

CONJUNCTURES IN LAW AND DEVELOPMENT: ASSEMBLAGES FOR PROGRESS IN
INDIAN AGRICULTURAL FUTURES

SAJJAD ALI MALIK

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ABSTRACT

This dissertation asks: how are the legal, political, and social legacies of the Green Revolution and India's incorporation into the global knowledge economy shaping or undermining the emergent discourses, practices, and regulatory rationalities of India's current Climate Smart Agriculture development initiatives? To answer this question, I construct a theoretical/methodological framework that brings together conjunctural analysis, assemblage theory, Foucaultian governmentality, and transnational legal pluralism. I identify two previous historical eras of significant agricultural and developmental change in India: the Green Revolution (1950s-early 1970s) and the liberalization of Indian agriculture as part of India's broader incorporation into the global knowledge economy (1991-mid 2000s). I study the historical relationship between the modern Indian state and Indian farmers across these eras of agricultural and developmental transformation to investigate how they are informing current Climate Smart Agriculture programs, how these contemporary programs work, and the extent to which these programs and the political struggles they incite represent a new historical phase of state power in India. I argue that Climate Smart Agriculture programs and the accompanying introduction of Big Data technology in Indian agriculture should not be understood as a singular event or a unique and novel initiative, but as the most recent project of governmentality mediating the relationship between the Indian state and Indian farmers. This dissertation further shows how relationships between states in the Global South and farmers are shaped by the interplay of technologies (understood both conventionally and in the Foucaultian sense) that are constructed and regulated through the law. I simultaneously demonstrate how the entwined processes of postcolonial state- and subject-making in the domains of agriculture and development always invokes forms of resistance that often result in contradictory regulatory outcomes, which continue to establish the conditions for future political contestation. This dissertation contributes to the field of Socio-legal Studies at large, and the subfields of Law and Development, Law and Globalization/TWAIL, and Green Criminology.

DEDICATIONS

For Ummi & Abu

For Connor & Suzanne

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ACRONYMS

ABS	Access and Benefit Sharing
AoA	Agreement on Agriculture
APMC	Agricultural Produce Market Committee
BMC	Biodiversity Management Committee
BKU	Bharatiya Kisan Union
CBD	Convention on Biological Diversity
CCAFS	Research Program on Climate Change, Agriculture and Food Security
CGIAR	Consultative Group on International Agricultural Research
CIDSE	International Cooperation for Development and Solidarity
CIMMYT	International Maize and Wheat Improvement Centre
CSA	Climate Smart Agriculture
CSV	Climate Smart Village
DUS	Distinctness, Uniformity and Stability
eNAM	Electronic National Agricultural Market System
FAO	Food and Agricultural Organization
FAAS	Farming as a Service
FPO	Farmer Producer Organization
GACSA	Global Alliance for Climate Smart Agriculture
GATT	General Agreement on Tariffs and Trade
GEF	Global Environmental Facility
GIS	Global Information System
GM	Genetically modified
GPS	Global Positioning System
GRAIN	Genetic Resources Action International
IADP	Intensive Agricultural Development Program
ICRISAT	International Crop Research Institute for Semi-Arid Tropics
ICT	Information and Communication Technology
IP	Intellectual Property
IPCC	Intergovernmental Panel on Climate Change
IPRs	Intellectual Property Rights
IPRI	International Plant Research Institute
KRRS	Karnataka Rajya Ryota Sanghatana
LVC	La Via Campesina
NBA	National Biodiversity Authority
NBDA	National Biodiversity Act (2002)
PBR	People's Biodiversity Register
PL 480	Public Law 480
PPV&FR	Protection of Plant Varieties and Farmers' Rights (2001)
SBB	State Biodiversity Board
SLS	Socio-legal Studies
SRISTI	Society for Research Initiatives in Sustainable Technologies and Institutions
TCP	Technical Cooperation Program
TK	Traditional knowledge
TLP	Transnational Legal Pluralism
TRIPs	Agreement on Trade-Related Aspects of Intellectual Property Rights

TWAIL	Third World Approaches to International Law
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNCTAD	United Nations Conference on Trade and Development
UPOV	Union for the Protection of New Varieties
USTR	United States Trade Representative
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

1. CHAPTER ONE: INTRODUCTION

1.1. Introduction

In July of 2015, Indian Prime Minister Narendra Modi introduced the Digital India initiative with the goal of digitizing a vast array of government services and connecting the rural population to the national digital infrastructure. By investing heavily in Information and Communication Technologies (ICTs) that would connect over a billion Indian citizens to the internet through ‘broadband highways’ while promising universal access to mobile phones, the project aimed to modernize state and society to equip the country to serve as an emergent economic power in an innovation-based global knowledge economy. Development scholars and development economists have recognized Digital India as a large-scale national development project intended to foster economic development through mass digitalization (Maiti et al., 2020). Digital India also tied the public distribution of welfare services to individual digital identities based on biometric data such as fingerprints, eye scans, photographs, and a unique 12-digit identification number for each citizen (Arora, 2016). Services ranging from opening bank accounts, activating mobile phone services, filing tax returns, participating in cloud-based electronic voting, and claiming subsidized food benefits were to be contingent upon enrolling in the digital identification program. It is, however, Digital India’s focus on harvesting Indian agricultural data that best exemplifies how developing states in the Global South accrue power by justifying their domestic political and development agendas as responses to global problems.

Digital India harnesses global concerns regarding the impacts of climate change on food production.¹ A key pillar of Digital India involves modernizing the country’s agricultural

¹ The links between climate change and industrial agriculture have been widely recognized since the UN Intergovernmental Panel on Climate Change (IPCC) formally acknowledged the importance of agrobiodiversity (genetic resources pertaining to food and agriculture more broadly) in mitigating climate change in 2014. The effects of climate change, such as fluctuations in rainfall, changes in land-use, and increased temperatures adversely affect

production using data-driven ICTs. As Modi declared at the celebratory launch a: “I dream of a digital India where farmers are empowered with real time information and connected to global markets” (Manghnani, 2016). Data-driven ICTs in Indian agriculture are optimistically expected to increase food production and increase farmers’ incomes while at the same time reduce greenhouse gas emissions. They also do so, I will show, to fulfill the Modi government’s broader agenda of maximizing state control over roughly 100 million Indian farmers who account for 23% of the country’s GDP (FAOSTAT, 2017).

Further recognising the pressing, interconnected challenges of population growth, climate change, and increased income for rural smallholders, India commenced Climate Smart Agriculture (CSA) development initiatives in 2011. The World Bank, a primary financier of CSA programs around the world, discursively ties CSA to market relations by emphasizing a scalable governance framework dependent upon commodified inputs at every level “with a focus on hybrid seeds and carbon capture practices; high-efficiency/low-energy use irrigation programs; livestock productivity; energy solutions for agribusiness; and mainstreaming of risk management” (2016, p. 4). CSA aspires to produce similar benefits to that of agrobiodiversity as

food production, while industrial agricultural production contributes an estimated 25% of global greenhouse gas emissions through land clearing, crop production, and chemically treated fertilizers (IPBES, 2019; OECD, 2015, p. 2; IPCC, 2014). Moreover, agriculture utilizes roughly 70% of global fresh water and makes use of 40% of global land area (Braumoh, 2013). Maintaining “diversity within species, between species and of ecosystems” (IPBES, 2019, p. 3) in agriculture is integral in combatting climate change (Clapp, et al., 2017; Smith, et al., 2007). Climate change negatively effects agricultural biodiversity at virtually all levels from “soil-microorganisms to coral reefs” and in turn, reduced biodiversity hinders the planet’s natural ability to mitigate climate change (FAO, 2017). For example, coral reefs are the ‘rainforests of the sea’, sustaining aquatic life while also protecting coastlines from storms and erosion (National Oceanic and Atmospheric Administration, 2019). As ocean temperatures rise due to climate change, coral reefs lose their natural color (‘bleaching’) which eventually causes their death. Mass bleaching has led to a decline in fisheries: “In the central Indian Ocean, bleaching has been shown to have direct impacts on 90% of the traditional artisanal fishing communities. Initial studies estimate that dead, crumbling reefs could lose 50% of their fisheries value” (Marambe & Silva, 2016, p. 143-44). As a species of biodiversity, agrobiodiversity results from the interactions between natural ecological processes and the cultivating work of agriculturalists (FAO, 1999). Peasants, herders, and fisherfolk manage agrobiodiversity through centuries of accumulated agricultural knowledge, skills, and practices. In addition to its role in conserving and enhancing local ecologies, agrobiodiversity is deemed an economic boon that enhances agricultural productivity, food security, and, ultimately, the economic welfare of agriculturalists around the world (Pascual et al., 2011).

it attempts to address the challenges of climate change mitigation through reducing greenhouse gas emissions, and rural development by raising farmers' incomes. Critics argue that CSA's focus on technology as the solution to the problems of increasing food production and climate change masks and depoliticizes struggles around who has access to land, labor, and water, and, ultimately, control over the world's food system (Taylor, 2017). Proponents and critics alike portray CSA in a binary manner; either it will help 'save the world' from its looming disasters or it will deepen the corporate food regime and further dispossess peasants. I instead consider CSA as a project of government which reconfigures states, communities, and farmers as interrelated participants with particular kinds of agency within a new regime of governance.

In this dissertation, I will argue that CSA and the introduction of big data technology in Indian agriculture should not be understood as a singular event or a unique and novel initiative, but as the most recent project of governmentality dominating the relationship between the Indian state and Indian farmers. To make this argument, I identify two preceding historical eras characterized by significant agricultural and developmental change in India: the Green Revolution (1950s-early 1970s) and the later liberalization of Indian agriculture as part of India's broader incorporation into the global knowledge economy (1991-mid 2000s). Each period, as I analyze it, represents a specific historical 'conjuncture' (Grossberg, 2010) of forces which illustrate global anxieties about food supplies and population growth, optimism about the harnessing of technologies to address the issue, and concerns about the capacities of state governments of Third World or 'developing' states to capitalize on the opportunities that these technologies present.

I study the historical relationship between the modern Indian state and its farmers across these eras of agricultural and developmental transformation to examine how CSA programs work

and the extent to which these programs and the political struggles they provoke constitute a new historical phase of state power in India. How are the legal, political, and social legacies of the Green Revolution and India's incorporation into the global knowledge economy shaping or undermining the emergent discourses, practices, and regulatory rationalities of India's current (CSA) development initiatives?

I begin with the Green Revolution to show how, against the experiences of famine and the imperatives of postcolonial independence, Indian politicians and a transnational development regime led by the Rockefeller Foundation established a modern state capable of negotiating aid and technology transfer from the United States. At the same time that these actors proved their managerial capacity to wield science and technology to promote industrialization and national development, they also indirectly if not deliberately established the conditions for the political mobilization of various groups of farmers. Next, I examine how, despite agrarian resistance rooted in the experiences of the Green Revolution, Indian leaders and experts successfully rendered native plant genetic resources as agricultural goods subject to agricultural trade liberalization in the global knowledge economy spanning the late 1980s-early 2000s. Finally, I analyze the ongoing struggle between the Indian state and smallholder farming communities over the use of Climate Smart Agriculture programs. CSA increasingly relies on big data technologies aggregating and analyzing data about farmer's lives, needs, and abilities in order to enroll them in market friendly mechanisms that promise to meet the current twin imperatives of sustainably increasing food production while mitigating the effects of climate change. I hope to illustrate how relationships between states and subjects in the Global South are forged in the interplay of 'technologies' – both in the generic sense of the term, and as instruments of Foucaultian government that impact the agencies and dispositions of 'smallholders' (Peluso, 2017) a term

which references peasants, farmers, and other producers of food as particular subjects of developmental government. I aim to show how the intertwined processes of postcolonial state and subject-making almost always entail some forms of resistance, resulting in uneven regulatory outcomes which continue to establish the conditions for future political contestation, as seen in the current Indian farmers protests of 2020/21.

1.2. Relevant subfields of Socio-legal Studies

The interdisciplinary field of Socio-legal Studies (SLS) divides the terrain of law and government into paradigms and sub-fields; my dissertation is situated in what is known as Law and Development, Law and Globalization, and Transnational Legal Pluralism (TLP). My exploration of the three conjunctures as assemblages enables me to reflect upon and contribute to these literatures, in order to forge what I believe is a distinctive new socio-legal approach to Law and Development.

The first iteration of Law and Development coincided with the broad trend of state-led national development, established in the context of the geopolitics of the Cold War and the emergence of newly minted postcolonial states. The postcolonial developmental state was born and baptized with the imperative of modernization. Newly independent states required structural transformations to join the international order, and law was the central tool used to catalyze these changes (Trubek & Santos, 2006, p. 5). Law was mobilized to establish and expand the reach of the state, produce legible populations, induce changes in economic behavior such as the transition from subsistence to commercial farming, and to remove ‘traditional’ barriers to modernization such as local and indigenous social systems and institutions based upon a stigmatized social collectivism and extended kinship ties (Parsons, 1964).

The second iteration of Law and Development began in the 1980s alongside the birth of the Washington Consensus. Law was no longer to work in service of the expansionary developmental state; rather, it was understood to be the institutional foundation for market relations capable of being deployed to limit the reach of the state, particularly in the economy (Trubek & Santos, 2006, p. 2). As the focus of law shifted from the paradigm of developing an administrative social welfare state to emphasize the creation of core institutions of private law in so-called 'developing countries' so as to integrate them into a global economy, the need to change local laws became apparent. This "Law and the Neoliberal Market" paradigm was based on the view that the best way to achieve economic growth was through free trade, foreign investment, fiscal discipline, and removing market 'distortions' created by state intervention (Trubek & Santos, 2006). Law would facilitate financial certainty through the security it provided for private transactions and strengthened property rights. This mode of thought was to be applied everywhere without discrimination; "markets were markets, and the same legal foundations would be needed and could operate anywhere" (p. 6). Within agriculture, for example, the structural adjustment programs imposed by international financial institutions aggressively restructured Third World economies by deregulating land markets, reversing land reform policies, cutting farm subsidies, and encouraging reliance upon chemical and fertilizer inputs via biotechnology and the commodification of seeds (Bello, 2009, p. 31). At the same time that law was conceived as a tool to limit the reach of the administrative state, neoliberal regulatory restructuring multiplied the number of actors vested with governmental authority (Braithwaite, 2008, Grabosky, 2013). The redistribution of state authority unfolded in variegated transnational and multi-scalar networks of power, designating neoliberal governmentality as a

field of both regulation and, it is important to recognize, resistance (Gupta & Ferguson, 2002; Miller & Rose, 2008; Brockling et al., 2010; Himley, 2012; Brady, 2014).

The third and current moment of Law and Development remains undefined, but it is one that recognizes the failures of the neoliberal moment and new policies and practices of the World Bank and other development institutions which emphasize technological innovation and experimental public-private partnerships in governance (Trubek & Santos, 2006; Trubek, 2011; Trubek & Santos, 2006). Law remains critical in the construction of markets because every market actor, transaction, and economic entity is also a legal entity (Veitch, 2016). Contracts, for example, constitute a key neoliberal legal technology in the allocation of natural resources and in the coordination of “an endless number of economic actors” (Perrone, 2016, p. 45), as seen, for example, in global supply/value chains and access and benefit sharing models. Arguably, however, contracts were just as dominant in the Neoliberal Market model. What might better define the current era is the proliferation of regulatory orders and public-private partnerships (Keck & Sikkink, 1998, Jessop, 2004; Hodges et al., 2010; Chorev, 2018) as well as the counter-emphasis upon rights-based development (Darrow & Tomas, 2005; Davis, 2009; Aylwin & Coombe, 2013).

Today, there is little, if any, support for one-size-fits-all approaches, as development now emphasizes the significance of local contexts. Greater attention is given to inducing local participation in the design and implementation of developmental reforms under the banner of participatory development, so that local groups are newly ‘empowered’ to take ‘ownership’ of development projects (Agrawal, 1995; Mohan & Stokke, 2000; Cooke & Kothari, 2000; Mosse, 2001; Hickey, 2004; Smith, 2011). Dominant neoliberal tropes such as the ‘responsibilization’ of subjects and their empowerment through development are continued here but tempered with

rights-based practices attentive to issues of participation and gender equality. Developmental subjects (both individuals and communities), now find themselves the subjects, targets, and objects of regulation, discipline, influence, and governance from a diversity of authorities such as transnational NGOs, international financial institutions, regional development banks, philanthropic organizations, and private actors (Rose & Miller, 2010; Coombe, 2016). This dissertation aims to make an original contribution to this subfield by appending a context-specific analysis of legal and political subject-formation that challenges instrumental and state-centric conceptions of law in development and eschews the presuppositions of the Western liberal state so often used as the prototype within conventional law and development thinking.

The dissertation also contributes to that branch of Law and Globalization dedicated to critical postcolonial approaches to international law such as Third World Approaches to International Law (TWAIL). This body of scholarship critically encompasses the relations between law and the politics of globalization, neoliberalism, and development as stemming from the closely intertwined historical interrelationship between modern law, colonialism, and imperialism. SLS scholar Boaventura de Sousa Santos (1987) presciently identified the primary challenge in studying the relationships between law and politics in a globalizing world as residing in the need to understand how socio-legal life is constituted in various, non-Western legal spaces through trans-scalar activities carried out by an array of actors. He implored socio-legal scholars to engage in “maps of misreading” in order to decenter state-legality as the primary domain of socio-legal critique. Such ‘misreading’ might occur by embracing a conception of legal pluralism that charts the multitude of ways in which ‘legal spaces’ at various geographical scales intermix and amalgamate in both legal discourse and ‘law in action’. Legal sociologist Susan Silbey (1997) also called for socio-legal research to critically

assess the mutual constitution of law and power embedded in social relations under the conditions of globalization, to avoid a depoliticized and romantic framing of the post-Cold War era. As I will venture to show throughout this Chapter, this dissertation ventures to respond to these scholarly calls to action by bringing together a diverse set of theoretical/methodological tools that allow me to engage in ‘maps of misreading’ while closely interrogating the relations of law and power within my selected case study and historical periodizations.

TWAIL scholars have often followed this path by arguing that the neoliberal restructuring of international law and governance represent imperial encroachments on state sovereignty, to the detriment of postcolonial states in particular (Chimni, 2012). The current generation of TWAIL scholarship is broadly concerned with understanding “more about how colonialism and imperialism and their ways of knowing have been crucial to the formation and practice of international law as a discipline” (Eslava & Pahuja, 2011, p. 117) and how this structures modern day neocolonialism. Sundhya Pahuja (2012), for example, takes a historicized approach to chart the path of mid-20th century international law in relation to the establishment of post-World War II geopolitical hegemony, the processes of formal decolonization, and the beginning and expansion of international development.

Scholars have made some progress in developing a greater attention to multiplicity of interpretive standpoints by posing global legal pluralism as a middle way between sovereigntist and universalist approaches to international law and globalization which emphasizes the ‘hybrid legal spaces’ produced as the result of interactions between various normative systems (Berman 2012). While global legal pluralism departs from the tenets of liberal legalism, even its early advocates admit that it falls short of incorporating the insights of critical interdisciplinary approaches that would strengthen its commitment to achieving “the best ways to accommodate,

celebrate, and/or assimilate non-majoritarian populations and norms” (Berman, 2018, p. 158). Santos & Rodriguez-Garavito (2006) offer “subaltern cosmopolitan legality” as an alternative approach based upon an understanding of the interconnection of law and politics in globalization through bottom-up perspectives which emphasize the politicization of rights-centered strategies and the legal/political construction of scale. This dissertation draws upon and attempts to contribute to this tradition of critical interdisciplinary scholarship.

Green Criminology is an emerging subfield within SLS and Critical Criminology. Green Criminologists are broadly concerned with theorizing and critiquing the ways in which law and politics are implicated in the roots and responses to ecological or environmental crimes, harms, and hazards. The subfield embraces interdisciplinary approaches and frameworks to study these issues, which stems from a holistic recognition of the interconnectedness between biodiversity/non-human natures. The emphasis on interdisciplinarity is also rooted in an analytical rejection of any attempt to isolate or individuate from other fields of law, policy, and regulation:

...our approach(es) to environmental degradation, harm and loss should not be compartmentalized as ‘environmental law’ or ‘environmental policy’, whereby only those statutes labelled as explicitly ‘environmental’ are conceptualized as having bearing on flora and fauna, and air, soil and water quality. Rather, for the environment to improve, we need to understand ‘the environment’ as having relevance for all legislation and as permeating all facets of life (Brisman & South, 2020, p. 4).

Two distinct approaches currently guide studies in Green Criminology: the ‘legal-procedural’ and the ‘socio-legal’ (Brisman & South, 2020, p. 43). While the former is primarily concerned

with more traditional positivist legal questions (i.e., what constitutes an environmental crime?), the socio-legal approach is rooted in environmental justice perspectives that are less concerned with what the law is but more so with what work the law *does* to structure, legitimate, and potentially combat, the production of environmental harms in both the North/South and with a focus on Indigenous and colonized peoples (Halsey & White, 1998; White, 2008; Walters, 2010; Carrington et al., 2016; South, 2017; Crook et al., 2018).

Biopiracy and the regulation of plant genetic resources is a topical concern within Green Criminology. As Green Criminologist David Rodriguez Goyes (2020) notes, the intersection between biopiracy and critical criminology at large centers the simple yet crucial mission of understanding social events that harm life (p. 224), with a particular concern for these harms and forms of life in postcolonial settings (Walters, 2006; South, 2013) Green criminologists typically disaggregate their studies of biopiracy in terms of its discursive features, the political-legal factors, and its practical effects (Goyes & South, 2019). In doing so, they concern themselves with mapping the actors, markets, and materials in instances of biopiracy, as well as tracking the production of agri-environmental narratives and the distributional/ecological/social consequences of biopiracy (Goyes, 2020).

I locate this dissertation within the socio-legal approach described above, while also attempting to broaden its focus through my deployment of a Foucaultian governmentality analytic and conjunctural assemblages, which I detail later in this chapter. I endeavor to show through my case study how the historical and future relations between law-agriculture-ecology-science/technology should be contextualized within the knowledge politics of Intellectual Property Rights (IPRs), the imperatives of development within the global knowledge economy, and the fluid relationship between the Indian state and domestic/transnational agribusiness, and

with what effects on and responses from various groups of Indian farmers. While I do not specifically focus on the specific criminality of biopiracy in this dissertation, I engage in the mapping of actors, markets, and materials within a broader set of relations specific to my historical periodization of the global knowledge economy (1980-2000s) but are shaped by historical forces emanating from the Green Revolution. Green criminologists further acknowledge the importance of studying scale to the extent that “what happens in once place is intrinsically important to what happens worldwide” (White, 2010, p. 9). While I agree with this basic point, I attempt to expand on this by utilizing Transnational Legal Pluralism to capture how the spatial and temporal relations of the regulation of plant genetic resources are forged through multiple scales of law and politics.

The redistribution of governmental power, state functions, and authority to a multitude of international institutions, NGOs, corporate actors, and philanthropic foundations is characteristic of neoliberalism. This recognition further requires that socio-legal scholars engage with processes of globalization through an understanding of law that is less jurisdictionally-bound and more attentive to the diversity of fields of regulation: “Interrogating law and globalization in the twenty-first century requires a flexible approach that seeks to connect and reintegrate apparently discreet phenomena back into the social, political, economic, historical, and geographic contexts (state and non-state) in which they occur” (Darian-Smith, 2013, p. 526).

As I will demonstrate more fully in the final section of this chapter, TLP functions as a hybrid theory/methodology that explores continuities and changes in the socio-political ordering of postcolonial states and societies, particularly in the context of neoliberal globalization. Critical transnational SLS scholars predominantly conceive of the ‘transnationality’ of law as both an

impetus for critical theory and as a methodology to “interrogate and reformulate the concept of law in transnational terms” (Shaffer, 2016, p. 15). This dissertation accords with this conception, rather than understanding ‘transnational law’ as itself a substantive field of law (Callies & Zumbansen, 2010). TLP attempts to address the often mistakenly demarcated boundaries between law and non-law (Callies & Zumbansen, 2010) by showing how ‘transnational legal ordering’ (Shaffer, 2016; Halliday & Shaffer, 2016) is rooted in a plurality of legal sources and actors beyond the state, is not bound to territory, and deconstructs traditional public/private and state/market distinctions, as seen, for example, in hybrid public-private partnerships. In so doing, TLP presents itself as a key SLS approach for assessing “the role of law as a regulatory and legitimating device in the context of global markets, multinational corporations, societal interdependence, and society’s increasing functional differentiation” (Shaffer, 2016, p. 19; Callies & Zumbansen, 2010; Zumbansen, 2012).

Similarly, critical scholars of global political economy and regulation characterize changes in state regulation not as state withdrawal, but as a process of regulatory reconfiguration in which a broad scope of state/non-state actors and authorities now exercise governmental powers over individuals and communities (Braithwaite, 2008; Himley, 2012; Grabosky, 2013). This focus on the plurality of non-state and hybridized sources of authority and government fits with the conception of transnational law espoused by critical scholars of SLS who argue that transnational law encompasses a variety of sources beyond the state (Callies & Zumbansen, 2010; Zumbansen, 2012; Shaffer, 2016). Further, legal scholar Amy Cohen (2018) suggests that: “...transnational legal theory requires the analyst to understand the transnational and domestic, like the state and the market, as alternative, even potentially homologous, ways of describing the distribution of authority, resources, and power” so that we are better positioned to recognize

“how powerful transnational actors may appear to strengthen state power and not simply undermine it” (p. 363, 369). Further, I posit that TLP addresses and potentially offers correctives to some of the limits of Law and Development under conditions of economic globalization. This dissertation endeavors to advance and further develop these points by deploying theoretical concepts (which I detail in the next section) that help integrate these insights into an exploration of the production of legal and developmental subjectivities across particular historical periods, scales of governance, and forms of economic regulation that comprise governmental assemblages.

TLP is useful in addressing questions pertaining to the construction of global legal frameworks attuned to local contexts under the conditions of neoliberal globalization. It is a tool to map transnational legality and regulatory orders without assuming a unitary spatial center or any normative hierarchy (Buchanan, 2008, p. 13). TLP is not a distinctive space that counters the local or national, rather it is a point of view from which law avoids confinement to jurisdiction or authority but instead functions within specific areas of societal activity. For regulatory regimes that no longer neatly fit within local or national legal and political orders, this lens enables us to understand these regimes not as ‘outside’ of these spatial confines but as “emerging out of and reaching beyond them” (Zumbansen, 2012, p. 31). TLP rejects the hierarchical spatial tropes associated with globalization such as the ‘global swallowing the local’, a point also made by anthropologists Ferguson & Gupta (2002). It treats the national, regional, and local as underpinning the global/processes of neoliberal globalization and as spaces where global policies are produced, exported, and implemented by various state and non-state actors. This is particularly relevant in my study of Digital India, which I suggest must be understood as a national development project that is shaped by transnational forces in response to global

problems, and is a unique but not novel, neoliberal development project. In sum, TLP provides an ideal framework to explore law under the conditions of neoliberalism.

1.3. Theoretical contexts

The Foucaultian concept of governmentality provides an explanatory framework to understand how exercises of power intended to regulate the ‘conduct of conduct’ of others transpire through assemblages of rationalities, technologies of government, discourses, and ideologies, to act upon the desires, aspirations, and choices of subjects. Governmentality encapsulates the myriad discourses, calculations, and technologies through which those who govern attempt to guide the behaviors and actions of the governed (Burchell et al., 1991; Li, 2007; Dean, 2010; Lemke, 2010), denoting “a range of forms of action and fields of practice aimed in a complex way at steering individuals and collectives” (Brockling et al., 2011, p. 1). Problematization is a key analytic of governmentality, focusing on the relations through which particular behaviors, processes, and phenomena become problems in need of solutions (Foucault, 1984). In chapter 2, for example, I map the historical processes through which the Green Revolution became the answer to the problems of development and modernization in India.

Government (as a verb) does not rely on force as an expression of negative or coercive power to achieve its ends, nor does it explicitly convey to the governed what to do, how to live or behave. Instead, programs and strategies productively induce subjects to regulate their own conduct to produce the intended objectives of various governmental authorities. In neoliberal forms of governmentality, for example, the experience of neoliberalism is intended to feel like a process of freedom which entails self-regulation (Rose, 1999; Lemke, 2001). This is not an instrumental process such as the way neo-Marxist approaches understand governing which revolves around controlling the means of production through mechanisms of accumulation and

dispossession. Nor are governmentalities limited to one specific aspiration, but towards a range of potentially conflicting goals focused upon educating the desires and aspirations of their targeted subjects.

As a paradigm in law and society scholarship, studies in governmentality developed in the late 1980s and into the mid-1990s with an emphasis upon shifting questions of ‘why’ to more empirically-based investigations of ‘how’ in legal governance (Valverde, 2010). This trend was complemented by attempts to demonstrate the gradual dominance of expert knowledge in legal governance (Hunt & Wickham, 1994). Criminologist Jonathan Simon (1988), for example, traced the transition from the nineteenth century subject, or the ‘modern self’ subjected to institutional discipline and reform, to the late twentieth century subject quantified and managed through aggregated risk-assessments (i.e. credit scores, health data), as seen in the contemporary insurance industry. SLS scholars Richard Ericson & Kevin Haggerty (1997) showed how the aggregation of personal information necessary for the emergence of the ‘risk society’ (Giddens, 1991; Beck, 1992) refocused the objectives of policing from organized social control to risk management. Later, the focus of law and society scholarship moved from “the epistemology of social control” (Valverde, 2010, p. 51) to a greater use of wide-ranging analytical tools and methods stemming from anthropology, political theory, and geography, among others (Merry, 2001; Lippert & Williams, 2012). This dissertation continues this line of contemporary SLS approaches in governmentality studies in its emphasis on ‘how’ rather than ‘why’ in its deployment of social science concepts, SLS methodology, and its interdisciplinary theoretical orientation.

Governmentality is often located at the juncture of government and rationality. Government (as a set of practices, techniques, calculations, and objectives) is attached to

specific rationality, or the justification for particular modalities of government which “construe the tasks of rulers in terms of a calculated supervision and maximization of the forces of society” (Rose, 1990, p. 5). Rose & Miller (1992) denote three fundamental attributes attached to a political rationality: a moral form that considers and pronounces the duties and tasks of governing authorities, an epistemological dimension that articulates an idea about subjects (i.e., children in need of education), and a particular vocabulary for rendering reality amenable to intervention (p. 179).

Various rationalities of government have utilized different techniques to achieve particular objectives. As political anthropologist David Scott (1995) influentially argued, colonial governmentality sought to impose modern forms of political rationality by displacing pre-colonial forms of rule so as to compel “new forms of life to come into being” (p. 193). In India, colonial governmentality sought the production of subjects amenable to both moral improvement and effective participation in a new market economy through the inculcation of rational and self-interested behavior (Kalpagam, 2000), rather than encouraging the free, rights-bearing individual central to liberal government. As the British introduced new kinds of knowledge in the form of statistics and ‘book-keeping’, economic measurements such as currency, market valuation of natural resources and inventories of tradeable goods, modern accounting systems thereby constituted calculative colonial technologies of government in constructing an ‘economy’ (p. 420). After nearly a half century of colonial rule, India was fashioned as a key locale in the establishment of the scientific discipline of statistics in the 20th century (Chatterjee, 2018).

As Foucaultian scholars have established, modern liberal rationalities of government coalesce around the ‘freedom’ of the individual (Rose, 1999; Dean, 2010; Lemke, 2019).

Freedom, however, is not an ontological orientation but rather denotes a principle of governmentality that requires fabrication and continuous effort. This construction occurs through organized forms of knowledge. Liberal government historically necessitated the discovery of the ‘population’ (understood through macro political-statistical phenomena such as birth and mortality rates which came to comprise the ‘social’) which required constant maintenance and optimization (Foucault, 1979; Dean, 2010). Individuals are the object of liberal government, not through their domination, but through their interpellation as voluntarily-compliant subjects whose rational self-interests converge with governmental activities oriented towards markets;

“the (economic) rationality of private parties is what enables the market to function in keeping with its true nature. Ultimately, such rationality ensures the welfare of the state: when the market functions naturally, it functions in the best possible way, and when it functions in the best possible way, it promotes the state’s strength” (Lemke, 2019, p. 183).

Liberal government thus acts upon the freedom of the governed, so that they might recognize, marshal, and optimize their inherent capacities to both think and act as responsible, rights-bearing citizens (Dean, 1999, p. 23).

There was no clear demarcation between colonial and liberal governmentality in India, a point that helps dispel any notion that the colonial and postcolonial periods can be clearly delineated. As Chatterjee (2018) notes, colonial and liberal governmentality overlapped in a strategic combination that continued into the late 1970s (p. 37). If colonial governmentality entailed the expansive production of statistical knowledge of the population, as discussed above, it was also supported by an extensive British historiography rendered in travel

observations, diverse surveys, and archival records of institutional surveillance (Cohn, 1996). The newly independent nation state was similarly concerned with classifying the population through the creation of legal categories regulating religion, ethnicity, caste, tribal status, and language while establishing the boundaries of groups deemed worthy of citizenship. The ‘postcolonial career of liberal governmentality’ later involved the convergence of elements of liberal governmentality with state-led industrialization, resulting in state-initiated welfare provisioning, subsidized food distribution, low cost medical facilities, and subsidies and credit for agricultural inputs (Chatterjee, 2018, p. 48). My exploration of the Green Revolution assemblage in Chapter Two furthers this point by conceptualizing and analyzing agricultural subsidies and credit as legal-financial technologies, which I deem critical to the making of the Green Revolution as well as illustrating that all governmental regimes and their technologies are embedded in law and regulation.

Neoliberalism is often deployed a ubiquitous catch-all term to encapsulate unprecedented levels of global economic inequality, national and regional austerity, and a not-so-new but heightened emphasis on aspects of human behavior such as individuality, competitiveness, and entrepreneurship. It seems to be almost everywhere, so much that it has become a type of bogeyman, synonymous with “everything privatized, profit-driven, inequality-creating” (Schwöbel-Patel, 2019). In the social sciences, two distinct theoretical approaches to neoliberalism exist. First, it is considered as an overt class project driven by or accomplished through economic policies with the singular objective of asserting the free market (Cutler & Gill, 2014; Harvey, 2005). In this line of thought, neoliberalism is shorthand for deregulation, austerity, privatization, “the withdrawal of the state from many areas of social provision” (Harvey, 2005, p. 12), and activities of financialization (Brown, 2015).

The neo-Marxist conception of neoliberalism is equated with a 'self-regulating' market implying a withering away or hollowing out of the state through deregulation and privatization; the state recedes while the market extends. This perspective tends to dominate the literature in critical agrarian studies, which deems the current moment as one dominated by a "corporate food regime" characterized by the subservience of states to global markets, structured by international finance and corporate capital which is met with resistance in the form of peasant social movements under the banner of food sovereignty (McMichael, 2013; Jackobsen, 2019). While this approach can be useful in identifying increasingly obfuscated forms of exploitation in the global economy, Marxist accounts of the relationship between power and subjectivity typically produce an unchanging antagonistic relation of class struggle, often conceptualized through the Gramscian concept of hegemony where consent is achieved and solidified to the benefit of economically powerful states, their allied international institutions, and a class of transnational elites.

Such accounts often neglect the ways in which the spread of market relations and technologies of commodification into culturally and geographically specific locales evoke politicization and resistance. As political scientist William Coleman and environmental geographer Scott Prudham (2010) comment: "Attempts to spread capitalist market relationships into new geographical, cultural, and informational fields inevitably encounter resistance because they intervene in existing social relations that shape the way these new commodity relations are interpreted, reconfigured or refused" (p. 12). This dissertation develops this perspective by attempting to show how the spread of capitalist markets, financial instruments, and technologies (in both the conventional sense and the Foucaultian meaning) in each historical conjuncture have

consistently conjured political contestation in a manner that at times has resulted in grassroots projects oriented in opposition to commodification.

Neo-Marxist approaches further tend to treat neoliberalism and capitalism more generally as a smooth functioning machine operating under a singular logic of insatiable accumulation in which one is either included or excluded with little regard for the countless other textures of life; of culture, of heritage, of pre-existing social and political formations; of other ways of constructing value; and of local and national historical experiences which often are co-constitutive even in their tensions and conflicts. Late Foucaultian approaches, however, treat neoliberalism as a distinct rationality of governing rather than as an economic ideology. From this perspective, neoliberalism involves a fundamental project of regulatory reordering through a repurposing of the state. In the social welfare state, regulatory reordering entailed not a 'roll-back' of the state but a shift in its functions and obligations to a mix of public and private institutions with an emphasis on market rationality, while crafting responsible, self-reliant subjects imbued with a competitive sense of individualism. As neoliberal subjects become responsibilized, the accountability for their economic-wellbeing (as well as the economy at large) and welfare lies in the actions of each individual rather than the state, enabling the state to "govern without governing" (Read, 2009, p. 29).

Neoliberalism is not smooth functioning; nor is it a monolithic structure predetermined to dispossess and commodify all things in the name of a market civilization. Rather, it is a malleable assembly of "calculative notions, strategies and techniques aimed at fashioning populations and peoples" (Wacquant, 2012, p. 69). Foucaultian understandings do not posit neoliberalism as uniformly universal. Neoliberalism does not take the same shape in different contexts; "there is not one big-N Neoliberalism but an indefinite number of small-n

neoliberalisms born of the ongoing hybridization of neoliberal practices and ideas with local conditions and forms” (Wacquant, 2012, p. 70). The characteristics of ‘actually existing’ neoliberalism in one place do not translate into the same features in another distinct place (Brenner & Theodore, 2002; Brenner et al., 2010). This is not to say, however, that each geographically-specific manifestation of neoliberalism is merely a singular event lacking broadly recognizable, historical conditions. Neoliberalism’s ‘long arc’ beginning in the 1970s first generally entailed the entrenchment of market-oriented norms of governance followed by ‘rule regimes’ beginning in the 1980s and intensifying in the 1990s (Peck et al., 2018, p. 11). These ‘rule regimes’ involved the ascension of international treaties, accords, standards, and traveling policy regimes accompanied by financialization in various sectors (Gill & Cutler, 2014; Peck & Theodore, 2015), many of which are explored in subsequent chapters of this dissertation.

