and Space*, 47(12), 2522–2536. <https://doi.org/10.1068/a140005p>
- Hamilton, C., Bonneuil, C. & Gemenne, F. (2015) Thinking the Anthropocene. In: Hamilton, C., Bonneuil, C. & Gemenne, F. (Eds.) *The Anthropocene and the global environmental crisis: Rethinking modernity in a new epoch*. New York, NY: Routledge, pp. 1–14.
- Hansen, A. & Jakobsen, J. (2020) Meatification and everyday geographies of consumption in Vietnam and China. *Geografiska Annaler: Series B, Human Geography*, 1–19. <https://doi.org/10.1080/04353684.2019.1709217>
- Hetherington, K. (2020) Agriopolitics: The health of plants and humans in the age of monocrops. *Environment and Planning D: Society and Space*, 38(4), 1–17. <https://doi.org/10.1177/0263775820912757>
- Hoelle, J. (2017) Jungle beef: Consumption, production and destruction, and the development process in the Brazilian Amazon. *Journal of Political Ecology*, 24, 743–762. <https://doi.org/10.2458/v24i1.20964>
- Holt Giménez, E. & Shattuck, A. (2011) Food crises, food regimes and food movements: Rumblings of reform or tides of transformation? *The Journal of Peasant Studies*, 38(1), 109–144. <https://doi.org/10.1080/03066150.2010.538578>
- Horlings, L.G. & Marsden, T.K. (2011) Towards the real green revolution? Exploring the conceptual dimensions of a new ecological modernisation of agriculture that could ‘feed the world’. *Global Environmental Change*, 21(2), 441–452. <https://doi.org/10.1016/J.GLOENVCHA.2011.01.004>
- Hospes, O. (2010) Feed security contested: Soy expansion in the Amazon. In: Hospes, O. & Hadiprayitno, I. (Eds.) *Governing food security: Law, politics and the right to food*. Wageningen, Netherlands: Wageningen Academic Publishers, pp. 349–372. <https://doi.org/10.3920/978-90-8686-713-4>
- Krausmann, F. & Langthaler, E. (2019) Food regimes and their trade links: A socio-ecological perspective. *Ecological Economics*, 160, 87–95. <https://doi.org/10.1016/j.ecolecon.2019.02.011>
- Krzywoszynska, A. (2019) Caring for soil life in the Anthropocene: The role of attentiveness in more-than-human ethics. *Transactions of the Institute of British Geographers*, 44(4), 661–675. <https://doi.org/10.1111/tran.12293>
- Levidow, L. (2015) European transitions towards a corporate-environmental food regime: Agroecological incorporation or contestation? *Journal of Rural Studies*, 40, 76–89. <https://doi.org/10.1016/J.JRURSTUD.2015.06.001>

- Lorimer, J. (2016) The Anthro-scene: A guide for the perplexed. *Social Studies of Science*, 47(1), 117–142. <https://doi.org/10.1177/0306312716671039>
- Lovejoy, T.E. & Nobre, C. (2019) Amazon tipping point: Last chance for action. *Science Advances*, 5(12), 1–2. <https://doi.org/10.1126/sciadv.aba2949>
- Ma, N.L., Peng, W., Soon, C.F., Noor Hassim, M.F., Misbah, S., Rahmat, Z. et al. (2020) Covid-19 pandemic in the lens of food safety and security. *Environmental Research*, 193, 110405. <https://doi.org/10.1016/j.envres.2020.110405>
- Magnan, A. (2012) Food regimes. In: Pilcher, J.M. (Ed.) *The Oxford handbook of food history*. Oxford, UK: Oxford University Press, pp. 370–388.
- McMichael, P. (2009) A food regime genealogy. *The Journal of Peasant Studies*, 36(1), 139–169. <https://doi.org/10.1080/03066150902820354>
- McMichael, P. (2012) The land grab and corporate food regime restructuring. *The Journal of Peasant Studies*, 39(3–4), 681–701. <https://doi.org/10.1080/03066150.2012.661369>
- Moore, J.W. (2017) The Capitalocene, Part I: On the nature and origins of our ecological crisis. *The Journal of Peasant Studies*, 44(3), 594–630. <https://doi.org/10.1080/03066150.2016.1235036>
- Otero, G., Pechlaner, G., Liberman, G. & Gürcan, E. (2015) The neoliberal diet and inequality in the United States. *Social Science and Medicine*, 142, 47–55. <https://doi.org/10.1016/j.socscimed.2015.08.005>
- Patel, R. (2008) *Stuffed and starved: The hidden battle for the world food system*. Brooklyn, NY: Melville House.
- Patel, R. (2013) The long green revolution. *Journal of Peasant Studies*, 40(1), 1–63. <https://doi.org/10.1080/03066150.2012.719224>
- Patel, R. & Moore, J.W. (2017) *A history of the world in seven cheap things: A guide to capitalism, nature, and the future of the planet*. Oakland, CA: University of California Press.
