CLIMATE CHANGE AND THE COLONIALITY OF FOODWAYS:
Linking the Replication of an Unsustainable Scale of Ruminant Consumption to Western Cultural Imperialism

by

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Dedication Page

This thesis is dedicated to all those willing to let the known be unknown.

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Abstract

This thesis examines the cultural processes attributable to a global protein transition toward climate change inducing ruminant products. It employs the theoretical lens of the colonial matrix of power to contend that a globalized nature/culture divide permits a damaging scale of ruminant consumption that is based on a relationship of servitude and shaped by the historic and contemporary forces of colonialism, capitalism, patriarchy, and racism – woven into Western cultural imperialism. Drawing on an interdisciplinary, mixed methods approach, the results show that new scales of ruminant consumption in shifted dietary preferences displaces past cultural relationships toward these animals and reformulates them in adherence to a foreign way of knowing, imagining, and being. Furthermore, the research offers insight into a Chinese cultural precedent of an alternative ruminant-human relation; that if renewed can forward a solution to mitigate the dire effects ruminant livestock contribute to the global warming of planet Earth.

List of Abbreviations Used

AMP – Adaptive Multi-Paddock

CMP – Colonial Matrix of Power

CO2e – Carbon dioxide equivalent

COP – United Nations Climate Change Conferences

EU – European Union

FAO – Food and Agriculture Organization of the United Nations

GHG – Greenhouse gas

IMF – International Monetary Fund

IPCC – Intergovernmental Panel on Climate Change

NDC – Nationally Determined Contribution

NUE – Nitrogen use efficiency

UNEP – United Nations Environment Programme

UNFCCC – United Nations Framework Convention on Climate Change

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Chapter 1

Introduction

1.1 Central Problem

Over the last century Earth's climate has undergone unprecedented and steady change at the hands of anthropogenic greenhouse gas (GHG) emissions (Gough, 2017, pp. 22, 65; IPCC, 2014, pp. 2, 4-5; IPCC, 2018, p. 6; Rahmstorf, 2008, p. 35; UNEP, 2018, pp. 1, 4-5). The Intergovernmental Panel on Climate Change (IPCC) estimates that the corresponding cumulative releases of carbon dioxide, methane, and nitrous oxide to the atmosphere have now caused 1.0°C of global warming above pre-industrial levels, set as the period between 1850 and 1900 (IPCC, 2018, p. 6). Future trends predict further change, with global warming on track to reach 1.5°C between 2030 and 2052, if rising temperatures continue at the current rate of 0.2°C per decade (IPCC, 2018, p. 6). The United Nations Environment Programme (UNEP) frames the present situation by accentuating that the warmest years ever recorded in human history have occurred in the past five years (UNEP, 2018, p. 1). Moreover, that recent anthropogenic GHG emissions dwarf annual contributions of decades past, with the year 2017 reaching a record high of 49.2 gigatonnes of carbon dioxide equivalents (GtCO2e) released into the atmosphere, an increase of 1.3 percent over 2016 (UNEP, 2018, pp. 4-5; see also, Gough, 2017, p. 65). Such levels far exceed the recommended "safe operating space" of net zero global emissions, and amount to no less than destabilizing Earth's life support systems that have fostered living beings for the past 11,700 years – a period of time exhibiting ideal life conditions referred to as the Holocene (Steffen et al., 2015, p. 736; see also, UNEP, 2018,

pp. xiii, 17, 19-21; Whitmee at al., 2015, pp. 1975, 1979). In response to this alarming evidence, the IPCC has called on humanity to redress the causal relationship and prevent global warming from rising beyond 1.5°C above pre-industrial levels (IPCC, 2018, p. 7). This monumental task would require total GHG emissions to peak imminently, reach an estimated ~24 GtCO2e in 2030, and decline thereafter by ~10 GtCO2e per decade until any remaining emissions are offset by sequestration activities and net zero is reached (UNEP, 2018, pp. 19-21; see also, IPCC, 2018, p. 14). If anthropogenic GHG emissions are not extensively reduced, and such a threshold is to be surpassed, the consequence of inaction is spelled out in the panel's report *Global Warming of 1.5°C: Summary for Policymakers*: (1) increases in mean temperatures in most land and ocean regions, with hot extremes in inhabited regions and the probability of drought and heavy precipition in several regions; (2) sea-level continuing to rise well beyond 2100, impacting small islands and low-lying coastal areas; (3) irreversible impacts on biodiversity and ecosystems, including unabated species loss and extinction; and (4) increases of climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth (IPCC, 2018, pp. 9-11; see also, Gough, 2017 Whitmee at al., 2015). The report posits that in order to achieve such a preventative target, there requires a rapid and far-reaching transition across all aspects of human society to shift away from our current level of emissions (IPCC, 2018, p. 17).

Far from an isolated plea for climate change mitigation, the IPCC call is a strict affirmation of the UNFCCC Paris Agreement, adopted on December 12, 2015, that brought the world together for a collective endeavor in maintaining the global

temperature to be well below 2°C set against pre-industrial levels (UNFCCC, 2015). Yet, as revealed by the UNEP *Emissions Gap Report 2018*, the current trajectory for global and national mitigation attempts are shockingly inadequate, and that an urgent acceleration of ambition is much-needed (UNEP, 2018). According to the report, in analyzing the gap between pledged mitigated levels of GHG emissions produced by countries of the Paris Agreement – Nationally Determined Contributions (NDCs) – and scientifically proven levels essential to prevent undesirable warming, the current trajectory will fail to peak global emissions prior to the year 2030 (UNEP, 2018, pp. 1, 16, 19, 21). If rising emissions do pass this critical juncture, the window to stay below 1.5°C will be lost for the foreseeable future, with the adherence to current NDCs illustrating that such a mitigation attempt would lead to a global temperature of 3°C by 2100, relative to pre-industrial levels (UNEP, 2018, pp. xvi, 3, 21). Even under the most ambitious NDC scenarios, the mitigation potential is capped at a maximum of 6 GtCO2e, meaning baseline global emissions would be expected to total ~53 GtCO2e in 2030 (UNEP, 2018, pp. 19, 21). This is in sharp contrast to the required action for bridging the emission gap between NDCs and a 1.5°C pathway; with a current mitigation amount of ~29 GtCO2e – five times the capped potential – necessary to secure the route to a safe operating level of net zero global emissions (UNEP, 2018, p. 19, 21). Due to this discrepancy, the report emphasizes the urgency of strengthening mitigation action without further delay. If we fail to do so, the current trend of moving beyond 1.5°C could spell unprecedented damage to social and natural ecosystems and an irreparable end to climate-resilient futures.

While anthropogenic GHG emissions are the result of a wide range of human activities, our collective food systems bear an ominous and pressing share in the contribution to climate change, as attested by the Food and Agriculture Organization of the United Nations (FAO), and accordingly requires rigorous scrutiny to heed the call of transformative mitigation wherever possible (FAO, 2016, pp. vi, 6, 38). Reflecting the burden of such systems, the combination of agriculture, forestry, and other land use change accounts for roughly one-fifth of global GHG emissions, an equivalent of 21 percent or 10.6 GtCO2e (FAO, 2016, pp. vi, 6, 38). Within those emissions, the three most potent GHGs produced by food systems are the culprits carbon dioxide, methane, and nitrous oxide; caused primarily through deforestation for cropland and pasture, livestock production, and soil and nutrient management (FAO, 2016, p. 6). Excluded from this calculation are the pre-production and post-production stages of the food supply chain – encompassing manufactured agrochemicals and fossil fuel energy use in farm operations, transportation, processing, and retailing – that are categorized in separate emitting sectors, but if included would increase the total share of GHG contributions by ~18 percent (FAO, 2016, xiii, 6, 8; Ritchie & Roser, 2020). Since 1990, the emissions being considered have experienced relative stability in growth, climbing approximately <1 percent per year (Willett et al., 2019, p. 463). The main factor in achieving this rate is due to the parallel managerial and technological advances that have so far offset further rises, due to decreasing the emissions intensity per unit of product – also known as improving eco-efficiency (Willett et al., 2019, p. 463; Gough, 2017, pp. 67, 98-99). However, when accounting for the recent outpacing scale of consumption, if the sharp trend continues, a landmark projection conceives food production in the future could

increase corresponding GHG emissions by 50-90 percent in the absence of more dedicated mitigation measures (Willett et al., 2019, p. 471). Hence, the upward drive of global food demand in 2050, an expected increase by at least 60 percent above 2006 levels, will only exacerbate the current impacts the global food system has on Earth's climate (FAO, 2016, p. 4). The authors in *Trends in Global Agricultural Land Use: Implications for Environmental Health and Food Security* reaffirm that our food systems present a great environmental threat; revealing that despite the slow of agricultural expansion, currently occupying half of the planet's habitable land, and the increased production granted by the Green Revolution, the underlying impact of GHG emissions, along with forest loss, biodiversity loss, soil health demise, and water use, persists due to the inherent nature of the systems that feed us (Ramankutty et al., 2018, pp. 791, 793, 803; see also, Ritchie & Roser, 2020). These impacts will only compound as a new demand for food, feed, and other agricultural products materializes, a feature the authors argue to be due primarily to rising human populations and an increasing per capita wealth (Ramankutty et al., 2018, p. 799). The study ends by projecting a more burdensome outlook than the FAO, indicating future food demand will increase by 100 percent for calories and 110 percent for protein by 2050, from a 2005 baseline, with the resulting increase in impacts from food systems a troubling concern (Ramankutty et al., 2018, p. 779-800, 805).

When considering avenues for climate change mitigation in the face of these challenges, acknowledging that the composition of food is far from homogenous – with distinct food groups affecting the environment and contributing to climate change to

vastly different extents – is crucial for directing attention to the most pressing burdens of the system (Willett et al, 2019, p. 471). Of the aforementioned GHG emissions from food systems, livestock are an unrivalled source responsible for approximately three-quarters of total emissions (FAO, 2013, p. 15; Wellesley, Happer, & Froggatt, 2015, p. 1; Willett et al, 2019, p. 471). On an aggregate level, this amounts up to ~7.5 GtCO2e per year, after incorporating climate change driving effects of methane (~44 percent) produced by enteric fermentation, nitrous oxide (~29 percent) associated with feed production, and the release of carbon dioxide (~27 percent) from land use for animal feed and pastures, as recorded between 1995 and 2005 (FAO, 2013, p. 15; FAO, 2016, p. 38; Herrero et al., 2016, p. 453). The highest concentration of animal-based emissions are derived from ruminants – mammals possessing a polygastric digestive system and responsible for enteric fermentation – with the raising and processing of cattle, other bovines, sheep, and goats for meat and dairy accounting for ~5.7 GtCO2e per year (Herrero et al., 2016, p. 453). Far from a negligible impact, this represents ~12 percent of all global GHG emissions (FAO, 2016, pp. vi, 6, 38; Herrero et al., 2016, p. 453). Furthermore, as the growing demand for ruminant products is on track to rise ~88 percent between 2010 and 2050, in part by a burgeoning global population to a projected 9.8 billion people in 2050, the future paints an even bleaker picture of a significantly higher share of such emissions (Searchinger et al., 2018, pp. 1-2, 15). This equates the present and unmitigated future practice of ruminant livestock as a considerable single driver of climate change, and an aspect of the food system deserving of special attention for transformative mitigation.

1.2 Research Problem

In light of the troubling GHG emissions arising from ruminant livestock, a myriad of solutions have thus far attempted to mitigate the climatic impacts that contribute to straining Earth's life support systems. In order to best introduce these corresponding solutions, two principle causes for which action is based upon will be presented as context. First, ruminant production systems have on average the highest GHG emission intensities of any available food in the world (Ritchie & Roser, 2020; Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016, p. 158). When compared to alternative foods, ruminant meat, based on the statistics of lamb and beef per 100 grams of protein, have a level of emissions ~2-6 times pork, ~3-9 times poultry, ~10-25 times tofu (soybeans), and ~75-190 times nuts (Ritchie & Roser, 2020; see also, Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016, pp. 158-159). These differences highlight ruminant meat as one of the most inefficient and pollutant foods to produce in terms of the ratio between inputs and outputs for human edible protein (Ranganathan et al., 2016, p. 6). The majority of GHG emissions arising from producing this type of food is fundamentally associated with raising large bodied, polygastric mammals (Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016, p. 159; Pelletier, Pirog, & Rasmussen, 2010, p. 387; Van Zanten et al., 2018, p. 4191). Thus, the discrepancy of GHG emissions mentioned above is primarily due to the biological makeup of ruminants compared to other food sources: possessing much slower reproduction and growth rates – thereby tying up feed energy in the "reproducing animal relative to the growing (producing) animal" and diverting feed energy to maintenance "instead of liveweight gain" – and also the major consideration of their polygastric digestive systems which emit substantial levels of methane (Wirsenius, 2003, p. 233; see also, Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016, p. 159;

Poore & Nemecek, 2018, p. 5). This is not to say that the mode of production is irrelevant, as otherwise illustrated by authors Pelletier, Pirog, and Rasmussen who compare data on the environmental performance of three modes of beef production – feedlots, backgrounded, and pasture – in the United States (Pelletier, Pirog, & Rasmussen, 2010). While the findings demonstrate that the cow-calf phase is responsible for the greatest share of GHG emissions out of all stages of production, a key indicator for level of emissions between modes is the length of time cattle spend on the farm prior to sale or slaughter; resulting in the contained feedlot-finished beef to be less resource and emissions-intense relative to pasture management practices, with 14.8 kg CO2e/kg and 19.2 kg CO2e/kg respectively (Pelletier, Pirog, & Rasmussen, 2010, pp. 386-387). Nevertheless, the evidence showcases that the natural processes of bodily functions inherent to raising domesticated polygastric mammals to adulthood are tied to substantially higher level of associated emissions as a whole.

Second, the expanding scale of ruminant production acts as a multiplier on all corresponding GHG emissions mentioned thus far (Herrero & Thornton, 2013, p. 20878). The sheer scale at play can only be acknowledged by first recognizing that the current base of livestock represents the largest land-use sector on Earth, occupying 40 million km^2 (~38.5 percent) of habitable land (Ritchie & Roser, 2020). Ruminants constitute ~96 percent of those land requirements, when considering the total land use footprint of cattle, sheep, pigs, and chickens – per kilogram of food product (Ritchie & Roser, 2020). As of 2014, this share of land hosted a global stock of cattle and sheep that numbered 1.47 billion and 1.20 billion, respectively; an increase of 62 percent and 64 percent between

1961 and 2014 (Ramankutty et al., 2018, p. 798; Ritchie & Roser, 2017). This collective 2.67 billion polygastric mammals maximizes and pushes the boundaries of the climate issues surrounding high GHG intensities. The further expanse to a projected cattle population of 2.2 billion alone, between 2000 and 2050, spells for a fiercer multiplier of GHG emissions than the already detrimental one at present (Thornton, 2010, p. 2856). If that was not enough, the encroachment on new lands for additional feed and living space fuels its own source of CO2 emissions from the "conversion of forests, grasslands and other carbon 'sinks' into cropland or pasture" (Ritchie & Roser, 2020; see also, Poore & Nemecek, 2018, p. 5). The impact is already being felt, with these processes, capturing more than three-quarters of global farming land, responsible for ~27 percent of the sector's emissions; in addition to the appropriation of natural land serving to capture carbon, or land use that could be used for more efficient human food production – given breeding animals for human sustenance only accounts for 37 percent of humanity's protein and 18 percent of total caloric intake (FAO, 2013, p. 15; Ritchie & Roser, 2020; Herrero & Thornton, 2013, p. 20878). Hence, the further scaling of ruminant livestock therefore has added pressure on climate impacts from a greater multiplier effect and any necessary land conversion in the process of expansion, and the occupation of land that could be served to negate the effects of climate change.

Given these potential avenues for targetable action, two distinct branches of solutions have formed around them. Currently, the most widely accepted stance for mitigating GHG emissions of ruminant livestock seeks to redress the first cause identified above; classified as supply-side solutions and will refer to technical and managerial

strategies to improve eco-efficiency across all stages of ruminant production (FAO, 2016; FAO, 2017, pp. 4-6; Havlík et al., 2014; Herrero & Thornton, 2013; Pelletier, Pirog, & Rasmussen, 2010; Ramankutty et al., 2018; Reynolds et al., 2017; Stanley et al., 2018) (Thornton, 2010; UNEP, 2017; Van Zanten et al., 2018; Willett et al., 2019). The authors in this camp of the debate align with the internationally accepted discourse and path of action of sustainable development: to minimalize any environmental harm involved in ruminant livestock production, while simultaneously promoting economic and social growth of the sector for human prosperity (Elver, 2016, p. 88; FAO, 2018, pp. xvi, xiii-xiv; Smith et al., 2014, p. 816). On the other hand, there lies the oft-marginalized demand-side solutions, whereby the authors seek to challenge the normalized belief, as seen in the previous camp and their related studies, that the consumption of ruminant products is non-negotiable, and thus the premise that a base level of corresponding GHG emissions are inherent in sustainable food systems (Brunelle, Coat, & Viguié, 2017; Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016; Garnett et al., 2017; Herrero et al., 2016; Kiff, Wilkes, & Tennigkeit, 2016; Poore & Nemecek, 2018; Searchinger et al., 2018; Wellesley, Happer, & Froggatt, 2015; Willett et al., 2019). This side of the debate therefore targets the second cause of scale, and will incorporate strategies to shift consumer consumption away from intensive GHG emitting ruminant-sourced products toward more climate-friendly diets (Brunelle, Coat, & Viguié, 2017; Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016; Garnett et al., 2017; Herrero et al., 2016; Kiff, Wilkes, & Tennigkeit, 2016; Poore & Nemecek, 2018; Searchinger et al., 2018; Wellesley, Happer, & Froggatt, 2015; Willett et al., 2019). These authors acknowledge that supply-side mitigation solutions are not sufficient to addressing the impacts on

climate change, and that such problems are imbedded in the systems of ruminant production itself.

Challenging common conventions is an indispensable component to securing a climate resilient future, and so the banner of demand-side solutions, championing the neglected yet crucial targeting of scale, will be core to this thesis. When searching for answers to the rising scale of ruminant production, no phenomenon is more paramount to scrutinize than the reciprocal rising scale of ruminant consumption; a relation of causation that reflects not only the sheer number of human mouths to feed, but also the frequency at which these animal products are eaten. Such a determined source of food is not uniformly consumed across the global population however, with vastly different national scales indicating an unequal burden of responsibility on those most driving the demand for these products (Ritchie & Roser, 2017). Hence, just as global GHG emissions are unequally distributed among the 7.6 billion people of the world, so too are the emissions for consuming ruminant livestock (Gough, 2017, p. 26). There is no denying food is a basic material need for human existence, but when the scaled consumption of one type of food in particular compromises the ability of future generations to survive and flourish, through its share of climatic impacts affecting all life on Earth – especially when readily available less emitting alternatives exist – there are fertile grounds for questioning the practice (Gough, 2017, p. 37; IPCC, 2018, pp. 9-11; Ritchie & Roser, 2020).

In response, the overwhelming focus of demand-side solutions are aimed at addressing this destructive inequality by targeting countries that are experiencing the highest and most prolonged rates of ruminant consumption across the population (Ranganathan et al., 2016, pp. 31, 34; Brunelle, Coat, & Viguié, 2017; Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016; Searchinger et al., 2018; Kiff, Wilkes, & Tennigkeit , 2016; Wellesley, Happer, & Froggatt, 2015; Garnett et al., 2017; Herrero et al., 2016; Willett et al., 2019). These countries fall into the category of "developed" and reside in the Western world, including the so-called advanced countries of the United States, Canada, Australia, and those in Western Europe (Ranganathan et al., 2016, p. 34; Ritchie & Roser, 2017). While the reliance on these region-specific solutions to shift dietary preferences away from a point of high intake is a commendable piece to the mitigation puzzle, falling silent on non-Western "developing" countries with comparatively low levels of consumption is a grave short-sighted error (Ranganathan et al., 2016, p. 34). Such an outlook neglects to acknowledge the recent rise of ruminant consumption occurring within these "developing" countries, rising at rapid rates unmatched by any "developed" country since the 19th century, and the ominous future share of impacts these areas will contribute as records continue to reach new heights with little signs of slowing down (Ritchie & Roser, 2017; Ranganathan et al., 2016, pp. 3, 35; Baics & Thelle, 2018, p. 189; Chiles & Fitzgerald, 2018, pp. 11-12, 14). This ultimately fails to reflect the global scale of action required to reduce ruminant-related emissions, and although some aspects of policy can be re-interpreted for a "developing" country scenario, the current literature offers little contextual solutions to disrupt the cycle of replicating an unsustainable scale of consumption (referring to a diet centralizing this

source of food – assuming alternatives exist) from an initially low base. If climate change mitigation targets are to be actualized, and the pathway to 1.5°C secured, this damaging ruminant-human relationship now transpiring around the world requires due attention.