Yet, neoliberal formations are always “partial, polycentric, and plural” as they form “in dialectical tension with inherited social and institutional landscapes and political struggles” (Peck et. al, 2018, p. 3). While neoliberalism attempts to restructure social realities through various technologies, calculations, and strategies, it is also mutually constituted with and through the social fabric integral to the particular spaces in which it is forged, as evidenced in the work of diverse social scientists (Goodale & Postero, 2013; Coombe, 2016, 2017; Allen, 2018; Chen, 2019). This creates an analytical challenge for the apposite manner for studying neoliberalism. As I will elaborate in the next section pertaining to this dissertation’s primary theoretical concepts, conjunctural analysis is well-suited to study ‘actually existing’ neoliberalism because of its capacity to balance the particularities of a historical constellation of forces, actors, discourses and practices (which I refer to as a conjuncture) while carefully weaving broader and sometimes seemingly unrelated contexts, conditions, and ‘frictional’ movements that produce

contradictory on-the-ground formations in distinct locales into a distinct tapestry. Institutional political economist/economic geographer Jamie Peck (2014) notes that “there is no neoliberal replicating machine...each experiment should be seen as a form of reconstruction, representing a conjunctural episode...in the contradictory evolution of neoliberal practice” (p. 5).²

While neoliberalism as an economic ideology prioritizes austerity and privatization, this is not necessarily the case in the context of burgeoning economies in the Global South. For example, India has embraced neoliberal macroeconomic policies while concurrently increasing social spending, as have many countries in the Global South (Ferguson, 2009, p. 171); this encompasses subsidized food programs for impoverished families and rural debt waiver programs for agricultural loans (Munster, 2012). I take my point of departure from the considerable body of literature devoted to exploring ‘actually existing’ neoliberalism that is at its core a contradictory and uneven formation to be understood in the context of evolving political conditions and struggles. It “cannot be reduced to a question weighing the size of the state or the extent of the market, as if the two spheres existed in a zero-sum relationship” (Peck et al., 2018, p. 5).

Studies of neoliberal governmentalities in India, for example, must consider the broader management of the Indian citizenry, labor regimes, the workings of the state’s financial system

² The same point is applicable to capitalism more generally. Economic anthropologist Vinay Gidwani (2008) rejects the conception of capitalism as a totalizing, homogeneous force that imposes a singular logic in any locality upon which it touches. Rather, he sees it is always prone to disruption and contamination as it settles as a geographically variegated social formation. He illustrates this point more broadly in relation to capitalism in rural Gujarat, India where environmentally-driven booms and busts in the agricultural economy produced structural and sectarian violence between beneficiary farmer’s groups and lower-caste farmers, to illustrate the idea that “because capital is heterogeneous, composed of a dizzying multiplicity of fractions, moving at different velocities, the terrains of difference produced and exploited by it can lead to booms in one place and, via entirely unforeseen connections, crises in other places” (p. 184). This approach to a culturally-specific political economy, is rooted in the notion that “a profit- or class centered economic rationality is always contaminated by other (potentially disruptive) cultural logics” (p. xxiii) that may be used to supplement governmentality approaches discussed above to understand how “contemporary capitalism and neoliberal forms of government intersect and resonate ” (Weidner, 2009, p. 392).

and microcredit programs, gender empowerment in development, and other social sector initiatives (Chatterjee, 2004, 2008; Sharma, 2006; Karim, 2011, Daftary, 2014; Munster, 2014). Political theorist Partha Chatterjee (2008) argues that the neoliberal governmentality in India has facilitated the infiltration of corporate or transnational capital into political society. He shows how international NGOs/donors may sometimes aid the state in co-opting grassroots social movements. This is a point further established by international development scholar Dolly Daftary's study of the effects of neoliberal development and microcredit institutions in rural India, in which she insists that "A neoliberal state that farms out its functions to non-state entities may be more pervasive while being more invisible, cloaked in the guise of institutions such as state-civil society partnership and democratic decentralization" (2014, p. 728). Chatterjee, moreover, suggests that neoliberal governmentalities in postcolonial contexts do not solely produce obedient subjects but are capable of generating political subjects capable of making demands upon the state and contesting social hierarchies (2004). In substantiating this claim in her study of neoliberal discourses of empowerment and the role of NGOs in the context of gender-based development programs in India, political anthropologist Aradhana Sharma adds that: "Governmentalization does not depoliticize so much as it spawns a subaltern politics that may take new, unexpected forms" (2006, p. 81). This dissertation endeavors to elaborate this argument by illuminating the ways in which historically specific regimes of governmentality in distinct eras that attempted to fashion particular kinds of agricultural subjects also served to create the conditions for political struggle and resistance, as seen, in the most vibrant contemporary example, in the constitution of a subaltern cosmopolitan legal subject discussed in Chapter Three.

In socio-legal studies of neoliberal governmentality, criminologists Michelle Brady &

Randy Lippert (2016) continued integrating the analytics of governmentality with other distinct concepts such as assemblages, and social scientific methods such as ethnography, interviews, and place-based research. This represented a sharp divergence from the archival/textual-based methods of conventional governmentality sociologists (Rose, 1999). More recent neoliberal governmentality studies in SLS have focused on ‘normalization’, or the processes through which particular ideas and values become common-sense or as societal standards, as well as the practices of neoliberal subjectification (Brock, 2019). For example, SLS scholar of women’s and gender studies Suzanne Lennon (2019) explores the ways in which the discourse of ‘love’ is central in establishing a “practice of homonormative neoliberal governmentality” to shape queer conduct in Canada (p. 79), while other interdisciplinary SLS scholars continue to investigate the possibilities afforded by neoliberal governmentalities for subjects to transgress or refashion neoliberalism to achieve their own political aspirations (Fritsch, 2019; Huizenga & Coombe, 2019). This dissertation continues this trend in SLS approaches to the study of neoliberal governmentality by utilizing a broad range of social science-based concepts to assess the role/s of law under the conditions of neoliberal government and subject-formation, as well as the opportunities for resistance it may open. It further originally contributes a case study to studies within SLS that have primarily explored rationalities and technologies of governmentality in Western urban environments.

The process of cultivating governable subjects occurs through a set of variegated practices, strategies, and discourses. Government does not operate through a top-down, command/control-oriented structure. Rather, government unfolds through technologies of subjectification “imbued with aspirations for the shaping of conduct in the hope of producing certain desired effects and averting certain undesired ones” (Rose, 1999, p. 52). Governmental

technologies rely on problematization, in which the activities of government circulate around the construction and framing of a problem in need of a solution, or the practices through which something becomes a fixed, neutral object of study, as suggested by prominent sociologists influenced by Foucault who have elaborated upon his concept of governmentality under conditions of neoliberalism (Rose & Miller, 1992). The production of actionable governmental programs revolves around “the failings it seeks to rectify, the ills it seeks to cure...” (p. 181). Instead of merely receiving the commands of a sovereign (and the violence doled out if they fail to adhere), subjects must participate in the processes through which they are governed, so that they are calculable and responsive to government (Higgins & Tamm Hallstrom, 2007, p. 690). Technologies activate the exercise of government by shaping the conduct of populations to produce (and avoid) particular effects:

Government is a domain of strategies, techniques, and procedures through which different forces seek to render programmes operable, and by means of which a multitude of connections are established between the aspirations of authorities and the activities of individuals and groups. These heterogeneous mechanisms we term technologies of government (Rose & Miller, 1992, p. 193).

If one imagines governmental actors on one side of a room and subjects on the other side, then technologies emanating from both sides in tangible and intangible forms constitute a spatial zone between the two. This space occupied by technologies is not static; instead, it is a field of power characterized by a magnetic force that is pushing and pulling both sides while producing ripple effects in either direction, depending on their use and the response their action elicits. Technologies of government often exist as mundane, taken for granted activities of monitoring and assessment, such as calculations, audits, examinations, knowledge-bearing registers,

inventories, and databases. Technologies might render populations more legible (and thus, governable) to state and non-state actors vested with governmental authority to operationalize a social reality that constantly requires active stabilization, evaluation, calculation, and intervention (Coombe & Weiss, 2015, p. 46).

Using this as a point of a departure, I attempt to show the relations and travels of various technologies in accordance with distinct political rationalities in each of my historical periodizations. In the Green Revolution assemblage, I explore how the interactions between colonial and then postcolonial high-modern³ technologies interacted to produce the Indian Green Revolution, as well as particular agricultural subjects. With respect to the emergence of post-Green Revolution farmers' movements and their campaigns against agricultural liberalization in the 1990s that comprise the Knowledge Economy assemblage, I argue that technologies of neoliberal governmentality have paradoxically rendered governmental actors more susceptible to demands of political accountability. I attempt to illustrate the potential of historically marginalized communities to refashion governmental technologies in order to exercise an "emergent political agency" (Coombe & Weiss, 2015, p. 63). Technologies of government not only constitute the devices, practices, and processes of governing human beings, but may also function as resources for the governed via the modes of subjectification and agency that their affordances provide (Ferguson, 2010). Within the CSA assemblage, I attempt to further the well-established point that the collection of statistics about the population renders the population knowable object capable of being 'worked on', or a domain to be governed (Rose & Miller, 2010). I detail various technologies of calculation and measurement in the CSA assemblage. The soil health card scheme, for example, operates as an 'inscriptive

High-modernism is explained in detail in Chapter Two.

device' (Latour, 1987) in which farmers' measurements and quantifications of their soil produce a reality susceptible to governmental intervention.

1.4. Key theoretical concepts

While the concepts of ideology and discourse emanate from diverse and distinct theoretical traditions, both are concerned with the constitution of subjectivities. Marxist ideology denotes the general process of the construction of meanings, ideas, and values which are the expression or projection of a particular class interest (Williams, 1977). This process represents the imaginary relationship of individuals to their real conditions of existence through interpellation, or the modes through which the recruitment of subjects into subject-positions unfolds to systematically buttress and replicate existing dominant social relations (Althusser, 1970). Law may, and arguably is usually utilized as an 'ideological weapon' that conceals or distorts class formation, transformation, and exploitative class relations (Hirst, 1979; Hunt, 1985; Cotterrell, 1997, 2004). Scholars utilizing Foucaultian understandings of discourse are concerned with how systems of organizing and producing knowledge structure the constitution of social relations in distinct historical periods (Foucault, 1969); "discourses are produced by effects of power within a social order, and this power prescribes particular rules and categories which define the criteria for legitimating knowledge and truth within the discursive order" (Adams, 2017). Discourse stretches further than text or speech; it is not simply a reflection of reality. Instead, discourses constitute reality by way of practices which structure and govern ideas and texts, and in turn are shaped by social and material practices, resulting in the construction of subject-positions. Socio-legal scholars have further argued that while each concept has a distinct intellectual lineage, they need not be suspended in a diametrical opposition (Purvis & Hunt, 1993). Ideological analysis can supplement discourse analysis in

showing how discursive formations have various ideological effects which can uphold, reproduce, and/or challenge existing social relations (Hunt, 2004). I apply this hybrid conception to show in Chapter Three how various farmers' organizations and movements deployed a particular nationalist discourse to advance their disparate ideological orientations to the opening of Indian trade and agriculture to world economic relationships in the early 1990s. While one set of farmers utilized this discourse to frame globalization and trade liberalization as a neo-imperial threat to Indian sovereignty, others mobilized so as to link it to a new political imaginary of the 'global' deemed to be dynamically synergistic with a distinctly Indian cultural tradition.

Legal subjectivity is a product of law's authoritative power in social life. It emerges out of the multiple variations of the power of law which range from law's construction of the facts and subjects it purports to recognize (Geertz, 1983; Coombe, 2011) to law's capacity to "categorize and coerce" (Hirsch & Lazarus-Black, 1994, p. 16). The productive power of law entails the construction of legal categories of persons subjected to it through modes of inclusion and exclusion, the potential for legal discourses, categories, and processes to generate hegemony and counter-hegemony, its production of rights-bearing subjects, and its capacity to constitute the construction of communities through legal representation (Mertz, 1994).

The processes of subjectification are bumpy and uneven; even only partially successful interpellations produce new kinds of understandings of the self, one's place in the world, and the capacity for agency. In these failures to produce a compliant subject, generative potentials for contestation emerge. In this sense, there is no 'whole' or complete subject. Rather, there is the production of endless contradictions, gaps and heterogeneities which constitute the subject. I conceptualize the subject as constantly exposed to attempts to insert it into various (subject)

positions by a variety of governmental actors. Subject-formation is processual in its formation and characterized by heterogeneity and contradiction. The conditions for resistance develop in these processes (Smith, 1988, p. 149-159). Racialized or ethicized groups, for example, may strategically deploy state-produced and legally recognized “essentialized” identities at certain political conjunctures while refusing the same essentialization at other moments and scales of resistance (Spivak, 1996). Socio-legal scholars recognize this as a creative exercise of resistant political agency, rather than reducing subjects to positionings manipulated by external programming or accusing subjects of political inconsistency/ideological impurity (Collier et al., 1995; Coutin, 2001; Coombe, 2009, 2012; Gooding, 1994; Greenhouse, 1994; Maurer, 2004). Contradiction and difference are inherent to subject formation and remain the basis for resistance.

States and elites have historically represented agrarian communities as economically inefficient and averse to technological change, while scapegoating them for society’s ills as a means to “promote policies aimed at pushing peasants off the land and turning them into laborers” (Edelman, 2013, p. 3). Twentieth-century developmentalism bound agricultural subjects to the state in a paternalistic fashion; if private property and inclusion into liberal markets were necessary conditions to modernize the peasantry, then it would be the state (and development experts) who could provide such conditions. The modern state deployed demeaning social imaginaries of peasants so that they could be more easily incorporated into the state’s vision of wealth accumulation and reinforce its own authority; “tying peasants to the state, fixing them in location and in the[ir] relationship to the state, became a central concern in the second half of the twentieth century” (Handy, 2009, p. 341). The twin problematic of modernization and development is shown in Chapter Two to have been framed in the dominant

consciousness (and ideology) of European modernity that mythologized the law as Europe's apotheosis of universal 'progress' and the 'traditional' agrarian subject as its constitutive other. Whether in the historical constructions of the agrarian subject as predisposed towards indiscriminate reproduction, laziness, and inefficiency, or in the ruling elite and the liberal state's thrust to civilize/discipline the agrarian subject through the accumulation of land for private property, the agrarian subject was representationally forged in the domain of tradition and as an obstacle to capitalist modernity, embodying a malleable subjectivity that could nonetheless be reshaped and remolded to serve new ends.

Through the selective provisioning of Green Revolution input subsidies, credit, and agricultural technologies not only did the state transform agrarians into capitalist producers and consumers but in so doing it also provoked and spurred the generation of new farmers' movements. In the 1970s, the World Bank and USAID "shifted to a strategy of upgrading the productivity of the poor via rural development programs in line with the Green Revolution" (Bello, 2009, p. 28), which retained the imperatives of modernization. However, a shift occurred when Southern peasantries were encouraged to understand themselves as producers positioned within the frame of capital surplus rather than subsistence. Control over the means of production was no longer a matter of debate, nor was redistribution. Instead, questions of rural development and agriculture centered around increasing productivity. The World Bank advocated for tightly integrating smallholders into the national economy, encouraging them to abandon subsistence farming to become small-scale market producers (Ayres, 1981).

Beginning in the 1980s, global development actors embraced the creation of private property through formalized markets as the best conduit for achieving economic development. Within this model, law was put into action to establish the conditions thought to be conducive to

market-led capitalist growth. This also indicated a shift in the way that governmental conceptions of developmental subjects were imagined. No longer was this subject in need of wholesale re-programming and transformation. Developmental subjects now needed formal, liberalized legal and institutional frameworks in place to unchain the already existing entrepreneurial energies assumed to be latent within them; as SLS scholar Sundhya Pahuja shows, “instead of effecting a long process of civilizing the savage or modernizing the backward, in this version of the story universal economic man is discovered to exist already in the Third World and already to be a proto-capitalist with proto-capitalist laws” (2011, p. 220). This shift, as I discuss in Chapter Three, coincided with the advent of the knowledge economy and neoliberal globalization in which legal reform was integral to contract-based governance, trade liberalization, and the extension of private property rights, notably those of intellectual property.

Law plays a crucial role in subject-formation under conditions of neoliberal governmentality. Whereas liberal governmentality views the market (defined by relations of exchange) as a natural entity populated by intrinsically rational and free subjects, neoliberal governmentality views markets and subjects as in need of construction (Foucault, 1979; Hull, 2015). Competition displaces exchange as the definitive feature of market rationality (Reade, 2009, p. 27) and becomes a distinctly normalized mode of human behavior. Neoliberal governmentality is thus concerned with cultivating the conditions through which competitive and entrepreneurial conduct unfurls. The work of technologies guides neoliberal subjects (both individuals and communities) towards the acceptance of possessive attitudes, entrepreneurialism, self-reliance and improvement, while using legal technologies such as property rights and contractual means to encourage engagement in market relations (Rose,

1999; Lemke, 2001; Weidner, 2009, Brockling et al., 2010; Dean, 2010). Economic calculation (e.g., cost/benefit analysis) infiltrates every sphere of social existence, with the effect of disrupting the traditional distinctions between capitalist owners and workers. Understood now as possessing 'human capital', the neoliberal subject is 'responsibilized' to conceive of his or herself as an entrepreneur, investing in, drawing upon, and enhancing his or her personal capacities to maximize individual economic well-being. This point will be particularly salient in investigating the construction of the neoliberal Indian agricultural subject, who is positioned and urged towards rational farming decisions conducive to the ongoing datafication and financialization of Indian agriculture.

The growing dominance of public-private partnerships in India's agricultural development, marked by an extension of contract-based governance in Indian farming, deregulation, and financialization, is explored in Chapter Four. The agricultural subject in this final assemblage is still oriented, if not steered to adopt a self-empowered, entrepreneurial disposition, but is now considered to lack the precise agricultural and ecological information needed to make choices conducive to effective, value-maximizing participation in increasingly privatized markets. The introduction of big-data technologies in agriculture, the Indian state and its corporate partners suggest, will serve to rectify this paucity of technologically-sound information. To benefit from the alleged fruits of big-data technologies in farming, the Indian agricultural subject must be transformed into a vector of data collection through a variety of new technologies. This ongoing process of subjectification, however, is not unfolding in a smooth, linear manner. I deploy a conjunctural analysis to better capture the uneven processes of subject-formation within a larger context that links both the past and the future of Indian agriculture.

Conjunctural analysis, rooted in Marxist theory and deployed in cultural studies and the social sciences more generally, provides a way of constructing contexts premised upon relationality, contradiction, and change, with the objective of theorizing and analyzing “the concrete complexity of a social formation” (Hall, 1988, p. 162). A conjuncture comprises a social field in which modalities of power affect every series of relationships between its constituent elements. Conjunctural analysis (re)constructs contexts so as to understand the relations of power more effectively, while maintaining a realistic view of the contingency of these relations in that “they did not have to be that way, but, given that they are that way, they are real and they have real effects” (Grossberg, 2010, p. 22).

Capturing the impact of any moment, event, or practice requires an analysis that delineates the significance of the relations in which they are immersed. However, a conjunctural analysis accepts that exercises of power do not unfold uniformly. Their collective force does not travel in a linear manner and their effects are not determined by a single agent. As cultural-political geographers have demonstrated, excavating relations of power in conjunctural analyses involves an interrogation of the relations among the multiple, overlapping, and competing (or complementary) elements within a social formation, while insisting that each element has a distinct history prior to this conjuncture (Anderson et al., 2012). This is followed by analyzing the emergence of such relations, how they are stabilized/destabilized in varying spatio-temporalities, and finally assessing the resulting temporary balances of power which result in the (re)production of structures and political struggle (Grossberg, 2019, p. 46).

I utilize the ‘problem space’ as an analytic practice in my conjunctural analyses. A ‘problem space’ is the result of a historical interruption which reorders a configuration of questions and answers (Scott, 2004). It is constituted through a problematic, or a “conceptual

knot...that animates particular struggles” which “links a series of crises of values” (Grossberg, 2019, p. 52) as it intertwines itself through political, economic, and social relations in fragile and sporadic ways akin to a spider web. I show how the postcolonial Indian state’s contestation, hybridization, and partial acceptance of European Modernity (which I use interchangeably with ‘Western’ Modernity) underpinned the birth of development as an industry and a discourse. Development then denotes the key problematic that spawned the key crisis illuminating each of my conjunctures, as well as serving as the ‘conceptual knot’ that connects each crisis across my conjunctures.

I conceptualize each of my historical conjunctures as an assemblage, a term first developed by Deleuze & Guattari (1980) but further refined in social science disciplines such as anthropology, geography, and sociology (e.g., Collier, 2006; Li, 2007; McFarlane, 2009; Brady, 2014). What Anderson and fellow geographers (2012) call ‘assemblage thinking’ attends to how seemingly dissimilar elements come together to produce a formation and how they are stabilized and/or disrupted, recognising that each element carries a distinct history and agency capable of acting outside of or in another further assemblage. The term assemblage denotes three approaches in such bodies of thought: as a way of describing resultant social formations (or, the sum of the assembled parts), as a concept attentive to the process of assembling a formation’s constituent parts, and denoting an ethos guided by difference, heterogeneity, and indeterminacy (p. 173). Anthropologist Tania Murray Li further adds that studying governmental assemblages necessitates a focus on the goals to be accomplished by governing authorities, governmental practices as well as practices of resistance, and the effects of governmental interventions (2007; 2007). Following these insights, my objective is not merely to describe the product that results from assembling a governmental apparatus, but to capture the processes of assembling

themselves by tracing the relations between elements in a manner that is sensitive both to historical contingency and to the capacities of elements of the assemblage to influence future governmental formations.

The practices which orchestrate the processes of assembling thus involve a disorderly collision of forces which produce various sparks and shockwaves. These may result in the formation of new assemblages or the congealing of existing assemblages. After these collisions, situated subjects pull the resultant assemblage both apart and together (Brady & Lippert, 2016). Tracking the commonalities and discontinuities between each of my three conjunctural assemblages helps me to consider how the elements of each assemblage form and transform in new problem spaces over time.

Chapter Two entails an exploration of the historical formation of various elements which comprised what is known as the Green Revolution: actors (states, government leaders, agricultural scientists, farmers), legal and regulatory technologies (subsidies, aid, credit), institutions (philanthropic foundations, NGOs, agricultural research centers, universities), objects (land, seeds, crops, synthetic fertilizers, pesticides), and practices (crop competitions, the creation of agricultural extension programs), many of which overlap as governmental technologies. In unpacking the elements of the Green Revolution, I focus on the effects of key technologies both in the application of scientific knowledge in Indian agriculture and in the construction of agrarian subjectivities. Various technologies of law, understood as constituting “the basic elements of global economic and political life— capital, labor, credit, money and liquidity, as well as power and right” (Kennedy, 2016, p. 11) which comprise the background rules of distributional outcomes in society, were crucial in both state and agrarian subject-making during the course of the Green Revolution.

Chapter Three traces the roots of India's incorporation into the global knowledge economy beginning in the late 1980s and crystallizing in 1991 when the Congress Party-led government embraced various forms of economic liberalization (Sunder Rajan, 2017, p. 32). By the early 1990s, international financial institutions began prescribing new policies of free trade, direct foreign investment, and the opening of global markets (Randeria, 2013, p. 563). Privatization of state led sectors and goods soon followed, as did the reduction of agricultural subsidies. The Indian state undertook transnational regulatory restructuring, opening itself to the demands of foreign corporations and investors, as well as global institutions and NGOs. This knowledge economy assemblage is comprised of subjects (the Indian state, civil society, global institutions, NGOs, corporations), law (international treaties/soft law instruments, national legislation, various articulations of rights), practices (privatization, trade liberalization, state-capacity building, commercial farming), discourses (competition, entrepreneurialism, nationalism) and a mix of ICTs and governmental technologies (biotechnology, global governance indicators, comparison, evaluation, and other forms of subjective 'empowerment'). In delineating the assemblage of India's integration in the global knowledge economy, I illustrate the processes through which the state government in alliances with transnational NGOs and private actors, selectively implemented provisions of global policies and treaties concerned with IPRs and environmental and agricultural regulation to achieve new kinds of rural development embedded in free market relations.

Neoliberal regulatory restructuring at the global, national, and local levels enabled India to selectively implement global legal frameworks regulating agriculture and environmental governance. At the same time, it facilitated the emergence of a pluralistic legal terrain characterized by policy spaces for the Indian state to perform a particular kind of postcolonial

sovereignty, and for Indian farmers' movements who utilized these spaces to articulate and demand new objectives by drawing upon nationalist/postcolonial discourses emanating from the prior Green Revolution in what, following SLS scholar César Rodríguez-Garavito (2006), I consider the emergence of a subaltern cosmopolitan legal subject. In the mid-1990s, for example, local movements such as the *Karnataka Rajya Ryota Sangha* engaged with the international peasants' movement *La Via Campesina*, effectively linking their opposition to GMO seeds and to Monsanto with an anti-neoliberal globalization politics through a discourse animated by an anti-IPR politics promoting seed sharing against corporate monopoly controls.

In exploring the CSA assemblage in Chapter Four, I attempt to map the connections between key state and non-state actors involved in producing and implementing CSA programs globally and locally, such as the Climate Smart Village (CSV) initiative unfolding in various parts of India. The chapter analyzes the intersections of policies, rationalities, technologies, and discourses that constitute this emergent neoliberal trans-scalar governmental assemblage. Elements in this assemblage encompass: subjects (farmers' organizations, Indian NGOs and international NGOs/donor agencies, local government leaders, private sector actors), objects (farms, agricultural application technologies, data, seed banks), practices (soil testing, precision fertilizer application, contract farming), and technologies (ICTs, big data, agricultural insurance schemes, participatory science). Shifts in international climate policy that occurred simultaneously with the 2007-08 global financial crisis established the conditions for national policies that eventually produced the policy rationale for CSA in India. I attempt to show how various aspects of CSA projects, notably CSVs, not only reconfigured Indian agriculture for the introduction of big-data technologies but also involved practices, such as capacity building workshops, that constituted 'climate-smart' neoliberal agricultural subjects capable of acting as

vectors of agricultural data collection. The Chapter further explores the boom in Indian ag-tech start-ups as new corporate subjects aligned to further the Digital India initiative. These firms created agricultural platforms in partnership with domestic and multinational food retailers designed to encourage the financialization of Indian agriculture through mergers and acquisitions akin to the larger corporate consolidation of global agribusiness. Moreover, the ‘Farming as a Service’ model further integrates data-driven agriculture and financialization as a new corporatized agricultural paradigm in India. This new paradigm is closely tied to the highly contentious Farm Reform Bills introduced in 2020 and ensuing farmers protests.

1.5. Methodology and methods

A key component in establishing a socio-legal research methodology involves the way in which one understands and conceptualizes ‘the law’ (Schiff, 1976). To reiterate key points from the prior discussion, I work within a paradigm that attempts to address the often mistakenly demarcated boundaries between law and non-law (Calliess & Zumbansen, 2010) by showing how ‘transnational legal ordering’ (Shaffer, 2016; Halliday & Shaffer, 2016) is rooted in a plurality of sources and actors beyond the state, is not bound to territory, and deconstructs traditional public/private and state/market distinctions (as seen for example, in hybrid public-private partnerships). Within this paradigm, legal regulation is understood as an emergent form of collaborative governance dependent upon a variety of actors instead of manifest only in command-and-control type regimes (Levi-Faur & Jordana, 2005; Levi-Faur, 2017), that is nonetheless indistinguishable from other legal orders (Paiement, 2013).

By recognizing the equal importance of legal discourse (and discourses that do not originate with law but come to inform law), peoples’ tribunals, and forms of ‘soft law,’ to name a few, with legal treaties and legislation, TLP enables a more informed emphasis on ‘what is at

stake' in politically-informed legal struggles. This methodological intention is evident in my use of a mix of primary-source archival materials such as Rockefeller Foundation and World Bank reports and memorandums, which provide insights into the historical production of legal/developmental discourses, policy planning documents, as well as the uses of legal instruments such as credit. Other primary texts for my purposes include international legal treaties, domestic legislation, development-project briefing documents from various state and international agricultural institutions, Indian government agency reports and policy statements, as well as NGO and corporate reports and grey literature. I analyze these to assess and theorize the dominant discourses embedded in the agendas, rationalities, and framings of the conjunctural assemblages I explore (Bowen, 2009).

In conjunction with my selected methods, a TLP legal pluralist approach has allowed me to critically examine of the key characteristics of each 'moment' designated in the previously discussed Law and Development literature. The developmental Indian state in the Green Revolution assemblage explored in Chapter Two was deeply implicated in a transnational governance regime, composed of state and non-state actors whose objectives both overlapped and departed from one another. Primary source material located in archives shows how the US government, the World Bank, the Rockefeller Foundation, and the Ford Foundation played key roles in shaping the conditions for the developmental Indian state's interventions in agriculture. The Ford Foundation's early Green Revolution report, *India's Food Crisis & Steps to Meet It* (1959) was influential. The University of Minnesota's 'UMedia – Green Revolution' Archive and The Rockefeller Foundation Archive Center provided access to *A partnership to improve food production in India: A report from the Rockefeller Foundation* (1969), as well as the following agricultural technology marketing campaigns: *Bharat Earth Moves Ltd.*, "*We prepare*

the ground for national development” and *Krishi Engines Ltd.*, “*Krishi – The Green Revolutionary*.” The digital archives of the Reserve Bank of India offered “rich evidence about how the state regulated economic life and attempted to improve the financial well-being of Indians”, as described by economic historian Balasubramanian (2017), and led me to *The General Report of the Committee of Direction: All India Rural Credit Survey* (1954). Interdisciplinary secondary literature drawn not only from SLS, but from the anthropology and sociology of development, the anthropology of the state, economic geography, legal history, political theory, international development and post-development studies, and agricultural and rural political economy, helped me to explore the agricultural, ecological, and political-economic impacts of the Green Revolution on the Indian state and its farmers within a broader historical legal, geopolitical, and developmental context.

As I have suggested, the ‘transnational’ in TLP underscores the evolution of the processes through which local and global legal forms, actors, and institutions are historically embedded, as well as their respective capabilities to emerge in various spatio-temporal scales of law, regulation, and political struggle. In Chapter Three, for example, I show how the creation of dominant international legal and regulatory instruments of the Knowledge Economy assemblage, such as *The Convention on Biological Diversity* and *The Agreement on Trade-Related Aspects of Intellectual Property*, were shaped by the concerns of the Indian state, while simultaneously shaping India’s domestic statutes, the 2001 *Plant Varieties Protection and Farmers’ Rights Act* and the 2002 *National Biodiversity Act*. I examined India’s role in the formation of international treaties (WTO-*Agreement on Agriculture*, *The Convention on Biological Diversity*, *The Agreement on Trade-Related Aspects of Intellectual Property*, and *The Nagoya Protocol*) and other contested negotiations (Uruguay Round negotiations, the Dunkel Draft) during this era that

were intended to liberalize national economies while incorporating Third World states into the global knowledge economy. Further, the chapter demonstrates how international law, in conjunction with the broader imperatives of the knowledge economy and neoliberal globalization, constituted the Indian state as a ‘macrosubject’ of transnational governmentality.

Analyzing primary sources such as the World Bank’s 1988 memorandum on the Indian seed sector which accompanied its loan to India, its 1998/99 *World Development Report*, and the World Economic Forum’s *Global Competitiveness Report* enabled me to map particular neoliberal technologies of incorporation in the global knowledge economy. At the same time that India was constituted as a neoliberal ‘macrosubject’ in the global knowledge economy, the state subjected farmers to new forms of government which provoked resistance among old and new actors. I identified the key agro-environmental civil society actors who influenced the resistance to India’s partial embrace of neoliberal reforms, their linkages to transnational social movements, and the discourses which they mobilized to advance their efforts, while attempting to link how these actors deployed dominant discursive tropes in their assertions of commonalities and contradictions back to the Green Revolution and forwards to CSA initiatives. By critically investigating India’s selective implementation of domestic neoliberal reforms through its engagement with international law, I was able to consider India’s exercise of state agency and map the geopolitical context in which the state was obliged to perform its sovereignty and to what publics, a point that I will return to in Chapter Four.

The interdisciplinary secondary literature that helped me to provide critical context for this Chapter includes historical accounts of the knowledge economy, critical food and peasant studies, neoliberal governmentality frameworks developed in anthropology and international relations, reflective first-hand accounts from Indian lawyers and scholars who were negotiators

during the Uruguay Round, TWAIL and cultural ecology approaches in environmental law, SLS and critical political economy studies of globalization and Indian legislative history.

In emphasizing the mutually constitutive nature of law and society rather than simply linking law to the state, a transnational legal methodology insists that the state is a historically contingent arena of political struggle. In addition to Chapter Three, the second half of Chapter Four demonstrates this point by focusing on the ways in which *Digital India* and Indian CSA initiatives established the groundwork for the introduction of the highly contentious 2020-21 Farm Bills, as well as providing incubating conditions for the massive farmers' protests that the proposed legislation has activated. TLP then, provided a distinct way of seeing legal connections and disjunctions across multiple geographical scales and historical contexts, revealing the work that law, in its myriad governmental formations, performs in Indian political struggles.

My focus in Chapter Four on hybrid public-private partnerships in India was inspired by TLP's commitment to disrupting classical public/private and state/market distinctions and illustrates the increasingly blurred lines between the Indian state, Indian agribusiness, and Indian agri-tech firms. The state of Haryana is the focal point through which I explore how domestic and transnational actors are implementing data-intensive CSA initiatives. Located in North India and bordering the state of Punjab, agriculture is the primary sector of Haryana's economy, comprising 81% of total land usage in the state (Govt. of Haryana, Economic Survey, 2018, p. 3, p. 53). It is currently the second largest food grain producing state in India (Aggarwal & Moudgil, 2015, p. 135), with 70% of the state population working in agriculture (p. 135). It was a primary beneficiary of Green Revolution technologies and has seen major increases in total food production with grain production rising by 576% between the inception of the Green Revolution and 2014-15 (Aggarwal & Moudgil, 2015, p. 136). It is second to Punjab in the use

of fertilizers and pesticides (Kohli & Singh, 1997, p. 3), indicating the continuing legacy of Green Revolution inputs. In its 2013-14 annual agricultural report, the Department of Agriculture of Haryana estimated that farmers administered 250 kg of chemical fertilizer per hectare (Aggarwal & Moudgil, 2015, p. 138).⁴

Through digital searches, I obtained the state government of Haryana's policy statements and its documents related to agriculture and climate change mitigation. I further searched the websites and reports of global CSA actors, most notably the dominant agricultural organizations involved in public-private CSA partnerships, such as the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) to understand to what extent they are directly working with the government of Haryana, its farmers, and how.

I engage in a preliminary mapping of the regulatory and discursive flows unfolding in Haryana's enactment of CSA initiatives, most notably the CCAFS CSV program, in order to assess how and when CSA became embedded there. CSA's mandates and implementation are heterogenous across scales, which requires an investigation of global CSA platforms (such as the Global Alliance for Climate Smart Agriculture), complementary national policy frameworks, and Haryana's local CSA programs. Obtaining and researching CCAFS project documents shed light on the specific ways that particular CSA development projects are enacted with Haryana's farmers, which I elaborate upon in Chapter Four. Indian newspapers also provide up to date information on recent policy pronouncements regarding India's growing agri-tech start-up industry. The websites of these start-ups further detail what work they are doing, where, in partnership with whom, and with what funding, all of which highlight their connections to established large-scale Indian agribusiness. With respect to the consideration of the datafication

⁴ Or, roughly 551 lbs. per 2.47 acres of land.

of agriculture in India, the selected interdisciplinary secondary literature is drawn from critical data studies, theoretical accounts in the political economy of big data as well as in the financialization of agriculture, political ecology, political science and environmental studies of climate change policy, development geography, agricultural economics, critical food and peasant studies, and NGO grey literature. During the period of this conjunctural assemblage (2018-2021), I set Google Scholar for the terms: “climate smart agriculture” and “India”, “climate smart agriculture” and “intellectual property”, “climate smart agriculture” and “seeds”, and “climate smart agriculture” and “ICTs” to update scholarly literature, while subscribing to CGIAR’s Climate Blog updated with blog posts, journal articles, media, videos, and grey literature on new CSA developments to stay atop of policy concerns and political developments.

2. CHAPTER TWO: MAKING THE INDIAN GREEN REVOLUTION

2.1. Introduction

This chapter explores the various problems, actors, institutions, knowledges, discourses, and technologies that formed the origins and shaped the implementation of what I will refer to as the Indian Green Revolution assemblage. I conduct my analysis in the form of a history of projects of government with multiple mutually constitutive actors, policy objectives, legal and regulatory fields, normative ideologies, and facilitating technologies and practices of governmental subjectification,⁵ many of which afforded contradictory means and objectives. Rather than framing the Green Revolution as a singular solution to hunger or a means to prevent famine, I argue that it was a governmental intervention into the perceived problems of modernization and development in India⁶ composed of distinct political rationalities and governmental technologies designed to shape desired subaltern subjectivities in the new nation state.

Formally commencing in the 1960s, what is commonly known as the Green Revolution was a US-led comprehensive agricultural package exported to various parts of the Global South through state development agencies and large philanthropic foundations such as the Rockefeller and the Ford Foundations. Indian and American leaders, scientists, and development planners viewed traditional Indian agricultural methods and seeds as incapable of feeding the growing nation. Western scientific knowledge and administration, they thought, could significantly increase crop yields and improve production efficiency. Led by the plant breeding efforts of

⁵ These include: actors (states, corporations, philanthropic foundations, government leaders, agricultural scientists, farmers, NGOs), legal, policy, and regulatory fields of authoritative discourse (private property, food regimes, food aid, bilateral technical agreements), ideologies (of progress, improvement, high modernism), technologies (high yield variety seeds, crops, synthetic fertilizers, pesticides), and technological practices (mapping, quantification, crop competitions, monocrop farming, modern plant breeding, mechanized cultivation).

Nobel Peace Prize winning biologist Norman Borlaug, it “symbolized the process of using agricultural science to develop modern techniques for the Third World” (Bernstein, 1990, p. 4). The Green Revolution was also seen as integral in containing the spread of communism in the Third World, both in terms of staving off famine and in facilitating national industrialization. The policy of ideological containment was, according to US and international development agencies to be achieved by ‘feeding the world’ while raising the incomes of resource-poor farmers. A booming global population, particularly in the Third World, required more calories and improved economic livelihoods; otherwise, these impoverished and hungry populations would be susceptible to the communitarian appeals of a rapidly spreading communist ideology. Borlaug’s grains, moreover, were configured as having a particularly viral agency in speeding economic growth in ‘developing countries’ (Shiva 2015, p. 15).