- Pechlaner, G. & Otero, G. (2010) The neoliberal food regime: Neoregulation and the new division of labor in North America. *Rural Sociology*, 75(2), 179–208. <https://doi.org/10.1111/j.1549-0831.2009.00006.x>
- Potter, J.D. (2017) Red and processed meat, and human and planetary health. *BMJ*, 357(j2190), 1–2. <https://doi.org/10.1136/bmj.j2190>
- Pritchard, B. (2009) The long hangover from the second food regime: A world-historical interpretation of the collapse of the WTO Doha Round. *Agriculture and Human Values*, 26(4), 297–307. <https://doi.org/10.1007/s10460-009-9216-7>
- Puig de la Bellacasa, M. (2015) Making time for soil: Technoscientific futurity and the pace of care. *Social Studies of Science*, 45(5), 691–716. <https://doi.org/10.1177/0306312715599851>
- Reisman, E. & Fairbairn, M. (2020) Agri-food systems and the Anthropocene. *Annals of the American Association of Geographers*, 193, 110405. <https://doi.org/10.1080/24694452.2020.1828025>
- Sabaté, J. & Soret, S. (2014) Sustainability of plant-based diets: Back to the future. *The American Journal of Clinical Nutrition*, 100(Supplement 1), 476S–482S. <https://doi.org/10.3945/ajcn.113.071522>
- Sage, C. (2013) The interconnected challenges for food security from a food regimes perspective: Energy, climate and malconsumption. *Journal of Rural Studies*, 29, 71–80. <https://doi.org/10.1016/j.jrurstud.2012.02.005>
- Sexton, A.E., Garnett, T. & Lorimer, J. (2019) Framing the future of food: The contested promises of alternative proteins. *Environment and Planning E: Nature and Space*, 2(1), 47–72. <https://doi.org/10.1177/2514848619827009>
- Shiva, V. (2016) *The violence of the green revolution: Third world agriculture, ecology and politics*. Lexington, KY: University Press of Kentucky.
- Soendergaard, N. (2018) Modern monoculture and periphery processes: A world systems analysis of the Brazilian soy expansion from 2000–2012. *Revista de Economia e Sociologia Rural*, 56(1), 69–90. <https://doi.org/10.1590/1234-56781806-94790560105>
- Szerszynski, B. (2018) A planetary turn for the social sciences? In: Jensen, O.B., Kesselring, S. & Sheller, M. (Eds.) *Mobilities and complexities*. New York, NY: Routledge, pp. 223–227.
- van der Ven, H., Rothacker, C. & Cashore, B. (2018) Do eco-labels prevent deforestation? Lessons from non-state market driven governance in the soy, palm oil, and cocoa sectors. *Global Environmental Change*, 52, 141–151. <https://doi.org/10.1016/j.gloenvcha.2018.07.002>
- Virah-Sawmy, M., Durán, A.P., Green, J.M.H., Guerrero, A.M., Biggs, D. & West, C.D. (2019) Sustainability gridlock in a global agricultural commodity chain: Reframing the soy–meat food system. *Sustainable Production and Consumption*, 18, 210–223. <https://doi.org/10.1016/j.spc.2019.01.003>
- Westhoek, H., Lesschen, J.P., Rood, T., Wagner, S., De Marco, A., Murphy-Bokern, D. et al. (2014) Food choices, health and environment: Effects of cutting Europe's meat and dairy intake. *Global Environmental Change*, 26(1), 196–205. <https://doi.org/10.1016/j.gloenvcha.2014.02.004>
- Whitmee, S., Haines, A., Beyrer, C., Boltz, F., Capon, A.G., de Souza Dias, B.F. et al. (2015) Safeguarding human health in the Anthropocene epoch: Report of the Rockefeller Foundation-Lancet Commission on planetary health. *The Lancet*, 386(10007), 1973–2028. [https://doi.org/10.1016/S0140-6736\(15\)60901-1](https://doi.org/10.1016/S0140-6736(15)60901-1)
- Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S. et al. (2019) Food in the Anthropocene: The EAT-Lancet Commission on healthy diets from sustainable food systems. *The Lancet*, 393(10170), 447–492. [https://doi.org/10.1016/S0140-6736\(18\)31788-4](https://doi.org/10.1016/S0140-6736(18)31788-4)
- Wright, C., Nyberg, D., Rickards, L. & Freund, J. (2018) Organizing in the Anthropocene. *Organization*, 25(4), 455–471. <https://doi.org/10.1177/1350508418779649>

How to cite this article: Beacham, J. (2022) Planetary food regimes: Understanding the entanglement between human and planetary health in the Anthropocene. *The Geographical Journal*, 188, 318–327. <https://doi.org/10.1111/geoj.12407>