1.3 Purpose of the Research

The goal of this research project is threefold: firstly, to consider the debate within scientific literature as to how best address reducing GHG emissions produced by ruminant livestock in food systems, a contestation between supply-side and demand-side solutions, and solidify scientific evidence that demand-side solutions are not only the most viable strategy for emission reductions, but a necessity if we are collectively going to attain the IPCC targets of preventing an increase of global warming above 1.5°C pre-industrial levels. In recognizing the neglected aspect of this side of the debate, a comprehensive examination of the most contemporary demand-side literature will seek to reveal that the rising scale of ruminant consumption in low intake areas of the world is a pressing and relevant gap in current solutions. Secondly, to examine the historical undercurrents of this gap in demand-side literature to base new strategies that will bolster and further the essential cause of these solutions. This requires investigation into why Western "developed" countries situated ruminant products as a central dietary feature of unsustainable proportions, and how that deep-seated attitude has come to reflect countries around the world experiencing an unprecedented appetite for such foods. Specifically, assessment of the role of culture and the intersections contained within – race, gender, and class – in forming and perpetuating damaging ruminant-human relations that drive the scale of consumption. Identifying this cultural genesis will serve as an opportunity to

contrast such a way of knowing, imagining, and being toward ruminants with alternatives. Thirdly, to position Chinese food culture as a case study in the transformation of ruminant-human relations within a non-Western culture. In moving from Imperial China to the modern state, chronicling the erosion of a historic beef taboo – seeded in the colonial encounter and then accelerated by iconoclasm and the developmentalist drive – will serve as the basis to understand the cultural shift of consumption from a minimal intake of ruminant products to the replication of Western scale in Chinese dietary preferences. This will offer insight into the imposition of foreign-influenced cultural thought, pushing toward unsustainable futures through damaging relations, and the potential course of resistance through harbouring an immemorial Chinese relationship with these animals; that if followed can realign the dangerous trajectory of replication that is being cemented in China, and around the world, in a renewed, climate resilient direction.

The focus on China is due to the country experiencing a protein transition of unprecedented proportions toward the inclusion of ruminant products in dietary preferences throughout the population (Ranganathan et al, 2016, pp. 3, 35; Ritchie & Roser, 2017; Searchinger et al., 2018, pp. 2, 15). The explosion of growth can be traced back to a half-century ago, when in 1961 the FAO began compiling a database for a comprehensive recording of per capita ruminant consumption of countries around the world (Ritchie & Roser, 2017). Since this pioneering endeavour, the level of consumption per capita in China rose from 0.24 kg to 8.83 kg in 2017, an unprecedented rate of growth spanning 56 years and totalling a 3,579 percent increase (Ritchie & Roser,

2017). This is in stark contrast to the rate of growth in the United States, by far the highest consumer of ruminants in the world, that has experienced – and is undergoing – a steady decline since 1961 levels, registering at -13.25 percent for the same period (Ritchie & Roser, 2017). Even while China lags behind in terms of current per capita levels, with the United States boasting 37.59 kg as of 2017, the trajectory is on track for future patterns of rivalry consumption levels; given China is the most populous country in the world, recording 1.398 billion people as of 2019, and has a growing rate of per capita ruminant consumption that has far outstripped the correlated rise in population, with a difference of 85 percent and 13 percent, respectively, in the last 20 years alone (Ritchie & Roser, 2017; MacLachlan, 2015, p. 33; World Bank, 2020). In an effort to meet the persistent increase in Chinese demand, ruminant production in China has increased to 11.07 million tonnes in 2017 (Ritchie & Roser, 2017). This has positioned China as the fourth largest producer in the international community, and accounts for 9 percent of global production (Ritchie & Roser, 2017). With the global demand for ruminant meat projected to grow by 88 precent between 2010 and 2050, China as a modern leader in disrupting traditionally low consumption rates will absorb a significant share of this protein transition (Bai et al., 2018, p. 1; Ranganathan et al, 2016, pp. 3, 35; Searchinger et al., 2018, pp. 2, 15). If the world's greatest emitter of GHG emissions (~27 percent) continues down this path, the country will reinforce an unfounded precedent for the non-Western "developing" world that food systems are destined to be a part of the problem and not the solution for addressing global warming (UNEP, 2018, p. 7).

1.4 Central Question

Taken the scientific urgency for transformative action on climate change mitigation, and the problematic share accountable to ruminant livestock, the central guiding question for this thesis is as follows: How can the global scale of ruminant consumption be enduringly minimized? I argue that if the corresponding GHG emissions are to undergo the drastic reductions necessary, the relationship with these animals permitting the destructive scale of consumption – originating in the culture of Western "developed" countries and shaped by historic and contemporary forces of colonialism, capitalism, patriarchy, and racism – that is actively being cemented in the global imagination and materially replicated around the world requires an immediate alternative relationship before we reach the brink of ecological disaster. Chinese food culture provides such a ruminant-human relation in the historic beef taboo, and that if renewed, alongside targeting cultural transgression by rebuffing the dominant way of knowing, imagining, and being, will provide humanity a way out of this destructive cycle warming Earth and toward a 1.5°C pathway. In answering this, I hope to aid in averting a climate catastrophe by further contributing to the literature surrounding demand-side solutions on climate change mitigation of ruminant-based sources.

1.5 Methodology

I will employ a social constructionist approach in order to understand how realities are produced, brought into practice, and continually accepted. This approach asserts that reality is a socially constructed and contextual phenomenon that can be dissected to reveal the layers – and potential inception – upon which any given reality is

built upon (Benton & Craib, 2001, p. 231). Specifically, it addresses the complex relationships imbedded in social structures, such as power, knowledge, time, and language, that are taken for granted (Benton & Craib, 2001, pp. 70-74). Such an approach enables the best position to situate oneself in, as a researcher, to analyze any and all inputs to the pattern of ruminant consumption. It will provide the possibility to move beyond the common discourse of causation surrounding the topic, and into a critical realm that incorporates the aspect of culture scarcely acknowledged or conceived in previous literature. This perspective will enable the most effective, holistic, and necessary recommendations for policies on climate change mitigation. Furthermore, it will enable parallels to be drawn between realities of differing regional contexts, based on a shared construction of reality, in an effort to provide a proactive set of recommendations for populations with a presently low rate of ruminant consumption.

1.6 Methods

For the purposes of my research, I aim to employ an interdisciplinary, mixed methods approach that relies upon quantitative data and qualitative literature. The former will be utilized for gathering, interpreting, and synthesizing scientific and observable data to forward various arguments with a degree of verifiability and credibility. This is an important aspect given the scientific and political nature and debate surrounding climate change, and the vigorous emphasis placed on quantitative data within both fields. In terms of the latter, qualitative literature will be necessary given the exploratory nature of revealing concealed realities produced by culture that contribute to a given social construct. Once revealed, the process of merging quantitative and qualitative data can

commence. To elaborate, the quantitative data collected will provide a solid foundation onto which the qualitative data and be situated, examined, and integrated. The value of using a mixed method approach for my research is to provide a better understanding for the need and impact of an intervention program, based on scientific evidence, that informs and instigates debate at the policy level of non-Western countries. The primary logistical challenge I anticipate is establishing the validity of my qualitative findings due to the lack of existing research on the topic. In order to address this, I will ensure that the findings are comprehensive, holistic, and built upon an adequate arrangement of literature. With respect to acquiring the data, I will rely primarily on secondary sources. This includes a multitude of literature and statistics obtained from journal articles, scholarly books, reports, documents, and various modes of media.

Chapter 2

Theoretical Framework

2.1 The Colonial Matrix of Power

In order to guide and analyse my research, I will employ the colonial matrix of power (CMP) as the principle theoretical lens. To provide a working definition of the theory, I draw upon the seminal work of Walter D. Mignolo in *The Darker Side of Western Modernity: Global Futures, Decolonial Options* (Mignolo, 2011). According to Mignolo, the CMP is a global "structure of control and management" over authority, economy, knowledge, subjectivity, norms, and relations more generally that operates through hierarchies of race, gender, and class (Mignolo, 2011, pp. 7-9, 17-19). These interconnected hierarchies are tethered to the logic of coloniality – historical "colonial and imperial differences" constructed by Europeans to justify violence, oppression, exploitation, and expropriation – that "generates, reproduces, modifies, and maintains" them (Mignolo, 2011, pp. 2-3, 7, 13, 16-17). Albeit this undercurrent of the CMP is just that, the "hidden and darker side" of the outward facing rhetoric of modernity that presents the entire operation as a positive endeavour and normalizes the hierarchies within (Mignolo, 2011, pp. 13-14, 16, 85). Hence, terms that promise the path to modernity, such as progress, development, and modernization, are therefore perpetuating the unseen and perturbing agenda of coloniality to dictate the terms of our global reality (Mignolo, 2011, pp. xxi, 14). Ultimately, the CMP is a lens to draw back the curtain of the seemingly natural way the world functions and lay bare the relationship of power between the "enunciator" and the "enunciated" operating through interconnected

hierarchies (Mignolo, 2011, pp. 124, 128, 201). This thesis focuses on an aspect of the CMP that relates to the control and management of the relationship between humans and ruminants, within which cultural transformation, the imposition of hierarchies, and the developmentalist drive to consume these animals on an environmentally destructive scale will be explored.

In an effort to further ground this focus, the work of Aníbal Quijano in *Coloniality and Modernity/Rationality*, and his expression of decoloniality as an "epistemological decolonization" from the processes of "coloniality", will be particularly insightful to recognize cultural transformation and the imposition of hierarchies (Quijano, 2007, p. 177). This encompasses the outlook that cultures of the world are subjected to a colonized imagination: imprisoned by the historic consolidation of "Eurocentered capitalist colonial power" that universalized rationality as the exclusive mode of human "knowledge, reflection, and communication", and thus engendered relations of domination; which through liberation of these repressed non-European paradigms of knowledge and perspectives can the heterogeneity of reality return and flourish (Quijano, 2007, pp. 169, 171-172, 177-178). Advancing this last point, the duo Catherine E. Walsh and Mignolo, in *On Decoloniality: Concepts, Analytics, Praxis*, demonstrate challenging coloniality is to explore pluriversal and interversal paths of relations, in comparison to a universal truth as perceived and disseminated by the Western world (Mignolo & Walsh, 2018, p. 3). Importantly, the assertion that there are multiple ways of thinking beyond merely the existence of a singular, linear world and the hierarchies established within (Mignolo & Walsh, 2018, p. 3). For my research, this means identifying the relationship

to ruminants that is determined as universal, historize it as one cultural path, and open the investigation into an alternative relationship that may have succumbed to the grips of the CMP. Such an alternative that peels back the "global designs of the modern/colonial world" and revitalizes denied "knowledge, humanity, spirituality, and cosmo-existence" (Walsh, 2018, p. 16).

Delving into the coloniality of development, and the impacts on the global cultural political economy, the landmark work of James Ferguson, in *The Anti-politics Machine: "Development", Depoliticization, and Bureaucratic Power in Lesotho*, is invaluable in stripping back development as a mode to forward the contemporary existence of humanity, and thereby exposing the harmful power structures that exist and are reproduced within (Ferguson, 1994a). Ferguson's investigation uncovers and dissects the "complex relation between the intentionality of planning and the strategic intelligibility of the outcomes" (Ferguson, 1994a, p. 20). The result of which was the discovery that development projects unequivocally generates benefits on behalf of the development apparatus, even if the production of such an outcome is distorted from the original intention (Ferguson, 1994a, p.17). Hence, in an attempt to overcome power structures of domination, Ferguson highlights the need for careful consideration in forwarding new designs; ensuring that any given project has the key benefiting principles essentialized in the apparatus of delivery, distributes the entirety of benefits to the intended recipients, and is capable of adaptability in order to shift unintended outcomes efficiently and effectively to realign with project goals (Ferguson, 1994a, p. 17-20). The application of this insight requires dedication to examining the effects of why ruminant

consumption in non-Western cultures of the world are rising, and how to ensure that retracting a Western scale of consumption is not further pushing such ways of life to the margin, but rather empowering and reinvigorating a culture previously untampered from the current hegemonic power relations. Furthermore, Arturo Escobar, in *Encountering Development: The Making and Unmaking of the Third World*, provides a vision for producing a strategy to circumvent the CMP climate-inducing problem of scale within development (Escobar, 1995). Escobar posits that discourse analysis enables the detachment from development discourse, as an "encompassing cultural space" and a historically produced term, to be able to be understood in a new form free from Western perceptions (Escobar, 1995, p. 6). For my research, this reflects the need to challenge the current discourse of supply-side solutions to climate change mitigation, and also the commonly accepted proposed demand-side strategies, to identify solutions that reflect cultures situated outside of a Eurocentric way of knowing, imagining, and being. Such a strategy stems from Escobar's further assertion that this detachment must be "accompanied by that of constructing new ways of seeing and acting" (Escobar, 1995, p. 16). The implication of this for my research is to identify a new solution that breaks free from a Eurocentric worldview and empowers the cultures that have been marginalized in its wake. Hence, such an outlook will provide three areas of examination for my research: (1) the harmful practice of scale for ruminant products embraced by a Eurocentric capitalist onto-epistemic perspective; (2) the extent to which the practice encroaches, overpowers, and dictates other cultures' practices; and (3) the beneficial solutions that fully account for oppressed cultures and diverge from any harmful practices.

Chapter 3

The Neglected Sustainability Debate

Speaking at the opening of the United Nations Sustainable Development Summit on September 25, 2015, Secretary-General Ban Ki-moon championed what would become humanity's most progressive agenda for advancing the collective wellbeing of life on Earth:

> We have reached a defining moment in human history. The people of the world have asked us to shine a light on a future of promise and opportunity. Member States have responded with the 2030 Agenda for Sustainable Development. The new Agenda is a promise by leaders to all people everywhere. It is a universal, integrated and transformative vision for a better world. It is an agenda for people, to end poverty in all its forms; an agenda for the planet, our common home; an agenda for shared prosperity, peace and partnership; it conveys the urgency of climate action; it is rooted in gender equality and respect for the rights of all; above all, it pledges to leave no one behind… Seventeen sustainable development goals are our guide. They are a to-do list for people and planet, and a blueprint for success… Seventy years ago, the United Nations rose from the ashes of war. Governments agreed on a visionary Charter dedicated to 'We the Peoples'. The Agenda you are adopting today advances the goals of the Charter. It embodies the aspirations of people everywhere for lives of peace, security and dignity on a healthy planet (United Nations, 2015a).

Shortly after his speech, all 193 sovereign states member to the renown intergovernmental organization unanimously adopted Resolution 70/1 for the 2030 Agenda, and ushered in a new contemporary mainstay for the decades-old means to this imperative end: development (United Nations, 2015b). Sustainable development laid at

the core of this invigorated universal, benevolent, and urgent journey for world transformation; an interconnecting concept that offers a comprehensive approach to tackling the most pressing global issues of our time by balancing economic, social, and environmental considerations (United Nations, 2015c). The term sustainable development itself was defined and popularized by the Brundtland Commission in 1987 as an alternative to mainstream development (Mensah, 2019, p. 6). The independent body, formerly known as the World Commission on Environment and Development, was established in 1983 by the United Nations in response to the negative environmental trends brought on by decades of development – recognizing that the processes that garnered improvements in life expectancy, livelihoods, global food production, and other traditional indicators, have led to a level of environmental degradation that placed unprecedented pressure on Earth's natural resources (Brundtland et al., 1987, pp. 14, 19). With the mandate to investigate these concerns, an international team of 21 members identified mainstream development as encompassing the notion of "a progressive transformation of economy and society", and that the omission of an environmental dimension was an oversight requiring equal attention (Brundtland et al., 1987, p. 54). Hence, the resulting 1987 report, Our Common Future, set about widening the paradigm of development to incorporate the environmental aspect of transformation in tandem with economic and societal changes, so that sustainable development became "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland et al., 1987, p. 54).

The proceeding series of high-profile environmentally conscious international events spoke to the success of heightening the plight of the environmental agenda to the world stage. One year after the publication of the report, the IPCC was founded by the World Meteorological Organization and the UNEP to provide “regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation” (IPCC, 2013). Four years later in 1992, the United Nations Conference on Environment and Development, commonly referred to as the Earth Summit, catapulted the issues relating to sustainability from a point of academic discourse into a collaborative effort for its integration in development practice (United Nations, 1993). A concrete outcome of the conference was the United Nations Framework Convention on Climate Change (UNFCCC), representing an international, non-binding treaty that entered into force on March 21, 1994 to collectivize reporting on actions taken toward addressing climate change, with the ultimate objective to stabilize “greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system" (United Nations, 1992, p. 3). On December 11, 1997, the adoption of the Kyoto Protocol reinforced the UNFCCC by legally committing signed member states to limit and reduce greenhouse gas emissions in terms of agreed individually established targets (UNFCCC, 2011). The yearly United Nations Climate Change Conferences (COP) serves to review and assess the progress taken toward achieving these reduced levels, and acts to continually strengthen the collective response to the threat of climate change (UNFCCC, 2009).

All of these events cumulated in the United Nations Millennium Development Goals at the turn of the 21st century, marked by the ascribing of environmental sustainability as one of eight fundamental goals adopted for the agenda of the international community (United Nations , 2000). After 15 years of advancing humanity's collective wellbeing in tandem with concerns for the Earth, the journey to rid misery, hardship, and destruction from the world took on a new name to build off its legacy: the 2015 United Nations Sustainable Development Goals (United Nations, 2015c). This presented a new united front that deepened and centralized environmental sustainability as the primary endeavour, for which to infuse greater ethical responsibility into development and attain a green path for the future (Sachs, 2017, p. 2584). With the collaborative effort of ambitious projects by nations, effective guidelines and oversight from institutions, invaluable data of professional experts, a new responsibility by corporations, and the participation by those most affected by change, the global dream is thought to be in humanity's grasp, and the likes of environmental degradation will soon be a thing of the past (Escobar, 1995, pp. 40-41; Rojas, 2001, p. 574).

Albeit as noble sounding a discourse sustainable development is, the centrality of agriculture for sustaining human life, "rooted in the natural resource base and serving as a major contributor to development", positions the sector as a prime benchmark in determining if such rhetoric can deliver the promise of environmental commitment in a meaningful and substantive context in the face of climate change (Jager, Verhagen, & Wösten, 2007, p. 58). As the global population grows to a projected 9.8 billion in 2050, and overall food demand on track to increase by more than 50 percent, with an 88 percent

increase in the consumption of ruminant products alone between 2010 and 2050, the corresponding dramatic increase in greenhouse gas emissions from livestock agriculture represents a grave obstacle to ensuring climate change mitigation targets (Searchinger et al., 2018, pp. 1-2, 15). The path of action for sustainable development in livestock food systems is to minimalize any environmental harm involved in production, while simultaneously promoting economic and social growth of the sector for guaranteeing human prosperity (Elver, 2016, p. 88; FAO, 2018, pp. xvi, xiii-xiv; Smith et al., 2014, p. 816). The essential question is thus whether supply-side solutions of sustainable development are indeed the promised answer for climate change mitigation.

3.1 Ruminant Livestock and Supply-Side Solutions

3.1a Are Technical and Managerial Solutions the Answer to Climate Change?

The mainstream outlook for proposed solutions to mitigate climate change in the livestock sector, specifically targeting ruminants, examines the supply-side of ruminant production; offering technical and managerial strategies to improve efficiency across all stages of ruminant production in an effort to minimize the impact the sector has on emissions (Wellesley, Happer, & Froggatt, 2015, p. 5). The core arguments forwarded by this camp to mitigate climate change includes the following: (1) improving efficiency in natural resource use to reduce emission intensity; (2) fostering soil carbon sequestration in pastures by improving grazing management; and (3) reducing emissions by better integrating livestock into the circular economy (FAO, 2016; FAO, 2017, pp. 4-6; Havlík et al., 2014; Herrero & Thornton, 2013; Pelletier, Pirog, & Rasmussen, 2010; Ramankutty et al., 2018; Reynolds et al., 2017; Stanley et al., 2018; Thornton, 2010;

UNEP, 2017; Van Zanten et al., 2018; Willett et al., 2019). The authors in this camp of the debate are positive that their proposed strategies for limiting emissions are the ideal way to combat the issue, while maintaining the benefits of continued production. Although a few acknowledge an extent of ruminant production may be unavoidable for climate mitigation, they nevertheless forward supply-side solutions as the most viable in today's world, or more recently, suggest that a blending should occur between their key solutions and alternative solutions (Ramankutty et al., 2018; Reynolds et al., 2017; Willett et al., 2019).