The Green Revolution, however, was also constructed as a solution to the enduring problems of modernization and development. While it is often framed as a progressive modern solution to endemic problems of hunger and famine in 20th century India, a great deal of recent scholarship suggests that, like many contemporary governmental assemblages, it was animated by historical discourses that shaped the configurations it assumed. As geographers Anderson et al (2012) explain, historically dominant discourses tend to have an influential life in future assemblages. The Green Revolution’s various, ostensibly modern components were historically shaped by early modern English colonial ideas of progress, improvement, waste, and private property, whose integration promised to enable a shift in Indian agriculture from subsistence farming to a productivist agricultural regime oriented to producing commodities for export markets. The transfiguration of these colonial ideas underpinned the twentieth-century birth of

the international development industry, which facilitated transnational flows of policy actors, ideas, and practices manifest in the Indian Green Revolution assemblage.

I begin by showing how the ideologies of modernization and development were framed in the dominant historical consciousness of a European modernity that mythologized the agricultural subject as its constitutive other, lacking the dynamic forces attendant to modernity and its progressive tendencies towards positive social change. In so doing, I follow SLS postcolonial scholarship, particularly TWAIL, which has long explored the role of law and the legal imaginary in the mutually-imbricated conditions of modernity and colonial rule. Such scholarship challenges modern European law's claims to universality by exposing its lineage as a product of Western colonial rationalities of governmentality.

SLS scholar Peter Fitzpatrick (1992), for example, shows how modern law, rooted in secular Enlightenment thought, asserted its supposed universality in relation to an imaginary savage 'other' burdened by myth and tradition. Legal anthropologist John Comaroff (2001) suggests that European states made use of the colonies as laboratories to test modern legal instruments, institutions, and forms of regulation. TWAIL scholar Antony Anghie (2005) demonstrates how colonialism was constitutive of international law's founding doctrines. SLS scholar Brenna Bhandar (2018) illustrates how modern ideologies of progress and improvement not only rationalized colonial seizures and settlements but continue to inform contemporary property regimes and their ongoing legacies of dispossession. I continue these lines of historical inquiry by exploring how the imperative of private property traveled to India, buttressed by modern ideologies of progress, improvement, and waste, which eventually materialized in the *Colonial Settlement Act of 1793* (the Act). This resulted in the creation of a rural landed elite,

and the dispossession of peasants and traditional, subsistence-based agriculture, a foretelling of the Green Revolution and its aftermath over 160 years later.

How, I ask, did how did the Green Revolution (re)structure the relationship between the Indian state and the country's farmers? Older Enlightenment ideals pertaining to undesirable local traditions and desirable forms of universalized progress, I explain, were revitalized in a reenactment of modernization theory in the new global field of international development at the beginnings of the Cold War and India's independence. For the West, the birth of an international development industry represented an opportunity to continue to perpetuate relations of paternalism and domination through a new international legal order predicated upon replicating Western capitalist economies in the Global South (Escobar, 1994; Anghie, 2005; Pahuja, 2011). I show how the ideology of progress merged with the political rationality of high modernism in India to constitute particular practices of calculation, measurement, and classification, which can be understood as technologies of legibility. These technologies played a crucial role in the state's interventions to reconstitute a class of agricultural subjects as entrepreneurs capable of rationally and productively administering the Green Revolution's high yielding seed varieties, chemical fertilizers, pesticides, and farm machinery.

As a segue to the following chapter, finally, I consider how and to what extent the discursive formations, material practices, and geopolitical relations of the Green Revolution established the conditions for India's future selective incorporation into the global knowledge economy in the 1990s. I illustrate how the Indian Green Revolution functioned through interactions between colonial and high-modern technologies of government, both in terms of scientific knowledge and in terms of political rationalities. To do so, I show how law constructed "the basic elements of global economic and political life— capital, labor, credit, money and

liquidity, as well as power and right” (Kennedy, 2016, p. 11) that were crucial in constituting the new political fields (Foucault, 1972) through which governmental technologies established the conditions for future political actions.

2.2. Modernity: A historical problematization

Conceptualizing the Green Revolution as a project of government necessitates an exploration of the construction of modernization and development as ongoing problems requiring solutions (Rose, 1999). Modernization stems from the idea of modernity, unceasingly interrogated in classical critical social theory (Marx, 1867; Weber, 1920; Durkheim, 1964;), as well as by various schools of contemporary critical social thought (Adorno, 1973; Foucault, 1977; Spivak, 1988; Giddens, 1990; Latour, 1993 Escobar, 1995). Modernity emerged in the Enlightenment era from the 16th century European Renaissance as in an ideologically dominant desire to escape what was considered blind, faith-driven traditional thinking through the embrace of reason (eg: in the work of Bacon, 1620; Descartes, 1641; Locke, 1690; Kant, 1794). Rational thought that rendered the world an object of empirical knowledge, it was determined, could also be structured and intervened in to improve human wellbeing. In order to liberate humans from both natural forces and the stultifying social traditions of the pre-modern era, relationships between humans and human-nature needed to be reordered through the generation and application of controlled scientific knowledge embodied in ever-improving technologies.

In its most simplified form, modernity denotes a condition of social existence imagined to be absolutely distinct from all preceding forms of human social life (Shilliam, 2010). In distinguishing itself, modernity relies upon distinct dualisms; present/modern, past/tradition, self/other, culture/nature, civilized/primitive. As a historical concept, modernity is generally understood to have reached ascendancy in Europe. Less a Western invention than a concept

forged in colonial and imperial interactions with non-Western others (Mitchell, 2000, p. 2) it established “in the popular imagination the idea of the West as superior and more advanced along a singular path to progress...Europeans were placed at the pinnacle of human achievement: civilization” (McEwan, 2008, p. 81). The embrace of European modernity signified a rejection of tradition and its associated values which emphasized kinship, family, and community to prioritize individuality, freedom, and formal equality. It entrenched a faith in pre-planned social, scientific, and technological progress achievable through the forces of rationalization and industrialization to further embed capitalism and market economies. Such a trajectory also entailed the societal changes of urbanization and secularization, the development of the nation-state, and the emergence of liberal democracy and public institutions (Foucault, 1977, p. 170-177). The realization of modernity was understood to require a series of evolutions characterized by an inevitable unilinear movement through periods of time, overcoming anachronistic modes of thought and generating new forms of individual experience and understandings of selfhood. Modernity was to unfold through processes of modernization which required modern subjects. Small-scale agriculturalists were considered the antithesis of the modern subject, as the ideologies of modernity imagined this ideal actor.

Historically, modern nation-states have mythologized farmers as impediments to social and economic progress and in need of discipline and transformation to contribute to strengthening a capitalist modernity, Eurocentrically projected and imagined as a universal social telos. In colonial societies, European governing authorities castigated farmers due to their attachments to place, community, ethnicity, and tribe. Such attributes were viewed as evidence of their inherent moral inferiority and traditional backwardness, most visibly seen in large family sizes, which were linked to sexual impiety and considered a major cause of overpopulation

(Handy, 2009). This line of thought can be traced back to Thomas Malthus's *Essay on the Principle of Population* in 1798, which argued that excessive birth rates and unchecked population were a result of poverty, underdevelopment, and general moral depravity. The most undesirable vestiges of pre-modern life were manifest in the behaviors of the poor; they were their own worst enemies and a threat to the well-being and modernization of their societies. Malthusian ideas of overpopulation circulated in India under colonial rule, partly due to his three decades of teaching at the East India College, where "he and his successors ensured that generations of British officials and scholars in India saw that country's society in Malthusian terms, as evidenced by every Indian Census Report until 1951" (Ross, 1998; Caldwell & Caldwell, 1986, p. 4).⁷ In India, Malthus believed that privately owned property was a prerequisite for increasing cultivation out of so-called waste lands (Whitehead, 2012). As I will discuss later in this chapter, 20th century neo-Malthusianism influenced how the new Indian political leaders calculated the potential costs and benefits of receiving American food aid shortly after independence and in solidifying their political will to implement the Green Revolution.

Practically, however, rural family size was a result of subsistence farming; if farming families worked the land primarily to feed themselves, then their children would typically do the same. Subsistence farming, however, did not meet the modern standards of 'productive' land use, which entailed enclosing farmlands in order to reorient them to commercial farming, ultimately producing commodity crops fit for markets. High birth rates along with subsistence farming implicated smallholders as contributing to food insecurity and thereby in need of

⁷ His ideas gained traction with subsequent thinkers such as Darwin. Later in the 20th century, Malthusian thinking on overpopulation provided an intellectual justification for population controls that tied global food production, surges in population and density, and sociopolitical volatility during the Cold War (Lerner, 2018).

improvement. A civilized society, moreover, was obligated to ensure the erasure of the commons to enable the enclosures of private property necessary to develop the capitalist economy deemed to be the primary marker of civilization and progress. As Malthus argued, the poor (populations and nations) could avoid their extinctive fate only if they were to recast themselves in the image of the wealthy (Lerner, 2018, p. 488); private property would “‘free’ the rural poor from the binds that held them to their locality” (Handy, 2009, p. 328).

The alleged promise of enclosure stems from Enlightenment notions of ‘improvement.’ Derived first from Bacon’s conceptions and further elaborated in Lockean labor theories of value, the foundations of the liberal state relied upon the notion that any and all economic value derived from productive property belongs to the legal owner regardless of whether that value is a result of collective processes of social production. As political philosopher C.B. Macpherson noted, the significance of Lockean labor theory lies in its disavowal of any social or collective contribution to man’s labor and productivity (Macpherson, 1951). Economic value emerges because of ‘improvement’ upon property stemming from the owner’s labor and justifies the owner’s right to such property. Value itself “‘linked the improvement of land” through commercial usage to the “‘improvement of populations who were not capitalist tenant farmers or engaged in wage labor within emergent capitalist agrarian markets” (Bandar, 2018, p. 47).

Ideologically, this position was projected as a ‘rule of nature’ and as a matter of ‘natural justice,’ later forming the basis of ‘possessive individualism’ (Macpherson, 1962) to legitimate capitalist exchange as a natural feature of modern life. Improvement, however, is contingent upon active exercises of state power enacting primitive accumulation and disciplining new classes of dispossessed wage laborers. As cultural studies of law scholar Sean Johnson Andrews summarized, in the eyes of dispossessed peasants, the state “‘secured the order by which

wealthier people could continually invade the territory on which they subsisted, secure it by violence-legal or physical-and retain it as their own” (2019, p. 115).

Nineteenth century English agriculturalists such as John Sinclair typically portrayed enclosed English fields as evidence of ‘civilization’ and local ‘commons’ to be manifestations of barbarism (Handy, 2009, p. 327). The privatization of land coupled with commercial cultivation came to be understood as essential to galvanizing the progression from a state of nature to a civilized state of being (Bhandar, 2018). Common land ownership represented a primitive, premodern state of being which was not recognized as evincing any agricultural cultivation; “disputes over “common land” increasingly came to be judged through the category of the highest and best possible use of the land” (Whitehead, 2012, p. 5). Locke’s defense of private property as instituted and enforced by the liberal state relied upon improving the value or profitability of lands through labor. If one did not improve the land, then one was properly subject to its dispossession. Improvement became synonymous with ownership in the liberal capitalist state under the assumption that if someone owns something, then he must have labored upon it and if an individual owned property, then that individual created its value. The early 17th century English state initiated a state-led process of primitive accumulation, as an ideological project of improvement in the enforced enclosures and the construction of infrastructure to facilitate agricultural development. The fruits of this project were then “claimed as a natural right by the newly landed classes lucky enough to assert ownership” (Johnson Andrews, 2018, p. 84).

The English state further recognized that it needed to instill the values of a possessive market society into the consciousness of dispossessed wage laborers. Enclosures produced new spaces of capital investment and private property while fundamentally rupturing preexisting commons-based social relations. The criminalization and punishment of vagabondry and

wandering which accompanied the Enclosures legislation were specifically aimed at the former subsistence-based peasantry while cementing the perception of the state's authority over local institutions. The lower classes who resisted and rioted against the Enclosures were deemed "unnatural and, in the words of Bacon, monstrous" (p. 102). The English state's early colonial projects relied on enslaved Africans and enslaved aboriginal labor on plantations (Mintz, 1978). Later, the English state deported the poor, the idle, the Irish, and Gypsies to the colonies as contractually-bound indentured servants. Law enforcement training at the time centered on familiarizing the new proletariat with the sacredness of private property. As Marxist legal historian (and Sociolegal Studies Program Professor) Douglas Hay (1978) suggested, the state thus was essential in the imposition of the market economy, inextricably linked to private property and authority.

The early English state established the foundation for capitalism through the elimination of the commons. As legal historian E. P. Thompson (1971) showed, enclosures forced peasants off the ancestral lands on which their livelihoods depended; pre-industrial practices of craft-work and subsistence farming eroded, while the moral economies of the feudal land-regime which adjoined economic and social relations were disrupted. This led to a mass migration of rural dwellers to urbanized areas and their incorporation into the wage-labor that ultimately propelled the British industrial revolution. Subsistence peasants were transformed into poor, landless laborers, understood as 'free' to sell their wage labor on newly privatized land under the control of landlords or find employment in new factories; enclosure as a process of primitive accumulation constituted the forced separation of the majority of the population from the means of production (Neocleous, 2012, p. 948). However, as Bhandar (2018) reminds us, this process did not function exclusively to create a class of wage laborers; it also sought to criminalize

groups of people who did not engage in marketized forms of cultivation and were typically untethered to regular work and geographic location. Alongside the material act of enclosures was the ideological construction of the peasantry as:

rough and savage...and refractory to Government, insolent and tumultuous... the commons led the poor to Begging, Filching, Robbing, Rogueing, Murdering, and whatsoever other Villainies their unexercised brains and hands undertake...For the ruling class, wasted land, wasted labor and wasted time went hand in hand (Neocleous, 2012, p. 953).

English thinkers at the time equated legalized enclosures with improvement, conjoining the valuation of land and people through a logic of calculation and measurement (Bhandar, 2018, p. 39); “land and the labor of men ought to be conceptual equivalents...the improvement of one requires the improvement of the other” (p. 42). Landed elites would benefit from higher rents, small farmers would benefit economically from increased agricultural productivity, and the state would have enough food to sufficiently feed the new labor force. Moreover:

Locke’s labor theory of property created the original legal map that divided wildness from civilized, wasteful from productive, and the civilized from the savage. Hence, the labor theory of property classified those who would, and who would not, become most vulnerable to accumulation by dispossession in a colonial context. Inhabitants of wastelands became people without history, property or productive identities, inflecting class projects of dispossession with a racialized subjectivity located in a state of nature before history began (Whitehead, 2012, p. 18-19).

Whether in constructions of the agricultural subject as predisposed towards overpopulation, laziness, and inefficiency, or in the ruling elite and liberal state's drive to civilize/discipline him through the accumulation of private property, the agriculturalist was understood to have been forged in the domain of an unproductive and stifling tradition and to stand as an obstacle to capitalist modernity, occupying and embodying a subjectivity that could, should, and must be reshaped.

Colonial governmentality in India instantiated new technologies of government such as mapping, counting, measuring, and surveying to produce new and superior knowledge about the territory, its resources and its peoples who were dispersed into numerous groups and principalities (Cohn, 1988; Appadurai, 1996; Kapalgam, 1995, 2000a, 2000b). Early colonial topographical mapping projects began in the late 18th century in order to identify potential sites of revenue extraction: "The British project of governance entailed first defining the territory and fixing the boundary, and an understanding of the realm contained therein in terms of people and things... in particular the collection of tropical specimens for the newly emerging natural sciences, the collections of statistics of people and resources to administer and exploit" (Kapalgam, 1995, p. 89).

Revenue surveys were then used to gauge the potential for productive land use, existing land tenure systems, and to produce classifications and valuations for crops. The East India Company initiated survey projects which would "make revenue assessment and revenue collection efficient for alien rulers who had to first familiarise themselves with the local practices. These related to tables of exchange...tables of weights and measures...for regulating the quantities and prices of grain and other articles" (p. 93). Lands were measured across villages in terms of crop yields, soil quality, and the revenue potential of cultivated crops. These maps

and surveys were critical to the production of agricultural statistics. Revenue assessment and administration entailed the mass collection of statistics about agricultural lands and inhabitants to evaluate and compare crop productivity across farms. This contributed to the broader introduction of a new “quantificatory episteme” (Kapalgam, 2000b, p. 40) in Indian society under which modern statistical knowledge established the lens to understand various forms of human existence. These technologies further prepared the constitution of governable colonial subjects:

Making up ‘individuals’ was an important agenda of nineteenth-century liberalism, but liberalism in the colonial context did not seek to create the citizen-individual, i.e., the individual as bearer of rights, but an individual who by being forced into a new sphere of commercial exchange would become the *Homo economicus* of the market economy (Kalpagam, 2000a, p. 420).

During colonial rule, “...the identification of the Indian countryside and agriculture with poverty in the late eighteenth and early nineteenth centuries gave authority to a widely deployed strategy of improvement” (Arnold, 2005, p. 522). In 1793, the East India Company and local landed feudal elites introduced the *Permanent Settlement Act* (the Act) which inscribed the category of wasteland into Indian law and land revenue policies (Guha, 1984). In its first manifestation in India, the notion of wasteland closely followed Lockean applications of the term (Whitehead, 2012). Wasteland was the distinct opposite of cultivated land for the purpose of revenue-generating agriculture; wasteland could be improved upon through tillage and planting which was indicative of mixing one’s labor into the soil, that then produced a private right to the land that one had improved (Bhandar, 2018, p. 48).

The Act created a class of feudal landholders whose claims to land tenure were contingent upon meeting the revenue quota paid to the British through the East India Company. Through the Act, wastelands were transformed into private property subject to taxation or subject to state ownership (Deb, 2009, p. 110). Revenue generation thus compelled feudal landowners towards deforestation of ‘wasted’ forest lands, predominantly in the eastern regions, in order to transform them into spaces of agricultural production fit for export. Waste as a categorical designation of land was not based on any ecological distinction (such as infertile or barren territories) but as common lands deemed to be lying idle or to mark lands in which neither sufficient crops nor revenue were being generated. Lands not utilized for commercial purposes constituted waste and ‘waste’ justified state appropriation and the expansion of British control over new territories:

Not cultivating the land, letting it lie fallow for long periods, utilizing the land for gathering, hunting or pasturage activities, or not applying capital to land, would all serve to qualify specific groups of people as unproductive users of idle wastelands. According to Lockean theory, such individuals not only squandered resources by ignoring the imperative to produce the highest possible value from land, they also forfeited the “‘natural’” right of property in land (Whitehead, 2012, p. 7).

With the objective of establishing Indian agriculture as a primary source of potential food and wealth through colonial trade, the British granted private property rights to a class of “gentlemen farmers” (known locally as ‘Zamindars’) permanently settled for the purpose of transforming ‘wastelands.’ The objective of agricultural improvement was vested in the establishment of a landlord and a laboring class:

Consequent to the introduction of a land tax regime which sought to maximize revenue in a “population deficient province,” the myth of the “lazy native,” who deserted productive land in order to escape the regressive tax net came to be perpetuated. In its historical empirical manifestation, the colonial ideology utilized the idea of the lazy native to create subjectivities, where existing societal practices were denigrated. This negative image of the natives and their society rationalized the European conquest and domination of the area. It distorted elements of social and human reality to ensure a comfortable construction of ideology. Settlement of wastelands thus assumed salience for colonial governmentality... (Hilaly, 2016, p. 57-58).

The implementation and administration of the Act, along with the development of new transportation and communications infrastructure created a field of governmental technology, steering Indian smallholders towards a productivist, export-oriented agriculture and away from traditional farming. The erosion of subsistence farming in favor of a regime oriented to productivity further elaborated the distinction between pre-modern and modern: “Peasant notions of provisioning for the future derived from cyclic notions of time were replaced by bureaucratic notions of planning for the future that were based on linear notions of time” (Kalpagam, 2000, p. 433).

In order for landlords to meet their taxation obligations under the Act they needed both access to distant markets through the development of transportation infrastructure (Washbrook, 1994) and tenant laborers’ disciplined to grow cash crops rather than traditional varieties predominantly used for subsistence. As international trade and food scholars Gregory et al., note:

Indian farmers abandoned the biodiverse poly-cropping cultivation of traditional species, such as bajra (pearl millets), legumes, pulses, wheat, cotton, sorghum and other traditional crops, for an intensified, often mono-cropped, commercial cultivation of non-food crops such as indigo, cotton, jute and opium. More movement towards the mono-cropping of food and non-food crops, including wheat, rice, cotton, jute, groundnuts and sugarcane, occurred in the latter half of the nineteenth century (Gregory et al., 2017, p. 585).

The landlord system, however, led to low rates of agricultural productivity and initiated a period of sluggish agricultural improvement (Shani, 2006). This was crucial in creating pervasive rural poverty and, as some critical analysts argue, a vital cause of Indian famines in the 18th-20th centuries (Davis, 2002; Shani, 2006) that later came to frame justifications for the Green Revolution.

To summarize, the shift from commonly held lands to private property was also deemed to mark the evolution from a state of nature to a civilized state. This movement indicated an advancement from the pre-modern to the modern which was foundational to European industrialization, typified by the power of science and technology to organize society in a materially improved way of life. European industrialization, though, was dependent upon raw materials acquired through colonial plunder. Postcolonial sociologists and economists describe the collection and redirection of taxes and revenues in the colonies to the metropolises as ‘colonial drain’, the beginning of which is traced “to 1765 when the East India Company acquired tax revenue collecting rights in Bengal” (Bhambra, 2021, p. 313; Patnaik, 2017). Into the early 20th century, colonial drain not only fueled English industrialization, but provided the economic basis for the early English welfare state (Bhambra, 2021). Soon thereafter, the nexus of progress,

private property, and capitalist market relations was elevated to a universal standard and one to which non-Western states and peoples must aspire; “it was progress which had permitted Europeans to ‘discover’ the whole world, and progress which would explain their growing hegemony over the global horizon” (Sbert, 2001, p. 197). While faith in progress in the 20th century was shortly suspended after the ravages of the Great Depression and World Wars, it reemerged in designating the conditions of underdevelopment and development in which the movement from pre-modern to modern was transfigured as a shift from a condition of underdevelopment to one of development. Progression in development necessitated the material execution of modernization theory and denoted a theory of social change enacted in the Cold War era alongside an evolutionary schema that reinscribed the Eurocentric modern/traditional dichotomy (Bernstein, 1971).

2.3. The birth of international development

As a theoretical model of social change underpinning the post-1945 international development apparatus, modernization denoted a deterministic, linear process of internal change in which undeveloped countries could evolve through gradual stages of economic growth to effectively ‘catch up’ with industrialized, capitalist countries. As sociologist Gurinder Bhambra (2007) notes:

explanations of the processes of modernization were primarily located in the context of a historical understanding of societies where each form was deemed to be superseded by a progressively higher one. Traditional, or pre-modern, societies were put forward as objects of comparison with societies already deemed to be modern and the problem was set up in terms of accounting for the historical transition from one to the other (p. 57).

In addition to macroeconomic transformation, the universalizing teleology of modernization required alterations in the societal values characteristic of ‘undeveloped countries’. Leading theorists of modernization theory posited progressive economic development as leading to mass consumption akin to the British industrial revolution (Rostow, 1960), turning innovation, individual success, and free enterprise into cornerstone values (McClelland, 1967), in a gradual political liberalization through institution building (Huntington, 1968). Modernization theorists endeavored to shape ‘modern man’ in relation to the goals of national development in developing countries (Portes, 1973). As I’ve discussed, Enlightenment thinkers had woven these facets of modernization together in their disavowal of a context exemplified by diverse histories and cultures in favor of a universal, transplantable model of social evolution, abolishing the shackles and legitimating role of tradition (Bhambra, 2007). In modernization theory too, as we shall see, social administration and regulation were seen as processes directed from above by knowledgeable experts unburdened by such obstacles.

Modernization entailed a scaling and mimicry of industrialized, Western capitalist states. Early modernization theorists believed in the universality of their model, which also embodied the global standard to which non-Western societies should aspire (Lerner 1958, Rostow 1960):

They co-ordinated their studies around a common set of categories derived from the Western experience and used these to establish the comparative framework within which the developing countries could be ordered...once Europe had become modern it was deemed to be able to show the way to the rest of the world as a model to be imitated. The birth of modernity, it was believed, could be induced (Bhambra, 2007, p. 59).

The West established the industrial model as an example for non-Western countries, stemming from its claim to civilizational superiority manifested in the Enlightenment and universalized through colonialism. The assimilation of European modernity required underdeveloped states to remove ‘traditional’ barriers to modernization, such as local and indigenous social systems, institutions, and systems of knowledge based in collectivism and kinship ties (Parsons, 1964). As one of the preeminent critical anthropological theorists of development asserts, “what was at stake was a transition from a ‘traditional society’ to an ‘economic culture, that is, the development of a type of society whose goals were linked to future-oriented, scientific-objective rationality” (Escobar, 2001, p. 137).

In the context of modernization and development in Africa, anthropologist James Ferguson adds that:

“(a)s the “backward nations” advanced, in this optic, to a “modern” form of life encompassing a whole package of elements -- including such things as industrial economies, scientific technologies, liberal democratic politics, nuclear families, and secular world views – would become universalized...Modernity figured as a universal telos, even for the most “traditional” of societies” (2006, p. 177-178).

Other barriers posed by ‘traditional societies’ would disappear through the application of modern technology and mechanization in both statecraft and in the everyday experience of the population in fields of agriculture and transportation, and industrialization as embodied in factories -- the antithesis of craft production --where mechanization would lead to urbanization, and liberal democracy would encourage the cultivation of individual national identities to replace communal or kin-based identities.

International development spread and entrenched Western modernization theory, linking Cold War geopolitics to an ideology and set of practices that some critics describe as a global industry devoted to neocolonial socio-material transformation (Apffel Marglin & Marglin, 1990; Escobar, 1995; Cooper & Packard, 1998; McEwan, 2009; Asher & Wainwright, 2018). In the mid-20th century, international development involved the formal inscription of modernization processes and ideologies into the contemporary international system. It did not emerge as a fundamentally novel conception, however, but as an outgrowth of colonial civilizing missions that emphasized Western models of economic growth.

As TWAIL scholars have recognized, Western states established the legal apparatus of the Mandate System during the interwar period (1918-1939) as it became clear that the colonies were proceeding towards statehood (Anghie, 2007). The Mandate System was a legal apparatus spanning the transition from colonialism to international development. It functioned as a system of trusteeship in which colonized territories were no longer directly ruled by colonial powers but were still deemed to require the tutelage of their colonial rulers as they ‘matured’ towards civilization and statehood. While imperial powers had looted the colonies for decades, the changing nature of the international order required a means to continue resource extraction through a more liberal humanist register regulated by law rather than naked imperial violence:

Despite the happy suggestion that both the natives and the world in general would benefit from the exploitation of these resources, the fact that the terms of the exploitation were set by the colonial powers or the mandatory powers inevitably led to the sacrifice of native interests. Thus, while the sort of outright exploitation of native peoples by chartered companies that took place in the nineteenth century was condemned, the new regime of unequal exchange, officially sanctioned by

the colonial state and embodied in legal regulations, was completely acceptable (Anghie, 2007, p. 160-1).

Thus, externally guided self-governance merged with a model of economic progress that was deemed mutually beneficial for both colonizers and the 'natives'.

Transforming the natural resources so abundantly found in the colonies into commodified goods destined for market exchange also required the expertise of Western states who had cultivated this industrial expertise through the extraction of those very resources in generations prior. Economic development, it was assumed, would bring about important social changes both directly and indirectly. For example, it would promote the organization of modern, efficient communities through an ethic of individualism intended to gradually eradicate established patterns of communal living and exchange. The economic development of Western states was no longer sought through the exploitative underdevelopment of the former colonies and the Third World at large, as suggested by dependency theorists of development (Gunder Frank, 1966). Rather, Western states could further their own economic development by assisting the former colonies in improving their own economic wellbeing through the modality of internationally institutionalized development.

The idea of what is now formally understood as international development emerged in the post-World War Two international order, marked by President Truman's inauguration speech in 1949. Underdevelopment had long existed in most parts of the world as a result of colonial and imperial exploitation. Post-development legal theorist Gustavo Esteva points out that Truman was the first to reframe underdevelopment as a problem in need of a humanitarian policy prescription: "In order for someone to conceive the possibility of escaping a particular condition, it is necessary first to feel that one has fallen into that condition" (2001; p. 7-8). As

anthropologist Akhil Gupta (1998) explains, modernity and modernization were intimately bound, first in colonialism and then in development:

The “modern” celebration of Western progress, civilization, rationality, and development, came to be instituted as a global phenomenon through colonialism and through multiple and diverse modes of governance and domination in the postcolonial world...After the formal demise of colonialism, one of the chief mechanisms by which this self-representation has been promulgated has been through the discursive formation known as “development...” (p. 36-37).

Ideologically, development marked the articulation and universal imposition of an unrestrained ‘good life’ characteristic of the new American way of living where material-wellbeing became a paramount universal value (Berthoud, 2001). If development was the attainment of a Eurocentric conception of the ‘good life’, then underdevelopment was the corollary condition that required escaping. This was also marked by a shift from British colonial hegemony to a post-World War II American imperialism accomplished through an emergent international development industry with an emphasis on food, the reintegration of rural and urban living, and the power and benevolence of technology to improve the non-Western world. As Sachs (2001) notes, Truman’s inauguration speech demarcated the basis for development interventions:

...we must embark on a bold new program for making the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas... I believe that we should make available to peace-loving peoples the benefits of our store of technical knowledge in order to help them realize their aspirations for a better life...we should foster capital investment in areas needing development. Our aim should be to help the free

peoples of the world, through their own efforts, to produce more food, more clothing, more materials for housing, and more mechanical power to lighten their burdens...With the cooperation of business, private capital, agriculture, and labor in this country... Such new economic developments must be devised and controlled to the benefit of the peoples of the areas in which they are established...The old imperialism-exploitation for foreign profit-has no place in our plans...And the key to greater production is a wider and more vigorous application of modern scientific and technical knowledge... (Truman, 1949).

These excerpts of Truman's speech captured the basic contours of a Western modernity made accessible through the processes of modernization, which formed the basis of the practices and rationalities of international development. In establishing the model of American industrialism as the pinnacle of modernization, Truman affirmed an evolutionary process in which progress steadily unfolded in clearly compartmentalized periods of time. The effect of this temporal sequencing, as Ferguson (2006) comments, was that "poor countries...were not simply at the bottom, they were at the beginning. And the clear implication was that history -- the passage of developmental time -- would in the nature of things raise the poor countries up to the level of the rich ones. For those at the bottom of the global hierarchy, the message was clear: wait, have patience, your turn will come" (p. 178).

If economic productivity was achievable through technological advances, then the technologies needed to jumpstart industrialization were to be exported to the non-West in accordance with subsequent conceptual models produced by American social scientists and government planners (Rostow, 1960); "for developers, what was at stake was a transition from a 'traditional society' to an 'economic culture', that is, the development of a type of society whose

goals were linked to future-oriented, scientific-objective rationality and brought into existence through the mastering of certain techniques” (Escobar, 2001, p. 137).

Hunger was the definitive feature of underdevelopment. The aesthetics of hunger fit comfortably with conceptions of underdevelopment rooted in stagnant, poor, and unmodern Third World rural regions prone to famines. Turning the problem of hunger into a domain of intervention fit with the general impulses of development; providing food and nutritional programs would satisfy the development industry’s paternalistic humanitarian impulse while shaping the needs of its underdeveloped subjects.⁸ Hunger also constituted a developmental priority at the state level. For newly independent post-colonial states yearning for Western-styled modernization, hunger impeded the goal of rapid and large-scale industrialization; if farmers could not feed the population, then the hungry and increasingly urbanized workforce could not contribute to the nation’s industrialization.⁹ Without industrialization, the postcolonial state could not ‘catch up’ to Western states (and it was therefore outside of Western modernity and

⁸ The development gaze upon agriculture began in 1947 in what became known as the ‘surplus food regime’ according to a political economy-based framework that divides regimes governing agri-food relations into distinct periods of capital accumulation (Friedmann, 1987; McMichael, 2009). The surplus food regime was constitutive of the post-WWII world order which saw the restructuring of post-War Western economies in favor of mass production and consumption, especially of processed durable foods through an emphasis on national regulation in the form of protective import controls and export subsidies (Friedmann, 1987). Mass agricultural production required greater raw agricultural inputs, particularly for the chemical sweeteners, fats, and preservatives essential to durable foods. As the US encouraged its own farmers to produce more and more through its import controls and export subsidies, it found itself with increasing agricultural surpluses.

⁹ Food aid was the basis for *Public Law 480* (PL 480), which established the export of American food aid/surpluses to India and later influenced India’s food policies at the onset of the Green Revolution. PL 480 governed the conditions of food aid between the US and India in the early 1960s. PL 480, known as ‘Food for Peace’, established a series of agricultural sales agreements through which the US sold its surplus wheat to India at bargain prices as a means of Cold War diplomacy and to avoid widespread famine in India, while creating an avenue for the US to liquidate its domestic food grain surpluses. From 1960-1964, India purchased roughly 16 million tons of American grain (Akita, 2014, p. 241) while its domestic food production steadily decreased (Lerner, 2018, p. 492). The imported wheat was crucial towards feeding the urban poor population that provided the labor necessary for Indian industrialization. However, as Akita (2014) argues, the cheap, mass imports also made it impossible for Indian farmers to compete in local markets, thereby further decelerating domestic food grain production. This development foreshadowed future conflicts over liberal and globalized agricultural trade and practices of food dumping by Western states into the Global South (*see* Bello, 2009).

international political maturity).¹⁰ For developed states, hunger also represented an imminent revolutionary threat in the context of the Cold War.¹¹ Global concerns about hunger, whether to prevent socialist uprising or humanitarian catastrophe, formed the conditions for the reformation of the agricultural sectors of Third World states guided by productivist frameworks in line with modernization theory.¹²

¹⁰ Negotiations between the US and India produced a conditionality under which India would only receive a food aid package if it devalued the Indian rupee, which was a goal of the World Bank in its 1965 Bell Report, “as a means of making the Indian market more internationally competitive” (Lerner, 2018, p. 496). Though devaluation was widely criticized across the Indian political spectrum, it was ultimately accepted by June of 1966, seeing the rupee devalued from 4.76 to 7.50 per US dollar (p. 497). India invested nearly half of all returned rupee proceeds into harnessing and developing water resources for flood control, electric power projects, and hydroelectric dams (Akita, 2014, p. 240), all of which were requisite components of the infrastructure needed to implement the Green Revolution. While PL 480 became a dual carrot/stick foreign policy tool by the US, it was subject to political maneuvering by Indian leadership who used it to acquire the food grains necessary not only to stave off famine, but to fuel its industrialization, triggering a mass transfer of labor and capital from rural farms to urban factories (Khan, 2018, p. 8). In alterations to PL-480 in 1966, President Johnson implemented a conditionality attached to food aid in the form of ‘self-help provisions’ which required that in order to continue receiving food aid, India had to begin implementing agricultural reforms to increase agricultural food production and improve its infrastructural capacity to store and distribute food grains. The terms of the previous agreements permitted India to purchase discounted American grains in Indian rupees, which later circulated back to India by way of various ensuing forms of American development aid (Khan, 2018, p. 7). This was crucial in that not only did it allow India to preserve its increasingly scarce foreign exchange, but it enabled India to reinvest these funds in developmental infrastructure, which was formally stipulated in the 1966 law.

¹¹ US ruling elites and government development planners identified the threat posed by the stark socio-economic inequalities in the rural parts of the Third World in geopolitical terms; hungry peasants lacking a state-led social safety net would be highly susceptible to communist and socialist ideologies which planners thought aligned with the communal values ascribed to rural villagers. This was particularly clear in the ways in which democratic India was contrasted to socialist China; as a US Senator in 1951 remarked “with more than half the world’s people now deciding between China and India.... “we must do what we have to, we must spend what we need to, to help India” (Cullather, 2010, p. 138).

¹² Capitalist agri-industrialization, moreover, became a model exported to and taken up by newly independent Third World states. Surplus crops in the form of food aid were crucial to feeding increasingly urbanized labor forces engaged in national industrialization, while providing political cover for Third World governments (McMichael, 2009, p. 145). On the consumption side, surpluses as food aid conjured anxieties about the long-term reproduction of core-periphery relationships of food dependency. The acceptance of food aid, however, was not a passive endeavor. Food aid produced change in Third World state practices of food production by encouraging aid recipients to adopt and replicate the national regulation of agriculture and trade (Friedmann, 1993, p. 35).

For Third World states, national economic development centered around establishing an equal geopolitical footing with the economically developed West. Witnessing the global context of American and then European strategies of strong national regulation rather than liberalization, Third World states approached agricultural restructuring and modernization less as a vehicle for export-based growth and more as a catalyst to spur national economic growth through industrialization. India’s fear of food dependency largely influenced its regulatory replication of the US agro-industrial model.

If the problem of hunger was an effect of stagnant national agricultural systems, then farmers represented the localized source of national agricultural deficiencies. Transitioning from a traditional society to a modern one required a different sort of peasant with modern values based in competitive entrepreneurialism, inculcated with a self-interest to adopt and master new agricultural technologies. Modern farmers needed to assume a level of self-reliance oriented towards their improvement under productivist agricultural regimes modeled on the industrialized American agricultural system, where yields ruled over any other agricultural metric (Stone & Glover, 2017). As geographers Nally & Taylor (2015) insist, the Rockefeller Foundation's impact on the Green Revolution extended beyond its assistance in training in new agricultural methods and the introduction of new agricultural technologies; it was deeply invested in projects of subject-making.

The ethos of 'reforming the world' espoused by early 20th century philanthropists such as Rockefeller and Carnegie underpinned their recognition of the limits of the capitalist system that produced their enormous wealth. Charitable gift-giving was one aspect of mitigating the excesses of capitalist inequality, but these individuals and foundations recognized that a more sustained change would be achieved by rearranging the attitudes of the charity's recipients. To receive monetary aid, the beneficiaries should "be actively enrolled in the process of securing their own salvation" (p. 52). Self-governed improvement was the basis of philanthropic self-help. To have the sort of transformational impact that Rockefeller and Carnegie envisioned, charitable giving needed to instill feelings "of usefulness and habits of self-reliance" (p. 52). Changes in the gambit of values, attitudes, judgments, and calculations, therefore, were prerequisites to the introduction of industrial agriculture. Farmers required a two-fold conversion into capitalist roles; one, as producers oriented towards productivist agriculture, and second, as consumers of

new agricultural technologies in the form of farm machinery and chemical inputs supplied by agribusinesses such as Esso (currently known as ExxonMobil) (Cullather, 2010).

2.4. Progress, high modernism, and technologies of legibility

The modern ideology of progress, achievable through the prescriptions of development, merged with the ideology of high modernism as the Indian state created the conditions for the Green Revolution. Unpacking the Indian state's proclivity towards particular aspects of high modernism enables a clearer understanding of the Green Revolution as a project of postcolonial government. According to anthropologist James Scott (1998), several large-scale 20th century state-led projects of social engineering were planned and implemented under the auspices of high modern ideology: "its main carriers were the avant-garde among engineers, planners, technocrats, high-level administrators, architects, scientists, and visionaries...they envisioned a sweeping, rational engineering of all aspects of social life in order to improve the human condition" (p. 88). Of the four elements Scott identifies as constitutive of high modern projects, two in particular can be clearly ascertained in India's planning and implementation of the Green Revolution: the administrative ordering of nature and society through state simplifications and a deep-rooted faith in science and technology to meet societal needs (p. 4-5).

Modern statecraft is fundamentally oriented to the problem of legibility, which is central to administrative ordering of nature and society (Scott, 1998, p. 2). In order for the modern state to engage in basic administrative tasks and then in larger projects of social engineering, it must aggregate an extensive scope of knowledge about its population and their activities. The concept of legibility encompasses the state's attempts to organize society and nature in ways that render these 'visible', or knowable (p. 2). It is only after the state can 'see' society and nature in a simplified manner that these domains become amenable to governmental intervention. For

example, Scott identifies the production of cadastral maps, the creation of standardized systems of measurement, and the imposition of a single, official language as successful state simplifications in which complex local practices became standardized, centralized, and the basis for broader projects of government (p. 36-49). These modes and practices of calculation, measurement, and classification can be understood as technologies of legibility, in that they allow for a variety of governmental actors to know and then intervene in shaping the way subjects exercise their freedoms (Foucault, 1977). I will show in the following section how the crop competitions that preceded the Green Revolution were technologies of legibility that made particular farmers knowable and thus classifiable as ‘Master Farmers’ for the purposes of comparison and evaluation.

As I discussed at the beginning of this chapter, the unshakeable confidence in the ability of science and technology to satisfy human needs was constitutive of the ideology of progress central to the ideals of Western modernity. In colonial India, the ideology of improvement under modern Lockean labor theory were tightly integrated in broader notions of progress, modernity, private property, and inherently linked to practices of dispossession. Later, these ideologies of progress and improvement were operationalized in modernization theory, which underpinned the beginnings of the mid-20th century international development industry. The Green Revolution, as conceived by the Indian state’s new leaders, would address needs both for national industrialization and self-sufficiency in food production. This would, however, require that Indian farmers embrace Western advances in the science and technology of modern plant breeding, as I will discuss below. The scientism of high modernism was deeply intertwined with both postcolonial aspirations for modern development and anxieties about the need to avoid the

reproduction of colonial dependency while simultaneously providing conditions for the economic advancement of the postcolonial Indian state.

For the post-colonial Indian state, development became the means of realizing modernity through processes of industrialization. The Indian state fixated upon development as its mechanism of improvement in securing the well-being of its population in the domains of education, poverty alleviation, and nutrition. Independence unfolded after the second Bengal famine of 1943 which killed an estimated 2-4 million rural Indians (Sen, 1981) in eastern India and what is now Bangladesh. While natural disasters were commonly deemed the main cause of mass crop failures leading to the famine, others point towards reduced domestic access to food caused by speculative market practices and increased prices due to high food demands from Britain and an enforced continuation of rice exports to Britain as it fought in World War II (Mukerjee, 2011). Such food constraints were a particular burden upon farmers (Sen, 1981).

Prime Minister Jawaharlal Nehru's vision of development in the early years of independence relied upon public investment in domestic industry, with the idea that general industrialization would also accelerate national advancement in the agricultural sector (Varshney, 1995). The primary objective of industrialized agriculture was to feed an increasingly industrialized national workforce. In the 1950s, the US government, the World Bank, and the Rockefeller and Ford Foundations all exerted pressure on Indian officials to hasten the acceptance and implementation of Green Revolution technologies, as later evidenced by the Rockefeller Foundation's report titled *A partnership to improve food production in India: A report from the Rockefeller Foundation* (1969). The conditions of the Green Revolution's implementation were embraced by some Indian leaders (Khan, 2018), in a way that international relations scholar Lerner (2018) argues, was partially attributable to the ideological influence of

political neo-Malthusianism in the country's elite circles. It was feared that a rapidly growing population would inevitably lead to heightened food insecurity under prevailing conditions. Addressing such food insecurity without a modernized agricultural system capable of feeding the nation would usher in an unwelcome dependence on foreign aid contrary to the postcolonial state's sovereignty and its drive for autonomous development, especially when the US and other donors such as the World Bank deployed aid to shape India's domestic policy decisions (p. 489).

Malthusianism resonated as a politically-influential imaginary among Indian leaders because it amalgamated their concerns with the contemporary political economic landscape with the nation's memories of colonialism. Their own sense of impending catastrophe emanated from reimagining a relationship of dependency upon their former colonial masters; "if they were unable to increase food availability, they would continuously expose their nation to neo-colonial domination— a political catastrophe which parallels the demographic catastrophe a population risks in Malthus' model" (p. 490).

For the newly independent Indian state, preventing famine by increasing available food was crucial to securing international and domestic legitimacy and imperative to prevent neocolonial domination. The state thus perceived farmers to be instrumental in the struggle for sustenance and national self-reliance under Nehru's leadership, according to historian Benjamin Siegel (2017) literally responsible for feeding the industrializing nation. Not all farmers, however, were considered equally suited to the task. 'Master' or 'Progressive' farmers, broadly understood as those imbued with an openness to agricultural experimentation characterized by expert knowledge and breeding (who were typically already landlords or wealthy), were publicly valorized as leaders in the task of feeding the young nation. Progressive Farmers embodied the attributes of a reformed Indian peasantry open to scientific expertise and technology, as well as

symbolizing the new state itself in representing its desire for rapid industrialization and developmental progress through ingenuity and hard work. These farmers carried the responsibility for the development and prestige of the new state; “And those citizens,” Jawaharlal Nehru characteristically affirmed, would “have to feel that they are partners in the great enterprise of running the State machine . . . sharers in both the benefits and obligations” (Siegel, 2017, p. 67).

The rights attached to citizenship did not precede duties to the state but flowed from the completion of those duties; citizens were asked, in other words, to undertake the burden of national development in partnership with the state. Crop competitions commenced in 1951 to promote improved agricultural methods and technologies more widely across the country. At the same time, the US and India signed the Indo-American Technical Agreement, which provided \$54 million USD for India to purchase chemical fertilizers through the establishment of the Technical Cooperation Program (TCP). The funds from this Agreement also contributed to the previously discussed establishment of agricultural research centers and extension services (Saha, 2013). The Ford Foundation’s first offices in New Delhi opened during the same week as the signing of the Agreement. Competition winners were designated as ‘Krishi Pandits’, or ‘Master Farmers,’ lauded as national heroes emblematic of the changing relationship between the state and the peasantry. As a government publicity brochure asserted:

A community of interests is now being established between the farmer and the Government. The farmer realizes that increased production will benefit him as well as his country. To evoke the required response in the farmer the Government is creating an atmosphere in the country in which he who achieves the highest yield per acre is accepted as a hero deserving as much honor as a soldier or

politician. . . .With this end in view crop competitions are organized by the Centre (central government) and the States (Siegel, 2017, p. 69).

As the competitions spread across local districts and more broadly between the country's states (and the winners' yields far surpassed national averages), Indian leaders located agricultural deficiencies in farmers themselves as products of a stagnant, traditional culture. The exaltation of competition-winning Progressive Farmers in the 1950s prefigured the widening gulf between subsistence farmers and capitalist, commercial farmers later seen in the Green Revolution. The construction of the Progressive Farmer fit comfortably with the imperatives of the newly minted postcolonial state and its desire for sovereignty through rapid industrialization. Armed with a spirit of science and competition, Progressive Farmers transcended the local peasantry's entrenchment in the stagnation of traditional custom:

He would participate eagerly in the market economy — accumulating profit without hoarding produce — and would follow exuberantly, if dutifully, the advice proffered by the relevant extension officer. He would make use of better inputs and resources, from chemical fertilizers and improved seeds to new irrigation and plowing techniques. As his lot improved, he would avail himself more readily of educational opportunities and new lines of credit, his success invariably eroding the skepticism of his more conservative and backward village compatriots. . . .Indian bureaucrats and politicians drew on interlinked notions of progressivism and modernization, hewn from the colonial imagination, the nationalist struggle, and the emerging conceits of international social science (Siegel, 2017, p. 66).

The postcolonial developmental state thus constructed the idealized figure of an exemplary Indian farmer as the symbolic standard bearer of national development. The exemplary farmer was an entrepreneurial, technologically savvy subject amenable to receiving expert advice. Winners of the crop competitions were eventually installed as village leaders (known as *pradhans*) under Nehru's Community Development Program (Siegel, 2017, p. 75) as planners hoped that these competition winning farmers would lead by example and spur greater village-level productivity.

This scheme quickly failed but not without consequence; *pradhans* and other competition winners came together, with funding obtained through the TCP in 1956 in Delhi under the banner of the 'Farmer's Forum.' The practices of individuated subjectification worked to create an elite and exclusionary collective political solidarity, as *pradhans* ultimately asserted demands for increased capital and resource inputs from the state. Competition winners often used their success as a platform to denounce state-led land reform, attributing their success to their personal ingenuity and capacity to follow state prescriptions for modernization such as paying five rupees per acre in exchange for chemical fertilizers, using spraying equipment, and accepting technical supervision. As one Pradhan proudly claimed:

“No poor villager could have produced a quarter of what I get from my twenty acres of land, since he lacks up-to-date knowledge and cannot afford to apply modern fertilizers in sufficient quantities. What is more, with my knowledge, supervision, and a small amount of capital, my twenty acres provide work, income, and food every year for more men and women than five such peasant holdings would be likely to provide” (Siegel, 2017, p. 72).

Master farmers thus provided a reliable voice to divert any talk of radical land reform by refocusing attention on their individual enterprising qualities. The state's attempts to construct a new agricultural subject position enabled crop-competition winners to pose as industrious and dutiful contributors to the well-being and advancement of the nation-state. At the same time, this subject position helped to mobilize a class of elite farmers newly vested with capital, political connections, and access to new agricultural technologies, a tendency that intensified over the course of the Green Revolution (Gupta, 1998).

As a key attribute defining the Master farmer, openness to adopting new agricultural technologies came to focus upon a willingness to use chemical fertilizers and high yielding seeds. This was an expensive endeavor. The Indian state initiated agricultural subsidies and credit programs in order to encourage the adoption of the new technologies among smallholders, while at the same time hedging these investments by simultaneously endowing landlords with subsidies and credit. The introduction of the high yielding seeds of the Green Revolution could only effectively produce promised yields if the seeds were accompanied by the full package of complementary agricultural technologies -- specifically chemical fertilizers, pesticides, and irrigation pumps. A major concern was the affordability of the new technologies, which might obstruct mass usage and the quick breakthrough of agricultural production perceived as necessary.

As the *The General Report of the Committee of Direction: All India Rural Credit Survey* (1954) would demonstrate, the Rural Credit Survey Committee (the Committee) was crucial in institutionalizing rural credit schemes. These schemes were enacted through rural, village cooperative structures, which were "primarily, autonomous, economic institutions of user members united voluntarily to meet their common economic, social, cultural needs and

aspirations through a jointly owned and democratically controlled enterprise” (Joseph & Njavallil, 2016, p. 94). In what was deemed as the largest individual field investigation ever attempted in India (Thorner, 1960), the Committee canvassed over 127,000 rural households, dwarfing the sample sizes of previous state attempts to collect rural demographic information. The Committee noted that large parts of the countryside were not organized into cooperatives, and even organized areas largely lacked access to state credit. The British had established some rural credit and agricultural cooperatives under colonial rule. These institutions did not formally come under state control, however, until the state implemented the Committee’s recommendations in 1963 (Rohan, 2006). Agricultural banks, which were eventually nationalised under PM Indira Gandhi, administered rural credit. State-based rural credit was a financial technology integral to the adoption of Green Revolution agricultural technologies, the development of infrastructures for energy and irrigation, and ultimately, the expansion of state government into the everyday lives of Indian farmers by making them debtors dependent upon government financing.

Predicated upon a dominant (if not exclusive) strategy of betting on the strongest, the allocation of subsidies and credit often further endowed already wealthy, large landholding farmers with the means to purchase Green Revolution technologies. The Ford Foundation was a key actor in shaping the criteria through which farmers were considered most capable of implementing Green Revolution agricultural technologies. In 1960-61, the state began implementing the recommendations of the Ford Foundation’s seminal report, *India’s Food Crisis & Steps to Meet It* (1959), in the form of the Intensive Agricultural Development Program (IADP).

In describing the IADP as the “organizational framework” of the Green Revolution, environmental studies scholar John H. Perkins (1997) argues that the Green Revolution was an agricultural strategy based on the transformative potential of new technology. The Ford Foundation Report called for privileging large land-owning farmers located in regions which had shown previous success in achieving high yields. More effort should concentrate on the most promising areas for wheat and rice production, i.e., those which had the most rapid rate of increase in the recent past, and had the highest potential for rapid large increases in the years immediately ahead. For rice, the IADP identified 25 important growing districts; for wheat, selected districts in the Punjab, U.P., M.P. and Bihar were emphasized:

These areas will, the Team believes, increase India's food production more rapidly than others, if given allocation of fertilizers in combination with other improved practices, such as plant protection measures, improved seeds, and water for irrigation. Attention to other areas should not be reduced. But, in the national interest, the Team believes that increased effort should be immediately directed to the most responsive areas (1959, p. 5).

What Das (1999) coins the ‘geographical unevenness’ in the distribution of Green Revolution technologies is a way to understand the role of the state and of law in forming India’s rural economic and developmental policies. Green Revolution technologies were more readily adopted in areas where pre-existing property relations were conducive to capitalist farming; whereas the eastern regions of the state which were predominantly under colonial statutory feudal landlord regimes were largely overlooked. Punjab and neighboring regions under landholding systems which allocated ownership rights to members of land-cultivating castes were the most successful in receiving and implementing the new technologies (p. 174).

Commercial farming including, and not limited to, that based on the GR [Green Revolution], has enriched large landowners. So, they have more material resources.... For example, in the Punjab, the bastion of India's GR, between 1965-66 and 1982-83, per hectare net income from agriculture increased by 88.46% at 1960-61 prices (Das, 1999, p. 178).

Through the selective provisioning of input subsidies and credit, forms of law which constituted the 'background rules' of distributional outcomes (Kennedy, 1991; Kennedy, 2016), not only did the state transform farmers into capitalist producers and consumers but it also helped establish the conditions for the mobilization of farmers in new social movements provoked by the inequities of those who were seen to be the winners of the Green Revolution. The policy of 'betting on the strong' in the distribution of Green Revolution technologies and state support to mid and large cultivators created sharp increases in rural inequality that catalyzed the political formation of disparate farmers' groups and social movements. Conservative groups formed around medium and large land-owning, subsidized capitalist farmers, also referred to as 'bullock capitalists' (Rudolph & Rudolph, 1987). At the same time, revolutionary Marxist peasant groups, such as the Naxalite movement in West Bengal, formed in response to the intensive mechanization during the Green Revolution which caused already landless agricultural laborers and sharecroppers to lose paid employment on large farms (Rai & Prasad, 1972). The Bharatiya Kisan Union (BKU) based in Northern India was one of the most influential farmers' movements in the late/post-Green Revolution in the late 1970s. Comprised primarily by middle to large, land-owning farmers who produced and sold their surpluses (Lutringer, 2010), the BKU (and similarly structured organizations such as Shetkari Sanghatana in Maharashtra, the Tamil Agricultural Association in Tamil Nadu, and Karnataka Rajya Ryota Sanghatana (KRRS) in

Karnataka) did not just receive state subsidies, but demanded new subsidies from the state (Das, 1999, p. 182). They had little concern for land reform but a deep interest in maintaining state-backed price supports “to put pressure on central and state governments, precisely in order to influence the state regulation of agriculture” (Luttringer, 2010, p. 522).

The valorization of the Master Farmer worked in conjunction with state and donor identifications of those farmers who would receive state-backed subsidies and credits to purchase new farm technologies. Agricultural input subsidies and credit schemes were key components in postcolonial agricultural modernization plans. The major barriers to smallholder farmers adopting the new agricultural technologies derived from their perceived deficiencies in knowledge of the effective use and benefits of new agricultural technologies, as well as their very real lack of capital (Chirwa & Dorward, 2013). Smallholders were not only financially poor but were considered ignorant of the means of application and the benefits to be derived from modern technologies. This perception overlapped with the discursive construction of farmers by the state. The deployment of subsidies and credit furthered the project of creating new markets for the adoption of agricultural technologies and the interpellation and insertion of rural subjects into agrobusiness markets as both consumers of new agricultural technologies and inputs and producers of crops from high-yield seed varieties.

High modern agriculture as governmental technologies

The Green Revolution’s new agricultural technologies clearly functioned as technologies of government in their logics of standardization and comparison. Scott (1998) suggests that high modernist agriculture is premised upon developing and transplanting Western cropping and field preparation into non-Western contexts -- a singular focus on enhanced productivity that fails to attend to ecological externalities until they adversely affect production -- that ultimately works to

entrench state power (p. 264). The Green Revolution's high yielding 'miracle' seeds, for instance, were, uniquely, a singular technology abstracted from the rural context as a means to increase food production (Yapa, 1993, p. 265). As anthropologist and development studies scholars Stone & Glover (2017) argue, this abstraction was effected through a process of disembedding seeds from their local contexts in a modernist, cosmopolitan approach to plant breeding:

Borlaug's wheats were not bred in India, where they had their major impact; the key germplasm originated in Japan, was brought to the United States, and then to Mexico, where Borlaug's "shuttle breeding" strategy—raising alternate generations of plants in the southern highlands and the northern desert—further canceled out the effects of place. They are routinely described as inherently higher yielding as if this trait were independent of place, even though different crop traits have different effects depending on the growing environment (p. 90-91).

This high modernist approach to plant breeding required an 'ideotype', "a conceptual model of an ideal plant with physiological and morphological characteristics that theory predicted would yield productively under ideal conditions" (p. 92). This productivity was routinely evoked in justifications for the seeds' superiority to indigenous varieties. Yet, as Indian political ecologist Vandana Shiva (1993) argues, "there is no neutral or objective measure of 'yield' on the basis of which the cropping systems based on miracle seeds can be established to be higher yielding than the cropping systems they replace" (p. 68). High modern plant breeding and the resultant high yielding varieties simplified comparison by making individual crops and genetic elements of crops the basis for comparison to indigenous varieties. This reductionist mode of comparison

negates the wider ecological benefits of indigenous varieties in preserving local biodiversity and in restoring the larger ecosystem (Abbandonato et al., 2017; Urzedo et al., 2021). The work of abstraction renders the broader ecological context invisible by foregrounding yields without any consideration of the relationship between indigenous varieties and the properties of soil, water, plants, and insects with which they interact and whose properties they influence:

The measurement of yields and productivity in the Green Revolution paradigm is divorced from seeing how the processes of increasing output affect the processes that sustain the condition for agricultural production. While these reductionist categories of yield and productivity allow a higher measurement of yields, they exclude the measurement of the ecological destruction that affects future yields (Shiva, 1993, p. 71).

Local environments and agricultural systems had to be modified and standardized to provide the conditions for the growth of the high yielding seeds which required resource-intensive irrigation and the use of chemical fertilizers and pesticides. Monocrop farming, or the agricultural practice of growing a single crop/breed at a time, incorporated high-yielding varieties of seed as a key facet of industrial farming (Scott, 1998, p. 266). Monocropping was a form of mechanized industrial improvement inflicted upon traditional, non-industrial agricultural systems and inclined exclusively towards commodity-oriented production.

Historically, colonial regimes imposed monocropping onto biodiversity-rich, colonized lands to establish large scale plantations for specialized cultivation of cash crops for export back to the metropolises (Gonzalez, 2006). The introduction of cash crops such as wheat into predominantly subsistence-farming societies was a technology used to steer farmers towards abandoning traditional forms of agriculture in favor of modern capitalist farming (Fowler &

Mooney, 1990). Monocropping also later underpinned the high modernist rationalities of uniformity through standardization. With the objective of maximizing profit, the practice rendered the complexities of seed and the genetic diversity associated with traditional farming into a manageable, simplified, and myopic endeavor. In conjunction with the introduction of hybrid high yielding seeds, farm mechanization displaced traditional intercropping practices which entailed planting diverse crops and/or diverse genetic strains of a specific crop, long recognized as an indicia of farmers' innovation used in conjunction with informal seed exchange and the use of seed banks (Tripp, 1996) to further diversity locally available plant germplasm.

As agri-food and sustainability scholars Gregory et al. (2017) note, the introduction of high-yielding varieties in conjunction with monocropping “induced the abandonment of traditional crops. Thousands of highly-nutritious traditional and locally-cultivated food crops such as *ragi* and *jowar* (Indian millets) were foregone in favor of HYVs [high-yielding varieties] of wheat and rice” (p. 587). This dislodging of traditional crops also led to massive loss in genetic diversity, while the HYVs, bred from a genetically narrow pool, contributed to soil erosion and intensive water usage:

Genetic diversity in Punjab has been destroyed by the Green Revolution at two other levels-first by the transformation of mixed and rotational cropping of wheat, bajra, jowar, barley, pulses and oilseeds into monocultures and multicropping of wheat and rice, and second, by the conversion of wheat and rice from diverse native varieties suited to different soil, water and climatic conditions to monocultures of single varieties derived from the exotic dwarf varieties... (Shiva, 1993, p. 83).

On-site farm visits facilitated the dispersal of such new varieties. These visits, however, were not neutral activities. Instead, they constituted a technology of government intended to facilitate knowledge transfers and induce a shift in farmers' behavior. Agricultural research centers trained extension agents capable of bringing and imparting expert knowledge to farmers. The state thus created a new intermediary who could shape the conduct of farmers by encouraging them to identify with and internalize the use of new agricultural technologies and practices (Abrol, 1983). As S.K. Dey, the Minister of Rural Development in Nehru's regime, remarked upon the role of a modern agriculture and the modern farmer in spurring national development on the independent nation's fifth anniversary: "A hungry man who has no work to do has time hanging on him. In sheer self-defense, he builds an artificial world within himself from which he bolts the world without." The mission of rural extension workers, he argued, was to deliver "reason and scientific knowledge into this artificial world of obstinate tradition" (Loveridge, 2017, p. 63). The Ford Foundation-funded Allahabad Agricultural Institute also recruited urban Indians to move to rural areas to receive agricultural training from American-trained social scientists, intent on understanding the everyday dimensions of rural life in India. Such extension officers believed that rural Indian farmers were not inherently backwards, but rather were "victims of circumstance and tradition whose lives were pervaded by fears and superstitions. Any attempt to improve conditions...had to consider the source and influence of these forces" (Hess, 1968, p. 28).

Extension officers were deployed to the countryside with the objective of spreading improved agricultural methods and technologies, as well as the ethic of hard work and a sense of self-reliance and a duty to advancing national development (Loveridge, 2017). They were also involved in showcasing the new technologies, which was crucial to render them attractive to

farmers (Cullather, 2004). Agricultural scientists often joined extension officers in first-hand demonstrations to farmers on how to use chemical fertilizers and practice monocrop farming and explaining how the extensive use of such fertilizers would increase crop yields and thus improve their profitability (Saha, 2013).

On-site visits were introduced as part of bilateral technical agreements between India and the Rockefeller Foundation, as discussed earlier with regard to crop competitions. The technical agreements also led to the creation of international agricultural research hubs such as the International Maize and Wheat Improvement Center in 1966, where extension officers were trained (Morvaridi, 2012, p. 45), thereby rendering these research centers technologies of government. New and existing agricultural research centers were oriented towards the goal of distributing new Green Revolution technologies to Indian farmers. These research centers both generated and deployed expert agricultural knowledge and served as houses of foreign power and surveillance. Their establishment also constituted a technology of legibility, rendering farmers more visible and knowable to the state and society at large: “their increasing contacts and transactions with merchants and government agencies draw them [farmers] into closer acquaintances with the world beyond their villages. They increasingly become *citizens*, full members of the nation” (Mosher, 1966, p. 11-12).

The creation of international agricultural research centers continued across developing countries implementing the Green Revolution throughout the next decade and culminated in the Consultative Group on International Agricultural Research (CGIAR), which was formed with the support of the FAO and the World Bank in 1972. CGIAR brought together 16 international agricultural research centers, including the International Crop Research Institute for Semi-Arid Tropics (ICRISAT), located in Hyderabad, India. These institutions were crucial in the collection

and storage of local germplasm in seedbanks. In a 2003 report, the World Bank stated that ICRISAT held over 113,000 germplasm accessions from which 405 improved high yielding varieties were developed and released in India and other Asian countries (Operations Evaluation Department, 2004, p. 10). National research centers and private actors have benefited the most from access to these publicly held seedbanks, leading critics to argue that Green Revolution research centers were little more than sites of dispossession, or, ecological imperialism (Kloppenburg, 1988).

2.5. Conclusion

In summary, this chapter addressed two core questions: How was the Green Revolution constructed as a solution to the problems of modernization and development? How did the Green Revolution (re)structure the relationship between the Indian state and farmers? In attempting to address these questions individually and collectively, I have shown how the various constituent elements of the Indian Green Revolution were interrelated and rearticulated to produce a historical governmental assemblage. Colonial ideologies, technologies, discourses, and practices resurfaced in early postcolonial India, each with their own distinct histories which later shaped the formation of the Green Revolution as a project of postcolonial governmentality.

Rather than framing the Green Revolution as a singular solution to hunger or means to prevent famine, I understand it to be an intervention into the perceived problems of modernization and development in India. The 1793 Act was the vehicle in which the ideologies of progress and improvement traveled through the course of colonial government. Later, these ideologies were embedded in the beginnings of 20th century international development. As these ideologies combined with the imperatives of high modernism, new technologies of legibility emerged. Crop competitions prior to the Green Revolution worked as a technology of legibility

that made particular farmers knowable to the state and thus classifiable as ‘Master Farmers’ for the purposes of evaluation, comparison, and later in determining the distribution of state credit and subsidies. National industrialization was intended to catalyze economic growth and would literally require the calories provided by the nation’s farmers, which was thought to be achievable through rational, high-modern agricultural planning and the introduction of technologically superior high-yielding crops. The interplay of colonial and modern technologies over the course of the Indian Green Revolution assemblage produced a context in which the Indian state rendered itself accountable to its farming population, precisely as it attempted to regulate the conduct of its farmers.

The final question, which serves as a segue to the next chapter, is: How and to what extent did the material practices, discursive formations, and geopolitical relations of the Green Revolution establish the conditions for India’s selective incorporation into the global knowledge economy? To frame this question, I turn to three key features discussed in this chapter: the selective provision of state subsidies and credit, the creation of new farmers’ groups and movements, and the ecological effects produced through the various features of high-modern agriculture.

The selective provisioning of state subsidies and credits, as I’ve shown, were largely predicated on a strategy of ‘betting on the strong’. The Indian state distributed agricultural subsidies and credit to already established large-landholding farmers and landlords, while also attempting to encourage the adoption of the new technologies among smallholders. This practice of the early postcolonial Indian state must be understood in conjunction with the broader international-level changes of agricultural regulation unfolding in the mid-20th century that created food aid/food dumping policies (which I have explained in detail in the footnotes to this

chapter). The Northern subsidy policies that produced exportable food commodities as food aid/food dumping also created a model of a highly-subsidized and highly-protected domestic agricultural systems, which was replicated by Southern states such as India, in order to rapidly industrialize and protect national agricultural industries. Decades later, this model became the target of deregulation in the global knowledge economy and was dismantled by the imperatives of the World Trade Organization (WTO), such as the Agreement on Agriculture (1995) and trade liberalization at-large.

The Indian state's selective provisioning of subsidies and credit through 'betting on the strong' also produced vast inequalities among Indian farmers that eventually led to the formation of politically heterogeneous various farmers' movements. As I detail in the Knowledge Economy assemblage, some of these groups advocated for pro-liberalization stances while others took militant positions and actions against agricultural trade liberalization. What united both, however, were their invocations of experiences of foreign domination in both the colonial-era (taken up by pro-liberalization groups) and the Green Revolution (as articulated by anti-liberalization movements). Further, the reliance upon state subsidies and credits to purchase chemical inputs and machinery introduced in the Green Revolution created extensive rural debt and a consequent crisis of farmer suicides beginning in the early 1990s. The ecological ruin caused by heavy irrigation and the pesticide use needed for Green Revolution high-yielding seeds would later become the problem to be solved by a new generation of genetically engineered seeds, promised by the biotechnology industry to both increase yields and be resistant to drought, heat, and flooding. These seeds and the neoliberal regulation of agriculture through a new international trade and intellectual property regime formed the conditions for the emergence of a new Indian agricultural subject whose multi-scalar forms of resistance would deeply

influence the Indian state's selective incorporation in the global knowledge economy, as I will attempt to show in the next chapter.

3. CHAPTER THREE: MAKING THE KNOWLEDGE ECONOMY ASSEMBLAGE

3.1. Introduction

In the ‘first moment’ of SLS scholarly concern with Law and Development in the mid-twentieth century, the state was understood to be the primary driver of industrial-based economic growth. States utilized law to ensure agricultural productivity through advances in science and technology. Law was further implicated in the restructuring of international/national agricultural systems and markets, the sending or receiving of ‘food aid’, and, as we have seen, in social engineering projects to transform Third World peasantries. The ‘second moment’ of law and development beginning in the 1980s was marked by an intensifying concern with technological and scientific progress. Private property rights and the enforcement of contracts assumed the mantle of development’s guiding model to fully harness the power of science and technology in economic development to achieve agriculture productivity.

In a 1981 *New York Times* article titled “The Second Green Revolution”, environmental journalist Peter Steinhart explored the emergent developments in agro-biotechnology that were unfolding in American university and private laboratories. After discussing the Green Revolution as the initial major twentieth-century international agricultural revolution, he outlined the need for a second agricultural revolution to address the harms resulting from the original Green Revolution: high prices for the new technologies such as fertilizers and machinery, fluctuations in food production, poor and inefficient distribution of agricultural inputs and products, and ecologically damaged soil consequent upon the application of Green Revolution chemical inputs. Steinhart pointed to Dr. Martin A. Apple, the president of the International Plant Research Institute (IPRI) in San Carlos, California as an exemplar of the advanced plant breeder upon whom the success of the next agricultural revolution would depend:

He does not look like a typical agrarian. At 42, Apple has a Beethovenish mane of graying hair and wears tinted eyeglasses...Where traditional breeders talk about hybridization, cross-pollination, back crossing and selective breeding, the terms of the new agriculture are "cell culture," "tissue culture," "protoplast fusion" and "recombinant DNA." Instead of working with whole plants in the field, I.P.R.I. focuses on the cellular and molecular levels, adapting the new cell-culture and gene-splicing practices...At their most optimistic, scientists say the next Green Revolution will construct plants the world has never seen before...Seeds will probably be the chief products of the new revolution (Steinhart, 1981).

In short, the manipulation of plant genetic resources through biotechnology was considered the new holy grail for India's poverty, food insecurity, and its beleaguered agricultural classes. Decades later, the founding director of The Norman Borlaug Institute for Global Food Security, Malcolm Elliot, published an op-ed in the *Economic Times of India* titled "Time for Gene Revolution: If we are to save India from starving, we must embrace GM crops" (2013). Elliot lambasted the Technical Expert Committee, appointed by the Supreme Court of India in 2012, for recommending a 10-year ban on field trials of genetically-engineered food crops, extolling GM food crops in India as the only logical and realistic solution to population growth and the complementary problems of hunger and ecological degradation:

If the naysayers manage to stop agricultural biotechnology, they will precipitate the famines and the crisis of global biodiversity they have been predicting...the full range of cutting-edge techniques to produce higher yielding, higher quality, lower input and lower environmental impact crops...[such as] gene manipulation approaches . . . are delivering results faster and more precisely than . . . classical

crop breeding techniques, prevent[ing] these approaches from being brought to the service of the people of India” (2013).

These examples illustrate that the ‘Gene Revolution’ was perceived as the necessary successor to the Green Revolution (Scoones, 2008). India needed a second agricultural revolution precisely because of the Green Revolution’s widely perceived negative impacts. Steinhart’s comments on Dr. Apple, moreover, put two dichotomous subject positions into contrast and stark relief; modern, technologically sophisticated plant breeders working in laboratories, and traditional farmers, laboring unproductively in fields. This conventional distinction has a long history in the international law regulating plant breeding (Fowler, 2013), but it is one that was (and is) rigorously contested by farmers in new social movements, as this chapter will illustrate.

While the shift from the Green Revolution to the Gene Revolution seems to be a continuous project of harnessing new agricultural technologies, accepting this narrow, straight linear path from the former to the latter obscures the broader contexts and conditions under which it unfolded. In a comparative assessment of anti-GM activism in the global south, agricultural ecologist Scoones (2008) argues that these national campaigns were mutually constituted in global debates about “anti-globalization, food sovereignty, farmers’ rights and biodiversity” (p. 326). If we broaden our focus to understand the Green Revolution not only in terms of its agricultural significance but as a project of high-modern postcolonial statecraft and subject-formation, as I argued in the previous chapter, then we can see how the Green Revolution helped to establish the conditions not just for the Gene Revolution in agriculture, but for India’s selective integration into the global knowledge economy, often characterized as a “new global imperialism’ (Chimni, 2012), which I will discuss later in this chapter. Neoliberal

restructuring at the global, national, and local levels enabled India to selectively incorporate itself into the global knowledge economy through its particular forms of engagement with the global legal frameworks which linked the regulation of agriculture and biodiversity in the 1990s. Through what rationalities, practices, discourses and technologies did India do so, and to what ends and effects?

To answer this question, I continue my analytical conjunctural history of projects of governmentality through an exploration of another assemblage in which subjects (the Indian state, farmers', domestic farmers' movements, transnational social movements, international financial institutions, NGOs and corporations) interpreted and articulated a variety of legal texts and instruments (international trade and environmental treaties, soft law instruments, national legislation, human and increasingly biocultural rights) with discourses (of nationalism, competitiveness, and anti-neoliberal globalization), in practices (ranging from state capacity-building, privatization, trade liberalization, decentralization, direct-action campaigns, and export-oriented farming) and through neoliberal technologies of governance (evaluation measures of productivity, matrices of comparison, indicators, inventories, and registers), all of which were taken up in contradictory ways by different actors with conflicting objectives.

I aim to illustrate the formation of a transnational neoliberal governmentality assemblage in the context of the broader institutionalization of the global knowledge economy and the neoliberal restructuring of Indian state powers which formally commenced in 1991. In so doing, I utilize and attempt to expand upon anthropologists Ferguson & Gupta's (2002) conception of 'transnational governmentality', which conceives of the ways in which neoliberal government unfolds through multi-scalar processes while constructing both states and populations as neoliberal subjects. Global institutions, such as the IMF and World Bank, are often perceived as

‘above’ the state in their authority to alter state sovereignty by imposing condition-based, disciplinary reforms. On the other hand, civil society, transnational social movements, and sympathetic NGOs assert their influence from ‘below’ (p. 997). This multiscalar spatial formation, typically associated with neoliberal globalization assumes cleanly demarcated, nested scales which naturalize a supposed distinction between the state and society (Mitchell, 1991) and reify the state as a unified, homogenous entity (Painter, 2006, p. 754). I attempt, instead, to delineate a transnational neoliberal governmentality assemblage by illustrating multiple flows, technologies, and connections. While Ferguson & Gupta (2002) pay scant attention to subject-formation in their conception of transnational governmentality, I intend to show how the neoliberal transformation of the Indian state and agriculture was not only a result of intersecting multi-scalar processes, but a dialogic one in which the neoliberal Indian state was constructed as a ‘macrosubject’ by global neoliberal institutions and the disciplinary power of international law (Larner & Walters, 2004, p. 509), while the state itself simultaneously attempted to entrench a quintessentially Indian competitive agricultural subject position for members of its farming classes, formerly perceived as, and increasingly asserting rights as peasants. Consequently, the state and global neoliberal actors provoked a political agricultural subject embodying what SLS scholars Santos & Rodriguez-Garavito (2005) designate a ‘subaltern cosmopolitan legality’, in what I will later suggest was an emergent subaltern cosmopolitan legal subject.

First, I explore the origins and conditions under which the ‘knowledge economy’ was forged in the Global North and then globalized through distinct mechanisms of ‘accumulation by dispossession’ (Harvey, 2003), which significantly relied on the use of agricultural biotechnology, undergirded by an ideology of progress. From there, I explore the origins of the agricultural biotechnology sector in India. In tracing the ways in which the global knowledge

economy was assembled, I first turn to the creation and deployment of neoliberal technologies of incorporation in the global knowledge economy. Next, I investigate India's selective incorporation into the global knowledge economy, from the beginning of the Uruguay Round in 1986 through its late stages in the early 1990s. This was followed by India's contentious entry into the World Trade Organization (WTO) in 1995, through the 1995 Agreement on Agriculture (AoA), and The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs Agreement).

I conceptualize these legal instruments as instigating neoliberal international legal technologies that linked agricultural and environmental governance through trade liberalization made manifest in the proliferation of intellectual property (IP) rights (IPRs) and new recognitions of traditional knowledge (TK), which represented the interrelated but competing interests of corporate capitalist interests and those of local communities. I also attempt to demonstrate how these legal technologies of incorporation into the global knowledge economy provoked various forms of national and transnational resistance among farmers' movements. In the last section, I show how India's engagement with these international legal technologies, as well as the Convention on Biological Diversity (CBD) translated into two interrelated pieces of domestic legislation: the 2001 *Protection of Plant Varieties and Farmers' Rights Act* and the 2002 *National Biodiversity Act* which aim to 'protect' both the rights of Indian farmers and Indian biodiversity, albeit with uneven, if not contradictory, results.