The report *Climate Change Mitigation through Livestock System Transitions* addresses and supports the first solution (Havlík et al., 2014). The authors emphasize the "large mitigation potential inherent in the heterogeneity of livestock production systems", and state the most effective action is to target emissions from land-use change and transition from extensive to more productive systems (Havlík et al., 2014, p. 3709). More productive systems, classified as intensive mixed crop-livestock and industrial systems with improved breeding, better quality feeds, reproductive efficiency, and health interventions, resulted in a global decrease in grass consumption of 3 percent (Havlík et al., 2014, pp. 3709-3711). Hence, in their scenario, by 2030, efficient systems would see emissions reduced by 736 MtCO2e per year, primarily through the sparing of 162 Mha of land conversion that would otherwise generate those emissions (Havlík et al, 2014, p. 3711). In terms of the second solution, the article *Impacts of Soil Carbon Sequestration on Life Cycle Greenhouse Gas Emissions in Midwestern USA beef finishing systems* analyzes the possibility of grass-fed beef production for climate change mitigation

(Stanley et al., 2018). Although the authors accept that concentrated systems require significantly less land than grazing systems, they nevertheless posit that sequestration rates of the (improved) latter are able to reduce emissions relative to the former, and can act as an additional GHG emission reduction strategy (Stanley et al., 2018, p. 249). Specifically, the implementation of adaptive multi-paddock (AMP) grazing to act as a net carbon sink (Stanley et al., 2018, p. 249). The results found that sequestering more soil organic carbon in the AMP system enabled emission reductions from 9.62 kg to -6.65 kg CO2e kg carcass weight, compared to the increase in feedlot emissions, due to soil erosion, from 6.09 to 6.12 kg CO2e kg carcass weight (Stanley et al., 2018, pp. 253-254). Hence, the authors conclude that improved grazing management systems, such as AMP, facilitate soil carbon sequestration, enable the finishing phase to act as a net carbon sink, and is ultimately utilizable as a strategy for climate change mitigation (Stanley et al., 2018, p. 257). The authors Pelletier, Pirog, and Rasmussen support the mitigation potential of positive soil carbon sequestration, and stress that pasture systems may offer substantial reductions in net GHG emissions if managed properly (Pelletier, Pirog, & Rasmussen, 2010, p. 388). Finally, the article *Defining a land boundary for sustainable livestock consumption* elaborates on the third solution by proposing the low-cost livestock concept (Van Zanten et al., 2018). The concept forwarded by the authors is based on "decoupling of production of livestock feed from the use of arable land" (Van Zanten et al., 2018, p. 4192). This enables, if prioritized, the increased efficiency for which livestock recycle and convert nutrients in leftover streams from arable land and nonarable grassland back into the food system (Van Zanten et al., 2018, p. 4192). In doing so, the expansion of agricultural land for feed production of ruminants, currently

representing 40 percent of global arable land and a driver of GHG emissions, is significantly minimized (Van Zanten et al., 2018, p. 4186). This translates into the authors' projection that consuming low-cost livestock reduces GHG emissions from the livestock sector by 19 to 50 percent compared to a business as usual scenario (Van Zanten et al., 2018, p. 4191).

3.1b The Looming Obstacles for Supply-Side Solutions

The article *Greenhouse Gas Mitigation Potentials in the Livestock Sector* explores the realities of attempting to implement management solutions on the supply-side of ruminant production to mitigate climate change (Herrero et al., 2016). The authors acknowledge that there is evidence-based potential for technical mitigation techniques, but they assume a practical perspective and focus on the hardship of implementation due to economic costs and variables that go unconsidered (Herrero et al., 2016, pp. 454-459). The identified technical and management interventions, including increasing livestock and pasture productivity, along with a slew of other strategies, offered a potential total mitigation of ~2.7 GtCO2e per year (Herrero et al., 2016, pp. 454-456). However, the majority of potential mitigation solutions are yet to be realized due to adoption constraints, costs, and numerous trade-offs between practices (Herrero et al., 2016, pp. 457-459). One such consideration is running the risk of successful farmers expanding production for economic gain, given increased productivity and decreased emissions intensity (Herrero et al., 2016, p. 459) Ultimately, the "economic potential of the examined management alternatives is less than 10% of what is technically possible" (Herrero et al., 2016, p. 452). In specific rebuttal to the model by Havlik *et al*., the notion

of land spared from intensive systems – a proposed 176 Mha of land over the period 2000 to 2030 – requires a subsequent global increase in feed grain consumption by 3 percent to sustain the equivalent of expanding global croplands by 105 Mha of land over the same period (Havlík et al., 2014, p. 3711). This results in an elasticity between intensification and feed requirements, with a decreasing expansion of pasture and an increasing cropland, respectively. Any increases in cropland related feed, given that the current levels of demand and consumption outstrip the alternative reliance on non-competitive permanent grassland resources and fibrous by-products, will compromise land that could be used to grow direct human crops at significantly lower GHG intensities (Wirsenius, 2003, p. 234).

With respect to the argument for grass-fed ruminants as a solution to mitigate climate change, the report *Grazed and Confused?* raises powerful objections against such a possibility (Garnett et al., 2017). The authors premise such a doubt on scientific evidence that states at an aggregate level the emissions from ruminant grazing systems will still outweigh the sequestration mitigation levels (Garnett et al., 2017, p. 124). For instance, "on the 90 percent of soils that are not amenable", the application of nitrogen to generate nitrous oxide will extend emissions beyond any sequestration potential (Garnett et al., 2017, pp. 47, 59). Further problematic is the fact that sequestration potential is acutely contextual on ecological variables, and even if all variables can be met, the "net GHG balance will depend upon the rate of sequestration, the number of years for which sequestration occurs before soils reach carbon equilibrium, and the stocking rate" (Garnett et al., 2017, p. 66). Importantly, if successful, this reduces emissions by a

maximum of 22 percent, and once soils reach carbon equilibrium any further sequestration will be severely limited; thereby locking in the land and any climate mitigation potential (Garnett et al., 2017, p. 120; Poore & Nemecek, 2018, p. 5). Additional ruminant uses on the land will continue to produce GHG emissions, such as methane, with no significant mitigation balances to counteract it. Mounting these criticisms against the findings by Stanley *et al*. demonstrates that the sequestration ability in that specific case of Midwestern USA beef finishing systems was a statistically isolated scenario. Moreover, the study merely incorporated data from the finishing phase of beef production. The omission of GHG emissions from all other phases of production, including the cow-calf phase, which is the most intensive in terms of total emissions, enabled the findings to bolster the illusion of the sequestration potential in grass-fed beef (Pelletier, Pirog, & Rasmussen, 2010, p. 387). In actuality, if the data represented a holistic outlook on production emissions, the sequestration potential for climate change mitigation would be significantly reduced.

Finally, in response to Van Zanten *et al*., and the figure that consuming low-cost livestock reduces GHG emissions from livestock production by 19 to 50 percent, the authors carry on to dismissively acknowledge that a study has shown that consuming no livestock at all "reduces emissions considerably more" (Van Zanten et al., 2018, p. 4191). The explanation of which is reflective of the findings by Pelletier, Pirog, and Rasmussen, namely that unless a viable techincal solution to reduce methane production in ruminents is implemented – a troubling excuse that seeks to make acceptable altering lifeforms and their natural processes at human whim – there will naturally be continued and significant

emissions of the potent GHG emissions (Pelletier, Pirog, & Rasmussen, 2010, p. 387). Ultimately, the very act of managing large-bodied, ruminant, and low fecundity mammals produces a high baseline of emissions that are unavoidable (Van Zanten et al., 2018, p. 4191). Nevertheless, instead of considering alternatives to supply-side solutions, the authors double-down on their argument by articulating that emissions from low-cost ruminant consumption would still be lower than conventional consumption (Van Zanten et al., 2018, p. 4193).

3.2 Ruminant Livestock and Demand-Side Solutions

3.2a Is Behavioural Change the Answer to Climate Change?

In terms of demand-side solutions, and stepping outside the bounds of livestock sustainable development, the authors on this side of the debate seek to challenge the normalized belief, as seen in the previous camp and their related studies, that the consumption of ruminant products is non-negotiable, and thus the premise that a base level of corresponding greenhouse gas emissions are inherent in sustainable food systems. The common theme in demand-side literature incorporates shifting consumer consumption away from intensive greenhouse gas emitting ruminant-sourced products toward more climate-friendly diets. The solutions proposed to attain such a shift broadly includes: (1) policy and pricing, and the intervention by governments, through the utilization of its resources and capacities, to redirect diets at scale, reinforce acceptance, and ensure successful implementation; and (2) maximizing awareness and evolving social norms, by increasing the availability, visibility, literacy, and viability of sustainable food (Brunelle, Coat, & Viguié, 2017; Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016;

Garnett et al., 2017; Herrero et al., 2016; Kiff, Wilkes, & Tennigkeit, 2016; Poore & Nemecek, 2018; Searchinger et al., 2018; Wellesley, Happer, & Froggatt, 2015; Willett et al., 2019).

In assessing the need for these alternative solutions, the landmark article *Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems* found that improvements in food production management could reduce agricultural GHG emissions by 10 percent in 2050, while dietary shifts could reduce emissions by a staggering 80 percent (Willett et al., 2019, p. 472). The discrepancy between effectiveness of GHG mitigation is due to the innate characteristics of ruminants, such as enteric fermentation, that have little potential for change (Willett et al., 2019, p. 472). Building off this insight, the article *Demand-Side Mitigation options of the Agricultural Sector: Potential, Barriers and Ways Forward* presents a comparison between supply-side and demand-side mitigation options, and showcases that the latter's potential is measured significantly higher than the former (Brunelle, Coat, & Viguié, 2017, pp. 1-2). Demand-side mitigation options were found to "represent an estimated 85 percent of the total potential reductions of non-CO2 emissions in the year 2055" (Brunelle, Coat, & Viguié, 2017, p. 3). Specifically, a global reduction of livestock consumption by 25 percent per year, between 2005 and 2055, could reduce non-CO2 emissions by 11 GtCO2e in 2055 (Brunelle, Coat, & Viguié, 2017, p. 3). Looking at ruminants in isolation, shifting one-third of beef calories to legumes resulted in a reduction of emissions by 1.5 tons CO2e per year (Brunelle, Coat, & Viguié, 2017, p. 2). The gulf in GHG emissions between these two foods is also extended to the amount of

protein on offer, with herd beef contributing 49.89 kilograms of CO2e (kgCO2e) per 100 grams of protein in contrast to the combination of all legumes that total 4.75 kgCO2e per 100 grams of protein (Ritchie & Roser, 2020). In support of this claim, the IPCC has reported on a number of Lifecycle Assessment (LCA) studies that assume nutritionally sufficient diets and nevertheless demonstrate "substantially lower GHG emissions for most plant-based food than for animal products" (Smith et al., 2014, pp. 839-840). This is an important factor to stress: that the shift from protein and calories offered by ruminant livestock is viably substitutable by available plant-based food, or even other meats, to ensure human health and wellbeing without compromising Earth's climate to such a destructive extent.

Further adding to the debate, the article *How Can the EU Climate Targets be Met? A Combined Analysis of Technological and Demand-Side Changes in Food and Agriculture* serves as a case study for the potential effectiveness of demand-side solutions within the European Union (EU) (Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016). The EU has adopted targets of reducing total GHG emissions by at least 80 percent, or up to 95 percent, by 2050 relative to 1990 levels (Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016, p. 152). In order to meet such targets, emissions will need to be reduced to an estimated 500 kg CO2e per capita per year, or less (Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016, p. 163). Currently, food-related emissions in Western Europe range between 1.4 to 2.7 MtCO2e per capita per year (Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016, p. 163). The authors recognize that supply-side options alone are "very unlikely to be sufficient, and changes in diets towards low-emitting food

will almost certainly be necessary" (Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016, p. 163). While technological and management advancements, under optimistic assumptions, can cut methane and nitrous oxide emissions by almost 50 percent, down to 600-900 kg CO2e per capita per year, it simply does not go far enough (Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016, p. 157). Hence, "deep cuts, by 50% or more, in ruminant meat consumption is the only dietary change that with high certainty is unavoidable if the EU climate targets are to be met" (Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016, p. 163). These authors acknowledge that supply-side mitigation solutions are not sufficient to addressing the impacts on climate change, and that such problems are imbedded in the systems of ruminant production itself. Therefore, research on reducing consumption is not only seen to be the most viable strategy for emissions reductions, but a necessity if we are collectively going to attain the IPCC targets of preventing an increase of global warming above 1.5°C pre-industrial levels.

Beyond this absolute reduction in GHG emissions, minimizing the scale of ruminant livestock on Earth by shifting consumer demands will also capture the atmospheric cooling potential of falling anthropogenic methane emissions, of which ~44 percent is due to ruminants (Cain et al., 2019, p. 1; FAO 2013, p. 15). Recent scientific evidence reveals that the standardized measurement of CO2e – using Global Warming Potentials over 100 years to convert and amalgamate non-CO2 GHG emissions to the equivalent of CO2 – treats the potent short-lived climate pollutant of ~12 years as a cumulative pollutant that warms global temperatures irrespective of current emission rates (Cain et al., 2019, pp. 1-2; Gough, 2017, p. 22). This assertion ignores the climate

leverage inherent in anthropogenic methane emissions. While the calculated impact holds true if the rate of methane emissions are steadily increasing, the divergence occurs when these emissions are on the decline and concentrations in the atmosphere actually fall and pull down global temperatures (Allen at al., 2018, pp. 2-3; Cain et al., 2019, p. 5). Unlike a decline in CO2 emissions that merely slows the future rate of warming, this causes a global cooling effect equivalent to actively removing CO2 from the atmosphere (Allen at al., 2018, pp. 2-3; Cain et al., 2019, p. 5). As such, a rate of decline by 25 percent over 30 years would "cause the cooling equivalent to the active removal of 420 tCO2 from the atmosphere" (Allen at al., 2018, p. 3). Thereby, even more pressing than the annual ~12 GHG contribution suggests, ruminant livestock are continuing to release damaging pollutants to the atmosphere in the form of methane that could otherwise be an active agent in cooling global temperatures, relieving the burden of other carbon removal activities, and supporting the pathway to net zero global emissions.

3.2b The Potential for Real Action with Demand-Side Solutions

In an effort to give voice to the opposition of such an alternative approach to climate change mitigation, the article *Sustainability Challenges, Human Diet and Environmental Concerns* is presented as challenging the implementation of behavioural change (Reynolds et al., 2017). The authors posit human diet modification is problematic and precarious due to four overarching reasons: (1) economic pressures, and the barrier of not having access to socially acceptable, nutritionally adequate, and safe alternatives to ruminant products; (2) insufficient education, and the finding that consumers have increasing preferences for impactful foods, with few following current nutritional

guidelines and having an awareness of the environmental impacts associated with food products; (3) ineffectiveness of policy, and that "world governments suffer from a chronic lack of action and misdirection of policy, selecting trade and economic growth over food or ecological security," leading to low uptake within the population; (4) and culture, and the phenomenon that meat consumption is ingrained as a desirable central protein in many sociocultural contexts around the globe (Reynolds et al., 2017, pp. 53, 57, 61-63). The following proposed solutions will demonstrate that these suggested concerns can for the most part be overturned and successfully mitigated.

In addressing all aforementioned apprehensions, the article *Demand-Side Mitigation options of the Agricultural Sector: Potential, Barriers and Ways Forward* delivers a holistic policy of three interrelated solutions: these include: (1) "selling a compelling benefit such as health or affordability; (2) maximizing awareness by increasing the availability and visibility of sustainable food; and (3) evolving social norms by informing people about the environmental impact of our food choice and make alternatives socially desirable" (Brunelle, Coat, & Viguié, 2017, p. 6). Following such climate policies aimed at orienting consumer choice away from ruminant-intensive diets, the palatability of restricting consumer food sovereignty could be better attained. Similarly, the report *Creating a Sustainable Food Future: A Menu of Solutions to Feed Nearly 10 Billion People by 2050* provides three realistic strategies for implementing demand-side solutions (Searchinger et al., 2018). These strategies include (1) product innovation, and the continued investment in developing meat substitutes until they satisfy consumers who desire a similar experience of consuming meat at less cost; (2)

promotion, and the improvement of marketing plant-based foods by employing behaviour change techniques such as "minimizing disruption to consumers, selling a compelling benefit, maximizing awareness, and evolving social norms"; (3) policy and pricing, and the intervention by governments through their own "food procurement practices" that shape the consumption environment and reduces the price of nonmeat alternatives (Searchinger et al., 2018, p. 17). Furthermore, the authors draw on the shift from beef toward poultry that occurred in the US and EU diets since the 1970s, suggesting that these dietary shifts are feasible with effective policy (Searchinger et al., 2018, p. 15). The article *How Can the EU Climate Targets be Met? A Combined Analysis of Technological and Demand-Side Changes in Food and Agriculture* specifically addresses the idea of the ineffectiveness of policy (Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016). The authors identify "price-based policy instruments, such as consumption taxes differentiated by emission levels, . . . to be essential policy components", since those policies are proven to be the most effective given the current literature on the topic (Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016, p. 160). Furthermore, touching on the aspect of economic pressures, policy makers could adjust the distribution of producer subsidies, currently amounting to 20 percent gross receipts for EU agriculture, and shift the support away from the ruminant livestock sector, which receives a disproportionate fraction of the subsidies, toward more climate friendly sectors and thereby widen accessibility for alternatives (Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016, p. 160). In the report *Changing Climate, Changing Diets: Pathways to Lower Meat Consumption*, the authors emphasize the role of government to implement such holistic demand-side solutions (Wellesley, Happer, & Froggatt, 2015). Therefore, all considered

strategies require the government's involvement to a certain degree, as the actor with the necessary resources and capacities, to redirect diets at scale, reinforce acceptance, and ensure successful implementation (Wellesley, Happer, & Froggatt, 2015, p. vii). Such policies would be tailored to national contexts, accounting for education levels and demographic groups, and framed around a positive message of promoting "gastronomic diversity" to maximize effectiveness and widespread adoption (Wellesley, Happer, & Froggatt, 2015, p. 48). While valid objections to mitigating climate change from outside the framework of sustainable development exists, as summarized by authors Reynolds *et al.*, these proposed solutions aim to overmount anxieties and provide a path to escape the dire anthropogenic caused crisis of climate change inducing ruminant livestock.

3.2c The Literature Gap in Demand-Side Solutions

As scientific evidence proved the need for a concerted effort to pursue radical reductions in ruminant-related emissions before irreparable damage is done to the Earth, so has it demonstrated enacting demand-side solutions as humanity's crucial means to do so. However, within this camp there exists a gap in the literature. As of now, the overwhelming directive for applying these solutions are framed, or benchmarked against, in the context of countries experiencing the highest and most prolonged rates of ruminant consumption among the population (Brunelle, Coat, & Viguié, 2017; Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016; Garnett et al., 2017; Herrero et al., 2016; Kiff, Wilkes, & Tennigkeit , 2016; Ranganathan et al., 2016, pp. 31, 34; Searchinger et al., 2018; Stoll-Kleemann & Schmidt, 2017; Wellesley, Happer, & Froggatt, 2015; Willett et al., 2019). These countries fall into the category of "developed" and reside in the Western

world, including the so-called advanced countries of the United States and those in Western Europe, with comparatively low consumption levels in "developing" countries missing the spotlight in most cases (Ranganathan et al., 2016, p. 34). Accordingly, the posited solutions are catered to shifting dietary preferences away from a point of already high intake, and if considered, express hesitation or incapacity to recommending these solutions in the context of "developing" countries (Brunelle, Coat, & Viguié, 2017, pp. 1-2, 4, 6; Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016; Garnett et al., 2017, pp. 22, 124; Herrero et al., 2016, pp. 457, 459; Kiff, Wilkes, & Tennigkeit , 2016, pp. 6, 8; Ranganathan et al., 2016, p. 42; Searchinger et al., 2018, pp. 15, 76; Stoll-Kleemann & Schmidt, 2017; Wellesley, Happer, & Froggatt, 2015, p. 5; Willett et al., 2019, pp. 480-481). Although some aspects of policy can be re-interpreted for a "developing" country scenario, the current debate offers little contextual solutions to constrain replicating an unsustainable scale of consumption from an initially low base. This presents a real threat to the actualization of global climate change mitigation targets, as these "developing" countries are now experiencing an unprecedented wave of intake patterns, rising at levels unmatched by any "developed" country since the 19th century, and with future projected rates showing little signs of slowing (Baics & Thelle, 2018, p. 189; Chiles & Fitzgerald, 2018, pp. 11-12, 14; Ranganathan et al., 2016, pp. 3, 35; Ritchie & Roser, 2017). The transnational scale of climate change requires a collaborative effort to stem GHG emissions from ruminant agriculture in a manner that the global population enduringly minimizes the scale of consumption from dietary preferences. In this vain, duel action is now required for demand-side solutions: addressing the inexcusably gargantuan and outright destructive amounts of ruminant products consumed in "developed" countries,

that current research is urgently and diligently seeking to relay viable policy for, and focusing attention to ensure that this ruinous activity not be replicated in other countries around the world.

Surprisingly, as it stands now, the majority of demand-side solutions assume the scaling of consumption in these "developing" parts of the world to be a likely outcome from a series of determinants that include population growth, increasing disposable income, shifting demography, and urbanization (Brunelle, Coat, & Viguié, 2017, p. 4; Garnett et al., 2017, pp. 24-25; Herrero et al., 2016, p. 452; Kiff, Wilkes, & Tennigkeit, 2016, p. 10; Searchinger et al., 2018, pp. 1, 15; Wellesley, Happer, & Froggatt, 2015, pp. 2, 17, 18, 20; Willett et al., 2019, pp. 449, 471). These quantitative analyses actually overlap in agreement with supply-side solutions on the drivers of scale, and only differ by reacting against excess consumption – once these determinants have plateaued and such levels are unequivocally high (Thornton, 2010, p. 2853). In this rather harmonious agreement of a linear trajectory for global ruminant consumption, solutions are closed off to a deeper and more holistic understanding of the causation in rising consumption patterns in non-Western countries. Furthermore, any assumptions in the uniformity of future practices across people in the world, especially based on quantitative analyses, is a dangerous slope that in part homogenizes experiences and removes agency in choosing an alterative, climate-resilient path forward. One casualty is formidable discussion on culture, and the powerful role it plays in guiding the relationships humans form with all other entities on the planet. Hence, the various ways of knowing, imagining, and being directed toward cattle, other bovines, sheep, and goats, and the actions that follow from

said interpretations, is an under accounted determinate in establishing the scale of ruminant consumption in any given society. Moreover, lack of examination into the capacity for one cultural interpretation to supplant another, and converge on a given pattern of consumption, is a missed opportunity to interject and realign the drive for more ruminant products before the ruinous scale of activity is replicated in the "developing" world. The limited literature that attempts to target culture simply acknowledges this aspect as an obstacle, and suggests evolving social norms on environmental grounds and even, depending on the cultural heritage, "emphasizing moderation rather than substitution" (Wellesley, Happer, & Froggatt, 2015, pp. 38, 41, 51; see also, Brunelle, Coat, & Viguié, 2017, p. 6; Ranganathan et al., 2016, pp. 3, 35). The planet and the fate of all those living within do not have time for anything less than radical changes to reduce the scale of ruminant consumption across the globe, with vague or temporary solutions unacceptable to prevent warming beyond 1.5°C above pre-industrial levels.

Chapter 4

The Western Nature/Culture Divide

Addressing the world for International Mother Earth Day of 2020, incumbent United Nations Secretary-General António Guterres declared that "climate disruption is reaching a point of no return" and issued a rallying call for "a healthy and resilient future for people and planet alike" (United Nations, 2020). Yet sustainable development – the path to realize this global aspiration – is at odds with the very basis of scientific inquiry that constituted its envisioning, revealing contradictory claims to the environmental viability of the process. The inherent climate impacts associated with developing ruminant livestock, and the inability for sustainable supply-side solutions to meet adequate mitigation levels, exposes this unsettling friction: pinning economic growth, increased livelihoods, and social availability to red meat, and at the dire cost of, unrelenting and irreversible environmental damage to Earth. Hence, with ruminant livestock as an indicator, the unanimously agreed upon nation-state agenda for sustainable development, rather than securing the life of future generations, is pitting Earth as the necessary victim for human transformation toward short-term prosperity. Demand-side solutions, outliers to the paradigm of development in livestock, have been presented as an alternative answer to avoid a climate catastrophe. However, the literature gap within this camp has exposed the insufficient attention for solutions to constrain the rising scale of consumption in non-Western, "developing" countries. The current reliance on the posited solutions to shift dietary preferences away from a point of already high intake in "developed countries" fails to reflect the global scale of action required to

minimize ruminant-related emissions. The role of culture stands as a crucial under accounted determinate to advance a deeper and more holistic understanding of the causation in rising consumption patterns in non-Western countries. Hence, the critique raised that demand-side solutions will fail due to the phenomenon that meat consumption is ingrained as a desirable central protein in many sociocultural contexts around the globe, and that the trajectory for scaling consumption is thereby destined, is central to challenge in order to produce proactive demand-side solutions (Reynolds et al., 2017, pp. 53, 57, 61-63). If such an addition to the literature is to be made, there first requires a historical investigation into why the culture of these Western "developed" countries situated ruminant meat as a central dietary feature, and how that deep-seated attitude has come to occupy cultures around the world experiencing an unprecedented rising wave of appetite for these products.

4.1 The Age of Reason, Civilization, and the Commodification of Nature

The sixteenth and seventeenth centuries were a tumultuous time of ideological and material change in Europe, instigated by no less than the colonial encounter with the "New World" in the Americas (Bhambra, 2007, pp. 5, 16; Mignolo, 2018, pp. 139-140, 142, 155, 178, 205; Parasram, 2018, p. 107; Quijano, 2007, p. 176). Recollecting a distinctly European ontological divide between nature and culture speaks to a central theme of these period changes, and lays a base of understanding for why an unsustainable scale of ruminant consumption would later arise in the region. Expounding this divide, Cristina Rojas succinctly asserts that the imagined worldview placed nature as an object to be known – an external reality that can be accurately represented – for the human

subject that knows (Rojas, 2016, p. 372). Offering credence to this assertion are the historic writings of Thomas Hobbes (1588-1679) and John Locke (1632-1704), two of the most influential philosophical theorists of the time (Hobbes, 1651/1965; Locke, 1690/1823). When examining their works, of particular concern is the articulation of nature/land as a resource for humanity's control, exploitation, and ultimate benefit (Parasram, 2018, p. 110). Although in a form of negation, Hobbes in *Leviathan* forwarded the argument that without a man-built commonwealth existing separate from the state of nature there can be no desired control of nature/land, acknowledged and respected à la "*Mine* and *Thine*" differentiation between men – note the deliberate exclusion of women (Hobbes, 1651/1965, pp. 96, 98). Contending that without such bonds of sovereignty:

> there is no place for industry, because the fruit thereof is uncertain: and consequently no culture of the earth; no navigation, nor use of the commodities that may be imported by sea; no commodious building; no instruments of moving and removing such things as require much force; no knowledge of the face of the earth; no account of time; no arts; no letters; no society; and which is worst of all, continual fear, and danger of violent death; and the life of man, solitary, poor, nasty, brutish, and short (Hobbes, 1651/1965, pp. 96, 98).

Given this stance, in order for civilization to flourish, is the interpretation that man must – through reason – restrain the conditions of nature he was born in (violence), and act in accordance with his fellow men (by artificial covenant) to reap nature's bounty (Hobbes, 1651/1965, pp. 128, 131, 276). In a more direct and telling fashion, Locke in *Two*

Treatises of Government offers a comprehensive elaboration on nature/land as a human resource:

> God, who hath given the world to men in common, hath also given them reason to make use of it to the best advantage of life, and convenience. The earth, and all that is therein, is given to men for the support and comfort of their being. And tho' all the fruits it naturally produces, and beasts it feeds, belong to mankind in common, as they are produced by the spontaneous hand of nature; and no body has originally a private dominion, exclusive of the rest of mankind, in any of them, as they are thus in their natural state: yet being given for the use of men, there must of necessity be *a means to appropriate* [emphasis added] them some way or other, before they can be of any use, or at all beneficial to any particular man (Locke, 1690/1823, pp. 115-116).

Locke would carry on to make explicit what he meant by "a means to appropriate", and in doing so he clearly conceptualized nature/land as property for control, exploitation, and human benefit:

> God, when he gave the world in common to all mankind, commanded man also to labour, and the penury of his condition required it of him. God and his reason commanded him to subdue the earth, i.e. improve it for the benefit of life, and therein lay out something upon it that was his own, his labour. He that in obedience to this command of God, subdued, tilled and sowed any part of it, thereby annexed to it something that was his property, which another had no title to, nor could without injury take from him (Locke, 1690/1823, p. 118).

Hence, through the separation of nature (object) and man/culture (subject), as depicted by these theorists, the European praxis of knowing, imagining, and being was centered on a

"hierarchical ordering of human and nonhuman beings" (Rojas, 2016, pp. 371-372; see also Mignolo, 2018, pp. 153, 155, 163, 174). More specifically, European men – as ideological harbingers of reason – represented the apex lifeform living in their embodied dominion of culture separate from nature (Rojas, 2016, pp. 371-372; Mignolo, 2018, pp. 153, 155, 163, 174).

Although outside the scope of this research project, it is important to note that the belief of such a hierarchy did not arise spontaneously: having ancient origins tracing back to Ancient Greece, through the Platonic and Aristotelian traditions that articulated a Great Chain of Being, and preserved in the religion of Christianity (Brake, 2009, pp. 89-90; Mignolo, 2018, pp. 154-155, 172; Parasram, 2018, pp. 106-107). In briefly addressing the latter, Max Weber (1864-1920) in *The Protestant Ethic and the Spirit of Capitalism* affirms the conceptualization of nature for control and exploitation by pointing to a unique corresponding ethic of duty toward labour and land improvement that was not found elsewhere in cultures of the world (Weber, 1905/1992, pp. 13-38). Indicating this linear trajectory is to emphasize the new context – and interpretation – to the hierarchy and nature/culture divide that occurred during these two centuries in question: the European discovery of previously "undiscovered" people of the Americas. Such contact provided a sense of grounding to hypothetical realities by juxtaposing Europeans against indigenous peoples of these continents (Parasram, 2018, p. 107). For the blind conviction that they were on the side of culture contrasted against "savage" lesser humans in proximity to nature (Rojas, 2016, p. 371). Harkening back to Hobbes, he asserts:

> For the savage people in many places of America, except the government of small Families, the concord whereof dependeth on natural lust, have no government at all; and live at this day in that brutish manner, as I said before… It is consequent also to the same condition, that there be no Propriety, no Dominion, no *Mine* and *Thine* distinct; but onely that to be every mans, that he can get; and for so long, as he can keep it. And thus much for the ill condition, which man by mere nature is actually placed in; though with a possibility to come out of it, consisting partly in the passions, partly in his reason (Hobbes, 1651/1965, pp. 97-98).

Keeping in line with Hobbes' disgust with the way of life in the Americas, Locke had a considerable amount to say on their lack of reason to control nature:

> There cannot be a clearer demonstration of any thing, than several nations of the Americans are of this, who are rich in land, and poor in all the comforts of life; whom nature having furnished as liberally as any other people, with the materials of plenty, i.e. a fruitful soil, apt to produce in abundance, what might serve for food, raiment, and delight; yet for want of improving it by labour, have not one hundredth part of the conveniencies we enjoy: and a king of a large and fruitful territory there, feeds, lodges, and is clad worse than a day-labourer in England… God gave the world to men in common; but since he gave it them for their benefit, and the greatest conveniencies of life they were capable to draw from it, it cannot be supposed he meant it should always remain common and uncultivated. He gave it to the use of the industrious and rational, (and labour was to be his title to it) (Locke, 1690/1823, pp. 122, 115).

Hence, in positioning indigenous peoples of the Americas as the epitome of living in the state of nature, two further subdivides emerged: separating moderns from non-moderns, with the proximity to nature serving as the indicator for depriving certain humans of value; and attaching progress to a linear conception of time, one that perpetuates a story

that the ways of the past were wrong, backward, and in need of change (Rojas, 2016, pp. 370-372).

This conception of space and time served as a Eurocentric basis to then contrast levels of progress – escaping the state of nature – internally and between and against all other cultures in the world (Bhambra, 2007, pp. 5, 16; Mignolo, 2018, pp. 139-140, 142, 155, 205; Parasram, 2018, p. 107; Quijano, 2007, p. 176). The emergence was a system of social classifications to disassociate (wealthy) European men from the rest of the species on classist, racist, and sexist terms (Mignolo, 2018, pp. 153, 155, 163, 174). Furthermore, this imagined reality provided Europeans with a sense of "legitimate right to improvement" in foreign lands, and the even darker "right to destroy those that do not exercise this right" (Rojas, 2016, p. 371). In the "New World" that translated into unimaginable levels of extractivism and possession of gold and silver – used as a commodity currency – along with other raw materials and foodstuff (Inglis, 2015, pp. 473-474; Janer, 2010, p. 243; Mignolo, 2018, pp. 139-140, 142, 183; Nunn & Qian, 2010, pp. 163-164). Progress in this age of civilization therefore meant the need for land-value extraction (culture), perpetuated against those deemed to have failed to improve the land (racism/classism), and led by men as the only qualified gender to do so (sexism) (Blaney & Inayatullah, 2010, pp. 183-184; Mignolo, 2018, pp. 155, 163, 174; Parasram, 2018, pp. 109-111). All of this was wrapped in the European consolidation of absolute power – dictating the terms of reality and accruing the means to enforce it – which created the imperialist totality of knowledge: an active and hostile mode of being that propagates and

consolidates a singular image for the world, and disavows any and all alternative knowledge bases (Mignolo, 2018, pp. 110, 197, 204, 205; Quijano, 2007, p. 176).

One of the most pressing material changes derived from the divides was the privatization and exploitation of common agricultural land (Polanyi, 1944). In reference to the meticulous account by Karl Polanyi, sixteenth century England would be the initial site for the "enclosures of open fields and conversions of arable land to pasture" for improvement and wealth creation (Polanyi, 1944, p. 36). Following these parliamentary acts of enclosures, the primary endeavour to be examined was the "highly profitable occupation of raising sheep and selling their wool" (Polanyi, 1944, p. 36). By depriving and displacing peasants of their "share in the common", lords and nobles led a revolution against the poor to secure land worth "double and treble the unenclosed" and satisfy a desire "for public improvement which profits him privately" (Polanyi, 1944, pp. 36-37). As the rich wielded law to displace and restrict the livelihoods of those reliant upon tillage, destroy villages on newly confined private property, and breed sheep in startling numbers – causing soil erosion through overgrazing, they tore the social fabric of England (Polanyi, 1944, pp. 36-37). In response, while anti-enclosure sentiment did exist in the monarchy, any philosophical, legal, or forceful attempts to slow or prevent the process from unfolding ultimately failed (Polanyi, 1944, pp. 37-38, 40). The power of the rich to pursue private interest – ascribed to the notion of reason and devoted to the linear path of economic progress – unquestionably prevailed, and with it the elimination of the perceived "primitive institution of the common" that connected nature and culture together (Polanyi, 1944, pp. 38-39). In the words of Polanyi, "the government of the

Crown gave place to government by a class – the class which led in industrial and commercial progress" (Polanyi, 1944, p. 41).

The vision of progress thereby meant the degradation of human labourers, the objectification of sheep, and the exploitation of both living animals to advance a mode of production designed to perpetually scale wool in search for greater wealth accumulation (Polanyi, 1944, pp. 38, 41). In turn, the foundations of modern capitalism was seeded: an economic market system based on private ownership of the means of production and the drive to accumulate capital and profits (Polanyi, 1944, pp. 42-44). A system whereof not only the owner comes to rely upon continuous production, but society at large "comes to depend upon such continuous production for incomes, employment, and provisions", and involves "no less a transformation than that of the natural and human substance of society into commodities" (Polanyi, 1944, pp. 43-44). In asserting his justification and approval of the practice, Locke commented approximately two centuries later:

> It is plain that the consent of men have agreed to a disproportionate and unequal possession of the earth—I mean out of the bounds of society and compact; for in governments the laws regulate it; they having, by consent, found out and agreed in a way how a man may, rightfully and without injury, possess more than he himself can make use of by receiving gold and silver, which may continue long in a man's possession without decaying for the overplus, and agreeing those metals should have a value (Locke, 1690/1823, pp. 125-126).

While Locke in his argument centralizes the harmless accumulation of gold and silver – used as a medium of exchange for all transactions – these metals are in fact, as mentioned

earlier, inseparably tied to the extraction processes in the Americas, and thus the flow and transfer of wealth are interconnected with colonialism (Mignolo, 2018, pp. 139-140, 142, 183; see also Polanyi, 1944, p. 44). Hence, a far cry from merely Weber's understanding of a European disposition for "a duty of the individual toward the increase of his capital, which is assumed as an end in itself", is the undeniable role of colonialism hidden from sight during the enclosures and establishment of the wool industry (Weber, 1905/1992, p. 17). Examining the advancement of these ontological divides in the context of ruminant livestock, keeping a particular focus on the capitalist system and colonialism, will be indicative of the genesis of an unsustainable scale of consumption in Western countries.

4.1a The State of Scaling Ruminant Livestock within Industrial Capitalism

Moving into the eighteenth and nineteenth centuries, the materialization of the Industrial Revolution would build upon in earnest the English story of sheep – subjected to a life of commodified servitude for wool – for a new story of integrating their meat and dairy, along with cattle and goats, into industrial capitalism. Prior to this specific investigation, the historic context of integrating food into the realm of culture during this new age of science, rational thought, democracy, industrialization, and capitalism will first be presented (McMichael, 2000, p. 21). In acknowledging this unprecedented change originally took shape in England, Polanyi provides an apt introduction:

> That an avalanche of social dislocation, surpassing by far that of the enclosure period, came down upon England; that this catastrophe was the accompaniment of a vast movement of economic improvement; that an entirely new institutional mechanism was starting to act on Western society… The new creed was utterly materialistic and

> believed that all human problems could be resolved given an unlimited amount of material commodities (Polanyi, 1944, p. 42).

The transformation of agriculture from subsistence to an industrialized and capitalist agricultural food system was a key expression of this movement of economic improvement attained by Europeans, and an exemplar of traversing the linear trajectory of progress concocted by colonial powers (Inglis, 2015, p. 474; McMichael, 2000, p. 21; Polanyi, 1944, pp. 42-44). In conjunction with the consolidation of a market system economy, this was made possible by a number of features that comprised the structural change of foodways during this period, as articulated by David Inglis:

> Massive and rapid urbanization in Europe and North America, leading to large urban populations needing to be fed; the transformation of farms into ever larger production units; the development of mass-market oriented agricultural and livestock production systems; the application of innovative scientific knowledge, to both animals and crops, especially in terms of producing species that were particularly conducive to rapid and easily manipulated growth; the massification and rationalization of animal breeding techniques and slaughtering systems; the consolidation of nation-wide, and international, transportation systems; and the development of new modes of packing and preservation (Inglis, 2015, p. 474).

These features speak to the climax of the division between nature and culture when the narrative of reason was applied to food. Through the mastery of nature as an object to be known and manipulated, a temporal and spatial disconnection was achieved that delinked food from the biological systems that restricted its production – seasonality and unadulterated species as examples – and transferred responsibility to human

domination; relying on rational and scientific knowledge to free man from the struggle to feed himself and produce a steady supply of "food that is accessible to, and affordable by, the vast majority of people in the Western world" (Morgan, Marsden, & Murdoch, 2008, pp. 2, 7, 9; see also, Rojas, 2016, pp. 370-372).

As this achievement over nature propelled the European superiority complex to new heights, so did the move to further disassociate from the rest of the species and harden social classifications. Reflecting the subdivision between moderns and non-moderns, Europeans demonstrated their civility with the near complete spatial separation of Western populations from the proximity to nature; a feat achieved with the mass exodus of rural populations to urban centers – the pinnacle of civilization – and the unnatural, privatized agro-industrialized machine assuming the duties of food production (Rojas, 2016, pp. 370-372; McMichael, 2000, p. 21). This latter integration of food with capitalism, and the subsequent exploitation of land and commodification of food sold for profit, also exacerbated the social classifications of race, class, and gender – as these distinctions make possible capitalism and its exploitive mechanisms, along with the institutions and state which sanctions its functioning (Chiles & Fitzgerald, 2018, p. 9; Loomba, 2002, p. 134; Polanyi, 1944, pp. 35-44, 141, 143-144).

The unwavering belief in these ontological divides led the European dynamics of food to integrate with the notion of reason and the attainment of happiness, or more directly accumulating wealth/material commodities (Earle, 2017, pp. 172-173, 176, 181; Polanyi, 1944, p. 144-145). This required the articulation of legitimizing cultural

food relationships based on nutritious and suitable qualities, good governance, and commerce – in conjunction with the imperial expansion (establishing new markets) of such foodways (Earle, 2017, pp. 172-173, 176, 181; Polanyi, 1944, p. 144-145). Such an orientation toward reason preserved the imagined hierarchy of life: granting the right for humanity's continuous control and exploitation over the resources of nature. Consequently, the narrative had direct repercussions on the way of knowing, imagining, and being directed toward food: facilitating both a conquest of material control over nourishment bearing life, and a discursive incursion that reduced these lifeforms to a European connotation of value (Blaney & Inayatullah, 2010, p. 184; Earle, 2012, pp. 156-158; Earle, 2017, pp. 172-173, 176, 181; Parasram, 2018, pp. 106-107, 109). In historic support of this claim, Locke considers "natural reason, which tells us that men, being once born, have a right to their preservation, and consequently to meat and drink and such other things as Nature affords for their subsistence" (Locke, 1690/1823, p. 115). Writing in the nineteenth century, Charles Darwin (1809-1882) in *The Descent of Man, and Selection in Relation to Sex* cemented this imagination of reason, and the corresponding transformation of nature to his and his community's betterment, as a defining faculty for "his preeminent position in the world" (Darwin, 1871/1981, pp. 158-159). Albeit men in the "civilised world" had expanded upon such reason "from a lowly condition to the highest standard as yet attained by him in knowledge, morals, and religion" (Darwin, 1871/1981, pp. 183-184). Hence, any life sanctioned as proper food was relegated to a relationship of servitude: designed and destined to be laboured upon, improved, and extracted for human betterment (Locke, 1690/1823, pp. 116, 118, 123).