3.2. Making the knowledge economy

As I discussed in the previous chapter, the making of the Green Revolution assemblage was deeply intertwined with the postcolonial politics of industrialization. The colonial exploitation of India, among other colonies, was necessary to advance English industrialization

through resource extraction, labor exploitation, and a ‘colonial drain’. As I have explored, postcolonial India’s motivation to utilize the Green Revolution as a means to fuel its national industrialization was in part rooted in a nationalist desire to ‘catch-up’ to the economically developed West. Shaped by the imperatives of high-modernism, India’s implementation of Green Revolution agricultural technologies represented a strong government and elite faith in the ability of modern science and technology to induce industrialization, and in so doing, fulfill the ideology of progress.

While India sought rapid industrialization through modern science and technology, Western states began shifting their focus to developing domestic science and information-based industries in the late 1960s (Powell & Snellman, 2004). The Gross National Product of the US, economists argued at the time, was increasingly comprised of knowledge-concentrated sectors ranging from education and scientific research and development to mass media and information services (Machlup, 1972). This was a trend that began decades prior in the US, as burgeoning American industries were beginning to invest financial resources into the research and development of knowledge-based goods:

In 1938 five industries employed 75 percent of the staff involved in industrial research: the chemical, power machinery, electrical, petroleum and rubber industries. Each of these industries had its heavy hitters: DuPont, General Electric, General Motors, International Harvesters, United States Rubber and Goodrich and the various Standard Oil companies. These giants became dependent on a strategy of knowledge-led product diversification for their continued growth. After World War 2 they looked to new markets for these products (Drahos & Braithwaite, 2002, p. 52).

These very industries, particularly chemicals and power machinery, created the agricultural technologies introduced over the course of the Green Revolution roughly thirty years later. Economist and prescient business management scholar, Peter Drucker, saw advanced modern states as initiating a transition from manufacturing-based economies, characterized by the mass production of tangible goods, to economies grounded in knowledge-based industries (1959). A key part of this shift towards a knowledge economy entailed the promotion of service-based sectors such as software and telecommunications, banking/finance, insurance, healthcare, education, and entertainment built upon the creation and circulation of intangible goods, rather than production of raw tangible materials or the manufacturing of physical goods. These services crucially rely on their ability to ‘add value’ to new and existing goods and services through the application of novel ideas and knowledge, in which technological advances play a significant role. What came to be understood as the knowledge economy, then, was increasingly premised upon establishing “production and services based on knowledge-intensive activities that contribute to an accelerated pace of technological and scientific advance as well as equally rapid obsolescence” (Powell & Snellman, 2004, p. 201).

By the 1980s/90s, policymakers and management scholars understood the knowledge economy to encapsulate an empirical trend in which advanced states accumulated a significant portion of their economic wealth from the production and dispersal of knowledge (Roberts, 2009). Breakthroughs in the creation of information and communication technologies (ICTs) played a significant role in hastening the growth of Northern knowledge economies. ICTs combined information technologies (IT) such as computer hardware, software, and digital networks that collect, store, process, and present information with communication technologies that enabled real-time, instant flows of information across the world (World Bank, 2002, p. 3).

The capacity of ICTs to globally transmit information rapidly and inexpensively was accomplished by and an increasingly well-established global information infrastructure, which elevated the importance of ‘informational’ goods in the global economy, that is, goods embedded with intangible knowledge that largely constituted their monetary value (Kundnani, 1999). Crucially, ICTs eased and accelerated the digitalization of informational goods so that they could be easily copied, reproduced, and distributed (Shapiro & Varian, 1999).

The distinctions between physical goods and informational goods, understood as tangible products whose value is based on the knowledge they contain, are vital in justifying the commodification of knowledge and understanding the globalization of the knowledge economy more broadly. Physical goods are inclined towards private or exclusive use due to their rivalrous and excludable qualities. The use or consumption of a physical good depletes the amount of that good available to others. For example, the finite quantity of food, clothing, or cars available for others diminishes when an individual purchases and uses such physical goods. Further, these goods are exclusive in that their use can be restricted to those consumers who have the ability to purchase them; consumer 1 may possess the ability and will to purchase a \$50 pair of jeans, whereas consumer 2 may not and they are therefore excluded from purchasing or using that particular pair of jeans. In contrast, informational goods are non-rivalrous due to their intangible qualities. Both consumers 1 and 2 can simultaneously access and use a recipe or consume a work of art without reducing the availability of either. In distinguishing knowledge as a public rather than a private good, economist Joseph Stiglitz (2008) comments: “I have just shared with you some of the things I know, but sharing this knowledge with you has not taken away from what I know. Thus, knowledge has the quality of non-rivalrous consumption” (p. 1700). With internet access becoming widespread and normalized, ICTs enabled the rapid and cheap duplication and

distribution of informational goods: “Whereas once information was tied to physical forms like the vinyl record or the printed page, in the digital age information floats free” (Kundnani, 1999, p. 56).

The public essence of the knowledge with which informational goods are comprised poses a distinct problem for the commodification and construction of capitalist value in informational goods. If informational goods are non-excludable, such that non-paying individuals cannot easily be prohibited from accessing their informational content, and such goods and their content can easily be copied and dispersed at little cost (particularly under conditions of digitization), then private actors cannot easily restrict the free flow of informational goods, leaving them with few capacities to accrue profits from their use and circulation. Informational goods must therefore be transformed into private, excludable goods capable of bearing capitalist value (Hutter, 2003). A key part of this transformative process entails controlling the free flow of knowledge in order to restrict access to the knowledge embedded in informational goods. In discussing this transformation, regulation and global governance scholars Peter Drahos and John Braithwaite (2002) comment that “knowledge is an example of an impure public good because although it is non-rivalrous in consumption it does not always possess the quality of being non-excludable” (p. 215).

Intellectual property rights (IPRs) are the key legal mechanism through which such knowledge is enclosed, rendered excludable, and commodified. Since ICTs allow for the replication and dispersion of information both cheaply and quickly, for private actors in knowledge-based industries who invest significant capital into the research and development of informational goods, IPRs serve as monopoly rights by which they can restrict the use of this knowledge or collect a rent from end users of it to facilitate capital accumulation (Coombe et al.,

2007). IPRs, then, constitute a fundamental component in the legal infrastructure that underpins capital accumulation in the knowledge economy (Drahos & Braithwaite, 2002; Stiglitz, 2006; Maskus, 2010; Coombe & Turcotte, 2012). As I will illustrate later in this chapter, India's selective incorporation into the global knowledge economy involved geopolitical contestations from the Global South about the global harmonization (and imperial imposition) of western IPR standards, and provoked varied forms of resistance to the 'informationalization' of Indian agriculture by organized farmers' movements.

3.3. Globalizing the knowledge economy

As the post-Cold War geopolitical order began taking shape in conjunction with the prescriptive reforms associated with the Washington Consensus, the knowledge economy was no longer confined to Western, economically-developed states. What is now commonly understood as economic globalization commenced in the early 1990s and is normally associated with the spread and integration of free market economies, decentralized state-planning and reduced regulation, and the incorporation of local and national markets into world markets. The technological advancement of ICTs in the global knowledge economy further enhanced the transnational mobility of goods and services, people, and capital through liberalized trade policies (Coombe et al., 2007; Roberts, 2009). The extension of the knowledge economy into the Global South neatly fit the general imperatives of economic neoliberalism (Harvey, 2005), or what other critical Southern scholars deemed a 'new global imperialism' which included the growing importance of mobile international finance capital de-linked from industrial production, the internationalization of property rights in informational goods, the growing economic power of multinational corporations, and novel forms of regulatory authority vested in international institutions such as the WTO, World Bank, and the IMF (Chimni, 2012, p. 28-31).

The globalization of the knowledge economy instantiated new forms of capital accumulation, conceptualized by Marxist geographer David Harvey (2004, 2007) as examples of ‘accumulation by dispossession.’ Seeking to further flesh out capitalism’s drive for expansion beyond national borders, contemporary Marxist theorists suggested that as capitalism matured in the 1970s, it became susceptible to crisis, due to falling profit rates and over-accumulation, leading to devaluation of both capital and labor creating weak domestic demand for and under-consumption of goods produced by the expropriation of natural resources (Knox, 2016, p. 87). It is from this point of crisis and the need for regeneration that Harvey (2004) explains the emergence of a new form of accumulation by dispossession, predominantly unfolding in processes of privatization and financialization. Since the 1970s, both the Global North and much of the Global South have undergone the privatization of national industries and public utilities such as water (Bolivia), housing (South Africa), and infrastructure (India), for example. Land held by smallholder and peasant farmers across the South has also been subjected to commodification and financialization in the form of international investment and speculative market practices (Ferrando, 2017).¹³ Moreover, accumulation by dispossession is seen to be typified in the exploitation of biodiversity in the Global South, understood as ‘bioimperialism’ (Chimni, 2012, p. 30), wherein the internationalization of IPRs enabled Northern actors to legally capture and transfer what were historically understood to be commonly-held, public-domain plant and genetic resources in Southern regions. As I will explore later in this chapter, the international legal architecture of the global knowledge economy facilitated capital

¹³ These developments are understood as contemporary forms of enclosures, although some have argued that to understand current instances of enclosures as ‘new’ fundamentally misses colonial genealogies through which we might understand twenty-first-century enclosures as a continuation of long-standing processes in which the post-colonial world has “already been integrated into global networks of accumulation, violently and unevenly, through the brutality of slave trade, resource extraction, and financial dependency” (Ince, 2014, p. 17).

accumulation not only for Northern economic agents to legally exploit Indian biodiversity and liberalize Indian agriculture, but also to establish the regulatory foundations for the Indian state to expand its own authority over biodiversity and agriculture.

Resource extraction resulting from colonial and imperial plunder was vital for European industrial development, in that the bulk natural resources taken from the colonies were processed in factories and the resulting tangible products were utilized in Europe and eventually sold back to the colonies (Mieville, 2004; Knox, 2016). While natural resource extraction for the production of tangible commodities continues to hold significant relevance in post-industrial capitalism, the genetic and chemical information contained within plants plays a crucial role as a new 'raw material' for the production of informational goods in the global knowledge economy, within the life sciences and biotechnology industries, in particular (Kloppenborg & Kleinman, 1987; Shiva, 1993; Parry, 2000; Chander & Sunder, 2004). In 1973, the life science and biotechnology industries achieved a major breakthrough when ICTs and digital technologies were applied to biodiversity to make possible the isolation of plant DNA so that targeted genes (typically those expressing desirable traits such as drought tolerance) in one plant could be extracted, edited, and inserted into another (Mishra, 2000; Dutfield, 2003). The US Supreme Court extended the scope of patentability to genetically modified life forms in the *Diamond v. Chakrabarty* (1980) case, which was widely seen as a regulatory boon to the nascent biotechnology industry and private plant breeding (Juma, 1989; Sell, 2009), while also prompting a severe decline in traditional seed saving practices among farmers (Mascarenhas & Busch, 2006).

Seeds are 'naturally' capable of reproduction and open circulation through human practices of seed exchange and traditional seed saving practices, both of which threaten the

realization of capitalist exchange value (Kloppenburg, 1988). Seeds must be commodified in order to control their reproduction and circulation. Biotechnological interventions such as genetic use restriction technology (i.e., Monsanto's Terminator Seed) can restrict this self-reproduction. The commodification of life forms, embodied in a biophysical sense through the commodification of seed, enables capital to circulate in and through biophysical nature. As global health expert Bronwyn Parry (2000) argues, the construction of capitalist value in plant and genetic informational material depends upon the ability to control and restrict its circulation and reuse.

Advances in agricultural biotechnology and the proliferation of genetically modified seeds in conjunction with reforms in IPR laws are indicative of neoliberal enclosure of the global genetic commons (Scharper & Cunningham, 2006; Montenegro de Wit, 2017). In considering how these developments are generally understood as positive socio-technical advancements benefitting humankind, SLS scholar Chandra (2016) argues that an ethic of progress reinforces the biotechnological enclosure of the genetic commons in which biotechnological expansion is framed within a global/local dichotomy. The biotechnology industry has the capacity to create 'better' and greater quantities of seeds resistant to environmental stress and sometimes containing greater nutritional content and thus produce more food to feed the world. If local and indigenous stewards of the genetic commons do not allow biotechnology firms and researchers access to the biodiversity they produce because of 'local' concerns and communities practicing subsistence agriculture 'underuse' such potentially globally valuable goods, then the entire world is deprived of the potential benefits associated with newly-improved varieties. Progress, once the ideology of colonial civilization and then modernization as I discussed in the Green Revolution assemblage, becomes a biopolitical imperative and "health, sustenance, [and] care of mankind

becomes its ethical impetus...Technology replaces faith in providing hope, the embrace of science promises the deliverance that religion provided” (p. 55). Traces of the imperial ethic of progress also reappears in the ‘common heritage of mankind’ principle which animates the CBD, as I will discuss later in this chapter.

Under the utilitarian rationale for IPRs, biotechnology firms not only require access to the genetic commons but must also secure the requisite market incentives to justify their investments in innovation. Legal interventions in the form of IPRs, specifically patents and plant breeders’ rights, are critical to controlling and regulating the circulation of plant genetic resources’ informational content. In order for socio-nature to be commodified, it must be turned into something understood to have been invented and thus capable of being owned by human or corporate legal persons. Commodification requires alienation and abstraction of the life form to render it a ‘thing’ and displace it from its social and ecological context, both materially and discursively (Prudham, 2007, p. 418). This hinges on constructing an autonomous invention out of what is ideologically imagined to be a pristine, untouched nature, which in turn demands an erasure of the historical contributions of human and nonhuman lifeforms in the creation of the socio-nature so imagined (Van Dooren, 2008), a process I will expand upon. As I will discuss later in this chapter, struggles to counter this erasure have unfolded through the implementation of the CBD, in UPOV, and through the emergence of Farmers’ Rights and, more recently, Peasants’ Rights in UN Human Rights Councils.

Agricultural biotechnology relies on patents as well as plant breeders’ rights as its primary arrangements for legal protection. In 1985, representatives of medium to large domestic and foreign seed companies formed the Seed Association of India, the first known organization to advocate for plant breeders’ rights in India (Ramanna, 2003), promoting a shift in policy that

would open the seed sector to foreign investment in hybrid seeds and agricultural biotechnology (Ramanna & Smale, 2004, p. 247). Their lobbying coincided with a \$150 million USD loan from the World Bank to India's seed sector because, according to the loan memorandum:

There is significant potential for private sector involvement in the industry on a larger scale in an operating environment which has become increasingly favorable for private initiative in recent years. In order for the industry to perform more effectively there is a clear need for a realignment in its structural and institutional framework aimed at creating financially strong, independent and business oriented public seed corporations and encouraging an expanded role for the private sector (1988, p. 1-2).

A year later, the Indian state and domestic seed companies began establishing the conditions for domestic agricultural biotechnology research and the expansion of IPRs in agriculture, in the form of plant breeders' rights.¹⁴ State-sponsored research into agricultural biotechnology in India began when the national Ministry of Science and Technology created the Department of

¹⁴ IP protection over plant varieties emerged at the beginning of the 20th century, when plant breeding began shifting from the domain of farmers' knowledge and practices to private nurseries and commercialized breeding (Dutfield, 2003; Correa, 2015). These new protections for plant varieties provided exclusive IPRs to mostly private companies and large scale commercial plant breeders developing new plant varieties while neglecting the role of farmers in saving, replanting and exchanging seeds on which these new varieties are based (Winter, 2010), as well as facilitating the enclosure of genetic commons. Plant breeders' rights legitimate a narrow view of authorship and innovation. As Borowiak (2004) notes, the expansion of genetic knowledge and technologies gradually enabled the displacement of plant breeding from farmers in fields to scientists in laboratories so that plants came to "resemble inventions" (p. 514). Gene editing in particular allowed for modifications in existing plant varieties that contained a history of accumulated scientific and TK, so that they might produce novel varieties fitting the desired parameters of novelty and innovation which render them protectable as IP-protected products. This is predicated on a Eurocentric notion of the genius individual author (Van Dooren, 2008), in that plant breeders are understood as adding an original or innovative element (genetic modification) to a formally public good (historically understood as the 'common heritage of mankind', which I will later discuss) to produce an IP-protected product that circulates in markets and collects rents for the breeder. Scientific plant breeders are recognized as innovators because their innovations contribute to scientific progress and capital accumulation, whereas the contributions of small farmers and indigenous communities in the form of seed exchanges and informal breeding techniques at best contribute to an exploitable public domain. Plant breeders' rights incorporated into recent national seed laws have placed limits on the production, sale and exchange of seeds, as well as criminalization and steep penalties for unauthorized use of 'protected' varieties (LVC & GRAIN, 2015; Wattnem, 2016; Oguamanam, 2018).

Biotechnology (Raju, 2016). The establishment of this department signified the opening of India's national agricultural research and plant breeding practices to its domestic private sector, as the public seed sector began providing seed germplasm to Indian seed companies, which later created the genetic foundation for private germplasm pools (Shiva & Crompton, 1998).

These combined efforts led to the 1988 'New Policy on Seed Development', with the objective of "providing to the farmer the best planting materials available in the world so as to increase productivity and thereby increasing farm income and export earnings" (Indian Ministry of Agriculture, 1988, p. 1). Hybrid high-yielding seeds could be imported under the condition that the foreign exporting company "agree to supply parental lines/nucleus or breeder seed technology to the Indian firm within two years of first shipment of commercial consignment" (Indian Ministry of Agriculture, 1988, p. 1), meaning that multinational seed companies had to share hybrid seed technology with domestic seed firms. Similar to its domestic development strategy during the Green Revolution, India opened itself to foreign actors in a careful manner so as to spur the growth of its domestic agricultural industries while avoiding foreign dependence. This time, however, the strategy was a boon more for domestic private actors than for the public sector or Indian farmers at large.

In 1989, the Seed Association organized a two-day conference titled 'Plant Variety Protection: Pros and Cons', comprised by a coalition of plant breeders' rights advocates ranging from domestic private seed industry representatives, government officials from the Ministry of Agriculture, and the American multinational seed industry. The key issue at hand, as environmental anthropologist Seshia (2002) points out, was not the desirability of plant variety protection in India, but whether such protection should unfold through patents or plant breeders' rights. In the same year, India appointed the UN Food and Agricultural Organization (FAO) to

produce a study on the viability of introducing plant breeders' rights, leading to FAO-led technical missions around the country (Rangnekar, 2013).

3.4. Neoliberal technologies of incorporation in the global knowledge economy

The deployment of technologies of government were integral in the course of fostering governable subjects (both macro, such as states, and micro, such as individuals and communities) in the construction of the knowledge economy assemblage. Such technologies are often subtle, taken for granted sets of practices and discourses which carry the aspirations of the ruling authorities while attempting to produce the subjects of government. While the trade negotiations that I will discuss in subsequent sections could be considered as disciplinary exercises intended to incorporate Southern states into the global knowledge economy, more subtle forms of 'inclusion' emerged in the governmental activities and technologies of international and transnational neoliberal institutions. Prior to the globalization of the knowledge economy, most Southern states were still primarily reliant upon industrial production and protectionist, nationally-oriented agriculture in the 1980s/90s. The deployment of knowledge economy indicators¹⁵ as neoliberal technologies of evaluation and comparison were central in steering Southern states towards neoliberal restructuring (Giannone, 2016; 2017) deemed necessary for the incorporation of the South into the global knowledge economy; "embeddedness in the global order is not imposed from above but is to be sought voluntarily. Both people and places are encouraged to apply financial disciplines, demonstrate entrepreneurial capacities, and seek out new opportunities" (Larner & Walters, 2004, p. 509).

¹⁵ According to the World Bank (2006), common knowledge economy indicators include the number of patents granted each year by the United States Patent and Trademark Office (USPTO) each year, education and literacy rates, the number of researchers involved in R&D, national internet and mobile phone service coverage (i.e., accessibility of ICTs), soundness of national banks, levels of local competition among business, reduction in tariff and non-tariff barriers, and exports of goods and services.

In contrast, disciplinary mechanisms intended to induce regulatory restructuring such as the IMF's Structural Adjustment Programs did so by attaching conditionalities that had to be carried out by the recipient state in order to receive financial assistance (Petras & Veltmeyer, 2001). International organizations, such as the United Nations and the World Bank actively generated global statistics and indicators for the purposes of conducting economic comparison between states in the 20th century (Ward, 2004), aspiring to “overtly and purposively...engage actors at the highest levels of government and influence their policies and governance practices” (Kelley & Simmons, 2019, p. 491). An overwhelming majority of contemporary global indices (composite indicators) were produced between 1991-2006, with a significant boom between 2001-2006 (Löwenheim, 2008, p. 266). Pointing to their central role in neoliberal global governmentality, SLS scholars Davis, Kingsbury & Merry (2012) define indicators as:

...a named collection of rank-ordered data that purports to represent the past or projected performance of different units. The data are generated through a process that simplifies raw data about a complex social phenomenon. The data, in this simplified and processed form, are capable of being used to compare particular units of analysis (such as countries, institutions, or corporations), synchronically or over time, and to evaluate their performance by reference to one or more standards (p. 73-74).

Indicators are not simply positivistic representations of pre-existing phenomena in the world, nor are they neutral sources of knowledge. They often create the activities they seek to measure and actively work to make the world they claim to represent (Merry, 2016); “the indicator represents an assertion of power to produce knowledge and define or shape the way the world is understood” (Davis et al., 2012, p. 76). In constructing the world they seek to describe, indicators

simplify the messiness of complex activities. They are conducive to examining, ranking, evaluating, and establishing hierarchies among states. In doing so, indicators act as neoliberal technologies that aim to constitute Southern states as competitive market subjects (Fouger, 2008) capable of incorporating themselves into the global knowledge economy.

Neoliberal rationality aims to instill and expand the marketization of social relations and institutions by cultivating prerequisite political, legal, and social conditions, namely those of competition and entrepreneurialism (Burchell, 1993). This extends beyond individual subjects or populations, to ‘macrosubjects’ such as states. Further, the sustained use of neoliberal indicators and similar tools of quantification produces a discursive field in which standards of normalcy are enacted and determined (Löwenheim, 2008, p. 262). Competition, for instance, is not only valued neoliberal behavior in the global knowledge economy but is a constitutive discourse encompassing “the set of institutions, policies and factors that determine the level of productivity of a country” (Cann, 2017). The World Economic Forum, one of the most influential global economic organizations and the source of the authoritative annual *Global Competitiveness Report* that measures states in the global knowledge economy:

We break down countries’ competitiveness into 12 distinct areas, or pillars, which we group into three sub-indexes. These are “basic requirements” which comprise institutions, infrastructure, macroeconomic environment and health and primary education. We call these “basic” as these pillars tend to be those that countries at earlier stages of development tackle first.

Next comes our “efficiency enhancers” sub-index. Essentially, we’re looking at markets – whether it is the functioning of goods, labour or financial markets – but we also consider higher education and training, and technological readiness,

which measures how well economies are prepared for the transition into more advanced, knowledge-based economies.

Our last pillar, innovation and sophistication, consists of two pillars: business sophistication and innovation. These are more complex areas of competitiveness that require an economy to be able to draw on world-class businesses and research establishments, as well as an innovative, supportive government. Countries that score highly in these pillars tend to be advanced economies with high gross domestic product per capita (Cann, 2017).

The discourse of competition in relation to a state's incorporation and advancement in the global knowledge economy echoes the evolutionary telos of modernization theory, discussed in chapter 2. Twentieth-century international development, underpinned by modernization theory and the ideology of progress, was based on the replication of modern, Western standards of living achievable through capitalist industrialization. Knowledge, expertise, and new agricultural technologies were exported to the Third World in a one-way flow, based on modernization norms in which the advanced centers of science and technology in the modern West provide the tools of civilisation and progress to the traditional, culturally-bound non-Western world.

In the global knowledge economy and its neoliberal governmental technologies of incorporation, Southern states are governed to work on their polities and economies by establishing the proper legal and institutional conditions to attract mobile capital and technology, while investing in their citizenry to cultivate a domestic labor force of high-skilled 'knowledge workers' (Fougner, 2008). The 1991 *World Competitiveness Report*, for example, evaluated state competitiveness based on how attractive the state was for business investment by understanding "the quality of resources available in a country from the point of view of an entrepreneur", as

well as the existing state of domestic firms imbued with “competence in transforming the available resources into value-added products and services” (Väläkangas, 1991, p. 8; Fougner, 2008). Updated and vigorously enforced IPRs “signal to prospective investors that a country respects their intellectual property and is “open for business” according to accepted international norms” (World Bank, 1999, p. 34). IPRs were considered as necessary to induce competition in trade. Further, the World Bank’s seminal 1998/99 *World Development Report*, which established the pillars of the Bank’s 2004 ‘Knowledge for Development’ program, comments:

Countries now in the earlier stages of development have much to learn from the successes and failures of today’s industrializers, for they, too, were on the lower rungs of the development ladder not so very long ago. Knowledge also flows from developing to industrial countries. These include not only indigenous knowledge—for example, about the curative properties of certain indigenous plants, the fruit of some developing countries’ biodiversity—but also some modern technological innovations. All these flows—among developing countries and between developing and industrial countries—can be expected to increase (p. 31).

In the neoliberal imaginary, Third World failures to economically develop are no longer rooted in the overt culturalist framing in which the non-West is inherently deficient due to its bonds to culture and tradition. Neoliberal development in the global knowledge economy suggests that the potential for economic growth within Third World states and subjects is inherent but must be unlocked and tapped into through proper legal and institutional arrangements. IPRs and their connection to liberalized trade in services, agriculture, and plant genetic resources were deemed critically important in establishing such arrangements, as I will discuss in subsequent sections.

3.5. India's incorporation in and resistance to the global knowledge economy

From the post-Green Revolution period into the late 1980s, Indian industries were unable to and uninterested in competing in international markets. The Indian state curtailed international trade by heavily regulating the domestic private sector while promoting small and local industries, in conjunction with heavily protected import policies. Indian reluctance to engage in international economic activity was manifest in the state's disastrous performance during the Uruguay Round (1986-1993), the 8th round of multilateral trade negotiations conducted within the framework of the General Agreement on Tariffs and Trade (GATT). Indian negotiators were unprepared and made very few legal commitments. Indian industry was similarly impassive. The Confederation of Indian Industry, an expansive business association, later acknowledged in a reflective 1999 report that it was "not so much concerned with what was happening in the Uruguay Round. It was not even fully aware of the items on the agenda that were being negotiated" (Sinha, 2014). Ganesan (2015), one of the state's negotiators, argues that domestic policies and politics dominated India's approach to the Uruguay Round and its attitude towards the appropriateness of IPRs more generally.

In these negotiations Northern states insisted on the extension of trade in services instead of merely intangible goods, as well as expanded IPRs, which provoked India's initial opposition to the GATT. Negotiators were deeply concerned, for example, that the liberalization of IP protection would hinder India's ability to provide affordable medicines to its population, rooted in a broader perception that integration into the post-Cold War global economy would seriously constrain the state's ability to singularly determine its domestic economic and social policies. India had little choice but to accept its position as passively receiving and complying with the demands of the industrialized North in these agreements, in part because the state lacked the

technical expertise in IPRs to assert a coherent position (Ganesan, 2015, p. 214). Legal scholar Jayashree Watal (2015), another negotiator in the Indian delegation, explained that: “Local expertise in IP policy... was also rare in developing country capitals. Domestic interests typically wanted the government to resist all demands but offered no realistic compromise solutions. Such expertise was practically absent in the Geneva missions of developing countries, especially in the area of patents” (p. 302). As a consequence, the country made heavy investments in developing new transnational capacities and forging new state agencies (Shaffer, Nedumpara & Sinha, 2015).

India’s stance towards IP during the initial phase of negotiations (1986-1989) reflected its insular understanding of its national economy and its historical tendency to heavily regulate the entry of foreign firms. Indian negotiators argued that the scope of IP protection in any future agreement should be limited to trade in counterfeit goods and mitigating anti-competitive practices by IPR holders. The state’s ideological understanding of foreign trade and investment was deeply nationalistic, such that external influence signified dependence rather than self-reliance. Trade liberalization and expanded IP protections were viewed as merely the extension of Western dominance achieved through regulatory reforms favorable to multinational corporations (Ganesan, 2015, p. 216), a position that found favor with several other Southern states.¹⁶ The substantive basis of India’s reticent position, however, was rooted in its fears that

¹⁶ These positions of Southern states were confirmed when a group of American trade associations with vested interests in IP protection formed the International Intellectual Property Alliance (IIPA) with the aim of lobbying both the American government as well as foreign governments. The IIPA consisted of over 1,500 individual corporations, whose annual output at the time exceeded five percent of the U.S. Gross Domestic Product (Sell, 2002, p. 81-82). By 1986, CEOs and high-level executives from some of the US’s largest corporations, including Bristol-Myers, CBS, DuPont, General Electric, General Motors, Hewlett-Packard, IBM, Johnson & Johnson, Merck, Monsanto, and Pfizer formed the Intellectual Property Committee (IPC) as a parallel pro-IP lobbying group. The IPC stressed that the issue of IP was ‘too important to leave to governments’. The group argued that industry needed to decide upon the best course of action and then tell governments what to do. The IPC convinced its European and Japanese counterparts of the merits of a trade-based approach by emphasizing their shared experience and common plight. The IPC stressed the high costs of IP piracy, and the successes that it had achieved through bilateral trade

acquiescing to the inclusion of IPRs in the GATT would force India to overhaul its existing 1970 Patent Act, which was seen as integral to the development of India's generic pharmaceutical industry due its non-voluntary licensing system (Watal, 2015).

The second phase of Uruguay Round negotiations spanned 1989-1991 and was marked by a change in India's negotiating stance. Three primary catalysts for this change coalesced during this period: external pressure from the US, new domestic openness to economic liberalization from the ruling political elite, and a general shift in the positions of other Southern states (Ganesan, 2015, p. 219-220). A fourth reason could also be linked back to the inducements for a new domestic agricultural biotechnology industry just a few years prior in the mid-1980s, as previously discussed. Echoing the disciplinary food aid measures it asserted against India during the Green Revolution, the US utilized Section 301 of the *US Trade Act of 1974* to identify India as a foreign country that practiced unfair trade practices restricting U.S. exports. This was followed by an investigation with the expectation that India would substantially increase imports from the U.S. under the threat of retaliatory measures. The office of the US Trade Representative (USTR) officially identified American use of Section 301 against India as stemming from the latter's steep tariffs on almond imports and its failure to effectively protect IPRs, creating a barrier to market entry for American corporations (USTR, 2013).

While India was staring down the barrel of potential unilateral trade sanctions, another internationally-rooted crisis ensued. India's dependence on oil imports plunged the country into economic turmoil during the first Gulf War, leading to the need to request a \$2.3 billion loan from the IMF in 1991, which unsurprisingly, was accompanied by conditionalities including an

negotiations. It eventually succeeded in forging an industry consensus with its European and Japanese counterparts, who agreed to work on it and pledged to present these views to their respective governments in time for the launching of the Uruguay Round (Sell, 2002, p. 86).

undertaking to reform domestic policy by opening the national economy to foreign trade and investment. This put PM Narasimha Rao in a difficult position between meeting the demands of India's international creditors and managing continued domestic resistance to global economic integration. Accepting the loan led to rivalrous positions between the Ministry of Finance, which supported the reforms, and the Ministry of Commerce, dominated by entrenched business interests resistant to abandoning India's protectionist policies favoring local industries. Nonetheless, as Shaffer, Sinha, & Nedumpara (2015) illustrate in an interview with a former high-level member of the Indian Administrative Services, the IMF conditionality actually provided the cover needed by Indian leadership to make domestically unpopular reforms; "the IMF and international institutions helped to provide an excuse to do what otherwise was more difficult to do politically" (p. 604). The growing aspiration of India's ruling elite to liberalize the domestic economy thereby received a political gift through the disciplinary measures imposed through India's agreement with the IMF, providing the state with the political cover needed to begin liberalizing at home in the face of resistance from civil society groups and some parts of the business elite.

In 1991, Arthur Dunkel (the Director-General of the GATT during 1980-1993) released a synthesis of the Uruguay negotiations up until that point in what is known as the 'Dunkel Draft' which ultimately provided the foundation for the creation of the WTO and the basis of the TRIPs Agreement (or more generally what became known as the WTO Marrakesh agreements of which TRIPs is only one). In India, patent protections were the features of the Draft which grabbed headlines; it called for the granting of patents on products, as well as the processes taken to create products. On the basis of the *Chakrabarty* case, the Draft further called for the granting of patents over all non-biological and micro-biological processes resulting from the use of

biotechnology, including micro-organisms such as enzymes. Unless a plant variety developed exclusively in nature (and even those were deemed to need protection under a *sui generis* patent system), it was also deemed fair game for patenting in the Dunkel Draft, which left Indian commentators fearful of its future implications for farmers: “This has the potential implication that soon Indian farmers may have to pay royalty in some form for any new crop that they grow” (J.M., 1992, p. 141).

With regard to tariffs and subsidies, the Dunkel Draft created classifications of states (i.e. LDCs or ‘least developed countries’ for the world’s poorest states) with varying time-based obligations and extensions for each class.¹⁷ It further demanded reductions in domestic support for agricultural producers, and the elimination of export subsidies on agricultural commodities. Hegemonic states, however, found ways to fund domestic producers in ways that reduced the selling cost of the commodity in foreign markets so that the exporter was undercutting the prices of domestic producers in the countries of import. This aspect of the Dunkel Draft highlights the historical reconfiguration of agricultural regulation, which I designate as a governmental element linking the Green Revolution assemblage to the knowledge economy assemblage. In the mid-twentieth century, highly-subsidized domestic agricultural commodities from the North became the cheap surplus commodities that formed the basis of food aid/food dumping in the Green Revolution assemblage, which also had the effect of undermining Southern producers of traditional food staples (Friedmann, 2015). Southern states began duplicating this model in their national agricultural systems to spur industrialization while also attempting to avoid food dependency on Northern states. The Dunkel Draft’s imperative of diminishing domestic agricultural supports epitomized the new neoliberal model of agricultural deregulation in the

¹⁷ This process was called tarrification, or the conversion of non-tariff barriers to trade into ‘bound’ tariffs that cannot be increased beyond a set ceiling while encouraging their gradual reduction (DeRosa, 1992).

global knowledge economy. As I will discuss in subsequent sections pertaining to the 1995 Agreement on Agriculture, this model reflected a new but nonunique form of North/South domination in part due to its refusal to open Northern markets to Southern agricultural exports.

At the negotiating table, the Indian government and its representatives were mostly pleased with content of the Dunkel Draft. The Indian government decided to remain within the multilateral rules system presented by an expanded GATT regime while dedicating the state to shaping its evolution, even if it was going to continue to endure losses in the early stages of the system's negotiation (Ganesan, 2015, p. 224). Although it accepted defeat on the scope of what could be patented in the outcomes which favored an expansionary American IP model, several of India's other proposals were adopted. Compulsory licensing regarding patents over pharmaceutical drugs enabled the domestic generics industry to produce patented medicines without the consent of patent holders. Flexibilities built into the final agreement provided space for domestic maneuvering, as seen in the right to provide a *sui generis* form of protection over plant varieties and thus to circumvent stronger patent protections. This would later come to fruition in the *Plant Variety Protection & Farmers' Rights Act*, which I address later in this chapter.

Non-state actors' opposition to the Dunkel Draft, however, were heavily publicized in the Indian media. Civil society groups and farmers' organizations responded with an outrage that equaled, even if it predated the infamous 1999 protests against the WTO in Seattle (Solnit & Solnit, 2009). Led by one of the largest farmers groups, the Bharatiya Kisan Union (BKU) and the Gene Campaign (an Indian NGO concerned with the preservation of agricultural biological diversity or agro-biodiversity) at least 18,000 (and perhaps as many as 200,000) farmers marched to Delhi in a show of agricultural strength and solidarity (Gupta, 1999). The responses from

farmers' groups varied. The more militantly anti-globalization groups mobilized in force, drawing upon nationalist discourses perceiving the GATT as an affront to Indian sovereignty and a lurking symbol of foreign dependence which were not far removed from Indian concerns in anticipation of the Green Revolution. A coalition of at least 45 voluntary organizations and trade unions deeply committed to maintaining all aspects of India as 'local'¹⁸ under the name of Azadi Bachao Andolan protested at Parliament (Kanjila I, 1992). The Karnataka Rajya Raitha Sangha (KRRS – Karnataka State Farmers' Association), a South Indian-based farmers movement born in the 1980s out of opposition to globalized world trade and one of the first Indian farmers movements to mobilize against the expansion of the GATT, set fire to a Cargill seed-processing complex near Bangalore (Bhimal & Rai, 1993). The Maharashtra Democratic Front, a Marxist political organization with a significant peasant constituency, issued a thorough denunciation of the Dunkel Draft, drawing upon nationalist tropes in the face of an imperialist threat:

It is the patriotic duty of the Indian people to struggle for 'Rejection of Dunkel Draft' and withdrawal of new economic and industrial policies. The people should rebuff the propaganda of apologists of foreign powers who preach that this vast country of rich natural resources and hardworking people has no option but to accept the dictates of foreign countries. The future of India lies not in complying with these dictates, but standing up to them...Designs of imperialists and treachery by compradors must be foiled (Bhimal & Rai, 1993, p. 3).

The focus of mobilization and protest for BKU and KRRS shifted from struggles around land redistribution to an interrogation of the new market-based logic dictating agriculture and liberalization. With a sharper focus on transnational capital, these groups espoused a more

¹⁸ For example, in their opposition to foreign seeds and inputs in agriculture or their advocacy of a decentralized national government.

holistic view of their struggles in recognizing agriculture to be linked to a broader rural politics, motivated by a desire to retain rural and indigenous practices which were animated by a general communitarian ethos (Assadi, 2002, p. 43).

Western conceptions of development were often a discursive target of agrarian ire. Protesters viewed the development industry as a simple extension of western capitalism and imperial interests, symbolizing both a predatory external threat to Indian independence, and a new form of Third World domination (Khor, 1995; Desmarais, 2002). From this perspective, the problem of the Indian state was its weakness. Farmers' groups were internally subjugated by the rule of an anti-rural industrialist class, while the ruling class (and the state more generally) were subjugated by Western imperialism (Assadi, 1994), thereby sketching a vertically layered conception of their domination. The weak state was to be captured and transformed into a strong one through the energies of an elevated class of farmers capable of defending itself from perceived foreign encroachments on its sovereignty.