Returning to the story of integrating ruminant livestock into industrial capitalism, ontological grounds in European culture reduced their value to meat and dairy foodways, and produced justifications for their scaled exploitation: scientifically discovering health benefits (including research asserting animal muscle is nourishing for human muscle), affirming meat's function in the identity of social class, race, and gender, and prescribing new biophysical value with the act of mass commodification (Chiles & Fitzgerald, 2018, pp. 4, 8-10, 12). The resulting "discourses of specialized breeding, cataloguing, veterinary medicine, experimentation, accounting, and dietary science", and the "conceptual and logistical distancing between meat production, processing, and consumption", along with the financial incentives to do so, degraded the reality of these living animals to a rational function in the linear progression of Western culture (Chiles & Fitzgerald, 2018, pp. 10-12). The institutionalization of the slaughterhouse in the beginning of the nineteenth century was – and continues to be – a space and process that demonstrates the full extent of Western culture seeking happiness at the expense of other living life forms (Fitzgerald, 2010, pp. 59-60). Whereby the civilized permutation of food became a packaged cut of meat delivered from an unknown and isolated locale – hidden from view the efficient system of mass slaughtering on an unimaginable scale – to quench an insatiable European desire for perceived beneficial material commodities, and a deeper longing to be modern and on the right side of progress (Chiles & Fitzgerald, 2018, pp. 11-12; Fitzgerald, 2010, p. 60; Polanyi, 1944, p. 42; Rojas, 2016, pp. 370-372). A system that rendered targeted animals the reward of human containment of nature; incorporating them as objects of

culture, bred for docility and regarded as an input to feed the machine of civilization (Emel & Neo, 2015, pp. 5, 7). The end result was de-animalized mammals, stripped of the categorized division of nature and the relations that constitute these lifeforms, and fused within capitalist human relations (Emel & Neo, 2015, pp. 6-7, 10). This mass-production of meat resulted in the newfound ability within Western culture to consume what was once a delicacy on a more frequent basis, with positive empirical research on health, disposable income, and notions of masculinity and racial superiority backing the increased levels of consumption (Baics & Thelle, 2018, p. 189; Chiles & Fitzgerald, 2018, pp. 5, 8-9, 11-12, 14). The invisible result from such a conquest over living nature was the establishment of an unsustainable scale of ruminant livestock that would habituate the sector's contribution to climate change.

Attention now turns to the second half of the story of ruminant livestock and industrial capitalism: colonialism. With the ever-sprawling empires in the Americas and in the continents of Asia and Africa, the imperial effect on non-western ontologies, cultures, and relationships was unprecedently profound (Mignolo, 2018, pp. 138, 221). A new format of delivery helmed this destructive path, as David Scott contends colonial power transitioned from a rule of force, based on extraction, to a rule of law, based on governing (Scott, 1995, pp. 192, 199, 204). With this shift, in order for cultures of the world to benefit from reason, the eradication of its imagined antithesis had to be pursued (Mignolo, 2018, p. 215). Thus, by asserting colonial divides, the civilizing mission required the systematic uprooting of primitive forms of life, dismantling the conditions of superstition that produced them, and planting new conditions based on rational principle

(Mignolo, 2018, pp. 155, 190; Scott, 1995, pp. 193, 198-199). These new conditions – such as private property, division of labor, market mechanisms, public opinion, and individual rights – formed in the colonially established systems of the democratic government, the capitalist economy, and the judiciary, and moved through a series of relationships consisting of "the concepts that it depended upon, the technologies that enabled it, the institutional sites through which it operated, the structures that guaranteed it, and the kind of subjectivities it required" (Scott, 1995, pp. 205, 208-211). It was this arrangement and rearrangement of conditions by colonial powers, "so as to oblige subjects to transform themselves in a certain, that is *improving* direction", one that required old principles to be cast aside so as to participate in the new order, that effectively instilled reason in colonial subjects (Scott, 1995, p. 200).

The near limitless consumption of livestock foodways, and the systems that made it possible, was therefore considered to be one such civilizing enterprise that could pull primitive cultures out from desolation and toward a higher cultural form (Emel & Neo, 2015, pp. 4-5). Through the European totality of knowledge dictating proper and unproper foodways, the approved agricultural practice was colonially extended far beyond the initial bounds of Western culture (Chiles & Fitzgerald, 2018, p. 4). The Americas served as a springboard for first advancing enlightened standards, maneuvering previously herded ruminants of cattle, goats, and sheep into objects fit for large-scale intensification to produce commodified meat for happiness (Chiles & Fitzgerald, 2018, pp. 10-12; Earle, 2017, pp. 172, 181, 184; Janer, 2010, p. 244). This reflected a successive process of colonial efforts to access their own foodways in the "New World" –

in opposition to substituting for indigenous foodways reported to be fundamentally backward and for bodies of bestiality – by importing domesticated animals to recreate an entire European agricultural system (Chiles & Fitzgerald, 2018, p. 10; Earle, 2012, pp. 3, 55-56, 63, 69-70, 82, 73-43, 118-121). In importing such a system however, colonists reproduced not only the environmental destruction that wreaked havoc in Europe – converting swaths of woodland for grazing and indiscriminately hunting livestock predators – but also the structure of power that maintained and controlled their relations over domesticated ruminants (Chiles & Fitzgerald, 2018, pp. 5, 8-10). This is not to suggest that indigenous cultures did not practice ruminant meat consumption, but rather to emphasize that the alternative mode to procure the food (hunting) was bound to place (nature), guided by a relationship of reciprocity, and limited to within indigenous needs and that of the land (Blaney & Inayatullah, 2010, pp. 183, 186-187, 195; Robinson, 2020, pp. 109, 111; Walsh D. S., 2015, pp. 231-232, 235). A stark contrast to the capitalist mode of production based on the continuous scaling and exploitation of living nature to extract as much value as possible. In cultures spanning the continents of Africa and Asia – where livestock were historically present prior to colonization – the introduced terms of commodification and intensification disrupted the pre-existing pastoral human-animal relations that co-evolved over thousands of generations (Chiles & Fitzgerald, 2018, p. 5; Emel & Neo, 2015, pp. 2-4, 10; Goossaert, 2005, p. 246; Vansina, 1979, pp. 11-12, 15). The imposed civilizing divides, that sought to separate humans from animals, tore populations apart into camps accepting of the narrative of reason, aligning people to conditions of rationality that incited the purchase of more objectified meat, and those resisting, holding onto local cosmologies that depicted animals as having reciprocal

relations that necessitated bonds of strengthening each other's life energies and free from functionality reductionism (Chiles & Fitzgerald, 2018, pp. 6, 10).

Even though large-scale production of livestock was primarily located in Europe and the Americas during the Age of Enlightenment, new refrigeration technologies and transportation networks enabled this global concentration of meat production to be delivered as a marketed good to cultures lured into this new reality of consumption (Chiles & Fitzgerald, 2018, p. 11; Inglis, 2015, p. 474; Swatland, 2010, p. 83). No culture was off-limits, with Western nation states and wealthy landowners scaling up production and eyeing the exportation of livestock as "a relatively stable good in the context of economic uncertainties" (Chiles & Fitzgerald, 2018, p. 10). The persistent opening of new markets served this lucrative opportunity, fueled by the basis that "more than a quarter of the Americas remained under colonial rule despite the disintegration of Spanish and Portuguese power", and that further widespread colonial rule had been "imposed on 90 per cent of Africa, more than half of Asia and almost the totality of the South Pacific" by the end of the 19th century (Macqueen, 2007, p. 24). In addition to this colonial motivation of international commerce for circulating European foodways, non-Western cultures served as a new site of rapid production – specifically in the Americas – and the actualization of a sense of duty to aid inferior people of the world; all of which lent credence to the civilizing mission of shaping the world in a manner conductive to achieve happiness for all (Earle, 2017, pp. 172, 181, 184; Inglis, 2015, pp. 472-473; Macqueen, 2007, pp. 26, 30, 38-39; Quijano, 2007, pp. 174, 177).

Yet, the very act of Europeans wielding the ability to define and provide happiness reinforces a set of unequal power relations: only through submitting to the projected European hegemonic reality of the ontological divide could this way of life necessary for happiness – in this context, eating objectified domesticated animals on a copious scale – be distributed down and made widely available to the people of non-European cultures (Quijano, 2007, pp. 174-176). Furthermore, in advancing this singular reality for the world, the mission foremost secured those at the top of the constructed hierarchy – (wealthy) European men – their happiness (Mignolo, 2018, pp. 153, 155, 163, 174; Quijano, 2007, pp. 174, 176-177). For the distorted access to it reflected merely a discursive extension that had limited effects outside of securing the relationship of power (coloniality) and advancing the pliability and dispensability of nature and the cultures of non-Europeans, so as to maintain their position (Quijano, 2007, pp. 174, 176-177). Ultimately, to the conclusion of the colonizers, the abundance and thriving of these European foods, and the failure of other cultures to improve the land in any equivalent manner, especially in terms of animal husbandry, illustrated the superiority of European culture, reinforced their civilization as the most progressed, and served as justification for enacting the violence of dispossession and exploitation on foreign interconnected lands (Earle, 2012, pp. 78-79, 82-83, 218; Earle, 2017, pp. 172-173, 176, 181; Emel & Neo, 2015, pp. 4-5; Parasram, 2018, p. 109-111). Hence, at the mercy of European force, colonized people had to contend with an ever-expanding influx of foreign foods – and the scales thereof – supplanting established reliance, debilitation of the ways of knowing constructed around those foods, and a subjugation to an ontology that treated food,

nature, and the life forms within to be dominated for profit and consumption (Inglis, 2015, pp. 473-474; Janer, 2010, pp. 239, 245).

4.2 The Age of Modernity, Development, and the Global Agricultural Regime

The bloody conclusion of the Second World War marked the dawn of a new era for humanity and the European ontology, inaugurated with United States president Harry S. Truman's Four Point Speech on January 20, 1949 that transitioned reason to modernity as the new narrative for happiness (Escobar, 1995, pp. 3-4; Mignolo, 2018, p. 110; Sachs, 2010, p. xvi). While this recasting signalled the establishment of a contemporary way of knowing, imagining, and being, and a revamped means to attain this desired ultimate state – all juxtaposed with empire crumbling as a "formal system of political domination by Western European societies over others" and the physical unshackling of oppressed peoples – the legacy of coloniality remained grounded in this new age (Quijano, 2007, pp. 168-169). In an effort to visualize the continuity between the narratives of reason and modernity, Cristina Rojas rearticulates three persisting binary oppositions that constitute them: the first maintained the division between nature and culture, which placed nature as an object to be known, an external reality that can be accurately represented, for the subject that knows; the second divided moderns from non-moderns, with the proximity to nature serving as the indicator for depriving certain humans of value; and the third attached progress to a linear conception of time, one that perpetuates a story that the ways of the past were wrong, backward, and in need of change (Rojas, 2016, pp. 370-372). Through the discursive power of Truman's speech, these three divides – epitomizing the continued colonial logic to deny and disrupt non-modern cultures and advance a single

worldview – fused into a new dichotomy to perceive and organize the world: developed and underdeveloped (Escobar, 1995, pp. 3-4; Rojas, 2016, pp. 372-373). Positioning the United States as the pinnacle of developed countries, Truman set a precedent that those dwelling in the Western "free world" enjoy peace, prosperity, and plenty, whereas people outlier to this Cold War geopolitical division of the world are deprived of happiness (Escobar, 1995, p. 3). Hence, by declaring more than half the world as underdeveloped, Truman effectively cast the countries and cultures within Latin America, Africa, and Asia as backward, non-modern, and in a place of desperation requiring help to achieve the mode of life set by the United States and its Western allies (Mignolo, 2018, pp. 110, 142; Quijano, 2007, p. 171). The golden ticket out was the achievement of "the features that characterized the advanced societies of the time – high levels of industrialization and urbanization, technicalization of agriculture, rapid growth of material production and living standards, and the widespread adoption of modern education and cultural values" (Escobar, 1995, p. 4).

The quest of development became the means to which modernity could be achieved, and the spread of this ontology completed – that is, not only sustaining the colonization of dominated people's imagination in a repressive manner, but transforming Western culture into an aspiration to be embraced and recreated (Quijano, 2007, p. 169). Such a quest proceeded to turn the underdeveloped non-Western world, an artificially constructed imaginary, into a tangible, quantifiable, and mouldable object (Esteva, 2010, pp. 7-8). This object was the focal point for a systematic scrutiny of human life; relentlessly identifying factors causing the undesirable state of being underdeveloped,

and providing comprehensive interventions for its cure (Escobar, 1995, p. 6; Esteva, 2010, pp. 5-7; United Nations, 1961, p. 18). Each country vied for advancement on the conceived objective hierarchy of the world, with rankings based on comparisons in time and space of the features of modernity (Sachs, 2017, p. 2578). Contrary to successfully delivering the promise of modernity, the preceding decades of development fostering universal change relished in the hidden coloniality of the narrative; one that caused widespread rupture, exploitation, and degradation of environmental and human ecologies in those targeted countries (Escobar, 1995, p. 52; Quijano, 2007, p. 168). A narrative that Rojas argues dismantled non-representational ways of producing knowledge, and the interconnectedness of reality, and enabled the control of non-Western populations and their territory (Rojas, 2016, p. 372).

Yet, the need for development never came into question (Ziai, 2017, p. 2551). Instead of revealing the intrinsic nature of coloniality, the mounting failures of development reinforced and hardened the notion for an even more comprehensive and intricate pursuit; strategies declared absolved from past mistakes, comprised of new variables to the equation of improvement, and prepared to deliver on its promise (Ziai, 2017, p. 2551). Even the rise of critical development theorists who gained popularity during the 1970s, asserting theories that opposed the mainstream capitalist strategies and called for autonomous control, could only enter the discussion by speaking critically in acceptance with this need (Escobar, 1995, p. 5). Timothy Mitchell argues this phenomenon is due to the presentation of development as an external force to the object of its application (Mitchell, 1991, p. 19). Accordingly, development shed the relations of

Western power that constitute it, and further buried its coloniality, and re-emerged as an objective, adaptable, and inherently positive means for transforming the underdeveloped society (Mitchell, 1991, pp. 19, 33). The agents of development, as revealed by James Ferguson, are shielded from those previous relations through discursive mechanisms that blocks their attribution (Ferguson, 1994b, p. 178). Ferguson cites the positioning of the national government of the so-called underdeveloped state, "as an impartial instrument for implementing plans", as one such mechanism that depoliticalizes the agents' decision-making process (Ferguson, 1994b, p. 178). As a result, development behaves as an "impartial, apolitical machine" that relegates all aspects of consideration to a technical matter, and dissolves itself of any power relations (Ferguson, 1994b, p. 178). This proclaimed impartiality for development, and the achievement of modernity it espouses, solidified its need and legitimization in the global imaginary (Esteva, 2010, p. 6). An imaginary that led development to become an integral feature for underdeveloped (henceforth referred to as "developing") countries, so much so that the subjection to cultural, environmental, and human agony at the hands of rational discourses and interventions by experts and leaders was endured for the hope of a better future (Escobar, 1995, p. 52). With each country falling prey to this promise, it was only a matter of time before the reality of the world became colonized by development discourse and the lure of modernity; hiding in the shadows of betterment the set of relations that maintains an imposition of Western power (Escobar, 1995, p. 5; Rojas, 2001, p. 571). An evolving form of power that acts, according to Escobar, "not so much by repression but by normalization; not by ignorance but by controlled knowledge; not by humanitarian concern but by the bureaucratization of social action" (Escobar, 1995, p. 53). The radical

transformation of life in the rural landscape was one such promise for happiness in "developing" countries (Escobar, 1995, p. 162; Inglis, 2015, p. 474; United Nations, 1961, p. 18; United Nations, 1970, p. 48; United Nations, 1980, pp. 108-109, 144; United Nations, 1990, p. 131). Over the course of decades, numerous phases of adapting development ethos would etch a permanent mark into this endeavour of altering the ontologies and ways of life of non-Western cultures.

4.2a Act One: Establishing the Rural-Urban Divide

The common sentiment of early development proponents, armed by the power and logic of numbers, and a grand vision of peace through world economic stability, was to focus on bolstering and normalizing the capitalist economy (Chiles & Fitzgerald, 2018, p. 12; Esteva, 2010, p. 8; United Nations, 1960, pp. 3, 7). In seeking to attain this root feature of modernity, these men desired no less than revolutionary changes to the fundamental economic structures of "developing" countries, shifting the economic base from rural activities to industry, and thereby replicating the success of the European Age of Enlightenment (Chiles & Fitzgerald, 2018, p. 12; Esteva, 2010, p. 8; United Nations, 1960, pp. 3, 7). Two prominent economists of the time, Arthur Lewis and Walter Rostow, popularized and guided this development as economics mindset that carried throughout the 1950s and 1960s (Esteva, 2010, p. 8). In Lewis' landmark piece *Economic Development with Unlimited Supplies of Labor*, economies of the "developing" were split into subsistence and capitalist sectors, with the need for a transfer of surplus labour from the mainstay former to the fledgling latter posited (Lewis, 1954, pp. 146-147, 151-152, 157). The outcome of such a transfer would produce a cycle of capital accumulation,

which over a period of time would spur the necessary growth to transform the once backward, rural economy into its modern, urban, and developed capitalist equivalent (Lewis, 1954, pp. 146-147, 151-152, 157, 159-160, 190). Building off his peer's insight, Rostow in his *The Stages of Economic Growth: A Non-Communist Manifesto* categorized the cycles of capital accumulation into five stages of economic growth: the Traditional Society, the Preconditions for Take-off, the Take-off, the Drive to Maturity, and the Age of High Mass Consumption (Rostow, 1959, p. 1). With each progressing stage, development would see growth accelerate and eventually accrue to achieve the peak of modernity (Rostow, 1959, pp. 4-12). The United Nations echoed and institutionalized this economic stance by declaring the 1960s the United Nations Development Decade, and as a period to "accelerate progress toward self-sustaining growth of the economy of the individual nations and their social advancement so as to attain in each under-developed country a substantial increase in the rate of growth" (United Nations , 1961, p. 17). This marked for the first-time development as an internationally sanctioned mandate and collective endeavor; a linear progression of economic transformation that positioned capital accumulation, and the rate thereof, as the primary vector and strategic variable at the center of all decision-making (United Nations, 2017, p. 39). Even the sphere of social progress became relegated to a function of attaining economic growth, whereby improvements in areas of health, education, and safety were designed to promote the productivity of radically shifted people in "developing" countries (United Nations, 1960, p. 7; United Nations, 1961, p. 18).

As this colossal undertaking to fixate non-Western ways of life to the rails of modernity proceeded over two decades, cultural bonds to land, and thereby life, that situated people in space and time were exchanged for a new structure of capitalist relations in spaceless urban cities run on linear time (Escobar, 1995, p. 159; Illich, 2010, p. 104). Such a dislocation and degradation of the rural population in countries of Latin America, led on the promise of higher standards of living, faced the inhuman realities of objectification through control and the exploitation of their labour instead (Escobar, 1995, p. 156; Illich, 2010, p. 99; Quijano, 2000, pp. 535-536). While this sequence to make modern is not homogenous across cultures, the experience serves to illuminate the damages superimposed Western hierarchical divides inflict. By the end of the 1960s, the perpetual emphasis on capital accumulation, the industrialist class, and the homogenization of experiences did briefly expose the inherent clash of the promise of betterment with the reality of extractivism and inequality (Chiles & Fitzgerald, 2018, p. 12; Esteva, 2010, p. 9; Herath, 2009, p. 1453; United Nations, 2017, p. 41).

4.2b Act Two: Modernizing the Remnants of Rural Life

The next iteration of development ethos devoted attention to expanding mandates and addressing these social woes, with the focus on reproducing an industrialized and capitalist food system a top priority (Phillips R. W., 1981, p. 9; United Nations , 1970, p. 40). Securing a means to feed a burgeoning mass of city migrants and factory workers became an exigent need, which led to the domination of nature in non-Western lands coming to the forefront in a clash of ontologies (Chiles & Fitzgerald, 2018, p. 12; Escobar, 1995, p. 157). The FAO was the body that captured the international stance

toward the progression of modernizing food of this time, declaring in Preamble of the 1965 constitution that party nations are determined to addressing: "(1) raising the levels of nutrition and standards of living of the peoples under their respective jurisdictions; (2) securing improvements in the efficiency of the production and distribution of all food and agricultural products; (3) bettering the condition of rural populations; (4) and thus contributing toward an expanding world economy and ensuring humanity's freedom from hunger" (Phillips R. W., 1981, p. 9). This malleable Second Development Decade of more humanizing goals saw in the 1970s the remnant bearers of non-Western culture, still existing through relationships to the land and subsistence agriculture, become the target for an immense change (Escobar, 1995, pp. 157-158; Inglis, 2015, p. 474; United Nations, 1970, pp. 39-41, 47-48). Development projects assumed the means to dismantle these generational systems of seemingly backward activities of "subsistence and local reciprocity", tethered to the life of peasants, women, and indigenous peoples, and reproduce the superior Western way of existing (Escobar, 1995, p. 159). For these forgotten peoples in the eyes of Europeans and their descendants, integrating them in the processes that produce and distribute Western approved foodways – industrialized and capitalist agriculture – was their gateway to modern life, and by ensuring a steady availability of these foodways, was their contribution to advancing the country toward modernity (Escobar, 1995, pp. 159, 162). With the elevated role of governments, and the international financial institutions – championed by the World Bank – that bankrolled them, "developing" countries led on the promise of betterment were able to rely on the guidance of Western experts, having mastered and refined the process of nature's domination since decades prior, to provide solutions only modern science and technology

could offer (Chiles & Fitzgerald, 2018, p. 12; Escobar, 1995, p. 159; Rich, 1994, pp. 84, 86). Hence, the path to restructuring an unproductive countryside became enamoured in the path to happiness, in which the result would be a steady supply of Western foodways to satisfy the newfound cultural fabric of life for all (Escobar, 1995, pp. 157-159).

The process of modernization took the practical and discursive form of rural development and the green revolution, whereby the "techniques and technologies that resulted from these efforts included intensive tillage, monoculture, the application of synthetic fertilizer, irrigation, chemical pest and weed control, genetic engineering of crops and livestock, and factory farming" (Chiles & Fitzgerald, 2018, p. 12; see also, Escobar, 1995, p. 157). Furthermore, the landscape of existing agriculture, widely comprised of small-scale holdings of land and employing diverse mixed-use practices, were deemed "too small and conditions of cultivation too unproductive to contribute significantly to agricultural production", and so required consolidated producers to fully implement all the recommended changes (Escobar, 1995, p. 160; see also, Chiles & Fitzgerald, 2018, p. 12). In turn, with knowledge and materials actively and endlessly transferred from international institutions, aid agencies, multinational corporations, universities and research centers, and governments, all with the expectation of radical change in "developing" countries, development advanced coloniality by subverting non-Western relational understandings to food and fix it, according to Escobar, to be "about growth, about capital, about technology, about becoming modern" (Escobar, 1995, pp. 40-41, 159, 162; see also, MacLachlan, 2015, p. 27; Rojas, 2001, p. 547). Those that resisted were non-modern and against the linear progression of humanity to universal

happiness (Escobar, 1995, p. 159). It was these initial flows of Western technical and scientific knowledge that "have been central to imagining the possibilities of a global modern agriculture and planet-wide modern diet" (Phillips L., 2006, p. 43).

4.2c Act Three: Orchestrating the Systems and Imagination of Modern Food

The seemingly straightforward path to modernity was disrupted by an early 1980s recession that rocked the economic order of the world (Harrigan, Mosley, & Toye, 1996, p. 8; United Nations, 1990, p. 125). Happiness was no longer attainable by the aiding hand of government, and instead modern confidence had to be placed in the third stage of development ethos: neo-liberalism, and the idea of a self-regulating, global free market to establish a new international economic order and position humanity on the correct path forward (Ebenstein, 2007, p. 210; Harrigan, Mosley, & Toye, 1996, p. 8; Friedman & Friedman, 1980, pp. 9-37; United Nations, 1980, pp. 106-108). With demanded repayments of debt suffocating the "developing" world, international financial institutions stepped in to administer the rapid mandating of deregulation, privatization, free trade, and the flow of foreign investment; rolled into the generic package of structural adjustment programs in order to establish macroeconomic stability, improve international competitiveness, and ultimately finance payment deficits (Harrigan, Mosley, & Toye, 1996, p. 8; Herath, 2009, p. 1454; Shafaeddin, 2006, p. 155). This saw development manifest as a means to liberalize – transfer control of – state industrial and capitalist agricultural systems to the hands of multinational and transnational corporations, and subsequently re-orient food consumption and production relations for most humans to one of passivity and exploitation (McMichael, 2000, pp. 22-23, 28;

United Nations, 1980, pp. 111-113). By swapping food security, governance, and symbolic power in the hands of non-Westerners for a new role in the global division of labour, the subordinated peoples of the world became an input of labour for the production of desired and appropriated high-value "exotic" foodways, and an output of consumption for mass, low-value staple Western foodways (McMichael, 2000, p. 23). This phenomenon of global corporate regimes undermined agriculture as an anchor of ontologies and cultures, and relegated it to a component of macro-scale capitalist business seeking perpetual growth (McMichael, 2000, p. 23). In doing so, it estranged food production and distribution from the majority of local control altogether and mounted dependence on imperial relations to the corporate regime, multilateral institutions, and foreign governments dictating all stages of the food system (McMichael, 2000, pp. 23-24). This shattering of autonomy ushered in an unspeakable loss for the ways of knowing, imagining, and being responsible for the harmonious preservation of land spanning millenniums prior to development (McMichael, 2000, p. 24).

The phenomenon carried well into the 1990s, with globalization – and the close integration and co-cooperation of countries after the decline of Cold War ideological conflicts – trade liberalization, deregulation, and the concentration of corporate power actively squeezing out small, independent, and nonmodern farmers, and normalizing across cultures these new detached relations and commodified materiality of contemporary food (Chiles & Fitzgerald, 2018, p. 12; Galt, 2013, p. 637; McMichael, 2000, pp. 31-32; United Nations, 1990, pp. 125-127, 129-131). Lynne Phillips persuasively compiles the developmentalist drive into three interrelated processes: (1) the

international circulation of food products as commodities, (2) the global governance of food and food issues, and (3) the transnational expansion of food-based corporations (Phillips L., 2006, pp. 38-43). In terms of the first process, the international circulation of food as a commodity, marked by "the shift to more flexible systems of production, the corporate search for higher profits in new and multiple territories, and a new approach to international trade to permit a freer flow of goods across national borders", has cemented the concept of a global food regime, and practices of standardization, that was once a local and contextual phenomenon (Phillips L., 2006, p. 39; see also, Chiles & Fitzgerald, 2018, p. 12; Galt, 2013, p. 637; McMichael, 2000, pp. 31-32). The second process relates to the involvement of international organizations that mobilize and direct food at a global level (Phillips L., 2006, p. 42). These include multilateral financial lending institutions, such as the World Bank and the International Monetary Fund, and various international trade agreements (Phillips L., 2006, p. 42). The latter can be directly linked to the lowering of trade barriers and the free flow of food, "through the Uruguay Round of General Agreement on Tariffs and Trade in the 1980s, and the establishment of the World Trade Organization in 1995" (Phillips L., 2006, p. 42). Hence, coerced or voluntary nations that took part in these sets of policies saw their protectionist strategies in support of local markets cut, and the flood of foreign competition assuming control (Gonzalez, 2004, pp. 421-422). The last process examines the growth and operations of food-related transnational corporations, attested by Phillips as "the driving force behind the restructuring of the global food system" (Phillips L., 2006, p. 29). Such transnational corporations are divisible into three distinguishing groups: enterprises that are involved in "how food is produced, those that distribute and trade food, and those that market food"

(Phillips L., 2006, p. 40). Characterizing and interlinking each grouping are the mandates to promote the industry's global expansion, standardize and maximize efficiency of practices, and exert control over supply (Phillips L., 2006, p. 40).

Given Phillips' assertion that "the concept of a modern globe has been and is still tied to the consumption of particular kinds of foods, the adoption of particular food production regimes, and the acceptance of particular kinds of food knowledge" – supported by the notion food is central to the dialectics of globality and locality – it is this period in the modern era that forever shaped Western approved foodways as an essential element to humanity's constructed and globalized collective reality (Phillips L., 2006, p. 43; see also, Chiles & Fitzgerald, 2018, p. 12; Inglis, 2015; McMichael, 2000, pp. 31-32). Through this developmentalist drive – in removing or appropriating non-Western cultural barriers in the interplay between culture and food – Western culture gained access to capture the legacy of food's centrality, draw upon precedented Western food culture to dictate the types of foodways to be included in the imagination of superior modern food, and control a single relationship toward food for all cultures to conform to (MacLachlan, 2015, p. 27; Phillips L., 2006, p. 43; United Nations, 1990, p. 131). Certainly, this dynamic hegemony over food can be contested by victimized cultures, but until it is broken the dominant global orientation of food "both symbolically expresses and is materially constituted in ways that make it a quintessential aspect of the contemporary social order" (Inglis, 2015, p. 470). Hence, the relegation of selected nourishment bearing lifeforms to a relation of servitude, wherein humans are justified – and eligible through the capitalist mode of production – to consume commodified animals on an unlimited

scale, maintains the cycle of coloniality cast on food since the processes of involuntary movement and exchange driven by colonial forces, and continues the disconnecting of non-Western peoples from the life substance that connects them to their ontologies and ways of knowing, imagining, and being (Inglis, 2015, p. 474; McMichael, 2000, pp. 28, 31-32).

4.2d Act Four: Quantifying Away the Problems of the Past

The fourth and most contemporary ethos of development arose in the 21st century. As the neo-liberal development agenda began to crack in the latter half of the 1990s, with increasing evidence of human inequality and a fundamental harm to the environment, attributed to the dominating global food system, a new reactionary agenda was formulated to dampen those fears and continue the means to global modernity (Elver, 2016, p. 87; Esteva, 2010, pp. 12-13; Sachs, 2017, pp. 2574-2576, 2577-2578). The Millennium Development Goals (2000-2015), succeeded by the Sustainable Development Goals (2015-2030), were the triumphant outcome, seeking to address the causes of hunger, ecological disharmony, and unfair social and economic distribution, while simultaneously progressing the framework of a corporately controlled global agricultural regime it inherited (Esteva, 2010, p. 13; FAO, 2016, pp. v, xvii, 4, 14-15, 45-46, 115, 118; FAO, 2002, p. vi; McMichael, 2000, p. 28; Sachs, 2017, pp. 2577-2578; United Nations , 2000; United Nations, 2015c). The posited answer, erroneous yet surrounded in the promise of hope and betterment, laid in further advancing the spread of modern science and the industrial model around the world, with “high tech responses including bioengineered, drought resistant crops, technologically sophisticated irrigation

systems, and genetically modified seeds, which are designed to be high yielding", and a refocus on applying these techniques to marginalized and small-scale farmers, all to overcome the now identified problem elements (Elver, 2016, p. 88; see also, FAO, 2016, pp. 46-50, 54-59; McMichael, 2000, pp. 26-28). In order to do so, the current measurement of "developing" countries has never been fiercer in this period of digital technology; monitoring life in a staggering amount of detail and speed and producing even more categories for comparison (Sachs, 2017, p. 2578). These quantitative indicators enabled planners at every scale of food production to take decisive action, correct perceived deficits, and even appropriate any oppositional discourse – with tactics such as greenwashing – to further the sustainable guise covering the contradictory nature of the development agenda (McMichael, 2000, p. 29; Sachs, 2017, p. 2578). For the new responsibility of all actors in the development arena became the proper sustainable management of people and resources (Jager, Verhagen, & Wösten, 2007, p. 58). Categorizing cultures and nature simply was the latest attempt to measure the world over and fit them within the prescribed Western ontology (Sachs, 2017, p. 2578). The glaring unimaginative aspect of sustainable development is that it continues to sustain the means to modernity, and aspire economic and social growth for happiness, with all the damaging implications that has for Earth (Esteva, 2010, p. 13; Ziai, 2017, p. 2553). This entirely fails to address the festering coloniality attached to its underbelly, and leaves the sustainable path forward as a means to harden the ontological divide between nature and culture that created the hierarchies of European and their descendants' superiority over nature, class, gender, and race.

4.2e Epilogue: The Solemn Fate of Ruminants in the Tragedy of Development

As the coveted practice of ruminant consumption, production, and distribution in Western culture reached the dawn of a new age after the Second World War, the narrative of modernity effortlessly resumed controlling and maintaining the relationships to justify centralizing these animals as a source of food for the attainment of consumerist happiness (Chiles & Fitzgerald, 2018, p. 14; MacLachlan, 2015, p. 27). Supporting this agenda was empirical research conducted by Western actors, identified as "academics, the general public, advertisers, and industry", that spewed modern discourse to legitimize and normalize this artificially constructed protein ladder, with prized ruminant meat only sharing the crown with pigmeat and poultry since the 1970s (Chiles & Fitzgerald, 2018, pp. 11, 14; see also, (MacLachlan, 2015, pp. 27-29; Ritchie & Roser, 2017). Albeit the terms of delivery changed to accommodate a colonially "free" global audience that would reject the once overt racial and gendered claims of past justification (Chiles & Fitzgerald, 2018, p. 14). One strategy for these actors was to capture the legacy of meat consumption in specific populations to universalize a natural genetic preconditioning for eating domesticated animals in the human species, and by extension that the activity is essential for our collective flourishing (Chiles & Fitzgerald, 2018, p. 14). Following this reasoning, such an activity is asserted to be innately demanded in terms of its (1) material necessity bound in the political economy, relating to the livelihoods of animal-dependent farmers; (2) environmental utility, surrounding the notion to make use of the productive capacity of grazing lands; and (3) human nutrition, building upon evolving notions of health (Chiles & Fitzgerald, 2018, pp. 4, 8-10, 12, 14; Ranganathan et al., 2016, p. 42; FAO, 1983, pp. vii, 79-81; FAO, 2009, pp. 3-4, 7, 32-33, 40; FAO, 2018, p. xiii).

However, indicative of David Scott's colonial governmentality, participating in the scaling of ruminant livestock – established as a universal direction for positive transformation – is to move within the constructs of the colonial system (Scott, 1995, p. 200). Therein, benefit is based on the imagined assumptions that capitalism provides livelihoods, that land is wasted if not utilized, and that a modern body requires detailed attention to every micronutrient and macronutrient to be healthy. The goal of such a system is to block out any alternative ways of knowing, imagining, and being and present these assumptions as the only way forward (Scott, 1995, pp. 200, 205, 208-211).

Development became the means to strengthen, stabilize, and globally disseminate the necessity of ruminants in a modern diet and to raised standards of living, with each iterative decade of development offering a renewed objective to emphasize the benefits of scaling this food (FAO, 1983, pp. vii, 79-81; FAO, 2009, pp. 3-4, 7, 32-33, 40; FAO, 2018, p. xiii; MacLachlan, 2015, p. 27; United Nations , 1961, p. 18; United Nations , 1970, p. 48; United Nations, 1980, p. 144; United Nations, 1990, p. 131). The path of action has been to upend past relationships to ruminants and circulate the assumption of the natural necessity of scaled red meat consumption, tying the patterns of rising meat consumption of a "developing" country together with an indicator of modernization (MacLachlan, 2015, p. 27; Wellesley, Happer, & Froggatt, 2015, p. 18). Reported cases of reduced poverty, and improved health and food security with the acquisition of livestock was thereby a major step up on the development ladder; with comparisons between consumption rates of the developed and "developing" world reflecting the rising progress of the latter to modernity (MacLachlan, 2015, pp. 27, 31). In turn,

modernization features such as urbanization, industrialization, and rising incomes and populations have been correlated – as mainstream determinates – with increased meat consumption, appealing to the notion that beneficiaries now have "improved physical and economic access to foods rich in protein and energy" (Wellesley, Happer, & Froggatt, 2015, p. 18; see also, FAO, 2009, pp. 11, 40; McMichael, 2000, p. 28; Reynolds et al., 2017, pp. 53, 57, 61-63). Hence, serving as a point of reference for glorifying intake, the rapid advances in availability of meat – especially beef – in the 20th and 21st centuries of Western countries symbolized the prosperity and values enjoyed in Western culture, and the happiness on offer to countries and cultures that follow suit (Chiles & Fitzgerald, 2018, p. 13). Ultimately, guided by the actors championing modernity, a global imagination of modern foods necessitated the centralization of ruminant livestock in dietary preferences (McMichael, 2000, pp. 31-32; Pingali, 2007, p. 282). Sustainable development represents the contemporary iteration in advancing the servitude of these animals for the benefit of humanity, as seen with the FAO rationalizing the sector's indispensability:

> Providing the world with sufficient and reliable supplies of meat, milk, eggs and dairy products; increasing the direct consumption of animal-source foods; helping to generate income and create employment; and strengthening the assets that rural households use to achieve their livelihood objectives. It can also help improve children's cognitive and physical development as well as school attendance and performance; empower rural women; improve natural resource-use efficiency; broaden access to clean and renewable energy; and support sustainable economic growth. Finally, it can generate fiscal revenue and foreign exchange; create opportunities for value addition and industrialization; stimulate smallholder entrepreneurship, close inequality gaps; promote sustainable consumption and

> production patterns; increase the resilience of households to climate shocks; and bring together multiple stakeholders to achieve all these goals (FAO, 2018, p. xiii).

Contrary to this manufactured popular opinion and assumption of practice, the chapter's earlier investigation reveals the story of eating ruminant livestock can be traced back to European "cultural-historical antecedents", and its key role in demonstrating civilization, progress, social, racial, and gendered status, and the superiority of humans over nature, and Europeans over the rest of the species (Chiles & Fitzgerald, 2018, p. 14). Only by the Industrial Revolution beginning in the eighteenth century, with the colonial outward expansion of industrialized and commodified ruminant meat – through relations of animal domination, objectification, and subjugation – did this dietary option of limitless ruminant consumption infringe and diffuse into distinct cultures of the world; where historically the phenomenon was aligned to a vastly different set of relationships and corresponding scale in practice (Blaney & Inayatullah, 2010, pp. 183, 195; Chiles & Fitzgerald, 2018, pp. 5, 10; Earle, 2012, p. 160; Emel & Neo, 2015, pp. 2-4, 10; Goossaert, 2005, p. 246; Mignolo, 2018, pp. 138, 164, 172; Robinson, 2020, pp. 109, 111; Walsh D. S., 2015, pp. 231-232, 235; Vansina, 1979, pp. 11-12, 15). The subjugation of these cultures to the logic of European ontological divides and their produced hierarchies frustrated the ability for alternative ways of knowing, imagining, and being directed toward food to flourish; contesting them with the path of modernity/coloniality and attempting to dictate their life experience (Chiles & Fitzgerald, 2018, p. 14; Escobar, 1995, p. 49). As this disruption of distinct lived realities persisted, the harmful scale of ruminant meat eating escaped Western cultural confines in language, literature and media, warfare, education, new technologies, grading practices, marketing,

hygiene and health, the research field, and as a social activity (MacLachlan, 2015, p. 27; Rojas, 2016, p. 372; Swatland, 2010, pp. 81-84).

As demonstrated, the claims of positivity for scaling livestock meat consumption thereby fails to acknowledge the culture of one particular community of humans as subjecting their guiding ontology over all other cultures on Earth (Chiles & Fitzgerald, 2018, p. 14). With a limitless consumption of meat representing a profoundly imparted aspect that legitimized one food culture and delegitimized others (Chiles & Fitzgerald, 2018, p. 14). Eventually, this was a new dietary habit that reflected a demand of what non-Western locals perceived as a richer and more varied diet, regardless of the importance past foods undergoing displacement had on "expressing and regulating sociality" (Inglis, 2015, pp. 470, 475). As a result, this culturally disseminated practice that has immense unsustainability – notwithstanding the scientific evidence that asserts overconsumption inflicts damage to human health, reveals the threat of transmittable parasites, toxins, and food-borne illness, and debunks the myth that meat serves as a superior source of protein compared to plant-based foods – is continued to be championed in the iteration of sustainable development as the means to modernity (McMichael, 2000, p. 28; Ranganathan et al, 2016, p. 33; Swatland, 2010, p. 83; Wellesley, Happer, & Froggatt, 2015, pp. 3-4, 6). On this journey, the role of cultural imperialism is conveniently omitted to blindly push forward to a new future. Ultimately, the European divide between nature and culture, guiding Western culture and blanketing cultures of the world – with development as the contemporary driving narrative of coloniality – played a critical role in dismantling past relationships to animals and

normalizing the importance and desire for an unsustainable scale of ruminant consumption elsewhere in the world. Investigation into the ongoing and unprecedented replication of such scale in Chinese food culture will seek to provide an in-depth case study of the transformation of ruminant-human relations within a non-Western culture (Ranganathan et al, 2016, pp. 3, 35; Ritchie & Roser, 2017; Searchinger et al., 2018, pp. 2, 15).