Farmers groups and sympathetic NGOs, more generally, were not, however, homogenous in their ideological positions. Political scientist Assadi (2002) denotes a split between the movements engaged in relation to the Uruguay Round negotiations in terms of how they framed their opposition:

One perspective saw in globalization the larger threat and strategy of western world/western capitalism to trap the Third World, including India in 'neocolonialism'. The second perspective saw in globalization 'the birth of the Indian village into an integrated world where the Indian farmer will have a fighting chance despite longstanding suppression by the State' (p. 45).

Groups who took the latter view again espoused a nationalist discourse. This time, however, it was used, not as a shield against external global forces threatening Indian sovereignty, but as a resource for articulating a hybrid entity linking a burgeoning political imaginary of the ‘global’ to a distinctly native cultural tradition in the vein of the nation’s anti-colonial struggles:

‘Liberalization/globalization is not an iniquitous import from the west.

Liberalization is in fact a worldview of Vedanta.’ This argument was advanced on the premise that ‘in ancient times, the Vedanta tradition of Indian philosophy articulated essentially a liberal worldview based on the identity between the unitary and the holistic and, consequently, on the rejection of the possibility of a superior and wiser intermediary’...‘Liberalism is as swadeshi as the saree and curry’ (p. 45).

The policy demands of these groups discursively mirrored those put forth in the Dunkel Draft. They did not, however, literally parrot these demands, but generally drew upon the Drafts’ broader discursive themes such as the greater efficiencies of the Indian state which were to be achieved through reductions of trade ‘distorting’ subsidies, the gradual elimination of an agricultural surplus labor force, the ‘trickle-down’ benefits of a seemingly unadulterated free trade, and an openness to a more robust domestic IP regime. The state, in this view, was not a structure to be demolished, captured, or escaped. Rather, it was perceived as a site for transformation presented by the expansion of the GATT regime and globalization more generally, and which would make the country internationally legible as more efficient, less bureaucratically encumbered, and at the helm of a more inclusive liberalized economy.

The concluding developments of the Uruguay Round steered the Global South towards trade liberalization in agriculture. The creation of the World Trade Organization (WTO) in 1995

ushered in liberalized agricultural policies guided by the principles of free trade through market efficiency and the gradual elimination of trade-distorting mechanisms such as subsidies, while spawning both the AoA and the TRIPs Agreement as part of its legal framework under the Marrakesh Agreement. India's implementation of WTO-congruent reforms significantly opened the Indian economy to greater trade; imports and exports both grew exponentially, while tariffs fell dramatically from an average applied tariff of 125% in 1970 to 13% in 2014 (p. 606). Fresh off the heels of the outrage over the Dunkel Draft, such reforms soon activated further widespread civil society opposition. Not only were well-documented activist and social movements mobilized against the predatory neoliberalism embodied by the IMF and WTO, but some business elites also mobilized against liberalization and global integration.

In the buildup to the AoA, the World Bank, IMF, transnational corporations, and the US sought to redefine 'food security' to mean the ability to purchase food (Jarosz, 2009, p. 51). This reframing fit nicely with the imperatives of trade liberalization in agriculture negotiated throughout the Uruguay Round. If food security simply referred to the ability to purchase food, then achieving food security became a matter of simultaneously increasing the supply of cheap agricultural commodities while raising incomes and purchasing power in the Third World. The former complemented agribusiness narratives of 'feeding the world' through corporate, industrial production, while the latter represented the ideal outcome of reduced market distortions and expanded market access in agricultural trade. As part of the 1996 World Food Summit, the Rome Declaration on World Food Security proclaimed:

Poverty is a major cause of food insecurity and sustainable progress in poverty eradication is critical to improve access to food...Trade is the key element in achieving food security. We agree to pursue food trade and overall trade policies

that will encourage our producers and consumers to utilize available resources in an economically sound and sustainable manner (FAO, 1996).

With the reframing of food security to squarely align with the interests of the North and neoliberal international financial institutions, the WTO's AoA marked for the first time the subjection of agriculture to multilateral trading rules and ushered in liberalized agricultural policies on a global scale (Gonzalez, 2002, p. 440). Its key interventions focused on market access, domestic support, and export competition. Market access was to be expanded for all member states through tariffication, or the conversion of non-tariff barriers such as subsidies, import quotas, and anti-dumping laws into tariffs that would then be gradually reduced by 36% over six years for developed countries and 24% over ten years for developing countries.¹⁹ Agreements in domestic support achieved a classification system of subsidies; the Amber Box, or measures that are taken to be trade-distorting, such as subsidies for chemical fertilizers and pesticides, and price support; (b) the Green Box, or measures that do not affect the cost of production, support for research, marketing assistance; and (c) the Blue Box, or measures such as direct payments to farmers to compensate them for limiting their production of specified commodities. Export subsidies, which are payments by states to encourage the export of agricultural commodities through increased domestic production, were agreed at the same levels and speed of reduction as market access tariffication.

The AoA was not only premised upon an export-based, commercial model of agriculture that simply did not reflect the reality of most of its participant states but it encouraged

¹⁹ Agreements in domestic support achieved a classification system of subsidies; the Amber Box, or measures that are taken to be trade-distorting, such as subsidies for chemical fertilizers and pesticides, and price support; (b) the Green Box, or measures that do not affect the cost of production, support for research, marketing assistance; and (c) the Blue Box, or measures such as direct payments to farmers to compensate them for limiting their production of specified commodities. Export subsidies, which are payments by states to encourage the export of agricultural commodities through increased domestic production, were agreed at the same levels and speed of reduction as market access tariffication.

developing countries to shift towards export-oriented, industrial agricultural systems (Canfield, Anderson & McMichael, 2021). Whereas the majority of farmers in the developing world engaged in subsistence farming to maintain their livelihoods, the AoA set forth a model to increase rural purchasing power as the ideal outcome of increased exports at fair global market prices (ActionAid, p. 4). While the reduction in export and domestic subsidies was initially deemed a mechanism to pry open western markets, the US and EU have utilized the box system to shuffle most of their subsidies into the Blue and Green boxes, allowing them to not only stay in place but to increase “the net result of transferring subsidies into different Boxes is that between 1999 and 2001, developed countries’ support to agriculture was some 9% higher in nominal terms than during 1986-88” (p. 6). Further, some developed countries significantly increased their domestic subsidies at the onset of the Uruguay Round negotiations, so that coming tariff reductions would not seriously affect their domestic producers. As a result, American and European farmers retained large state-subsidy supports which continued to drive food dumping into the Global South (McMichael, 2013). The AoA systematically favored agricultural producers in industrialized countries at the expense of farmers in the Global South. The Agreement opened Third World markets to exports from industrialized countries without reciprocal liberalization. In essence, this meant prohibiting domestic Third World subsidies while permitting industrialized countries to continue to subsidize their domestic agriculture. The AoA further introduced sanitary standards, that currently provide the basis for restrictive seed certification laws (Gonzalez, 2002, p. 439-468; Tansey, 2008).

The recasting of food security in conjunction with the technicalities of the AoA spurred the formation of a transnational food sovereignty movement. As scholars of food and agrarian studies Canfield, Anderson & McMichael (2021) note, international NGOs and newly formed

transnational anti-globalization movements organized a parallel summit to the 1996 Rome World Food Summit to denounce Northern food dumping in the South, while calling for ‘food sovereignty’, a concept articulated by La Vía Campesina (LVC), an international peasant coalition which achieved a global political presence and voice in the 1990s (Desmarais, 2007). By first asserting national sovereignty (1996 definition) and then local autonomy (2001 redefinition) over the regulation of agricultural production and food policies, advocates of food sovereignty foregrounded questions that the concept of food security obscured through the imposition of a market-based world trading system; what food is produced and where, by whom, and under what conditions? (Jarosz, 2014; Thivet, 2014). LVC joined 51 other civil society organizations to form the International Planning Committee for Food Sovereignty in 2000, a platform dedicated to amplifying the voices of small-scale food producers and rural workers’ organizations by “creating alliances and synergies between different movements and dialoguing with the different governments and institutions” such as the UN Food and Agricultural Organization (FAO) (IFC, 2021; Canfield, Anderson & McMichael, 2021).

The formation of LVC and the actions carried out by its Indian affiliates might be seen to constitute a ‘subaltern cosmopolitan legality’ (Santos & Garavito-Rodriguez, 2005), or a distinct form of legal subjectivity under conditions of neoliberal globalization. Subaltern cosmopolitan legality focuses on the counter-hegemonic activities of communities subjected to intensified forms of dispossession through economic liberalization, state violence, and territorial incursions by states and private actors, to name a few. In line with SLS scholars Santos & Garavito-Rodriguez’s conceptualization, the subaltern cosmopolitan legal subject (formed as individuals, communities or social movements) is identifiable through four key dimensions: engagement in multi-scalar combinations of legal/illegal/non-legal tactics, an expanded (and at times novel)

articulation of rights based on solidaristic and alternative forms of knowledge beyond the individual privileged by liberal legality, and a deeply politicized understanding of law/legal mobilization that collapses the distinction between law/politics (p. 13-17).

Indian farmers' movements, as I will discuss further below, engaged in fervent illegal and non-legal demonstrations, ranging from the destruction of property to symbolic protests reminiscent of anti-colonial actions against the British. Through such activities they joined arms with LVC as the latter pursued the international institutional avenues discussed above and articulated a unique understanding of food sovereignty as a collective, cross-cutting rights-based concept that amalgamated spatially and epistemically diverse communities (ranging from Southern producers to Northern consumers and other positions in global value chains) in relation to food and labor policies, environmental justice, and opposition to corporate dominance and organized crime (Desmarais et al., 2010; Claeys et al., 2015; Gonzalez, 2021). LVC participates in the World Social Forum and continues its pursuit of institutional pressure through the UN Educational, Scientific and Cultural Organization (UNESCO), the FAO, and the WTO (Peschard & Randeria, 2020). Since 2000, the KRRS and other Indian farmers' groups/organizations have planned seed festivals to encourage the sharing of TK and seed exchanges among farmers, maintained community seedbanks, and provided information to farmers and the general public on the *Protection of Plant Varieties and Farmers' Rights Act* (KRRS, 2019). KRRS farmers further insist upon their:

. . .strong commitment to non-violence. This is understood as violence against living beings (except GMO crops), not against inanimate objects. We engage in confrontational politics against unfair socioeconomic systems through nonviolent methods such as civil disobedience and direct actions that challenge unjust

laws... While our movement is deeply rooted in local struggles we have also been pivotal in forming and leading not only national level networks like the Indian Coordination Committee of Farmers Movements, but also international networks such as the global peasants movement La Via Campesina and the Peoples' Global Action Against Free Trade and the WTO. We believe that solidarity between people must be built throughout the world to confront unjust economic globalization (cited in Khadse & Bhattacharya, 2013, p. 2).

LVC and its Indian affiliates thus exemplify a late twentieth-century/early twenty-first century subaltern cosmopolitan legal subject forged through the conditions and affordances of neoliberal globalization.

While LVC and its regional partners have made headway in influencing agricultural and food policy at the global level, or what legal anthropologist Canfield (2020) designates as “global food governance from below”, some of their national member movements have engaged in direct action. As previously mentioned, the KRRS destroyed a Cargill seed processing factory in 1992 as part of its opposition to the Dunkel Draft. KRRS joined LVC a year later, united through their shared anti-globalization stances despite having differences on questions of land reform (Borras, 2008). Through their affiliation with LVC, the KRRS introduced the ‘Beeja Satyagraha’ (‘freedom to save seeds’) campaign in India in a localized expression of food sovereignty (Bhattacharya, 2017). Beeja Satyagraha was largely premised upon farmers’ rights to livelihood in a rejection of neoliberal agriculture, their freedom to save indigenous seeds and oppose GM seeds, while developing sustainable systems of agriculture. As KRRS farmers insist: “We feel that the entire paradigm of neo-liberal globalization led by multinational companies must be resisted and that people’s autonomy and the autonomy of peoples must be constructed

on the ground through the development of people alternatives” (Khadse & Bhattacharya, 2013, p. 3). Although the Beeja Satyagraha campaign largely criticized the introduction of biotechnology in agriculture, it also provided insight into larger and related issues including the state of rural livelihoods, ecological concerns, and the role of technology in addressing these, while “invoking memories of the adverse effects of the Green Revolution upon India” (Bhattacharya, 2020).

The KRRS further organized a series of direct-action campaigns such as the ‘Cremate Monsanto’ campaign in 1998, in which they occupied Monsanto’s field sites and burned the transgenic cotton crops grown and tested there (Thivet, 2014). To contest agricultural liberalization embedded in Free Trade Agreements, it organized the Bandi Yatra (Cart March) where various Indian farmers’ movements came together and “jointly threw away imported goods into the sea from the port in Mumbai” (Bhattacharya, 2017, p. 52). The KRRS continued to transnationalize their resistances in 1999, when they sent 400 of their farmer members to Germany as part of the Intercontinental Caravan to stage protests at a Bayer plant, joined by members from the Brazil’s Landless Workers Movement (MST), landless farmers from Bangladesh, Zapatista support groups, the indigenous Mapuches from Chile, members of the Afro-Colombian movement, and European activists (Featherstone, 2003). The KRRS has more recently become a major actor in promoting agroecological methods of farming in India such as Zero Budget Natural Farming, which is increasingly juxtaposed as an alternative vision to Climate Smart Agriculture (Pimbert, 2017). These efforts include the reintroduction of millet farming, reviving an ancient grain which largely disappeared during the Green Revolution due to the state’s promotion of rice and wheat crops (Bhattacharya, 2020).

In addition to the AoA, the TRIPs Agreement was another key component of the packaged conventions under the Marrakesh Agreement. TRIPs emerged through a series of coercive negotiations driven by the American, Swiss, and Japanese corporations (Sell, 2002; Drahos, 1995), comprehensively covering various forms of IP through the establishment of mandatory subject matter (countries can no longer exclude areas such as food or medicine from patentability), minimum standards, and the establishment of rigorous enforcement mechanisms (Roffe, p. 51-52, 2008). Braithwaite & Drahos (2007) reflect upon the one-sidedness of these negotiations:

Put starkly, the intellectual property rights regime we have today largely represents the failure of democratic processes, both nationally and internationally.

A small number of US companies, which were established players in the knowledge game...captured the US trade-agenda-setting process and then, in partnership with European and Japanese multinationals, drafted intellectual property principles that became the blueprint for TRIPS....The resistance of developing countries was crushed through trade power (p. 12).

Aside from coercive American lobbying, developing countries generally were enticed by the prospect of having greater access to western markets to sell traditional manufactured goods and agricultural products. In exchange for adherence to the IP standards set out in the agreement, developing countries recognized that failure to ratify TRIPs would prohibit them from joining the WTO, the essential lynchpin for trade within the newly forming global economic system. India, in particular, perceived agricultural liberalization, tied into TRIPs through its connectedness to WTO membership, as a potential victory if it meant that western states would have to reduce their domestic agricultural subsidies and in essence open their markets to Indian

agricultural commodities (Ganesan, 1994). This illustrated the government's shift from conceptualizing its domestic agriculture as primarily oriented to self-sufficiency towards accepting the export-based model indispensable to corporatized industrial agriculture (Rajan, 2017, p. 214). India's original confrontational stance towards the patent provisions in the TRIPs negotiations, particularly around compulsory licensing and its opposition to product patents (Watal, 2015), did not preclude its signing and ratification of TRIPs which initiated its harmonization of its laws with global IP frameworks. Critics often point to TRIPs as an instrument of Northern legal hegemony and corporate domination. As I will attempt to show, TRIPs was also an international legal technology for incorporation into a wider apparatus of transnational governmentality. Through its engagement with TRIPs, the Indian state directed itself towards IP-based domestic capacity-building, which ultimately enabled India to continue to project itself as a champion of the global south.

TRIPs tied IP, agriculture, and biodiversity together by requiring member states to protect plant varieties through patents, a *sui generis* system, or any combination thereof (Condon, 2013). As we have seen, India's *1970 Patent Act* granted patents on processes rather than the product of processes, guaranteed monopoly protection for seven years, and exempted agriculture (methods, seeds, plants, and animals) from patent protection. Under TRIPs, patents are granted on products rather than process, are protected for twenty years, and can be granted to any technology that meets the basic requirements for patenting, such as micro-organisms which are the vital element for biotechnology. Article 27.3B of TRIPs stipulates that WTO member-states must provide patent protection for micro-organisms, micro-biological processes, non-biological processes, and plant varieties through patents, *sui generis* regimes²⁰ (adapted to the specifics of the given

²⁰ The International Union for the Protection of New Varieties of Plants (UPOV) is a *sui generis* system that is compatible with TRIPs. UPOV attempts to mediate the regulatory relationship between agriculture and climate

country with no wider applicability), while providing flexibility on patenting of plant and animal innovations (TRIPs, 1994). This directly pertains to the regulation of biotechnology and seeds; proponents of patenting of plant and animal inventions (such as the US, Japan, and Switzerland) argued that patentability on biotechnological inventions (genetically engineered herbicide-resistant seed, for example) promote research and innovation through private sector involvement to solve issues of food security and encourage technology transfer.

Opponents to this dimension of TRIPs (led by India and Kenya) argued that such biotechnological patenting would adversely affect informal seed systems, potentially criminalizing seed exchange and reuse, promote biopiracy through the grant of wide-ranging patents that might not fully meet patentability tests, and fail to protect the local communities that are often the source of genetic material and TK (Roffe, 2008, p. 63; Dutfield, 2009; Mgbeoji, 2006). TRIPs ideally was also designed to provide a framework for the transfer of environmentally-sound technologies from advanced economies to developing countries, such as technologies expected to introduce low-carbon energy sources, improve agricultural techniques in irrigation, and produce drought resistant plant varieties (Fortunato, et al., 2009; Maskus &

change through its regulation of plant breeding, biotechnology, and seed supply; for example, advances in plant breeding are producing genetically modified seeds which are high-yielding and resistant to the effects of climate change, such drought, heat, and flooding (Yamano, et al., 2018; Singh, 2017). Having gone through three revisions (1971, 1978, 1991), each successive adjustment to UPOV has expanded the rights of commercial plant breeders while restricting farmers ability to use farm-saved seed (Oguamanam, 2014) The most recent version of UPOV grants Plant Variety Protection (PVP) to breeders over the dissemination of seeds of new plant varieties (Dutfield, 2008, p. 5), which functions as an exclusive IP right similar to patents. PVP is intended to incentivize investment in the costly research and development of new and improved plant varieties. UPOV in conjunction with TRIPs solidified the rights of plant breeders (typically commercial scientists with the backing of large-scale institutions such as corporations, universities, and/or state institutions) over the varieties they develop. At the same time, they restrict the ability of farmers to save and reuse their seed towards crop diversification, which has been deemed integral to increasing biodiversity and mitigating the effects of climate change (Yadav, et al., 2011). Critics have argued that these developments neglect the customary rights of traditional breeders (typically farming and/or indigenous communities) to their genetic resources and TK (Oguamanam, 2007), promotes an ecologically destructive industrial agricultural model reliant upon chemical fertilizers and pesticides for hybrid seeds (Rangnekar, 2000), has furthered the consolidation of the seed and agrochemical industry (Wright & Pardey, 2006), and fails to recognize the historical contributions of farmers to plant breeding which predate the invention of IPRs (Dutfield, 2003, 2008; De Schutter, 2009).

Okediji, 2015), but empirical studies suggest this promise has been largely unrealized (Maskus, 2004; Fox, 2019). As IP scholars Keith Maskus & Jerome Reichman (2004) note:

Economies with low incomes and limited technological capacity present neither attractive markets nor a competitive imitation threat. Because their intellectual property regimes are not particularly important in attracting [international technology transfer], it seems unlikely that the standards implemented in compliance with TRIPS will encourage additional technology transfer to the poorest countries (p. 289).

TRIPs largely required uniformity in domestic IP regimes, modeled primarily on existing American and European IP frameworks. Anthropologist Sunder Rajan (2017) argues that this regulatory harmonization constituted the expansion of multinational corporate hegemony in India as Third World regulations were instituted to advance First World corporate interests; it embodied the “logics of global capital touching down in India” (p. 11). At the same time, it activated civil society opposition to India’s neoliberal restructuring and the demands of global legal treaties (Gupta, 1998). While much of civil society activism was directed at the multinational pharmaceutical industry, the deterioration of the collective rights of farming communities also garnered considerable attention. Activists mobilized around practices of biopiracy and the patenting of genetic material well-known to Indian publics, such as Basmati rice (Shiva, 1999), the introduction and spread of GM seeds leading to indebtedness and farmer suicides (Scoones, 2008; Meek & Khadse, 2020), and large-scale corporate land grabs of peasant farmlands (Randeria, 2013; Borowiak, 2004).

Efforts to increase state capacity as part of the apparatus of transnational governmentality unfolded in the name of encouraging the development of greater international legal expertise and

involved the establishment of domestic IP agencies. From 2003-2010, India began a capacity building project titled “Strategies and Preparedness for Trade and Globalization in India”, led by the United Nations Conference on Trade and Development (UNCTAD). While the project advanced direct engagement with the WTO as evidenced by the increase in high-level Indian civil servants obtaining positions at the WTO Secretariat and appellate bodies, it also began a process of inducing and incorporating civil society participation in the state’s free trade policy-making:

Aiming to strengthen institutional trade capacity, the UNCTAD project organized a series of broad-based and sector specific stakeholder consultations around India. It hoped to mobilize organizations representing farmers, fishermen, and small producers to articulate their interests and concerns and inform the government's approach to WTO and new free trade agreement negotiations for the first time (Shaffer et al., 2015, p. 609).

When India’s grace period from TRIPs implementation concluded in 2004, the state established four new patent offices in high density metropolitan areas, and established an IP Training Institute. Its capacity building efforts supplemented India’s drastic revision of the 1970 Patent Act in accordance with its TRIPs obligations. Prior to India’s patent reform, the state actively engaged industrial and civil society stakeholders to assess and incorporate their concerns and hopes in the looming changes to the legal architecture of its IP regime (Shaffer et al., 2015, p. 622). The most radical reform was the extension of patent coverage from innovative processes to the actual outcomes of those processes in the form of products, most notably in pharmaceuticals and agricultural chemicals. However, it simultaneously revised the criteria for demonstrating

novelty and an inventive step in a narrower fashion, establishing a higher threshold of patent recognition which was ultimately a boon to domestic generic producers.

Sovereign states like India had used the patent system to develop a highly competitive generic industry that delivered quality drugs at cheap prices to its citizens. Indian patent law allowed pharmaceutical companies to obtain patents on processes, but not the products of those processes. The incentive for Indian pharmaceutical manufacturers was to make profits by finding cheaper and cheaper ways to make drugs. The effect of permitting states like India to have a say about the rules of the knowledge game was an erosion of the corporate control of knowledge. The gaps in the patent system when it came to the global control of knowledge would have to be closed (Drahos & Braithwaite 2002, p. 59).

India pressed for a reform of TRIPs that would mandate the disclosure the origin of genetic resources in all commercial research and transactions, in addition to playing a leading role in setting the terms of the CBD simultaneously negotiated (Drahos, 2009, p. 94). The World Intellectual Property Organization's (WIPO) turn in the mid-2000s from a purely administrative body to one explicitly concerned with sustainable development after the passage of the CBD (Farhat, 2008) was accomplished through the agencies of states such as India who actively pressured WIPO to adopt a development agenda to counter the WTO's exclusive emphasis on commercial transactions (Drahos, 2009). Another state initiative involved providing consultation to African states to help them block TRIPs-plus IP agreements (Khor, 2014). The assessment that "India has implemented TRIPs commitments while doing so in a more development-friendly manner that other countries can adopt", (Shaffer, Nedumpara, & Sinha, 2015, p. 623) suggests that India implemented international legal demands incumbent upon its integration into the

global knowledge economy, but did so selectively by retaining its status as a continuing model for and champion of the Global South while creating new markets for its policy models and expertise in ‘less-developed’ states.

3.6. Protecting Indian farmers, protecting Indian biodiversity?

Whereas the Dunkel Draft and IMF conditionalities provoked outrage among what I will argue were Indian subaltern cosmopolitan legal subjects, the 1993 Convention on Biological Diversity (CBD) was generally lauded for its recognition of the importance of protecting TK, or the body of information, wisdom, and cultural influences in conjunction with a set of skills or practice developed by a group of people over time with respect to biodiversity (Balick, 2007; Brush, 2007).²¹ The diverse nationalist tenor of the anti-Dunkel protests further converged around the threat of biopiracy, or the plunder and theft of Third World genetic resources and TK by private actors and researchers secured through patent rights (ETC Group, n.d.). Indian environmental and food activist Vandana Shiva noted that during the demonstrations, the “protesters carried twigs or branches of neem, a tree found throughout the drier areas of India”, alluding to the attempts by an American chemical company to patent extracts of neem for commercial use. India has always been rich in biodiversity, with at least 81,000 species of fauna and 47,000 of flora; at least 435 ethnic communities there have utilized at least 7,500 plants, animals, and minerals (and oral knowledge) as part of their tribal folklore for eons (Bhattacharya, 2014, p. 50). India was at the center of high-profile and well-documented biopiracy practices in the 1990s pertaining to its common plant varieties, such as haldi (turmeric) and basmati rice, in addition to neem (Marden, 1999; Dutfield, 2001; Robinson, 2010). It was in the protests against the Dunkel Drafts, though, that a key link was forged between agricultural

²¹ TK in agriculture is considered to contribute to community food security, the conservation of agrobiodiversity, and the preservation of agricultural heritage (Altieri, 2004).

and environmental activism against IPRs. This link would deepen in the creation and implementation of the CBD.

The CBD introduced a legal framework for global environmental governance with the objective of preserving biodiversity through sustainable development, understood as achieving development goals in ways that do not destroy the earth's ecological bases for current and future generations (Brundtland, 1987). It further called for equitable benefit sharing of the benefits accruing from genetic resources while affirming the sovereign rights of states over these (Raustiala & Victor, 1996; Coombe, 2002). Northern states (not including the US, which is a non-signatory member but consistently sends large delegations to CBD meetings to monitor developments) aimed to curb increased CO₂ and greenhouse gas emissions emanating in the South due to their recent industrialization. Northern actors sought legal guarantees to secure their access to and ability to exploit natural resources in the South as the 'raw' inputs for knowledge economy-based biotechnology and agrochemical industries. Southern states were concerned with replacing decreased financial assistance for development from the North with new international funding for eco-development projects, placating the demands of conservationist and environmentalist social movements concerned with biopiracy, and tapping into potential new revenue sources stemming from 'green' initiatives such as ecotourism (McAfee, 1999, p. 141). One source of North-South conflict in the CBD revolved around the funding for its implementation. Northern states established The Global Environmental Facility (GEF) as the primary funding mechanism for the implementation of the CBD in member states. Housed within the World Bank, it was perceived by Southern states to be an instrument of Bank control and an extension of Northern dominance. While initial funding was slow, it has rolled out US\$14.5 billion in grants and US\$ 75.4 billion in additional financing for almost 4,000 projects (GEF,

2019), illustrating the expanding market for ‘green’ or eco-development projects associated with the CBD.

The primary incentives for Southern states to join the CBD lay in the treaty’s recognition of the sovereign right of states to determine access to the genetic resources found in their territories (CBD, Article 3), the (as of yet largely unrealized) potential for North-South technology transfers to commercialize genetic resources, and the implementation of a contract-based access and benefit sharing (ABS) model. These incentives were seen to empower sovereign postcolonial states to simultaneously correct the historical injustices of colonial resource exploitation and contemporary biopiracy, while bringing these states into the fold of an emergent neoliberal information economy as full and equal partners (Chimni, 2004).

In recognizing the sovereign right of states to determine access to their genetic resources, the CBD shifted away from the commonly held international perception of genetic resources as the common heritage of mankind in the form of a global commons, which, as critical scholars argued, had long justified (neo)colonial South-to-North transfers of germplasm (Mgbeoji, 2003). In articulating that “States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies...” (CBD, 1992, Article 3), the CBD shifted the regulation of biodiversity and TK into state jurisdiction, in countries where memories of colonial resource plunder inspired vigorous struggles to have genetic resources clearly included in the treaty. This grant of jurisdiction implicitly signaled to countries in the ‘mega-diverse’ South, that they, too could developmentally ‘catch up’ to the North given their abundance of genetic resources, if they agreed to and played by the rules of the game, established under the WTO, AoA, TRIPs, and the CBD. States still in the process of ‘developing’ could now exploit (via technology transfers and

foreign investment) and sell their territorially-based resources in global markets, while asserting new state controls over local and indigenous farming communities who historically developed these resources for subsistence purposes:

developing states have asserted sovereign rights over genetic resources through the CBD at the same time as investing in industrial knowledge protection standards under TRIPs, removing legal control over the use and exploitation of genetic and intellectual resources from communities and creating a state of dependence of communities on the beneficence of the state (West, 2012, p. 22).

India's struggles with biopiracy in conjunction with its national ethos of self-sufficiency led to cooperation between the state and environmental NGOs in supporting this new area of national jurisdiction (Balaji, 1997; Eimer et al., 2016). The most visible Indian activists, such as Vandana Shiva, lauded Article 3 as a watershed moment against neocolonialism, still inherent, nonetheless, in the widely perceived predatory nature of the WTO and TRIPs; "the Biodiversity Convention accords India sovereignty over its own resources to be used in a sustainable manner...[while] trade liberalization policies seek to undermine [the] sovereignty of the nation state by diminishing the state's control over flow of resources and replacing it with market control" (Shiva et. al, 1997, p. 10).

The capacity to capitalize upon this new genetic patrimony, however, came with conditions; technology transfers were predicated upon the protection and enforcement of IPRs in recipient states (CBD, Article 16.2) which had to consistent with the minimal standards of patentability found in TRIPs Article 27, which I will discuss in the next section. The ABS provisions clearly favored a contractual model conducive to the patenting of natural resources and their genetic components conditional upon the acceptance and reproduction of the logic of

neoliberal commodification. The CBD's rubric of environmental regulation operated under the paradigm of capitalist valorization which emerged alongside global environmental governance and was characterized by a "growing political economic interest in the appropriation of nature for its marketing" (Brand & Vadrot, 2013, p. 209). If the unquestioned maxim of market-based governance in ecological conservation was premised upon "selling nature to save it" (McAfee, 1999), then its approach to protection was to be achieved through the fair and equitable sharing of benefits arising from the use of biological resources. However, genetic resources have to be turned into things in which the resources function as raw material inputs which are then improved upon. In order for the community custodians of TK to reap the economic benefits stemming from the use of biological resources, these resources had to become assets that could be capitalized upon, subjected to exchange relations, and circulated through global markets (Coombe, 2016; Coombe, 2017). In other words, plants do not inherently hold economic value even they may already contain health or ecological benefits; they have to undergo processes through which capitalist economic value may be generated.

Although intended to curb biopiracy, or the exploitation and expropriation of traditional forms of knowledge by outside researchers, the CBD did not prevent the patenting of already widely used natural resources, such as plant varieties, by commercial entities (Shiva, 1999). The scale of the problem was massive; the UN Development Programme estimated nearly two decades ago that "if unpaid royalty payments were being made to developing countries and indigenous peoples for the plant varieties and local knowledge used by multinational food and drug companies, those providers would be earning an estimated 5.4 billion USD a year" (Zakrzewski, 2002, p. 252). However, the CBD's ABS model also positioned indigenous and local communities who were widely seen to be the historical stewards of biodiversity as utterly

dependent upon the postcolonial states (West, 2012) in which they were resident, many of which were historically hostile to these groups (Kingsbury, 2011). Post-colonial states were now positioned to regulate the terms and interactions between bioprospectors and communities. Participating in this ABS model thus reinforced the legitimacy of IPR as the exclusive means of protecting knowledge because it relied entirely upon the legal protection afforded by patents to bioprospecting corporations and institutions. Alternative models, however, later arose in the 2014 Nagoya Protocol due to the efforts of indigenous and local communities, as I will explore in my subsequent discussion of India's domestic ABS model in its *National Biodiversity Act*.

The explicit tilt towards the IPRs of multinational corporations in both TRIPs and UPOV sparked a renewed push for the recognition of what were already described as farmers' rights. Plant breeding in the global south is largely characterized by farmers producing the majority of seeds through practices of saving, exchanging, and selling plant materials rather than large-scale, commercial breeding. Farmers' rights acknowledge indigenous and local community farmers as historical stewards of agro-biodiversity through the application of their TK in saving, growing, and sharing plant varieties while establishing their frameworks for compensation (Anderson, 2006). Borowiak (2004) comments that "(i)f 'breeders' rights' was the pivot upon which agribusinesses lobbied for changes in commercial law, 'farmers' rights,' 'indigenous rights,' and, more recently, 'human rights' provide the ground upon which resistance to plant variety IPRs is being waged" (p. 512). Legal scholar Chidi Oguamanam (2004) extols farmers' rights for incorporating a broader view of innovation that accounts for the generational transmission and collective nature of farmers' TK, and accounting for the cultural significance of practices such as seed exchanges (p. 247). Today peasants rights' also encompass this broad scope of recognition.

India's *sui generis* legislation over plant variety protection, the 2001 *Protection of Plant Varieties and Farmers' Rights* (PPV&FR) Act has been lauded as the most progressive iteration of farmers' rights in the world (Santilli, 2012; Prajeesh, 2015). To better understand how this statute materialized, we must briefly return to the events of 1993 previously discussed in this chapter. The first draft of the PPV&FR materialized in that year without any mention of Farmers' Rights. Taking heed of the massive demonstrations against the Dunkel Draft and in the broader milieu of rural discontent with the state's recent regulatory shift towards economic liberalization and its acceptance of the IMF's structural adjustment program in 1991, farmers' groups flooded Bangalore's Cubbon Park in protest. Mobilizing around the Gandhian slogan 'beej satyagraha', or seed protest), nearly half a million farmers protested for the inclusion of farmers' rights to save, exchange, and sell their seeds domestic PPV&FR legislation being legislatively considered pursuant to the pending TRIPs article 27.3 (requiring the protection of plant varieties either by patents or by an effective *sui generis* system), against Monsanto's creeping presence in the country's agricultural sector (Mooney, 2011) as well as against India's accession to the WTO (Seshia, 2002; Peschard, 2017).

The dominant discourse of these protests echoed a colonial and Green Revolution-based resistance to opening the country up to external domination: "we are going to launch a one-point programme – to drive out the multinationals. Our genetic resources are our national property" (M. D. Nanjundaswamy, the leader of the KRRS farmers movement quoted in Gupta, 1998, p. 292). This discourse connected memories of colonial rule and its Gandhian-based appeal to national sovereignty and the postcolonial state's developmental anxieties underpinning the Green Revolution. At the same time, it evoked a key aspect of the CBD in calling for national jurisdiction over natural resources as a defense against the neo-imperialism associated with

biopiracy and the economic liberalization insinuated by international institutions more generally. In this sense, the 1993 farmers protest successfully framed a complex, black-box series of discrete international agreements and domestic legislation into a wider topic ripe for public debate by temporally and spatially integrating the colonial experience of the Green Revolution, the subsequent dispossession of TK, and demands of economic liberalization.

The Navdanya Institute and the Gene Campaign were crucial in advancing the concept of farmers' rights at both the domestic and international level. It soon circulated throughout the various branches of the FAO, as well as becoming more familiar in people's tribunals and statements from peasant and farming organizations (Rangnekar, 2013). The concerted efforts of these groups in publicizing farmers' rights eventually led to subsequent revised drafts of the Indian PPV&FR in the late 1990s (Randeria, 2007). As the concept of farmers' rights circulated through the FAO and other international forums, fierce domestic debates about India's ratification of TRIPs merged with civil society optimism about the CBDs assertion of national sovereignty over genetic resources and the potential ABS mechanisms it afforded.

In articulating their opposition to TRIPs and agricultural liberalization more generally, Indian NGOs adeptly tied TK to farmers' rights using the *sui generis* clause in TRIPs article 27.3b (Rammana, 2003). They viewed the *sui generis* option as an escape route from the predatory patentability demands of TRIPs while advocating for ABS in the use of genetic resources to be implemented in Indian legislation. Although they also put forth alternative, unofficial legal vehicles such as 'community intellectual property rights' (Shiva, 1993) and performed damning dramatizations of criminal trials for multinational agribusiness corporations such as Monsanto, their success in pushing the state towards a *sui generis* system of plant variety

protection and the legislative formalization of ABS nonetheless reinforced the neoliberal premise of rendering TK tradeable through contracts.

Finally, after several drafts and seven years of protracted struggle, the PPV&FR passed in 2001 to the delight of farmers' rights proponents (Andersen & Winge, 2008). The PPV&FR aimed at establishing a system of plant variety protection in order to encourage the development of new varieties while securing the rights of farmers in their contributions to conserving and improving plant genetic resources (PPV&FR, 2001, Preamble). It aims to simultaneously strengthen the domestic plant breeding/seed industry through technological modernization while protecting the livelihoods and food security of farmers.

Proponents of farmers' rights typically take one of two approaches; the ownership approach establishes farmers' rights as equivalent to PBRs within a conventional property framework, arguing that farmers ought to be granted rights to ownership over their knowledge, whereas a stewardship approach aspires to place farmers' seeds, or 'farmers varieties', outside of or exempt from the plant breeder's system (Peschard, 2017, p. 14); India has opted toward the former. The key elements of the legislation center on authorial recognition, collective recognition, and rights to seed. In an attempt to address the historical elevation of the contribution of plant breeders over farmers, authorial recognition enables "any farmer, farmer group or community of farmers" (PPV&FR, 2001, section 16 (1d)) to apply to register a new seed variety that they have bred, by recognizing farmers to be equal to plant breeders: "there is nothing in the Act or the implementing rules that render differential treatment between farmer-breeders and other breeders that corresponds to their different socio-economic status and/or to the type of breeding practices they pursue" (Rangnekar, 2013, p. 5).