Chapter 5

Cultural History of Ruminant-Human Relations in China

As Chinese diets continue to experience a protein transition of unprecedented proportions toward the inclusion of ruminant products, a multitude of scholars have attempted to explain the rapid acceleration of demand for these products (Bai et al., 2018, p. 6; Delgado, 2003, p. 3908S; Dong & Fuller, 2010, p. 73; DuBois & Gao, 2017, p. 4; Fu et al., 2012, pp. 91-92; Gould & Villarreal, 2006, p. 1; Liu & Deblitz, 2007, p. 11; Ma, 2015, p. 195; Ranganathan et al, 2016, pp. 3, 35; Ritchie & Roser, 2017; Searchinger et al., 2018, pp. 2, 15; Wang et al., 2016, p. 149; Zheng & Henneberry, 2009, p. 873). The mainstream narrative on the subject identifies two major – frequently determinant – drivers: income growth and urbanization (Bai et al., 2018, p. 6; Delgado, 2003, p. 3908S; Dong & Fuller, 2010, p. 73; Fu et al., 2012, pp. 91-92; Gould & Villarreal, 2006, p. 1; Zheng & Henneberry, 2009, p. 873). The two drivers are argued to be intimately interlinked, as urbanization leads to income growth and a diversification of diet, and income growth facilities the expansion of such a diet to include more expensive varieties, particularly ruminants (Delgado, 2003, p. 3908S; Fu et al., 2012, p. 95). Such a linked cause is thereby exacerbated by the rapid increase of China's urbanization level, from 20 percent of the population in 1980 to 50 percent in 2010 (Fu et al., 2012, p. 95). Beyond these two factors, other scholars have identified sensory appeal, financial status, and sheer availability offered through modern production as contributing to rising demand levels, albeit with a reduced impact (DuBois & Gao, 2017, p. 4; Liu & Deblitz, 2007, p. 11; Ma, 2015, p. 195; Wang et al., 2016, p. 149). These core identifed factors align with

both supply-side and demand-side literature on the assumption that such "developing" parts of the world – of which China is included – are undergoing the natural developmental trajectory to attaining a desirable product, and thus the conclusion that rising levels of consumption are an inherent facet of betterment, irrespective of the climate impact (Brunelle, Coat, & Viguié, 2017, p. 4; Garnett et al., 2017, pp. 24-25; Herrero et al., 2016, p. 452; Kiff, Wilkes, & Tennigkeit, 2016, p. 10; MacLachlan, 2015, p. 27; McMichael, 2000, p. 28; Searchinger et al., 2018, pp. 1, 15; Wellesley, Happer, & Froggatt, 2015, pp. 2, 17, 18, 20; Willett et al., 2019, pp. 449, 471).

Aside from limited exceptions, conveniently excluded from this story of a linear trajectory for global ruminant consumption is the role of culture, as identified in Chapter 4 to be of prime importance: exposing the role of foreign-induced culture change as a significant driving force for such patterns (Brunelle, Coat, & Viguié, 2017, p. 6; Searchinger et al., p. 15; Wellesley, Happer, & Froggatt, 2015, pp. 38, 41, 51). Specifically, the colonial dissemination of a Western ontological divide between nature and culture that situated ruminant-human relations to centralize these animals as proper commodified food for consumerism. Although China resisted colonization and the partitioning into Western empire, it nonetheless did not elude the expanse of coloniality, the violence thereof, and the impact that had on cultural relationships to food (Mignolo, 2018, p. 221). A structure of power that shepherded the displacement and/or reformulation of traditional dietary preferences and relations – that had locally developed over time and space, and once expressed and regulated sociality – in favour of imagined superior foods and consumption patterns (Inglis, 2015, pp. 470, 475; Pingali, 2007, p.

282). This raises two questions: was simply the means and mode of production the missing element in satisfying a desire of ruminants that has always lingered there? Or was there a different relationship to these animals that existed prior to the developmentalist drive toward modernity? Thus, in order to answer these questions and close the gap in demand-side literature, in the context of China, the following will be addressed: (1) examine the historic cultural distinction that the Chinese ruminant-human relationship excluded levels of copious and wide-spread consumption of the animals; (2) identify the influence of cultural imperialism on shifting Chinese dietary preferences and relations; and (3) reflect on any immemorial relationship that inhibited the replication of this environmentally ruinous activity and advances the collective responsibility to prevent global warming from rising above 1.5°C pre-industrial levels.

5.1 Forming Chinese Food Culture: The Rise and Adherence of *Niu Jie*

The culture of Ancient China, specifically comprising the Zhou dynasty (1046 – 256 BC), was formed by and living within a cosmology principled on relationality, fluidity, and the coexistence of the opposite (Mignolo, 2018, pp. 135, 154-155, 167; Liu & Huang, 2006, pp. 517, 521-524; Zhuo, 2018, pp. 49-50). As one version of the story for creation goes, the universe "came from the *wu* (nothingness) of the chaotic *wuji*, through the *you* (thingness) of the *Taiji* harmony", to the receiving "transformation by the dual *yin-yang* principles" that eventually brought about the emergence of the world (Zhuo, 2018, p. 49). According to the classic text *Wuyun Linianji*, *yin* formed Earth, *yan* formed Heaven, and humanity formed by the infusion of *yin-yang* energies (Xiaodong, 2011, p. 168; Zhuo, 2018, pp. 49-50). *Tianxia* represents the spatial and interconnected

existence for known humanity, wherein lies the network within which humans learn, contest, and thrive through the interactions with the Eight Diagrams (Heaven, Earth, Water, Fire, Wind, Thunder, Mountain and Lake) and one another (Liu & Huang, 2006, pp. 518, 520-523). Under the guidance of this evolving cosmology, the period gave birth to a multiplicity of ways of knowing, imagining, and being that would come to shape the cultural history of Imperial China (221 BC – 1912 AD), and the centuries of successive dynasties within (Liu & Huang, 2006, pp. 526-528; Mignolo, 2018, p. 167). Daoism emerged as one of the overarching indigenous narratives, interpreting the *yin-yang* principles as attached to the *Dao*: "the origin of heaven and earth and the mother of the myriad of things" (Zhuo, 2018, p. 76; see also, Nelson, 2009, pp. 294, 306). Accepting the *Dao* is to believe that "the natural world operates spontaneously, fluidly, and through alteration, self-generatively transforming itself according to its own flows, rhythms, and seasons" (Nelson, 2009, pp. 307-308). In recognizing and living by this "concrete mutuality of things", and the relation to "nature from within nature itself", one can be in harmony with the complementarity *yin-yang* (Nelson, 2009, pp. 307-309; see also, Mignolo, 2018, p. 167). The philosophical brainchild of Lao Zi and Zhuang Zi, Daoism would go on to manifest simultaneously as a religious belief system and solidify as a foundational idea in the culture of China (Zhuo, 2018, p. 76). The result was a cultural avenue that acknowledged eternal co-existence, the interconnectedness of all living organisms and spiritual beings, and the capability to weave relations throughout (Nelson, 2009, pp. 294, 308; Mignolo, 2018, pp. 167-168; Zhuo, 2018, pp. 76, 90-92).

Guided by this cosmology, Chinese food culture under the impression of Daoism was rooted in a vastly different set of relationships compared to Western culture throughout much of time. Focusing attention on ruminant-human relations reveals the telling divergence, with the European relegation of these animals to a life of servitude – justifying and necessitating an insatiable scale for their meat and products – contrasting with the Chinese precedent to protect draft animals and respect animal life and autonomy – delineating a path toward minimal consumption or avoidance altogether (Chang, 2016, pp. 541-542; Goossaert, 2005, p. 239; Nelson, 2009, p. 307; Simoons, 1991, pp. 31-32, 304; Zhuo, 2018, pp. 239-240). The first norm-forming relationship referred to the "reciprocal debt of gratitude" owed to venerated ruminants, namely for their relation to humans as essential work companions in agricultural production (Goossaert, 2005, p. 241; see also, Simoons, 1991, p. 304). Thereby basing pragmatic grounds to honour their material and symbolic role in ensuring both the survival of society and – on a personal level – of individual farmers and their family (Goossaert, 2005, p. 241; Simoons, 1991, p. 304). The second norm-forming relationship directly linked to the teachings of Daoism, and was most clearly advocated in Zhuang Zi's *Inner Chapters*: with the understanding that "each of the ten thousand or myriad things has a life and perspective of its own; each is 'singular' in being naturally distinct from every other. This singularity and inherent worth in each thing entails a relative parity to the extent that each is equally important in having its own life and way" (Nelson, 2009, p. 307). Thus, as each life is "relatively equal in being differently its own, one cannot not properly assert that one way of being is preeminent over others" (Nelson, 2009, p. 307). Further reinforcing this, Lao Zi imparted his wisdom in *Daodejing* and appealed for a "receptive and reverent approach to the

myriad things residing between sky and earth" and rejected any form of dominance or use of coercion (Nelson, 2009, p. 296). In specific reference to gastronomy, Lao Zi argued "blindly following one's own stomach and tongue can lead to insanity and deviate away from the *Dao*", and offers the "appreciation of minimal flavor" as the alternative to "sensual gratification", especially when "associated with gluttony and cruel treatment of animals" (Chang, 2016, pp. 541-542). While this Daoist canon cemented the respect for animal life and autonomy, it was only after the arrival of Buddhism from India in the first century that action became infused with the introduced religion's practice of vegetarianism as a corresponding ethics of purity (Goossaert, 2005, p. 239; Simoons, 1991, pp. 31-33). Albeit this integration of vegetarianism (known as the *su* diet) into Daoism presented its own conflicting qualms, traceable to a Chinese practice of the most ancient origins (Simoons, 1991, p. 31; Zhuo, 2018, p. 31).

Ever since primordial ghost and nature worship, the commensality and rituality of sacrificial feats – whereby consuming blessed foods, occasionally including the meat of ruminants – continued to act as a vessel to link living humans with the dead, the spirits, and natural phenomena, and thereby create a world of continuity (Goossaert, 2005, pp. 239-240; Puett, 2005, pp. 83, 90-91; Zhuo, 2018, pp. 31-32, 39-41). As time progressed, and Daoism came to be institutionalized as a religion by the second century – arising from the ideas of the Yellow Emperor and Lao Zi that transformed Dao into a deity – an uneasy tension arose between these sacrificial feats and the purity of vegetarianism (Goossaert, 2005, pp. 239-240; Kleeman, 2005, pp. 141, 146, 148-149; Zhuo, 2018, pp. 79-80). Such a tension would continue to persist unresolved until the rule of the Tang

dynasty (618–907 AD), wherein the established Daoist and pragmatic relations toward ruminants would manifest into a Chinese beef taboo that singled out and forbade the killing and eating of these most sacred animals for any such purpose (Goossaert, 2005, p. 243; Simoons, 1991, p. 32). Although some Daoist texts argued the preferability for complete vegetarianism, the dissemination and acceptance of this beef taboo – translated and documented by Vincent Goossaert as *niu jie* – nevertheless had a profound impact on food customs that lasted for centuries (Goossaert, 2005, pp. 237, 240; see also, Simoons, 1991, p. 32).

Niu jie is specifically the "moral injunction to not kill bovines or to eat their flesh", with bovines referring to a ruminant subfamily of large mammals with cloven hoofs (Goossaert, 2005, p. 237). The observation of this taboo was first recorded in *biji xiaoshuo*, a collection of anecdotes that dates to the nineth century and continued to be referred to and spoken of in ethical Daoist texts thereafter (Goossaert, 2005, p. 238; Simoons, 1991, p. 35). One such influential statement of the time read "in favor of compassion to animals, an admonition against eating flesh on an everyday basis, and an observation that it is sinful to kill an animal just to satisfy one's taste" (Simoons, 1991, p. 35). Other texts extended the call further, declaring "the punishments in hells of those who kill bovines or eat beef, and the divine rewards for those who vow to Heaven to never to kill bovines or eat beef" (Goossaert, 2005, p. 238). Contextualizing the socio-political events at the time helps to explain the sudden surfacing of the taboo, whereby the Tang dynasty, under the leadership of Emperor Li Shimin, began an unwavering campaign to revere Daoism as the principle religious and philosophical teaching across

China (Zhuo, 2018, p. 82). The subsequent flourishment of Daoism attested to the success of the campaign: reaching new heights with various sects spreading and thriving throughout the provinces, and preserving its status into the Song dynasty (960–1279 AD) that resumed championing the religion (Zhuo, 2018, pp. 82-83). Eugene N. Anderson accounts for the general abandonment of bovines as a source of food during this period, remarking that many in communities regarded "the cow as unfair game", and those that did choose to eat beef did so with a sense of shame (Anderson, 1988, p. 66). Hence, the adherence of this taboo not only reflected the choices for individual morality and status in Chinese culture, but characterized entire communities devoted to the path of purity (Goossaert, 2005, pp. 244-247). As per the sustained effects of the taboo, evidenced by moving through the Song Dynasty, Edward L. Davis notes the references in several anecdotes that link the necessity between abstaining from the meat and ritual purity (Davis, 2001, pp. 50, 59, 70, 117, 122). Recounting one of these tales reveals the consequences of being unclean: "The judge criticized Li Sheng for his sloppy calligraphy and for his inability to abstain from meat and alcohol… Within a matter of days, Li passed away" (Davis, 2001, p. 50). Ultimately, in accordance to honouring the *Dao*, the humble and subsistence consumption of grains, vegetables, fruits, and fish personified the diets that the majority of Tang dynasty inhabitants – and each successive dynasty thereafter – adhered to (Simoons, 1991, p. 303; Sterckx, 2005, p. 35; Wellesley, Happer, & Froggatt, 2015, p. 21).

The development of *shanshu* – morality texts devoted to the accounting of actions – in the sixteenth and seventeenth centuries witnessed *niu jie* become codified into the

broad basis of Chinese morality (Goossaert, 2005, p. 238). With such a discourse reinforcing the "sin to even touch a single part of a dead bovine", and even commanding that "bovines that died a natural death were to be provided a proper burial" (Goossaert, 2005, p. 242). The taboo extended into the late imperial period of the Qing dynasty, until its dissolution in 1912, as evidenced by reference in copious forms of art and legal documents during the time (Goossaert, 2005, p. 238; Simoons, 1991, p. 303; Xiaoqing, 2003, p. 217). Noting one such legal enactment, Simoons describes the "strong public pressure" that brought about binding laws to protect "cattle and water buffalo against such slaughter for food" by the dynasty (Simoons, 1991, p. 303). The prominent early Qing novel *The Scholar* reaffirms the presence of these laws through recounting the grievance of a Chinese Muslim upset about how "an imperial ban on cow butchering has deprived him of a main meat source" (Anderson, 1988, pp. 119-120). As this historical investigation has showcased, the adherence of *niu jie* in Chinese culture contributed to the formation of a Chinese identity that was passed down and aspired to for generations; an identity that signified the concept of a moral and religious individual and provided social acceptance in one's community.

5.2 Reimagining Chinese Food Culture: The Downfall of *Niu Jie*

The Opium War (1839-1842) has been classified as the landmark clash between Western and Chinese culture that would go on to irreversibly disrupt and unsettle regional and internal dynamics of the latter (Fitzpatrick & Monteath, 2019, pp. 1-2; Frank, 1978, p. 344; Klein, 2012, pp. 789, 794). The resulting British victory and unequal Treaty of Nanjing would foreshadow the recurrent Western colonial and imperialist

attitudes, ambitions, and incursions that has come to represent the "century of national humiliation" (1842-1949) in Chinese historical discourse, and a necessary stimulus for China's revolutionary change in Western academia (Klein, 2012, pp. 789, 795; see also, Cohen, 2003, pp. 49-50; Fitzpatrick & Monteath, 2019, p. 2). Both accounts are interpretations of the undeniable effect foreign powers – agents of the Western ontological divides – had on Chinese culture, people, and the dynastic system (Cohen, 2003, pp. 49-50; Fitzpatrick & Monteath, 2019, p. 2; Klein, 2012, p. 789). For as the presence of the ontology became forcibly known, and in opposition to the historic cosmology guiding Chinese culture in harmony with nature, there followed not only the European violent display of dominance, but also the process of othering those outlying to their way of knowing, imagining, and being (Dirlik, 1996, pp. 104-106, 111, 117; Escobar, 1995, p. 6). The categorization of Chinese peoples into the Orient, and the degree of power leverageable over foreign discourse and relations, whereby "European culture was able to manage – and even produce – the Orient politically, sociologically, ideologically, scientifically, and imaginatively", expresses the implicit coloniality faced in China (Said, 1979, pp. 3, 46; see also, Dirlik, 1996, pp. 111-112; Klein, 2012, p. 798; Klein, 2014, pp. 277, 279, 289-290; Mignolo, 2011, pp. 48-49).

One avenue this Orientalism transpired was through articulating, questioning, and challenging cultural food differences, as seen with the Chinese beef taboo and the gradual weakening of a norm established for nearly a millennium (Goossaert, 2005, p. 246). Arising after the Opium War, the process was seeded in the second half of the nineteenth century as the Qing dynasty conceded Chinese harbours for treaty-ports to satisfy

European expansionism, with each power vying for comparative advantages in trade (Fitzpatrick & Monteath, 2019, pp. 2-3). These secessions first and foremost fundamentally challenged Chinese cosmology that situated China in the interconnected space-time of *tianxia*, wherein access with the Eight Diagrams (Heaven, Earth, Water, Fire, Wind, Thunder, Mountain and Lake) guaranteed there was "no other cultural form more advanced than the Chinese culture" (Liu & Huang, 2006, pp. 518-523). Existing in *tianxia* was therefore inconceivably different than that of the Western imagined geopolitical entity of a nation and/or state (Liu & Deblitz, 2007, p. 519). Hence, the violent clash of systems lay bare the reality of absolute sovereignty for questioning; gradually eroding the powerful mindset of *tianxia*, as historically known, to make way for accepting the unilateral transposition of China into a sea of nations (Liu & Deblitz, 2007, pp. 533-536). As a process of fracturing, this "completely changed Chinese people's comprehension of the world as a whole" (Liu & Deblitz, 2007, p. 533).

Set against this backdrop was the presence of Western foreigners housed in treaty-ports and their antagonistic cultural dietary attachment to consume bovine meat (Goossaert, 2005, p. 244). The experiences in Shanghai during the late nineteenth century exemplified such a foreign imposed ruminant-human relation, the ensuing contestation between ways of knowing, imagining, and being, and the eventual displacement of established norms connecting these animals and the indigenous locals (Xiaoqing, 2003, pp. 217-220). Ever since the city was opened to port settlements, ushering in an influx and concentration of Western foreigners to reside there, the presence of abattoirs inside the demarcated colonial zones – raising, fattening, and objectifying bovines to profit and

keep pace with a scaling demand for beef – created an uneasy tension with the other sections of the city that observed the beef taboo and the prohibition against the slaughter of bovine (Xiaoqing, 2003, pp. 217-218). Hence, far from being an undetected practice, the close proximity to this blatant disregard actually loosened a customary aspect of traditional Chinese culture and exposed the opportunity for a constructive dialog (Xiaoqing, 2003, pp. 217-218, 220). This created a schism of opinions, divided on whether to support and maintain Chinese ruminant-human relations, steeped in morality and pragmatic honor, or to question its legitimacy and partake in this exotic beef consumption (Xiaoqing, 2003, pp. 217-218). As the process of becoming "more accustomed to Western food" persisted, and the "debates, hesitations, and especially the protests from the traditionalists" fizzled out, the people of Shanghai are observed to have increasingly shed their inhibitions against the practice and adopt widespread beef eating (Xiaoqing, 2003, pp. 217-220). By the end of the nineteenth century, "eating beef was accepted as if it had always been so" (Xiaoqing, 2003, p. 220).

This is not to suggest Western foreigners were unaware of the beef taboo in China, on the contrary they became quite wary of the various forms of publications on the practice, with one such tract on proper moral behaviour seeking to dissuade bovine consumption by warning of "sudden death after eating beef", and that abstinence was a "guarantee of success in the imperial examinations, if not for oneself then for one's grandsons" (Xiaoqing, 2003, p. 217; see also, Goossaert, 2005, p. 245). In detailing the local distaste of such a perceived proper and civilizing food, American missionary Justus Doolittle wrote in 1865 that water-ox or buffalo are "regarded as a meritorious animal",

whereby the animals are “raised solely for its invaluable services in plowing and harrowing the land”, and that even their milk “is not used for making butter or cheese, nor as an article of food” (Doolittle, 1865, p. 58). Further discrediting the seemingly failure of China to improve the land and innovate livestock management and breeding, Scottish botanist Robert Fortune noted on a visit in 1847 that “the knowledge and practice of agriculture, although the Chinese may be in advance of other Eastern nations, they are not for a moment to be compared with the civilised nations of the West" (Anderson, 1988, p. 117). As such, European commentary on China’s visible averseness to new ways “took on the aspect, for many Westerners, of an obsolescent society doomed to languish in the stagnant waters of barbarism until energized and transformed by a dynamic, cosmopolitan, and cosmopolitanizing West” (Cohen, 2003, p. 50). Although this blunt cultural clash on the taboo had itself a limited immediate impact outside treaty-ports, it nevertheless ignited in the late Qing dynasty an internal religious and ethical debate between draft bovines and meat bovines, and thereby the ontological divide between nature and culture (Goossaert, 2005, pp. 245-246; Xiaoqing, 2003, pp. 218-219). Returning to the city of Shanghai, the novel *A Brief History of Enlightenment*, written by Li Boyuan that recounts a conversation between friends at a Western-style restaurant, informs such debates occurring during this time:

> Yao Wentong said, “Over the many generations since our founding ancestor, we have never eaten beef. So please don’t insist.”
> Hu Zhongli laughed loudly. “You are supposed to be an advocate of new learning, but you won’t even eat beef. This is sure to make your reformist friends laugh at you!”
> Kang Botu said, “The oxen of Shanghai are different from those in China proper. There, the oxen plough the fields and exert themselves for the good of man, and so

> people cannot bear to kill them and eat them. The foreigners in Shanghai, however, rear cattle and make them fat, so that they can kill them for their meat. So they are called edible oxen, and eating them cannot be considered wrong" (Xiaoqing, 2003, pp. 218-219).

This demonstrates the rising consciousness of a minority of Chinese moving beyond the cultural supremacy *tianxia* granted, and even going so far as to assume the identity of the non-modern Orient – of which was constructed by and contrasted against their modern colonial counterparts (Dirlik, 1996, pp. 111-113). Relinquishing the perceived traditional ruminant-human relation premised on the respect for animal life and autonomy, as orated by Daoism, and prescribing to the legitimacy of beef consumption, as per the colonial system of control and management over ruminant-human relations tied to the notions of race, class, and gender, can thereby be seen as an act of improving, or progressing, the Orient by distancing the identity from measures of subordinance (Dirlik, 1996, pp. 104-105, 112-113; Mignolo, 2011, pp. 48-49). A deliberate move by Orientalized Chinese in an effort to equalize themselves and their relation to others in a culturally violent post-*tianxia* world (Dirlik, 1996, pp. 104, 112; Mignolo, 2011, pp. 48-49).

The base for more widespread approval of radical Western-inspired socio-cultural changes occurred during the Hundred Days' Reform (Kwong, 2000, pp. 667-668). On June 11, 1898, by the edict of the Guangxu Emperor to ward external enemies and strengthen China, the dynasty embarked on a movement of applying *xinfa* (new foreign measures) to "educational, economic, military, and administrative" spheres (Kwong, 2000, pp. 667-668). While the Emperor "did not call for a sharp break with the past" and

advocated change “would be adopted without prejudice to the sages' moral teachings”, these reforms opened the door to the Western ontological divides, and a foreign way of knowing, imagining, and being, by situating the need for change in a new international reality previously unacceptable in the worldview of *tianxia* (Kwong, 2000, pp. 667-668; Liu & Deblitz, 2007, p. 536). As this process of reorientation transpired, and the religious structure of late imperial China waned under the disintegration of *tianxia*, the “beef taboo lost much of its importance when, from 1898 onward, the temple communities were ruined as a result of anti-superstition policies” (Goossaert, 2005, p. 246). Nevertheless, abstaining from bovine meat “remained strong as a marker of an individual’s ethical values” (Goossaert, 2005, p. 246). The deep-seated cultural norm depicting bovines as friendly draft animals thereby prevailed, and the increasingly anti-imperialist sentiment coursing through China only spoke to retaining such a distinct cultural attitude in the face of Westernization and a threatened Chinese identity (Fitzpatrick & Monteath, 2019, p. 4). Such resistance against Europeans came to the fore in acts that included the September 21, 1898 conservative coup by Empress Cixi, retracting the Emperor’s imperial agenda and executing six leading scholar-officials of the reform, and the 1900 Boxer Rebellion, whereby the Qing dynasty declared war against all forms of Western imperialism and suffered a crushing defeat (Fitzpatrick & Monteath, 2019, p. 4; Kwong, 2000, pp. 665, 671, 675-676). The aftermath of the latter act of resistance unhinged the momentum for the Western ontological divides to spread over China, motivate those within to internalize the Orient, and rewire Chinese culture anew; as testament by two proceeding events: The first being the Xinhai Revolution (1911-1912) that overthrew the Qing dynasty, dismantling a system of dynastic rule and state religion since Ancient China, and, by

adhering to the Western oppositional binary principles of space-time, replaced it with a linear conception of time, the Gregorian calendar, and a sovereign state system with the Republic of China (Klein, 2014, pp. 289-290, 292-293). This thrust into question treating "China's past as [a] sacrosanct body of knowledge of all that was significant – mythical, cyclical, moral, and ritualistic" – and tore open a void (already ripped by contesting *tianxia*) to be filled by a newfound depth of cultural interactions with foreigners (Kirby, 1997, p. 452; see also, Kwong, 2000, p. 665; Yü-sheng, 1979, p. 21).

Emerging from of this conscious disillusionment of broken social and moral bonds, the second disrupting event was the New Culture Movement (mid 1910s-1920s) that captured the uncompromising desire of an intellectual group to abolish conservative forces, adopt Western thought, and ultimately escape deteriorating conditions facing China (Chen, 1970, pp. 64, 72-74, 81; Yü-sheng, 1979, p. 26). Leading the iconoclastic pact were prominent men Ch'en Tu-hsiu, Hu Shih, and Lu Hsün, each with a distinctive take on social and political action but nevertheless all committed to the cause (Yü-sheng, 1979, p. 7). Uniting them was the belief that "cultural change was the foundation for all other necessary changes" on the path to rejuvenate China, and involved no less than "changing man's ideas concerning his total conception of, and relationship to, both cosmic and human reality" (Yü-sheng, 1979, pp. 26-27). This radical estrangement of remnant ways ushered in a national movement of mass consciousness to culturally break from Chinese institutions and ideas of the ancient past, and let flourish of a new way of knowing, imagining, and being based in science, reason, and democracy (Chen, 1970, pp. 63, 65, 72, 74; Yü-sheng, 1979, pp. 20-21, 26-27). In illustrating the acceptance of the

nature/culture divide, Charles Darwin's theory of evolution through natural selection, and the concept of survival of the fittest, proved to be particularly guiding for revolutionary intellectuals, expressed in a way that reflected a "general belief that Darwinism is a universal law of the cosmological and the human as well as the biological world" (Yü-sheng, 1979, p. 56). As this situated a "new criterion for evaluating Chinese social and cultural tradition", the civilized Western notions of the divides, between nature and culture, moderns from non-moderns, and a linear conception of time, began to defuse together into the making of a transformed Chinese culture (Yü-sheng, 1979, pp. 57, 153; see also, Chen, 1970, pp. 74, 77-78). Accepting these new terms of reality, and thereby fully immersing oneself in the Orient, unrestricted the opportunity to envision a new Chinese ruminant-human relationship free from the perceived backward past bound to Daoism, and to do so on a greater scope than mere treaty-port populations (Yü-sheng, 1979, p. 56). The future of beef eating was in good hands, as by no means did the iconoclastic agenda subside with the passing of the New Culture Movement, on the contrary it produced a discernable point of origin for future agendas of radical change (Yü-sheng, 1979, pp. 5, 157-158). Inspiring no other than forthcoming leader of the Chinese Communist Party Mao Zedong, that "so crucially influenced Mao during the formative years of his intellectual life" (Yü-sheng, 1979, p. 5). Hence, this newfound nationalism of the twentieth century, and the drive for progress that would be fueled through Marxist-Leninism, resembled not merely a Westernized endeavour, but rather a distinctly Chinese interpretation of China's history as a story of national emergence (Dirlik, 1996, pp. 106-107; Yü-sheng, 1979, pp. 5-7). Albeit drawn from the "images, concepts, and standards" that constituted a contemporary consciousness of which

‘Western’ ideas, including the ‘imaginative geography’ of orientalism, were an integral component” (Dirlik, 1996, p. 107). This homogenization of space-time thereby conjured a stagnant feudal society, as presently situated in, as the base for necessary change, and in doing so “maintained a sense of cultural identity in the course of change” by reorienting and reinvigorating the radical anti-traditional ideology and actions that transpired during the New Culture movement (Yü-sheng, 1979, pp. 5-7, 158-159; see also, Dirlik, 1996, p. 107). Albeit after all this, the beef taboo, in honouring pragmatic ethics, still managed to persevere throughout pocket communities in China, as Mao Zedong, “impressed by the zeal of Hunan peasants who observed the taboo, observed himself in 1927” (Goossaert, 2005, p. 246; see also, Smil, 2002, p. 608).

The taboo only started to fully deteriorate with the founding of the People’s Republic of China on October 1, 1949, as the onset of this unified state marked the structured capability to reach, disseminate, and enforce on all corners of its borders a new culture guided by the Western teachings of communism (DuBois & Gao, 2017, p. 3; Dirlik, 1996, p. 115; Kirby, 1997, p. 458; Li, 2001, p. 138; Simoons, 1991, pp. 30-31). This new ideology purged Chinese culture of structural, religious, and ethical restrictions tied to a past cosmology and refashioned and homogenized existence as a core binary between culture and nature, attesting to an egalitarian human-centric approach to dominating the latter (Dirlik, 1996, p. 115; Li, 2001, pp. 137-139, 140-142, 155; Simoons, 1991, pp. 30-31). As such, the drive of socialist development to achieve prosperity was a process “based on collective effort rather than… individualistic self-oriented motivation” (Li, 2001, p. 144). Nevertheless, accompanying such an

uninterrupted march toward socialist modernization was the "introduction of new forms of knowledge, industrialisation, [and] the emergence of urban and cosmopolitan lifestyles" (Klein, 2014, p. 294; see also, (Yü-sheng, 1979, p. 5). The radical realignment of the Chinese ruminant-human relationship speaks to these changes, as manifested during the 1950s agrarian revolution and collectivization policy, whereby mass migration to urban cities, the transfer of agricultural production decision-making from the hands of households to rational bureaucratic planners, and the awe of agricultural mechanization dissolved any remaining pragmatic ethical attitudes toward bovines (Klein, 2014, pp. 284, 286-288; Kuhn, 2004, pp. 74-75). However, even as this signaled the sharp break with a past, seemingly unmodern ruminant-human relation, the reality of agriculture practice in China still dictated the use of bovines for work, employing only spare machinery – owing to Mao Zedong's insistence that in the interim of modernity "labour-intensive methods of production, which stressed manpower over machines, could be as effective as expensive technology" (Kuhn, 2004, pp. 74-75). As the Great Leap Forward commenced in 1958, the imagination that bovines could carry out the same efficiency and effectiveness as machines was as foolish as Mao imagining China's production "could catch Britain within fifteen years" (Kuhn, 2004, p. 74). Attempting to attain preposterous agricultural output quotas – such as "increase food production by 50 percent" – at the expense of the life energy of bovines simply reduced them to an objectified tool, someday to be replaced by machines (Kuhn, 2004, p. 75). While this path of objectification began to align the ruminant-human relationship toward a life of servitude, the orientation of these animals to serve as a source of limitless food was still one missing component away in the colonial matrix of power, and thereby reflected uptake remaining

"very low throughout the first three decades" in the Marxist-Leninist People's Republic of China (DuBois & Gao, 2017, p. 3). That component was none other than class, and the integration into the capitalist system of evaluation and mode of production.

This all changed with the adoption of China's Open Door Policy in 1978, helmed by reformist and new paramount leader Deng Xiaoping, and the redirection of the state's future through a series of social and economic transformations that echoed key facets of market capitalism (Huan, 1986, pp. 1, 4; Kuhn, 2004, p. 100; Li, 2001, pp. 138-139, 152). The ensuing incursion of Western development, and the duality of modernity/coloniality, offered the route to elevate and assert the "unique national culture" of China and overcome the limitations that prevented the formation of a new Chinese ruminant-human relationship (Dirlik, 1996, pp. 116-117; see also, Escobar, 1995, p. 49). Rendering these imagined homogenous Chinese values, themselves derivative of orientalism, "into a value-system conductive to capitalist development" would come to grant the desired outcome at the hidden expense of the "consolidation of Eurocentric hegemony – or, more accurately, the hegemony of capital globally" (Dirlik, 1996, pp. 116-117). As the tide of ruminant livestock development swept the agricultural landscape, a slew of agricultural policies and investments directed at privatizing land and infrastructure, industrializing production, and maximizing efficiency took hold during the 1980s and into the 1990s (DuBois & Gao, 2017, pp. 3-4; Dong & Fuller, 2010, p. 75; Huan, 1986, p. 3; Li, 2001, pp. 138-139, 152; Ritchie & Roser, 2017). In turn, the objectives to attain economies of scale saw China enter the global agricultural space; exemplified by the major involvement by foreign companies, the reliance on vertical integration spanning nation-

states, and the ascension into the World Bank and IMF in 1980 and the World Trade Organization in 2001 (DuBois & Gao, 2017, p. 4; Huan, 1986, p. 7). Furthermore, heavy government subsidies, scientific breeding advancements, and lax environmental policies played an important contributing role in developing a competitive livestock industry (Bai et al., 2018, pp. 2, 6). The resulting freedom granted to ruminant meat supply underscores the stark transition in production levels and food availability from the earlier People's Republic of China – fresh from fully dismantling the beef taboo – to the modern state guided by Western development. In contrasting the two periods, first between 1961 and 1977, total ruminant production increased from 179,802 tonnes to 590,378 tonnes; when compared with production levels over the same timespan, from 1978 to 1994, an increase of 602,629 tonnes to 3.9 million tones occurred, the latter of which represents a remarkable 319 percent difference over the preceding period (Ritchie & Roser, 2017). As might be expected, the rapid increase in the scale of production of livestock impacted the demand for feed, competition for agricultural land, and exacerbated levels of environmental damage (Bai et al., 2018).

This developmental endeavour graciously destroyed any remaining attachment for bovines as work animals and aligned them to a Western relationship of servitude: serving as an objectified source of revenue and near limitless commodified modern protein (DuBois & Gao, 2017, pp. 3-4; Pingali, 2007, p. 282; Wellesley, Happer, & Froggatt, 2015, p. 18). As the state pushed for the mass consumption of these de-animalized lifeforms, through mediums such as law (i.e. food safety), deflating prices (i.e. corporate subsides and tax incentives), and reporting dietary benefits, coupled with transnational

corporate marketing campaigns and business strategies aimed at manufacturing the global imagination and desire for said foods, Chinese food culture was shaped in favour of an unsustainable scale of ruminant products (DuBois & Gao, 2017, pp. 4, 12, 14, 16; Phillips L., 2006, p. 45; Ritzer, 1983, p. 100; Zhang, 2014, pp. 23-24, 26, 30). The simultaneous diffusion of capitalist class relations throughout Chinese society, and the ensuing growth of unequal incomes and urbanization, marked the ability for segments of the population to afford this now desired food, and the finale of redefining the Orient's identity: emerging as an equal oppressor of ruminant life to their colonial other in the culturally violent post-*tianxia* world (Bai et al., 2018, p. 6; Delgado, 2003, p. 3908S; Dirlik, 1996, pp. 104, 112, 116-117; Dong & Fuller, 2010, p. 73; Fu et al., 2012, pp. 91-92; Gould & Villarreal, 2006, p. 1; Goossaert, 2005, p. 246; Klein, 2012, p. 798; Klein, 2014, pp. 277, 279, 289-290; Li, 2001, p. 139; Mignolo, 2011, pp. 48-49; Zheng & Henneberry, 2009, p. 873). The success of this new Chinese way of knowing, imagining, and being is reflected in the unprecedented rise of consumer demand for these animals, increasing per capita consumption between 1978 and 1994 from 0.57 kg to 3.06 kg, a 437 percent over the span of 16 years, and starkly contrasting with the per capita consumption rise between 1961 and 1977 of 0.24 kg to 0.56 kg (Ritchie & Roser, 2017). However, at what cost did the price of success come at? Born in violence, the process of an ontological divide between nature and culture to subject lifeforms to commodified servitude was seeded in the 1842 British colonial encounter, championed by Chinese iconoclastic reformists through to the developmentalist drive of Mao Zedong's People's Republic of China, and then enabled in the latest Western capitalist form of development. Hence, this destructive path to modernity disfigured beyond recognition a ruminant-human relation in Chinese

food culture that had lasted for over one millennium, and in doing so continues to compromise Earth's climate. Once characterized by morality and pragmatism, this Chinese precedent to respect animal life and autonomy and protect draft animals gave rise to *niu jie*, and the admirable adherence of a taboo to abstain from beef. When searching for answers to climate change, and the possibility to realign the climate threatening replication of ruminant consumption that is being cemented in China, returning to this immemorial Chinese beef taboo and its guiding principles offers a compelling alternative if the hegemony of capitalist modernity is to be questioned and climate resilient futures realized.

Chapter 6

Conclusion

Anthropogenic climate change, and the corresponding consequences to our way of life and the living world around us, will continually exacerbate without radical intervention into the way humans are currently interacting with Earth. This thesis examined ruminant livestock as a significant player in the causation of climate change, and the subsequent necessity for solutions to mitigate the issues surrounding humanity's hunger for ruminant products. Amongst these solutions, supply-side intervention has gained the overwhelming majority of traction, as it perpetuates the current model for satisfying consumer demand albeit with increased efficiency, productivity, and environmental performance. However, dedication to mere supply-side solutions has been demonstrated to be insufficient to reduce GHG emissions and mitigate climate change to the extent required for maintaining global warming below 1.5°C above pre-industrial levels. Hence, the presentation and embrace of demand-side solutions to shift dietary preferences away from such a climate change inducing appetite. Yet, worryingly, mainstream solutions of this camp fails to address the global scale of the issue, overlooking the unprecedented and continued growth of consumption in historically low-consuming countries. The subsequent exploration of the role of culture, and the external forces acting on it, served to fill this vitally unexplored link in the literature and open an avenue for new demand-side solutions that will prevent a continued scaling of ruminant consumption. As examined, the nature/culture divide and industrial capitalism was a historic and essential guiding force in normalizing and necessitating the desire for scaling

both ruminant production and consumption. Through an orientation of the way of knowing, imagining, and being that sided with culture and crowned superiority over all lifeforms, colonial Europeans clashed with cultures of the world, created imperial differences, and grounded these differences in projecting imagined hierarchies on everyone else. This system of control and maintenance confined power to Europeans to dictate and disseminate relations that would ultimately benefit them, with relegating ruminants to a life of servitude, exploitation, and objectification in order to satisfy their capitalist ambitions of wealth accumulation and material commodities exemplifying this. Contesting other ruminant-human relations was thereby an iteration of the 500 years of violent coloniality that would go on to rupture distinct cultures with a vastly different set of relationships and corresponding scale of consumption in practice. Albeit the impact of undermining and displacing cultural relationships toward food is still being enacted today, with the driving spread of this ontological divide in the modern age comprising development. A promise of betterment that reiterates and rearranges its alure while hiding the reproduction of racism, classism, and the patriarchy as a justification for violent exploitation, extractivism, and dispossession. As Escobar attests: development is an "extremely efficient apparatus for producing knowledge about, and the exercise of power over, the [underdeveloped] world… that ensures certain control over it" (Escobar, 1995, p. 9). A coherent continuity of domination from the historical narratives from which it rose: the civilizing mission to instill reason and the systems thereof, and born anew as development to achieve modernity. Both of these means supported the duality of coloniality, yet it is this latest and most adaptive spin that has deepened with unprecedented scope the marginalization of entire alternative worldviews and their

practices within (Escobar, 1995, p. 5). The disastrous outcome was the establishment, transplantation, and continual growth of an unsustainable scale of ruminant livestock that would manifest into being a major contributor (~12 of global GHG emissions) to the looming climate catastrophe facing the planet.

The global imagination of modern food, formulated and controlled by Western cultural notions continued to be tied to race, gender, and class, perpetuates the necessity of this scaling of ruminant livestock – propagating these de-animalized mammals as a central dietary feature by espousing certain human benefits of health and livelihoods and the symbolic representation of attaining modernity. The case of displaced and reformulated Chinese food culture has been presented as the casualty of Western cultural imperialism, and the incursion into the way of knowing, imagining, and being that historically shaped ruminant-human relations in China. The processes of dismantling and eradicating the beef taboo, established for a millennium prior, showcased the cascading effects of the violent colonial encounter, the pervasive power of orientalism to internally reorient identities and traditions, and the overriding momentum of Western capitalist development – conforming to the globalized imagination of modern foods and requiring only mere decades to finalize the transition toward consuming these once sacred animals. Given this understanding, if the Chinese state desires to seriously honour its recent United Nations declaration to achieve carbon neutrality by 2060, targeting the continued scaling of ruminant livestock will require due attention (United Nations, 2020b). Whether China is willing to pursue the necessary demand-side solutions to address the root cause of scale, fixed within the hegemony of capitalist modernity, is up for debate. That being

said, if climate change truly represents an existential threat as suggested, disavowing the replication of an unsustainable ruminant-human relationship of servitude, combating Western cultural imperialism of capitalist modernity, and drawing on a distinct Chinese food culture based in harmony with nature offers the most promising route for climate resilient futures. Such change is not merely in the hands of the state however, with the citizens of China possessing the agency and capacity to resuscitate the immemorial Chinese ruminant-human relation – centered on the respect for animals and their autonomy. In doing so, the act may itself be powerful enough to begin the process to dislodge the hegemony of corporate violence against nature, reflect on the trajectory of orientalism and ontological divides, and transition away from the environmentally ruinous activity of limitless ruminant consumption. The world requires proactive, defiant, and culturally oriented demand-side solutions to target the root replication of scaling ruminant livestock in this modern age. As this thesis has tried to demonstrate, there exists alternative ways of knowing, imagining, and being, and these ways will hold the key for ridding GHG emissions in unsustainable food systems and advancing the collective responsibility to safeguard Earth's climate.

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