While authorial recognition establishes a formal equality between farmers and breeders, it fails to substantively level the playing field between them due to preexisting inequalities between the two. Unlike the common Indian farmer who depends on agriculture for livelihood and food security, the typical plant breeder is not an individual of meager socioeconomic means nor is a plant breeder with limited access to technology and expertise but is often a professional scientist working for a university, large agricultural organization, or working for a corporate firm. Both are equally expected to register their varieties under the criteria of distinctness, uniformity, and stability (DUS), borrowed from UPOV which, as noted, is an instrument geared towards the rights of breeders, rather than farmers (Chandra, 2016, p. 167).

While farmers have been exempted from registration fees, DUS standards stand in opposition to the concerns that inform and animate farmers' breeding practices. For example, farmers' varieties are often characterized by genetic heterogeneity rather than uniformity. Uniform varieties are conducive to large-scale, chemical-intensive monocropping, and the ecologically destructive practice of growing a single crop year after year on the same land, a primary Green Revolution farming practice (Saxena & Singh, 2006). The standard of genetic uniformity in plant breeding encourages export-based, industrial farming in its orientation towards monocropping and reliance on chemical inputs which further erodes agrobiodiversity and soil health. Relatedly, distinctiveness is also difficult for farmers to prove, given the necessary exchanges of seed and knowledge between networks of farmers. In treating farmers as 'equal' to breeders without establishing the criteria for exceptions specific to the conditions and factors that motivate breeding choices, the PPV&FR is unresponsive to the realities and needs of most Indian farmers.

Though the DUS standards tilts the statute in favor of breeders', the PPV&FR's inclusion of seed rights enable farmers to use, save, exchange, share, or sell seed of a protected variety (Article 39). Additional protections are bestowed upon farmers, for example, that seed companies are obligated to notify farmers as to the expected yields of their varieties, so that farmers may claim compensation if those varieties fail to reach their expected yields (Peschard, 2017). However, as Chandra (2016) demonstrates, the articulation of seed rights within an ownership approach undermines the robustness of farmers' rights. The right to sell seeds applies to varieties typically bred by farmers but does not extend to hybrid seeds, such as the high-yielding varieties introduced during the Green Revolution or as newer seeds which have been improved upon through biotechnology. Hybrid seeds are programmed to cease their reproduction; therefore, farmers must purchase new seeds every year rather than saving or exchanging them (Kochupillai, 2011). This has resulted in the current scenario where hybrid seeds are rapidly displacing indigenous seeds, to the advantage of the Indian agro-biotechnology industry.

Implementing the PPV&FR has also shown some of its limits. The PPV&FR established the PPV&FR Authority in 2005 (the Authority) in order to implement the Act and the National Gene Fund (which is funded by the registration fees paid by plant breeders) as the mechanism through which ABS claims and redistribution of such benefits are regulated. While the early numbers in applications for registration of farmers' varieties were extremely low (six) until 2012, the figures increased significantly to nearly 500 in 2015 (Peschard, 2017, p. 153). This in part due to the Authority's 'training awareness' programs in farming communities to help farmers become more aware of the technicalities of the legislation. Farmers were asked to bring their indigenous seeds to the workshops and then taught how to register their varieties consistent with

the statute. In 2013-14, the Authority held 274 of these training programs across the country (Bhutani, 2015). The boom in applications to register farmers' varieties, however, has not led to successful registrations among farmers; farmers' varieties have the lowest rate of successfully registered applications (Chandra, 2016, p. 133). As of 2015, 355 'New varieties' which met the conditions of DUS and novelty, were successfully registered (Peschard, 2017, p. 153), the majority of which were hybrid seeds that must be repurchased every year. Almost 90% of those registrations were carried out by private transnational agribusiness actors such as Monsanto, Bayer, and Syngenta (Chandra, 2016, p. 133).

There has yet to be a successful ABS arrangement under the PPV&FR. For example, state-funded agricultural research centers are utilizing extant and traditional farmers' varieties in the public domain as the basis of their improved varieties, which are then registered as 'new varieties' rather than 'derived varieties' in order to avoid benefit sharing with farming communities (Kochupillai, 2012). In lieu of a firm governance structure to facilitate ABS, the Authority instituted 'Plant Genome Savior' awards to farmers for their preservation of agrobiodiversity, echoing the 'Master Farmer' awards doled out to farmers who successfully raised their yields through hybrid seeds during the Green Revolution discussed in Chapter 2. However, the criteria for 'Genome Saviors' specifies that not only must the prospective farmer-savior be "engaged in the conservation of genetic resources of landraces and wild relatives of economic plants and their improvement through selection and preservation" (the Authority, 2019), but that those varieties or landraces must be "economic plants" subsequently providing the foundational genetic material for improved varieties produced by plant breeders or donated for future development by breeders. Thus, the Savior award is not only an insufficient 'ABS-lite' mechanism but one that might potentially facilitate dispossession by compelling farmers to

register commonly held reproductive varieties in the public domain, which then become the building blocks for proprietary hybrid seeds.

After rigorous consultations with various stakeholders involved at every national/subnational level of government, scientists, industry representatives, and environmental NGOs (Brahmi et al., 2004, p. 659), the 2002 *National Bio-Diversity Act* (hereafter the NBDA) was passed in order to operationalize the sovereign right of the Indian state to exploit its genetic resources and establish a domestic ABS mechanism to distribute royalties from genetic resource exploitation and commercialization to local TK-bearing communities. It established an institutional structure to regulate national biodiversity usage by elaborating upon procedures and rights, most notably around IPRs in TK. Its objectives of promoting biodiversity conservation and preventing biopiracy by creating the conditions for the sustainable use and equitable sharing of benefits resulting from the exploitation of India's biodiversity resources were largely met by establishing a new, comprehensive bureaucratic state structure which incorporated communities squarely within a new scopic regime of state legibility.

The NBDA created a National Biodiversity Authority (NBA), subnational State Biodiversity Boards (SBBs) and Biodiversity Management Committees (BMCs) at the local level of Panchayats (village committees) and municipalities. The National Biodiversity Authority was vested not only with regulatory authority over the SBBs and BMCs, but over access to biological resources more generally. The NBA had the power to grant access and approval for obtaining Indian biological resources or knowledge for commercial usage, for the exploration and commercialization of said resources by foreign citizens, corporations, or non-resident Indians, and domestic corporations made up of non-Indian shareholders or management (2002, Article 3). It further assumed authority over the transfer of results of research relating to Indian

biological resources by any of the previously listed actors (Article 4). The NBA is vested with the power to grant approval to any person, domestic or foreign, so that they might attempt to apply for IPRs over genetic resources in India, in conjunction with the authority to impose fees or royalties (or both) for the commercial utilization of such rights (Article 6). Notably, however, this provision does not apply to individuals applying for IPRs to protect plant varieties.

The SBBs were intended to advise state governments on issues relating to the conservation of biodiversity, while at the same time conferred with the power to issue approvals to Indian citizens for bioprospecting and commercial utilization of any biological resource found in the state (Article 23). Nearly all of India's 28 states have established SBBs predominantly concerned with establishing BMCs at the village level (Bhutani & Kohli, 2012, p. 15), whose primary function is to establish People's Biodiversity Registers to collect and document local genetic resources and the various forms of TK involved in their conservation. As of 2012, over 33,000 BMCs had been established but over 80% of these are concentrated in Madhya Pradesh. Most local village councils have been resistant to implement and conform to the model of the BMCs, largely, it seems due to lack of perceived economic benefits (Bhutani & Kohli, 2012).

While the NBA is mandated to consult with the BMCs regarding ABS mechanisms, BMCs were not afforded any rights to representation in ABS negotiations. Local TK-bearing communities were further incensed by the demand that BMCs collect and document local biodiversity and associated TK without receiving any recognition of their rights of ownership over what they document for the Registers (Barpujari & Sharma, 2017). In 2007, a coalition comprising over 3,000 local village councils, individual leaders, and local governance institutions flooded the Prime Minister with resolutions resisting the formation of BMCs until the Indian state recognized local rights to the control of and ownership over the biological resources

such committees were designed to collect and register (Kohli & Bhutani, 2014). In 2013, the Indian government responded through the NBA's Guidelines for Operationalization of BMCs by calling for greater participation by BMCs in providing feedback to the SBBs and NBA on issues regarding IPRs, TK, and local biodiversity use, managing local sacred heritage sites, regulating access to biodiversity and associated TK for commercial and research purposes, and documenting practices that might be utilized in developing protocols that serve as prior art to prevent biopiracy (NBA, 2013, p. 2-3).

The primary responsibility placed upon a BMC is to ensure the conservation of biodiversity and the equitable sharing of benefits arising from commercialization through the implementation of People's Biodiversity Registers (PBRs). PBRs are records of people's knowledge, practices, and perceptions of the historical and contemporary uses of the biological diversity in their localities:

the main function of the BMC is to prepare PBRs in consultation with the local people. The Registers shall contain comprehensive information on the availability and knowledge of local biological resources, their medicinal or any use or any other traditional knowledge associated with them" (NBA, 2004).

Their primary objective is to facilitate the use of the collected information in a biodiversity information system managed through a decentralized system of natural resource governance (Gadgil & Rao, 1998). While the PBRs were the first of their kind as state-led initiatives²², Indian

²² Though India's TRIPs-based IP reforms arguably facilitated the conditions for multinational agribusiness corporations to penetrate a once closed off Indian agricultural sector with an increased threat of the biopiracy of TK, the state created a digital library of TK (with US and EU funding) to catalogue and archive traditional plant and genetic resources alongside a TK resource classification system accessible to patent examiners around the world in order to prevent the invalid granting of patents based on language barriers. The state estimated that in 2005, roughly 2,000 patents were incorrectly granted on Indian TK resources due to the varied use of local languages such as Sanskrit, Hindi, Urdu, and indigenous dialects (TKDL, 2019).

NGOs had already carried out similar activities to make community knowledge and practices more legible to policymakers. Management and innovation scholar Anil K. Gupta, for example, had formed the Honeybee Network in the state of Gujarat to document and commercialize traditional agricultural methods/knowledge to the benefit of source local and indigenous communities. Gupta and his team of students would visit rural villages and watch, listen, and document the knowledge, methods, and practices of local farmers, and then communicate their TK to policymakers and scientists (Gupta, 2006). They would then travel to nearby villages and eventually to various states to share previously documented knowledge (with the prior consent of the initial communities) through biodiversity contests, where villagers showcase their TK of local plant genetic resources and their nutritional or medicinal applications and receive prizes. Writing in 2000, Gupta stated that the Network had

collected over 10,000 examples of contemporary innovations and outstanding examples of the use of traditional local knowledge in the sustainable management of natural resources. These innovations are shared with local communities and individuals in over 75 countries through the HoneyBee newsletter which is issued in eight different languages” (p. 5).

Emphasizing the ability of source communities to preserve and share TK while commercializing TK and its applications into tangible goods, Gupta did not seek to dismantle IPRs but to reform and expand them so as to incorporate source communities and their TK:

Today, intellectual property rights are the modern foothold to the global marketplace. Developing nations are making the transition from nature-based economies, with local knowledge based on local resources, to market economies,

where knowledge and products have value beyond their immediate use to a villager. As they do so, individuals in these developing nations need the title to their unique knowledge in order to have the right to profit from it (Gupta, 2006, p. 61-62).

To this end, Gupta helped form the Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), a developmental organization that builds on the initial HoneyBee efforts with a focus on securing IPRs over indigenous innovations. Gupta has further engaged with WIPO to identify and explore the role of intellectual property rights in the sharing of benefits arising from the use of plant genetic resources and associated TK (WIPO-UNEP, 2004). SRISTI worked with the state government of Gujarat to scale up HoneyBee initiatives such as creating certifications for organic products and assisting the state government in operationalizing the CBD, Nagoya Protocol, and the PPV&FR (Burton, 2003). Scholars of IPRs and TK in plant genetic resources have recognized the work of HoneyBee and SRISTI as a successful local experiment in recognizing, protecting, and rewarding local creativity (Cullet et al., 2006).

Another project in 1995 led by the Foundation for Revitalization of Local Health Traditions was designed to record TK of medicinal plants (Gadgil, 1996). Such endeavors expanded to agrobiodiversity when the NGOs Navdanya and the Deccan Development Society, motivated by the international recognition of farmers' rights and seeking to establish a decentralized system of natural resource management, began documenting local seeds and landraces along with associated practices of conservation. Registers have also induced discussions and public debates within villages that have led to revised and updated conservation practices, as well heightening awareness of the ecological effects of commercializing such

agricultural heritage (Gadgil, 2000, p. 328). Challenges remain, however, particularly in incorporating villagers into the process of preparing Registers. As conservation and development scholars Sharma, Vasudevan, and Deora (2021) comment, Registers are “often prepared by a technical support group composed of professors, teachers, and students from a scientific background that are not necessarily from local communities” (para. 11).

These field investigators for the contemporary PBR regimes also typically work with government officials, scientists, or local environmental and rural development NGO workers. Their research methods involve establishing rapport with villagers of the selected locality as active participants in investigations that identify and interview various biodiversity user groups and particularly knowledgeable individuals, while mapping the selected landscapes (Gadgil, 2000). This information is then synthesized by the principal investigators of each site into documents that are translated and disseminated to local communities. Progress, however, has been difficult to achieve in the implementation of Registers; as of 2017, only 16% of local Panchayat bodies have established BMCs, and of these, only 3% have established PBRs, while at the same time only a handful of the 408 ABS arrangements approved by the NBA have actually produced economic benefits for BMCs predominantly in the form of meager one-time payments (Barpujari & Sharma, 2017, p. 10).

While one perspective on the state-led establishment of the Registers might perceive it as a positive, if not ambitious, step by a biodiverse-rich yet increasingly industrialized developing country to ensure sustainable conservation, establish an ABS system equitable to local and indigenous communities, and do so from a seemingly bottom-up institutional approach, another perspective might see this initiative as one that aims primarily to facilitate the transformation of TK into informational goods for monetized exchange within a global knowledge economy.

Regulatory authority is centralized almost exclusively in the NBA which is responsible for determining the terms of benefit sharing and has little obligation to the SBBs and BMCs beyond vaguely including them in ‘consultations’. The NBA is also mandated to enforce any directives coming from the central federal government. The 2002 Act mandates prior approval from the NBA before foreign citizens, companies or non-resident Indians can apply for IPRs within or outside India if the invention is based on any research on or information about a biological resource obtained in India. As an administrative mechanism, the Registers convert TK into recorded, written information with little regard for the actual person/s who carry such knowledge, as might be expected given the lack of rights afforded to local communities over their TK in the authorizing statute. Documentation of TK in biodiversity is thus reduced to a bureaucratic act rather than asserting that the historical carriers and stewards of such TK might be legally understood as innovators whose knowledge is worthy of legal protection. Despite a three-tiered institutional structure geared towards decentralized governance reflective of the neoliberal conditions under which the CBD and the 2002 NBDA emerged, the Registers thicken the regulatory power of the NBA and thereby the federal state.

The deafening silence of the NBDA on the issue of farmers’ rights is another failure of the statute to recognize indigenous seeds as both part of Indian agrobiodiversity and the genetic patrimony of local communities. Yet, some insight into potential changes in the NBDA can be gleaned by the creation of the Nagoya Protocol in 2010. As a supplementary legal framework to the CBD to implement fair and equitable benefit sharing from the use of genetic resources, the Nagoya Protocol was “the result of an ongoing struggle to assert the rights of indigenous peoples and local communities to their natural resources” (Bavikatte & Robinson, 2011, p. 40). The International Indigenous Forum on Biodiversity (IIFB) pressured and lobbied the Ad Hoc Open-

Ended Working Group on Article 8(j) and Related Provisions to ensure indigenous and local community participation in CBD meetings by providing financial and logistical support and participation in formal and informal negotiating groups (Barpujari & Sharma, 2017).

Indigenous communities from around the world influenced a key series of negotiations of the Working Group on ABS between 2009-2010 in the run-up to the Nagoya Protocol, through multi-scalar efforts which ranged from lobbying state delegates during negotiations, working with governments concerned with indigenous issues, and helping national indigenous organizations put pressure on their governments (Bavikatte & Robinson, 2011, p. 44). Their concerted efforts led to the Protocol's recognition of the indissoluble link between genetic resources and TK, its mandating of free and prior informed consent for the use of indigenous peoples and local communities TK, compliance with community laws and procedures, reinterpreting Article 8(j) of the CBD to indicate the state's duty to facilitate the rights of these communities, and affirming the need for states to utilize the UN Declaration on the Rights of Indigenous Peoples (UNDRIP) to interpret the CBD (Kamau et al., 2010; Teran, 2016). These four interrelated accomplishments are representative of what environmental law scholars Bavikatte, Jonas, and Shrumm (2010) designate as 'biocultural rights', understood as the "rights of Indigenous peoples and local communities over all aspects of their ways of life that are relevant to the conservation and sustainable use of biodiversity" (p. 51). The Protocol further recognized the need to support the development of 'biocultural protocols', which are participatory, community-created governance tools which detail and articulate local TK, local customs, responsibilities, and values related to biodiversity, as well as perceived threats to local biodiversity and TK (Bavikatte, Robinson & Oliva, 2015). While these protocols are not a silver bullet for safeguarding and advancing all indigenous and local community rights in relation to

biodiversity, by documenting these aspects that convey customary laws these communities are better positioned to regulate equitable ABS agreements with outside researchers and private actors, as seen in successful examples from India, Pakistan, South Africa, Peru, and Panama (Argumedo et al., 2011; IIED, 2021).

Indian farmers' groups and LVC have also continued their advocacy for farmers' rights both at the global level and nationally. In 2017, LVC and its North Indian affiliate, the Bhartiya Kissan Union (BKU), organized a meeting in Delhi regarding the UN Draft Declaration on the Rights of Peasants and Other People Working in Rural Areas' (UNDROP), which affirms farmers' rights to seeds (LVC-South Asia, 2017; Haugen, 2020). LVC and the BKU sought to inform various agricultural groups (farmers, fisherfolk, pastoralists, forest dwellers, NGOs) of the draft declaration at the time. Their goal was to mobilize the support of these various groups to both influence the federal government and finalize the declaration at the UN Human Rights Council, where negotiations took place. Further, in 2019, various farmers' groups and sympathetic NGOs such as the Gene Campaign,²³ came together with the Alliance for Sustainable and Holistic Agriculture (ASHA) to organize a 'peoples' conference' to reinforce the primacy of farmers' rights. They also spread awareness of the legislation in response to PepsiCo's unsuccessful 2019 lawsuit against Gujarati potato farmers, who PepsiCo deemed to be violating the company's plant variety protection under the PPV&FR.

In sum, this arrangement of both international and domestic legal instruments were important dimensions of neoliberal means to create and protect genetic resources as assets through technologies such as ABS, biocultural protocols, and TK databases, and biodiversity inventories (Coombe, 2016). These governmental technologies, however, may also be fashioned

²³ Whose founder, Dr. Suman Sahai, was "one of the civil society architects of India's Protection of Plant Varieties and Farmers' Rights Act of 2001" (ASHA, 2019).

toward new ends, suggesting that neoliberal government routinely fails when groups with differing agendas exercise their agency. For example, biocultural protocols and the PBRs serve as prior art, such that biotechnically engineered genetic resources that use such knowledge cannot be patented because they serve to publish the prior art. In short, these are anti-commodification projects although they must be scrutinized closely in their ability to enable new forms of contract and to the extent that they also alert outsiders to locations of knowledge and expertise.

3.7. Conclusion

In this chapter, I asked: how has India selectively incorporated itself into the global knowledge economy in relation to global legal frameworks that regulate agriculture and biodiversity? Through what rationalities, practices, discourses and technologies has this unfolded and to what effects? In delineating this knowledge economy assemblage, I attempted to illustrate the multi-scalar processes of transnational neoliberal government through which India, in alliances with transnational NGOs and private actors, selectively implemented provisions of global policies and international treaties concerned with IPRs, environmental governance, and agriculture to achieve new kinds of rural development under the conditions afforded by an increasingly transnational, pluralistic legal terrain. In doing so, I've endeavored to provide a corrective to the 'second moment' of law and development where the postcolonial state allegedly takes a backseat to markets, international financial institutions, and private actors in facilitating development (Gupta, 2015, p. 330). Utilizing a transnational neoliberal governmentality framework brings to light the various ways in which the Indian state was subjected to neoliberal government by Northern actors, while at the same time the state very actively subjected Indian farmers to the imperatives of neoliberal development. The various forms of resistance discussed

in this chapter, ranging from illegal direct action to the articulation of food sovereignty by LVC affiliated farmers (which eventually became legitimated and institutionalized in the Declaration of the Rights of Peasants and Other People Working in Rural Areas ratified by the UN general assembly in 2018) (Claeys & Edelman, 2019), and the HoneyBee Network's attempts to forge more inclusive IPRs, suggests that Indian farmers recognized that continuous and differentiated forms of pressure and defiance were needed to expose the limits of neoliberal governmentality. These limits continue to be tested in the current era of big data technologies and the corporate consolidation of agriculture, as I will explore in the next chapter.

4. CHAPTER FOUR: MAPPING THE DATAFICATION OF AGRICULTURE ASSEMBLAGE

4.1. Introduction

This chapter maps the conjunctural assemblage of data-driven agricultural governmentality and the reconfiguration of the Indian state since the global financial crisis of 2007-8. In the first section, I attempt to trace the connections between the key state and non-state actors involved in producing and implementing Climate Smart Agriculture at the global level and Climate Smart Villages in India, as well as the policies, discourses, rationalities, and technologies of neoliberal government that constitute this still emergent assemblage. By investigating ‘where the law is’ and the work that law is doing in this assemblage, I illustrate how new forms of property, contract, and fields of regulation have materialized out of multi-scalar policy mandates that link climate change, agriculture, and financialization with new valuations and constructions of commodities. Because this area of capital accumulation is a recent development and arguably less familiar to SLS scholars, I also provide a more extensive account of its political economy than that provided in my earlier Chapters.

In my second section I introduce key insights from Critical Data Studies, which offers a unique approach to understanding the construction of the ‘digital farmer’ and this subject position’s mutually-constitutive relationship with what I will define and describe as Big Data, in what is increasingly known as ‘digital agriculture’. I supplement the neoliberal governmentality model with insights from Critical Data Studies in this final substantive chapter to account for the unique and particular implications and affordances of this new regime of agricultural transformations. I provide a broad overview of major trends in the financialization of agriculture that is enabled by its datafication which have intensified during the relevant historical period. This process has been facilitated through the introduction of agricultural platforms -- digital

models that enable direct interactions between farmers and agricultural supply chain actors for the purposes of commercial or knowledge exchange. Ultimately, I attempt to show how the financialization of agriculture via Big Data technologies constitutes the most recent historical iteration of ‘accumulation by dispossession’ (Harvey, 2003; 2004), catalyzing large-scale mergers and acquisitions in the global agribusiness industry to further disenfranchise India’s farmers.

In the third section I chronologically outline the global components of this Chapter’s conjunctural assemblage by first analyzing changes in international climate policy as a precursor to Climate Smart Agriculture (CSA). I show how shifts in international climate policy that occurred simultaneously with the 2007-08 global financial crisis spurred the development of CSA and the Global Alliance for Climate Smart Agriculture, as well as the responses this Alliance has provoked among transnational peasant groups. The fourth section moves to the national level to show how India’s *National Mission on Sustainable Agriculture*, established the policy rationale for CSA and the Climate Smart Villages program. I attempt to show how Climate Smart Villages (CSV), which I show to be a governmental project, interpellated and prepared Indian farmers to utilize data-driven ‘precision agriculture’ technologies long before the introduction of Big Data in Indian agriculture made such technologies more widely incumbent upon farmers in particular regions. I argue that the CSV program significantly initiated the inculcation of a ‘climate-smart’ mentality or consciousness within participant subjects.

In the fifth section I examine India’s attempts to construct a national digital ecosystem for data-driven agriculture as part of the Modi government’s 2015 ‘Digital India’ initiative, which was introduced in Chapter 1. As part of Digital India, the state created the first database of agricultural data about farming practices, *Agristack*, in a public-private project ready made for

commodifying this data in new markets for agricultural futures in both the temporal and financial sense of that term. Digital India further prioritized the creation of digital agricultural services, thereby catalyzing the growth of the domestic agri-tech industry. From there, I turn to the ‘Farming as a Service’ model introduced in 2017, which I examine as a neoliberal model that combines data-driven agriculture and financialization in a single, clearly defined Indian agricultural paradigm that holds great potential peril for further dispossessing and deskilling Indian smallholders. I explore its discursive elements in conjunction with its modes of subjectification as exemplified through ‘nudge’ techniques that work to construct an emerging digital neoliberal agricultural subject, as well as its deployment of contract as a disciplinary legal technology. This section ends with a brief discussion of the highly contentious Farm Reform Bills introduced in 2020 and the ensuing farmers protests. These Bills, as I attempt to show, should be understood as the state’s most recent attempt to establish the regulatory conditions for data-driven agriculture and the Farming as a Service model and vividly illustrate the contestations such new modalities of neoliberal subjectification continue to provoke.

4.2. Critical data studies

Critical Data Studies offers a unique vantage point from which to examine the introduction of big-data technologies in agriculture. Data collection and analysis are not new phenomena. Societies have historically collected, stored, and analyzed data for administrative records, population mapping, and creating national registries (Bard & Shubert, 1999; Kitchin 2014). Data studies have etymological roots in Enlightenment thinking; as geographer Kitchin & critical media studies scholar Lauriault (2014) note, ‘data’ has its origins in 17th century English language where it was initially used in conjunction “with the growth of science, the development

of statistics, and the shift from knowledge built from theology, exhortation and sentiment to facts, evidence, and the testing of theory through experiment (p. 2).

Critical Data Studies establishes a research agenda by situating data regimes spatially and temporally with the objective of revealing the political forces driving data collection, understanding the implications of realizing that data and society are co-produced (Jasanoff, 2017), while illustrating how data is never ‘raw’ but specifically constructed, and assessing the emancipatory potential and limits of particular data regimes (Dalton & Thatcher, 2014). Science and Technology Studies scholars Rieder & Simon (2016) argue that by situating the ‘numerical evidence’ of Big Data within broader socio-political contexts, we can better understand “how the epistemological claims of Big Data science intersect with specific forms of trust, truth, and objectivity” (p. 1). Contextualization alone, however, is insufficient to capture the vast range of components (and their relations) within data regimes. Addressing this issue, Kitchin (2014) proposes the concept of the ‘data assemblage’ as a mutually constitutive socio-technical system made up of the data system/infrastructure (such a database or repository) and the political, social, and economic impacts and consequences of its meaning, operations, and effects.

Elements of a data assemblage range from: systems of thought (modes of thinking, rationalities, ideologies), instruments of financialization (investment, venture capital), policy (political economy, incentive instruments), governmentalities and legalities (data standards, regulations, IP regimes), infrastructures (computers, sensors, networks), and practices (techniques, ways of doing, scientific conventions), and subjectivities, among others.²⁴ As I will attempt to demonstrate in this chapter, the assemblage so explored bears rather clear similarities

²⁴ Kitchin (2014, p. 25) suggests that other elements may include: forms of knowledge (research texts, websites, magazines, etc.), Institutions (archives, corporations, government agencies, communities of practice, etc.), Places (labs, offices, server farms, etc.), and Marketplace (for data, software, analysts).

with my concept of a conjunctural assemblage which I have explored through the constituent components of governmentality. Data assemblages also transform as new knowledges and technologies emerge, market interventions unfold, and as the political economy alters; “they are thus always in a state of becoming” (Kitchin & Lauriault, 2014, p. 9).

New digital data sources, increased computing power, and enhanced sophistication in analytics have facilitated the creation and processing of Big Data, characterized as massive in volume, acquired at rapid velocities in real time, and exhaustive in the scope of its attempts to capture entire populations or systems (Kitchin & Lauriault, 2014, p. 2-3). Information studies and STS scholars Boyd and Crawford (2012) understand Big Data as the interplay of technology (maximizing computational power to collect and interpret large data sets), analysis (identifying patterns in large data sets to make social, technical, economic, and legal claims), and mythology (the belief that large data sets embody a higher form of knowledge and intelligence) (p. 663). Data is constitutive of the ideas, people, contexts, and techniques through which their data are collected, analyzed, and managed (Kitchin & Lauriault, 2014, p. 4; Ribes & Jackson, 2013). Data is never neutral, raw, or objective but provides relational, contingent, and contextual ways of seeing and interpreting the world. Data does not pre-exist its generation and it is not fixed. Rather, it is co-produced by the processes, protocols, measurements, categories, and standards that are designed and negotiated to generate and regulate it ; “raw data is an oxymoron...data are always already cooked” (Gitelman & Jackson, 2013; cited at Kitchin, 2014, p. 2). Big Data, moreover, must be politicized through an analysis of the power structures that enable its creation, collection, and analysis and through interrogations of positivist accounts (Iliadis & Russo, 2016, p. 2). Databases and repositories containing data are expressions of power/knowledge in that

they structure what kinds of questions are asked, who is asking them and how, and how answers are deployed (Kitchin & Lauriault, 2014).

Before considering the conjunctural assemblage of data-driven agricultural governmentality and the reconfiguration of the Indian state, it is crucial to explain the significance of Big Data more generally to the financialization of agriculture. As I discussed in the previous chapter, the Global North constructed the knowledge economy following periods of capitalist growth in the mid-20th century. The emphasis on the production of tangible commodities shifted to trade in goods and services, while the creation and sale of financial instruments rapidly increased as firms with excess capacity sought new avenues of investment as means to unload their glut of accumulated capital (Lawrence et al, 2018, p. 310). The turn towards financialization intensified after the global recession of the 1970s, when, as Marxist geographer David Harvey argues, capitalism required a ‘spatio-temporal fix’, or “solutions to capitalist crises through temporal deferment and geographical expansion” (2004, p. 65). Capitalism, he suggested, must ‘reset’ after a period of over-accumulation expanding its geographical, temporal and subject-matter reach to find new sources of accumulation,²⁵ processes enabled by ICTs, which now play a key role in facilitating digital agriculture.²⁶

²⁵ The central problem of over-accumulation is a lack of opportunities for profitable investment. The process of financialization allows for non-, pre-, or rudimentary capitalist territories and economic sectors to be pried open for both trade and capital investment, such as natural resources held in commons, incompletely commodified labor, traditional artisanal practices, and untitled, untapped lands. Accumulation by Dispossession predominantly unfolds through privatization and financialization under the conditions of late-twentieth century and early twenty-first century neoliberal globalization. Roughly three decades of global reforms imposing disciplinary tactics to induce economic liberalization and gradual deregulation in commodity markets established the regulatory environment for the financialization of agriculture (Krippner, 2011).

²⁶ These technologies play a vital role in agricultural extensions services (Sylvester, 2017) and are conceived of as powerful tools in further modernizing agriculture towards ‘e-Agriculture’ led by the FAO (Flor & Cisneros, 2015). They enable “the transformation of vast quantities of information into data, that is, bits of quantitative information that can be mathematically manipulated in ever more complex ways at great speed. Moreover, this can be done, even while keeping track of information about individuals” (Busch, 2010, p. 343). In addition to the federal Indian government, state governments and NGOs are investing heavily in rural ICTs (Kumar, 2012).

As in the financialization of any feature of life, rendering food and agriculture into sites for financial investment and accumulation necessitated the abstraction of its commodifiable subject matter from larger, constitutive material and cultural contexts (Clapp & Isakson, 2018). This was exemplified in the transformation of agricultural commodities into complex financial instruments such as agricultural commodity derivatives which have been largely deregulated since the 1990s (Hartmann et al., 2020). Several underlying factors deepened the incursion of finance into agriculture: the decreasing availability of arable farmland (in large part caused by soil degradation caused by excessive chemical inputs), the conversion of farm lands into biofuel production (both of which are linked to the increase in land grabbing by agrobusiness), increased demand for meat among burgeoning middle classes in the Global South (in large part met by increased industrial meat production), and the rise of speculative activity in agricultural commodities (Lawrence et al, 2018; Clapp & Isakson, 2018). As I will detail later in this chapter, the opportunity to financialize both agriculture and the climate crisis by creating new market instruments was reflected in shifts in international climate policy, which resulted in the formation of CSA as a means to increase yields and farmers' incomes while reducing greenhouse gas emissions and incorporate a form of financialization tied to development.

Mergers and acquisitions leading to the increasing corporate consolidation of global agriculture are central to its financialization.²⁷ In 2013, the six largest seed and pesticide companies (named the “big six”) held \$93 billion in global agricultural market share while

²⁷ 2015 witnessed the biggest year ever of mergers and acquisitions in terms of both capital value (an estimated \$4.7 trillion USD) and the number of ‘mega-deals’, or any deal that exceeds \$5 billion, of which there were 137 (Lam, 2016). A sizable portion of these occurred among various large-scale players in global agrobusiness: Dow and DuPont (\$130 billion), Bayer and Monsanto (\$66 billion), ChemChina and Syngenta (\$43 billion), Potash Corp. and Agrium (\$36 billion), as well as a failed \$143 billion bid by Kraft-Heinz to acquire Unilever, and Amazon’s entry into the retail/grocery chain through its purchase of Whole Foods (\$13.7 billion). In each of the sub-sectors of seeds, agrochemicals, and farm machinery, the top 5-10 corporate producers control no lower than 65% of their respective sub-sector market share, while the top 10 fertilizer producers control 28% (iPES, 2017, p. 6).

accumulating \$63 billion in revenue; 75% of the global agrochemical market and 63% the of commercial seed market, as well as 75% of all private sector research in seeds and pesticides (ETC Group, 2015, p. 4). The agricultural industry restructuring in favor of mass production and consumption that I detailed in the Green Revolution chapter as the creation of a surplus food regime spurred mergers across previously unconnected industries such as chemicals, energy, and seeds (Friedman, 1993).

In the Knowledge Economy chapter, I discussed how IPRs became a key tool of financialization through their capacity to garner economic rents. As legal mechanisms of financialization, IPRs further provided a comparative advantage to their owners through their capacity to erect barriers to market entry for smaller firms, which allowed large, IPR-owning firms to consolidate their market position (Drahos & Braithwaite, 2007). When a firm cornered a dominant market share, it then had the requisite capital to buy smaller and medium sized firms to obtain their IPRs and enlarge their range of products and services (May & Sell, 2006). Since 2007, financialization has driven corporate consolidation in agriculture as investors demand higher and shorter-term payouts. Today, firms who possess Big Data or offer Big Data analytic services differentiate themselves from others in the market due to the advantages which accrue from their ability to capture and analyze massive amounts of information that can be leveraged for real-time insights into product demand, marketing, and productivity. Agricultural Big Data offers a new opportunity for firms to increase their apparent market value to attract investment and lead to further mergers and acquisitions (Mooney, 2018).

Big Data is critical in facilitating mergers and acquisitions not only between global agribusiness firms, but also across sectors. This can be seen in Monsanto's \$930 million purchase of the burgeoning data analytics firm, Climate Corp. in 2016 (and, subsequently, four

more software and data analytic firms), in the years between 2012-2017 when the ‘big six’ altogether acquired 19 data analytic/AI/robotics firms (Mooney, 2018, p. 14). Two years prior, Monsanto’s chief technology officer commented that “I could easily see us in the next five or ten years being an information technology company... where the information itself becomes the business, we see a lot of opportunity” (McDonnell, 2014).

Data analytics are crucial to collect, analyze, and integrate information collected across agribusiness, spanning areas from weather prediction on farms to supply chain tracking, risk assessment for insurance purposes, and food safety measures. Such information can be fed into algorithms to create platforms capable of providing customized and predictive recommendations thought to improve crop management and increase yields. Data analytics, it is believed, will thereby lead to more precise decision-making, particularly through the creation and deployment of agricultural platforms. Platforms are digital intermediaries through which two or more groups can interact with each other and produce “network effects”; as more users utilize platforms, greater amounts of data are produced and harvested by the platform creator (Srnicsek, 2017). In an agricultural context, this enables the platform to produce more predictive and prescriptive information to relay back to farmers in the form of planting recommendations, extension advisories, and agro-financial services (Iazzolino & Mann, 2019). At the same time, Big Data in agriculture provides an informational edge to traders betting exorbitant amounts of capital in soy, wheat, and corn futures, and thus enables financial speculation. In the context of the mounting corporate consolidation of agriculture and the growth of agri-tech startups, network effects are likely to contribute to the increasing monopolization of food and agriculture.

These new troves of collected data and their processing through data analytics merge with genomic analytics in a new avenue for accumulation by dispossession. Advances in genome

editing technologies, such as the CRISPR tool, facilitate faster, more precise, and controlled plant breeding (Scheben & Edwards, 2017). Data-driven plant breeding can result in modified crops embedded with a tolerance to droughts or climate fluctuations while still producing high yields and ultimately satisfying the objectives of CSA. Climate data, plant genomic data, and natural resource data are stored in public databases, while soil data can be freely obtained from the FAO and international public domain climate data sources house data specific to India (Rao, 2018, p. 11). Because the physical genetic material is not needed in digital sequencing, the benefit-sharing provisions under the Nagoya Protocol do not apply (ABS Information Forum, 2017), generating vexing legal questions related to the CBD (Bond & Scott, 2020) and accusations of digital biopiracy (Navdanya, 2020).

The global agriculture analytics market is expected to reach a valuation of roughly \$2.5 billion by 2027 (Globe Newswire, 2019). For both domestic and transnational agribusiness corporations, “Big Data connects inputs—seeds, fertilizers, and chemicals—to farm equipment and retailers to consumers” (IPES-Food, 2017, p. 6), resulting in an increase of ‘one-stop shop’ stores/facilities. The ‘big six’ possess the capacity to merge their data businesses with their existing portfolios of seeds, machinery, and agrochemicals to create new platforms, while large-scale retailers (such as Wal-Mart and increasingly Amazon) execute similar plans around consumer data at the other end of the supply chain. After the collection of primary data at the level of the farm, the collection, processing, and use of Big Data analytics occurs at each ensuing step of the supply chain. While commercial seed and agrochemical producers are increasingly utilizing new digital technologies on farms, traders collect market data, and large processors and retailers collect consumer data. Actors holding pre-existing market dominance and seemingly unlimited capital are also the firms with the greatest ability to collect, process, and convert data

into actionable information. This is exemplified by the previously discussed cross-sectoral mergers and acquisitions in which agrobusiness companies are buying data analytics firms, and Amazon's entry into the agricultural supply chain as a retailer/supermarket.

With new, massive amounts of data informing business activity across food supply chains, the appetite of firms to engage in large-scale mergers increases as the 'big six' merge to improve their ability to set product prices at levels not sustainable in a more competitive market" (DePamphilis, 2014, p. 4). Big Data thus represents a means to consolidate every aspect of the food supply chain, raising barriers to competition and innovation, while, also, as we shall explore, policing and locking farmers into using corporate seeds, inputs, and machinery while feeding information about farming practices into proprietary corporate data streams. A scenario suggested by Blake Hurst, president of the Missouri Farm Bureau, may not be too far off; "It's not difficult to imagine a smart-phone ad arriving within seconds of a farmer encountering weed or insect damage while he's harvesting his crop" (Hurst, 2013). Bayer's platform, for example, provides instruction for 'prescriptive' pesticide application taking the form of individualized instructions to farmers suggesting which products to use, where/how to apply them, and how much to use stemming from accumulated satellite, crop, and yield data; "The next step is to combine current and historical weather data with satellite-based biomass and chlorophyll measurements as well as yield data. When added to special breed characteristics, the result can be an optimally customized crop management plan" (Grassi, 2016). Later in this chapter I will show how this scenario is gradually becoming realized in Indian agriculture through the model of 'Farming as a Service'.

4.3. Global policy precursors, financial pressures, and Climate Smart Agriculture

At the global scale, the CSA assemblage emerged out of contemporary global crises in accumulation and the debates around how to best address them both globally and nationally, as well as in deliberations over international climate change policy. The early phases of international climate change policy were premised upon differentiated responsibilities, or the idea that developed countries were the greatest purveyors of global emissions and therefore should take a leading role in reductions. India advocated strongly for this differentiated responsibilities principle; it took a leading role in early climate change negotiations as a champion of the Global South (Sengupta, 2012). Developed countries could achieve global emissions reductions, however, through payments to developing countries for their mitigation. This eventually led to the formalization of emissions trading in carbon markets that turned greenhouse gas emissions into “a new commodity created in the form of emission reductions or removals” (UNFCCC, n.d.) in the 1997 Kyoto Protocol, the first global agreement dedicated to climate change mitigation.

The West’s changing perception of increasingly strong Southern states such as India and China became evident in global climate change politics. Arguing that China and India should agree to mandatory emissions caps similar to those placed on developed countries, the US withdrew from the Protocol in 2001 (Joshi, 2010). The 2002-07 period saw a retreat in global consensus in favor of bi- and multi-lateral agreements, such as the Asia-Pacific Partnership on Clean Development and Climate, in which India was a member-state (Lipper & Zilberman, 2018, p. 16). India proposed that developing countries undertake nationally specific mitigation actions within the parameters of sustainable development, supplemented by North-South technology transfers and increased climate financing at the 2007 Conference of Parties-13 (Gupta, Kohli & Ahluwalia, 2015). At the same time, the Intergovernmental Panel on Climate Change (IPCC)

formally recognized linkages between global agricultural production and climate change in 2007, recognizing the potential for reducing greenhouse gas emissions by linking climate change policies to sustainable development initiatives in agriculture (Smith et al., 2007).²⁸

At the same time as these shifts occurred in international climate policy, the world witnessed remarkable volatility in agricultural commodity prices as part of the 2007-08 global financial crisis. The UN Food and Agricultural Organization (FAO) food price index suggested that the cost of agricultural commodity prices saw a 63% increase between 2007-08, as compared with an annual increase of 9% in 2006. Traditional staple foods such as maize and rice skyrocketed by 74% and 166% respectively, causing India to cease all rice exports (except for Basmati, which continued to fetch premium prices in global markets). Global food prices on average increased by 40% before precipitously falling in the summer of 2008 (Rapsomankis, 2009), causing double distress for smallholder farmers around the world. Some argued that increases in the global population and the corresponding demand for greater global energy production was the root cause of commodity price swings (Headey & Fan, 2010). The increased production of biofuels created by staples such as corn and the rising cost of chemical inputs was seen by many to be driving market volatility. Others, however, emphasized the financialization

²⁸ The gradual decentralization of international climate change policy accelerated in 2008 with the commencement of a new policy phase led by the UN Framework Convention on Climate Change (UNFCCC). The imposition of distributed responsibility measures for mitigation strategies upon developing countries was a clear feature of this new policy phase, resulting in the integration of mitigation strategies and practices into national policy streams. (Gupta, 2010). Developing countries were expected to submit Nationally Appropriate Mitigation Actions and their Intended Nationally Determined Contributions as a result of the UNFCCC Conference of Parties meetings 15 (2009) and 18 (2011). This led to 188 country submissions by 2016, which overwhelmingly focused on mitigation and adaption strategies in national agricultural sectors (Lipper & Zilberman, 2018, p. 17). The World Bank and FAO's early push for CSA funding linked sustainable agricultural development to climate change mitigation practices, primarily through capitalizing on booming international carbon markets (Stabinsky, 2012) whose value at the time of CSA's launching were an estimated \$141 billion (Lippert & Zilberman, 2018, p. 23). Carbon sequestration practices in agricultural soils were introduced to the agricultural sector in developing countries through soil carbon credits. Transnational civil society actors have argued that carbon offset markets in agriculture disproportionately placed the burden of mitigation on vulnerable smallholder farmers (ActionAid, 2010).

of agriculture in the form of market speculation (and hoarding) of agricultural commodities as the primary catalyst for the crisis (Wahl, 2009; Bello, 2009).

Olivier De Schutter, the UN's Special Rapporteur on the right to food between 2008-14, acknowledged inequities in global trade rules regarding subsidies as complementary reasons for the crisis, while commenting on the need for a 'second green revolution' less reliant on water, energy, and chemical inputs than the 20th century Green Revolution discussed in Chapter 2, but still capable of increasing farming yields (McColl, 2008). The dramatic swing in agricultural commodity prices along with De Schutter's call for a more productive, resource efficient approach to agriculture converged with shifts in international climate policy to further establish the policy rationale for CSA.

At the most basic level, CSA is a strategy to increase food production under conditions of climate change.²⁹ CSA has three interrelated, simultaneous objectives which its advocates suggest constitute a 'triple-win': (1) increasing agricultural productivity to ensure food security, (2) reducing greenhouse gas emissions while enhancing farmer resilience to the effects of climate change, and (3) raising farmers' incomes to accomplish global and national goals of sustainable rural development. CSA serves as an umbrella concept spanning production systems, specific agricultural practices and technologies, national policies and institutional arrangements, and financing mechanisms which conjoin agricultural and climate change objectives. No particular practice or technology is absolutely or explicitly designated 'climate-smart'. Instead, agricultural practices and technologies are recognized as climate-smart by fitting within the

²⁹ The 2010 Hague Conference on Agriculture, Food Security and Climate Change called for transformations of both subsistence and industrial modes of farming. Sustainable agriculture was deemed achievable with enhanced greater policy coordination between agricultural and climate change objectives across all levels of governance and nationally led public-private funding mechanisms. The early institutional iterations of CSA successfully framed climate change as an essential consideration in sustainable agricultural transformation by emphasising agriculture as a key contributor to climate change.

rubric of the ‘triple win’ goals described above. This criterion is understood as a sliding scale; for example, an irrigation technique acceptable under the CSA branding might be very productive in increasing yields and farmer resilience to climate change but only scantily reduce emissions, leading some to argue that virtually any existing practice might qualify as climate-smart (Neufeldt et al., 2013).

The global agrochemical and agricultural biotechnology corporation Monsanto, along with major fertilizer companies and food companies whose collective revenue amount to \$800 billion USD, established the World Business Council on Sustainable Development. The Council’s Working Group eventually provided scientific advice for the implementation of CSA (Dinesh, 2015). High levels of corporate engagement in CSA led critical food studies scholars Newell & Taylor (2017) to describe it as an “institutional embedding and a system of revolving doors” (p. 10), alluding to the close relationships between UN based agencies such as the FAO and the industries affected by potential regulatory changes in the world food system. The clear influence of powerful corporate actors in mainstreaming CSA has led critics, such as global environmental politics scholar Doreen Stabinsky (2014) to label global CSA little more than a trojan horse for the continuation and consolidation of corporate agriculture and biotechnology.

In 2014, the Global Alliance for Climate Smart Agriculture (GACSA) was created at the UN Climate Summit to develop the institutional environment necessary to advance CSA and secure sources of investment (Lipper & Zilberman, 2018, p. 19). Backed by the key UN institutions and donors above, GACSA operates as a platform for knowledge exchange and global cooperation on CSA initiatives with over 140 members including states, agricultural research institutions such as CGIAR, farmers’ organizations and civil society actors, agrobusiness corporations, NGOs, and development institutions such as the Asian Development

Bank. GACSA, however, operates without the typical environmental and social safeguards typical of UN-associated initiatives, such as participatory-based policies to prevent and mitigate undue harm to people in the development process (Aubert, Braun & Treyer, 2015).

Agrobusiness and food companies in particular have utilized GACSA as a mechanism to seize and shape the landscape of mainstream CSA. The chemical fertilizer industry, for example, has had extended influence in GACSA.³⁰ The public/private ‘partnerships’ that constituted GACSA became the target of a highly mobilized pro-peasant transnational civil society opposition which drew specific attention to the Green Revolution’s social and ecological legacies in their protests. In 2014, La Via Campesina issued press release deeming CSA to be a direct continuation of the Green Revolution that would result in further biodiversity loss, the erosion of traditional and subsistence agriculture, and ultimately facilitate the corporate-industrial takeover of all global agriculture.³¹ The NGO Genetic Resources Action International (GRAIN) criticized the role of the fertilizer industry in GACSA and CSA’s formulation, labelling the world’s largest fertilizer company Yara and its affiliated organizations the “Exxon of agriculture” (2015). The International Cooperation for Development and Solidarity (CIDSE), a network of European organizations working in various areas of agricultural reform, suggested in 2015 that GACSA was a corporate guise for carbon trading schemes, which would eventually lead to speculative investment activities in large scale land grabs in the Global South (CIDSE, 2015, p. 8-9).

³⁰ The world’s largest fertilizer company, Yara, played a lead role since the initial conferences, joined by their key lobby associations Fertilizers Europe and the Fertilizer Institute in comprising 60% of GACSA’s total membership in 2015 (IATP, 2015, p. 1). Major food companies such as Kellogg’s and McDonalds have utilized GACSA as a springboard to enroll corporate social responsibility initiatives into CSA, while Wal-Mart has developed its own CSA Platform in partnership with its suppliers and food companies including General Mills and PepsiCo (Newell & Taylor, 2017, p. 6).

³¹ CSA’s leading advocates in the UN system, such as the International Fund for Agricultural Development (IFAD), reject the CSA/Green Revolution comparison (eg: IFAD, 2011), but recognize these Green Revolution analogies to be increasingly ubiquitous in the criticism by pro-smallholder organizations.

In 2015, 55 international agricultural organizations and 300 national peasant groups (including 19 from India) forcefully rejected GACSA and the practice of CSA more generally (CIDSE, 2015). In calling for the UN and national policymakers to reject CSA, this coalition argued that GACSA operated as a vehicle for corporate greenwashing and that GACSA's conception of CSA was little more than an empty signifier lacking scientific criteria to distinguish agricultural practices and techniques. At least one European state, Germany, has not joined GACSA due to the widespread flurry of criticism coming from these influential voices in transnational civil society (KFW, 2016). As I detailed in the Knowledge Economy chapter, the Indian state is no stranger to transnationally organized farmer resistance and the speed at which these campaigns can be globally mobilized and publicized, as seen in the anti-globalization campaigns in the 1990s. India's lack of involvement with GACSA, I suggest, stems in part from its recognition of GACSA as a highly visible organization advancing corporate agriculture and its recognition of the controversy it has provoked amongst agrarian smallholders and their sympathizers.

As in the struggles discussed in the Knowledge Economy assemblage, agricultural activists are particularly concerned about the deployment of biotechnologies as new forms of accumulation by dispossession which will further smallholder dependency upon corporate capitalism in agriculture. The official CSA paradigm neither mandates nor dismisses the use of chemical inputs or GM-seeds (Lipper & Zilberman, 2018, p. 27), but the FAO's 2016 *State of Food and Agriculture* report advocates for the use of biotechnology to reduce emissions. Activists have frequently highlighted the use of biotechnologies in developing GM-seeds for CSA in the Water Efficient Maize for Africa project, a ten-year project in which new drought-tolerant maize varieties were developed under the banner of 'climate-smart crops', funded by the

Gates Foundation (TWN & ACB, 2015). They argue that the creation and dispersal of these varieties are intended to create smallholder dependency on largely unaffordable patented seed, as alarmingly suggested by an estimated 1,500 patent applications for climate-resilient seeds in 2015 alone (Shiva, 2015).

The creation of engineered climate-smart/resilient seeds is accelerating under data-driven ‘climate-smart’ plant breeding. In the agricultural context plant genomics and phenomics carry copious amounts of data which are complemented by sources containing smaller amounts of data such as information pertaining to spatial and temporal-specific climate conditions, land and soil, irrigation, greenhouse gas emissions, socio-economic conditions, and agricultural markets (Rao, 2018). The collection of plant genomic and climatic data provides the raw inputs for data-driven plant breeding to create evermore ‘climate-smart’ seeds. Automated sensing technologies fitted onto farm machinery have rapidly increased the amount of plant genomic data collected (Varshney, 2016). Such agricultural data is stored and transferred across cloud-based platforms, undergoes processing and transformation through machine-learning algorithms, and finally results in yield models and planting prescriptions (Wolfert et al., 2017, p. 75).

At the moment, IPRs do not protect data itself (Schönfeld et al., 2018). However, as IP scholar Daniel Gervais (2019) notes, databases containing Big Data and the human written software used to collect store and analyze Big Data sets are eligible for copyright protection: “The *outputs* of the processing of Big Data corpora may contain or consist of subject matter that facially could be protected by copyright or patent law. Big Data technology can be -- and in fact is -- used to create and invent” (2019, p. 5). In Canada, Monsanto’s Technology Use Agreements (TUA) with farmers’ dictate that:

...you are consenting to the collection, use and disclosure of your personal information by Monsanto... (including your contact information, information about your farming practices and information about the specific nature of corn, soybean, canola, sweet corn, and sugar beets that you farm using Monsanto Technologies) via electronic communication or otherwise, for the purposes of enforcing the [TUA]... and to assist Monsanto in developing its business and operations” (cited in Carbonnell, 2016, p. 5).

When Monsanto acquired the climate data firm Climate Corp in 2014, their end-user-agreement was updated to state:

We presume you own the information and data that you provide to us... including, for example, the data generated from the farming equipment you own or lease... we do not claim any ownership interest in Your Information [and it] remains yours even after you provide it to us...[but] we are the sole owner of the Climate Products and Generated Data and all associated technology and intellectual property rights (p. 7).

While farmers are acknowledged to own the data they have generated, Monsanto/Climate Corp maintains the right to own the data and innovations generated after analytic processing and the innovations that result from data analytics, which rely on farmer-generated data. It is thus entirely possible that ‘climate-smart seeds’ developed from Big Data driven plant breeding will eventually be held as property through new deployments of IPRs.

4.4. Making Climate Smart Villages and climate-smart mentalities

Climate Smart Villages (CSVs) emerged as an extension of the national climate change policy streams previously discussed. In 2008, India released its *National Action Plan on Climate*

Change composed of eight categories incorporating various ‘sub-missions’ broadly linked to sustainability that would enable the country to meet its developmental objectives while reducing emissions. These ‘sub-missions’ included enacting equitable water distribution and national forestry efforts to increase India's green cover to enhance carbon sequestration. The Plan also included a *National Mission on Sustainable Agriculture* (NMSA), designed to encourage the development of climate-resilient crops, produce weather insurance mechanisms, and induce changes in agricultural practices (Pandve, 2009). The NMSA shared CSA objectives of increasing both agricultural productivity and resilience to climate change.

Much of the NMSA policy focused on achieving greater efficiency in chemical input management, investments in digital infrastructure to improve extension services and knowledge delivery to farmers, and the use of biotechnologies to breed high-yielding and climate-resilient crop varieties. The policy framed investment in agro-forestry as a potential spur to increase carbon sequestration (NMSA, 2010, p. 44). In clear anticipation of the CSA model, the NMSA called for:

... continuous efforts in improving genetic traits to sustain productivity, both in the short and long term, with focus on research and development of resilient genotypes. Simultaneously, reforms in policies, regulatory regimes and conformance to standards [to] promote large scale research and wider adoption of genetically improved varieties by both producers and consumers. International collaborations with Consultative Group on International Agricultural Research (CGIAR) institutions would be critical for fostering these activities (NMSA, 2010, p. 21-22).

As I noted in Chapter 2, the UN Food and Agricultural Organization (FAO) and the World Bank jointly created CGIAR during the Indian Green Revolution to collect and store local germplasm. Composed of 16 international agricultural research centers, including the International Crop Research Institute for Semi-Arid Tropics (ICRISAT), in Hyderabad, India, it is now implementing CSVs in East/West Africa, Latin America, Southeast Asia, and South Asia.

Beginning in 2012, the consortium of actors described above targeted Haryana as a key site for the expansion of CSA development initiatives. CGIAR created the Research Program on Climate Change, Agriculture and Food Security (CCAFS) to advance research and implementation with the International Maize and Wheat Improvement Centre (CIMMYT) while collaborating with the state government of Haryana and the Indian Council of Agricultural Research. Haryana's leadership in agricultural production builds upon its history as a primary beneficiary of Green Revolution technologies and agricultural research. Not surprisingly, this 'success' has also made it a major contributor of carbon emissions and particularly susceptible to climate change (Ahmad et al., 2019, p. 89) which position it as an ideal site for CSA initiatives.

CCAFS initiated CSVs which are: "sites where researchers from national and international organizations, farmers' cooperatives, local government leaders, private sector organizations and key policy planners come together to identify which climate-smart agriculture interventions are most appropriate to tackle the climate and agriculture challenges in the village" (CGIAR-CCAFS-CIMMYT, 2014, p. 3). CGIAR partners with the International Center for Tropical Agriculture (founded by the Rockefeller Foundation), illustrating the ongoing influence of Green Revolution actors in contemporary rural and agricultural development initiatives.³² This

³² Donors for CCAFS include USAID, the governments of the EU, the UK, Ireland, the Netherlands, Australia, and New Zealand (CCAFS, 2021). The CGIAR Trust Fund, a public-private funding mechanism, is comprised these governments along with the World Bank, the Gates Foundation, and the Indian Council for Agricultural Research (ICAR). It is also a primary donor.

is a key partnership that positions CGIAR (and by extension, the CGIAR-created CCAFS) as the lead actor implementing CSA development programs in India. This web of public-private partnerships provides a glimpse of the multi-scalar and multi-national governance structures that subject bodies such as CCAFS to various forms of discipline. For instance, demands for gender equity and participation in rural development indicate that these projects were subjected to rights-based development norms and evaluations (Aylwin & Coombe, 2011).

CSVs are local test sites for assessing which CSA technologies and practices most effectively accomplish all three CSA objectives with the eventual intention of scaling-up successful actions in national policies and programs (Aggarwal et al., 2018).³³ They further operate as sites of governmentality, where Indian farmers were first prepared as subjects to adopt the tools and behaviors needed for data-driven agriculture. The more that they interact with CSV agricultural technologies (instruments, seeds, digital platforms) and become trained in a particular CSV vocabulary, the more “farmers begin acting like algorithms” (Gardezi & Stock, 2021, p.2) for use in the Farming as a Service model to be discussed later in this chapter.

In the earliest Haryana CSV initiatives commencing in 2012, the Karnal district was an attractive site for pilot projects in part due to its proximity to several national agricultural research bodies. As I discussed in the Green Revolution assemblage, these research bodies were sites of top-down expert knowledge production, surveillance and agricultural information collection through their control over state-held seedbanks and extension services, as well as

³³ Establishing CSVs involve four key processes: baseline assessments/site selection, the creation of portfolios that contain the specific activities to be carried out in each village generating evidence, and scaling (CGIAR-CCAFS, 2013). Site selection ensues primarily through analyzing historical climate data on a specified cluster of villages to assess their climate vulnerabilities, as well as their greenhouse gas emissions from agriculture. Village landscapes with high degrees of climate vulnerability during cropping seasons are ideal for tracking the effectiveness of CSV interventions. CSV portfolios are designed as specific to the selected cluster, rather than as a one-size-fits all approach to rural agricultural development. This is achieved by collecting socio-economic information on income levels, education, gender relations, local social institutions, as well as documenting existing agricultural practices and technologies.

laboratories for the production of high-yielding seeds. Karnal district is home to the Central Soil Salinity Research Institute, the National Dairy Research Institute, the Directorate of Wheat Research, and Haryana Agricultural University, all of which were partners with CCAFS and CIMMYT (CCAFS-CIMMYT, 2014, p. 4-5). These actors assisted in creating and dispersing the CCAFS Baseline Household Level Survey in eight randomly selected villages in Karnal district to assess their access to resources, livelihood activities, and cropping practices (CCAFS-CIMMYT, 2014, p 5).

Portfolio creation is a participatory process that involves researchers, farmers, state officials, and private stakeholders in selecting the most appropriate CSA technologies and practices building upon the baseline assessments (Aggarwal et al., 2018). In the pilot CSVs in Haryana and Bihar, consultations with local communities led to the creation of village committees made up of farmers, researchers, and local planners to implement the village portfolio, which contain the specific practices, crops, and technologies for implementation.

CSVs established farmer learning networks targeted to engage rural women in line with globally mandated gender inclusive participatory development objectives. CCAFS worked with an Indian development NGO Alternative Futures, to produce a toolkit titled “Training of Trainers: Summary Manual on Gender, Climate Change, Agriculture and Food Security”. This toolkit established capacity-building workshops to train female leaders to educate other women in CSV villages about the links between climate change, agriculture, and food security relevant to their livelihoods using examples that would resonate with them (Vincent et al., 2013). The objective was “to empower women by showing them that their own experiences validate the scientific.” (p. 56-57), asking them to “consider any changes they have observed in climate over their lifetime and their mother’s lifetime” with trainers explaining “how their experiences match

the projection of scientists” (p. 56-57). Women were also made aware of government loan and credit programs to reinforce to them their “need to connect more with government agencies” (Alternative Futures, 2013).

This “Training of Trainers” project was clearly a technology of neoliberal governmentality. It was designed to legitimate the CSV as an official state project and to change women’s subjectivities by teaching them to articulate their experiences in relation to climate change in scientific terms, using the vocabularies of greenhouse gases, climate change indicators, and water cycles and to adapt their understandings and experiences in ways conducive to the adoption of the agricultural technologies introduced by the CSV program. The capacity-building workshops sought to “empower” female participants to adapt successfully to projected changes by responding to “available government plans and programs and field-based adaptation models by non-government actors” (p. 6). If they knew how to identify and articulate the effects of climate change on local agriculture, they could then be ‘responsibilized’ to adapt to such changes more scientifically and thus more effectively.

As Rose and Miller (1992) suggest, “making people write things down and count them... is itself a kind of government of them, an incitement to individuals to construe their lives according to such norms” (p. 187). It is through mundane calculative technologies such as these exercises that the subjects of CSVs were constructed and the rationales of CSA translated into their routine, everyday practices. Rather than being condescended to as bearing outmoded and ineffectual traditional knowledges and practices, as they might have been only a generation earlier, women were put into a dialogue of sorts with practitioners of modern science. CSV neoliberal participatory technologies thereby illustrate a significant divergence from the high-modern technologies of the Green Revolution, in which peasants were constructed as parochial,

traditional, and in need of foreign, technological expertise. The neoliberal agricultural subject is, instead, made to feel like a responsible stakeholder in projects of development.

This particular dimension of neoliberal development, as I illustrated in the previous chapter, has the capacity to imbue agricultural subjects with new capacities to recast and reshape projects that engage them in forms of neoliberal government. In the Knowledge Economy assemblage, my discussion of the Convention on Biological Diversity indicated that the ‘traditional knowledge’ long disparaged under Green Revolution government was revalued as a crucial resource for dealing with reduced biodiversity under conditions of climate change. If, as the Green Revolution chapter indicated, high-modern rationality in 20th century development projects disregarded, if not ridiculed, the values, desires, and understandings of its agrarian subjects, neoliberal governmentality recognized, validated, and incorporated these in the way it shapes its subjects and orients them to its projects of government. The same tendency will be illustrated in the ‘nudging’ of the digital neoliberal farmer which will be addressed in my discussion of ‘Farming as a Service’.

Particular agricultural technologies and practices became popular in efforts to meet CSA objectives. These became indicia of success and integral to reconfiguring the agrarian subject. Laser land-levelling, a farmer-operated, tractor-towed, laser-controlled device that flattens and evens the soil surface, proved to reduce greenhouse gas emissions by reducing fertilizer usage while increasing crop yields in rice and wheat (CIMMYT, 2014). Smallholders rented out Laser Land Levelers at a rate of 6-700 rupees per hour, instead of purchasing them due to their prohibitive cost, which illustrated the growing ‘Uberization’ of farm machinery in India. While this led to greater accessibility for smallholder farmers, it also largely benefitted private agribusinesses such as Mahindra & Mahindra (India’s leading tractor manufacturer and an agri-

chemical company), and the state. When such technologies are rented from state-run, custom-hiring call centers, the Ministry of Agriculture was able to deploy an agricultural app described as ‘Uber for tractors’ to track machinery usage and prices, providing “an invaluable database for policy-makers... to track the usage of new technology that the government wants to promote” (Jebaraj, 2019). This model, as I will show in subsequent sections, fits squarely within the imperatives of ‘Farming as a Service’.

Levelers were also prerequisite tools for the expanded use of precision-farming technologies, such as the GreenSeeker handheld crop-sensor device. When held above a crop canopy, the GreenSeeker collected agronomic data used to indicate crop health as a prediction of future yields as well as nutrient and nitrogen requirements for a particular plot. The precise readings of these hand-held devices “allowed farmers to reduce over-application, reducing fertilizer costs and avoiding air and water pollution” (Lapidus et al., 2017, p. 2). The sensor collected information by sampling the scanned area; when the farmer released the device’s trigger, it displayed the measured value of plant health and fertilizer needs, which the farmer recorded and input into an algorithm (Abit & Arnall, 2019). This algorithm, significantly, was an essential component of the Nutrient Expert decision-support software, a computer-based tool jointly developed and owned by CIMMYT and the International Plant Nutrition Institute (CIMMYT, 2013). This proprietary software analyzed the crop data collected by GreenSeeker and provided tailored information on growing conditions and natural nutrients in the soil. It also sent recommendations for improvements in local practices directly to farmer’s phones (Sapkota et al., 2021). Hence, beginning in 2012 and in practices that have been accelerating since 2014, Indian farmers have freely gathered and contributed farm data and information that continues to create ongoing value for actors who hold the IPRs in data-based proprietary algorithms and

agricultural platforms, while also enriching the state in garnering massive investments from foreign and domestic agribusiness (Srivistava, 2021).

These are similar to those examples of accumulation by dispossession masquerading as empowerment, that we saw in the Knowledge Economy assemblage. These technologies become extensions of a particular neoliberal agricultural subject through capacity-building exercises which support new forms of financialization in which farmers themselves become vectors for information's commodification as data in supply chains. These early CSV enterprises prepared farmers themselves to serve as technological inputs into a flow of data from which others will profit and use as the basis for further financial calculation, as I will show in subsequent sections. For example, these precision-agriculture tools complement the Soil Health Card scheme in developing detailed fertilizer application recommendations.

India initiated the Soil Health Card scheme in 2015 to assess the quality of soil of every farm in the country, as a part of a broader national soil-mapping project intended to optimize input use while increasing production and profitability (GoI, 2015). Mapping in general has long been a technology of legibility and simplification in high-modern state planning (Scott, 1998, p. 58). As political ecologist Levi Van Sant (2021) argues, the modern state's drive to accumulate and possess knowledge of soils is not a neutral activity but is bound to state objectives of administering territories and populations and establishing the baseline conditions for future agro-industrial expansion.

The Soil Health Card project works not only as a technology of simplification and evaluation, but also as a technology that enrolls farmers into public-private projects of agricultural financialization. After soil scientists and extension agents collect soil data through onsite farm visits, state agricultural departments in partnership with national agricultural research

organizations analyze the data. Governments then distribute individualized report cards to farmers (to be re-sent every two years using updated soil data) on soil nutrient profiles along with recommendations for balanced fertilizer application and crop management (Kishore et al., 2018, p. 129). Crop management in this context involves state recommendations of improved seed varieties for growing export crops and intensifying land use (Reddy, 2019), with farmers encouraged to adopt the proprietary precision agriculture tools previously discussed to carry out these recommendations in a manner conducive to greater market shares:

Using optimal doses of fertilizers and cropping pattern as per the scientific recommendations is the first step towards sustainable farming. Soil testing is a science-based and time-tested tool for assessment of the soil fertility status and soil ailments and nutrient amendment recommendations. Soil testing, as a tool for judicious fertilizer use, works on the principle of profitability, which means if all other factors of production are optimum and none of them are limiting, there is a high probability of obtaining a more profitable response to applied nutrients based on soil testing than those applied on an ad hoc basis (Reddy, 2019, p. 1).

Whereas conventional soil mapping required soil scientists to manually classify and delineate soil qualities within a specified plot of land, digital soil mapping uses Geographic Information Systems and Global Positioning Systems. Understood as “the computer assisted production of digital maps of soil class and soil properties” (Cruz-Cardenas et al., 2011, p. 683), it relies primarily on remote-sensing technologies and satellite imagery and further functions as a technology of government that renders the environment legible. Such maps provide precise

topographical information utilized in land-management decision making, as well as predictive capabilities in soil types and properties reducing the need for field visits by soil scientists.³⁴

This soil mapping project will create a large digital soil dataset with potential uses beyond soil fertility recommendations: “Quality assessed soil data can inform a host of analyses and decisions beyond fertility management, including integrated water resources management, land use planning, commodity production and price forecasting, weather-based insurance schemes and market development for diversified cropping systems” (ISCRIC, 2019). Digital soil mapping thus also performs as a technology of quantification, or the construction, articulation, and representation of numbers as knowledge (Espeland & Stevens, 2008; Miller & Rose, 1990), through which market rationality extends to the domains of agriculture and environment while rendering farmers more amenable to calculation and governance as market actors.

Soil report cards encourage farmers to improve their performance in applying chemical inputs according to the results conveyed, while establishing a benchmark against which farmers and their practices can be measured and compared. In equating precision chemical input management and profitability with sustainable agriculture, farmers conform to the norms of the market by maximizing their productivity while simultaneously take responsibility for the quality of their yield outcomes. As development scholars Cioffo, Ansoms & Murison (2016) showed in the context of agricultural modernization projects unfolding in Rwanda, farmers who don't adopt such precision-oriented agricultural technologies and then experience low crop yields are easily castigated as 'bad' farmers. I hypothesize that if Indian farmers fail to adhere to the card's

³⁴ Plans to digitalize soil mapping began in 2015 with a joint workshop between the Indian Institute of Technology and the University of Sydney, sponsored by the India-Australia Council (DSM, 2017). This was followed by a 2017 Gates Foundation-funded joint training session in Andhra Pradesh, where the Cereal Systems Initiative for South Asia and the International Soil Reference and Information Centre (ISRIC) provided hands-on training to Indian researchers in digital soil mapping. These training workshops resulted in the creation of the Soil Intelligence System project (2018-2021), led by the CIMMYT, ISRIC – World Soil Information, the International Food Policy Research Institute (IFPRI), and the state governments and state agriculture universities of Bihar and Andhra Pradesh.

recommendations, they will be negatively castigated as unproductive producers of degraded soil deemed to be without regard for the role of inputs or land use planning. If farmers follow the prescriptions and fail to achieve the stated goals of improved productivity and reduced emissions, moreover, they will bear significant responsibility precisely because the recommendations were based in objective, scientific, neutral data. This parallels the effects of the Green Revolution assemblage in constructing new categories of technologically-oriented farmers elevated as ‘Master Farmers’ while denigrating others. In the current assemblage, digital and data-driven technologies interpellate farmers to occupy the position of tech-savvy agricultural subjects who are responsibly ‘feeding the world’ in an ecologically sustainable manner.

CIMMYT asserts that it is farmers themselves who will benefit the most from this project (Mathys & Vedachalam, 2018). Yet, as political ecologist Van Sant (2021) suggests in analyzing early American soil mapping projects, such projects are “not solely (or even primarily) designed to help individual farmers maintain a viable livelihood...[soil] Surveys worked to improve (some) farmer livelihoods only to the extent that doing so also promoted the state’s goals” (p. 688). In the current Indian context, digitally assessed soil data facilitates public-private capital accumulation by operationalizing the financialization of Indian agriculture. Fertilizer management, for example, is an object of financial valuation and probability-based estimation through which “the value of anything can be reduced to a couple of indicators (risk and return)” (Chiapello, 2015, p. 19):

Generalized fertilizer recommendations are the rule and the return on investment for programs such as the US \$85 M Soil Health Card initiative remain modest. In addition to eroding value at the farmstead level, fertilizer subsidies at the national level are currently 10.7 billion USD per annum – one of the largest recurrent

public expenditures in India. Gains in efficiency through improved targeting and recommendations could significantly improve the return on investment associated with this massive investment in subsidy, and potentially permit the Government of India to invest less while achieving better outcomes to the benefit of farmers and other stakeholders (ISCRIC, 2019).

Digital soil mapping and the eventual creation of the Soil Intelligence System rely on prediction rather than field visits and direct measurements. This will impact the allocation of fertilizer subsidies while raising the financial value of fertilizer companies and create new opportunities for trading in ecosystem services markets, as seen with the development of the GIS Nitrogen Trading tool utilized in the US. When used with soil data and climate databases, such trading tools can “be used to quickly conduct assessments of nitrogen savings that can potentially be traded for direct and indirect carbon sequestration equivalents in national and international water and air quality markets” (Delgado et al., 2010). The contemporary practice of digital soil mapping thus reflects the interconnection of scientific knowledge of soils with the broader financialization of Indian agriculture.

4.5. ‘Farming as a Service’: A paradigm for dispossession

In 2017, the Indian Institute of Management (Ahmedabad) and an American consulting firm, Bain & Company, co-authored a report titled *Indian Farming’s Next Big Moment: Farming as a Service* (hereinafter the Report). The Report is the first publication to articulate ‘Farming as a Service’ (FaaS), an emergent data-driven agricultural paradigm in which various components of farming are transformed into ‘services’, available on a subscription or pay-per-use basis (Bain & Indian Institute of Management, 2017). The FaaS model applies to three categories of farming activity: farm management solutions (pre-production), production assistance, and access to

markets. Farm management solutions rely on data-collecting farm machinery and tools, such as the GreenSeeker tool previously described, to gather farm data pertaining to soil and seed quality, weather conditions, input use, and monitoring crop output. This data is processed and disseminated to farmers through mobile alerts, digital dashboards, and application platforms. Whereas farmers typically initiate extension services when they determine that they need outside advice, real-time farm advisory under FaaS would allow extension agents to monitor and contact farmers to suggest farming practices. Further, the collected and processed farm data would be shared with financial institutions to facilitate loans, assess risk management, and process crop insurance claims (Kedia, 2018).

Access to markets involves the use of platforms to link farmers directly to agribusinesses in order to purchase seeds and inputs, while eliminating intermediaries (such as commission agents) who are integral to the current Mandi (market) procurement system. For example, ITC, a leading Indian food conglomerate, created 'e-Choupal', a digital platform through which ITC procures agricultural commodities directly from farmers while also providing advisory services and seed and input suggestions. As of 2018, FaaS had garnered roughly \$115 million USD in private equity investments, much of which is directed to supporting domestic agri-tech startups.

A key 'vision area' of Digital India is providing digital services on demand, which encompasses the production of several agricultural apps predominantly by domestic agri-tech start-up firms (GoI, 2021). India is currently home to over 450 agri-tech startups which attracted investments reaching almost \$250 million USD in the first half of 2019 alone (NASSCOM, 2019). Indian agri-tech start-ups have launched online services, web/mobile applications, and software to collect agricultural data and apply Big Data analytics, mimicking the same features

found in Monsanto's farm data projects.³⁵ In 2015, India established the *Agri Udaan* program to provide funding and infrastructural support for selected Indian agri-tech startups "to promote innovation and entrepreneurship in agriculture through rigorous mentoring, networking and helping the startups connect with potential investors" under the management of the Indian Council of Agricultural Research (GoI, 2019). *Agri Udaan*'s areas of activity include sustainable inputs, precision/smart agriculture, agricultural biotechnology, and agricultural financial technologies.

Various state organizations are key actors in this field of neoliberal governmentality, introducing freely accessible information on crop prices and advisories, but the private sector controls and directs the vast majority of current data-driven projects (Shankarnarayan & Ramakrishna, 2020). It is crucial here to understand, however, that these projects are the result of a deepening relationship between the state and private corporations. For example, one of India's most influential national think tanks, NITI Aayog, entered a partnership with IBM in 2018 to develop predictive crop yield models to enable real-time advisory services to farmers. State governments are entering into public-private partnerships to further galvanize domestic agri-tech start-ups and implementing agri-tech solutions. The state government of Uttar Pradesh is working with the Bill and Melinda Gates Foundation and Tata Trusts to establish the Indian

³⁵ Using Monsanto's FieldScripts platform, farmers generate data using farm machinery equipped with data collection devices which is then stored in a cloud and analyzed by Monsanto. The provider then generates information specific to the farm at hand, which is relayed back to the farmer in the form of prescriptive agronomic advice for purchase. When the farmer purchases and implements these recommendations, the process restarts with new data generated and collected for the ensuing harvest. The purchase of prescriptions in conjunction with Technology Use Agreements (TUAs) also mandate the purchase of proprietary seed varieties (Sykuta, 2016, p. 61) and regulate the parameters of farmers' use of patented seeds (Carbonell, 2016). TUAs dictate to whom crops can be sold, that Monsanto may inspect fields for a specified number of years, that litigation will occur in Monsanto's corporate base of St. Louis, MO, and monetary penalties will be valued at 120 times the value of the actual damages (Pechlaner, 2010). TUAs offer a legal mechanism through which Monsanto enforces its seed patents while at the same time enabling Monsanto to collect agricultural data. In accepting TUAs to plant Monsanto's patented seeds, Canadian farmers forfeit rights to the data which they have generated. Monsanto casts a wide net in its data collection; soil fertility, crop yields, weather conditions, what products the farmer is using, and farmers' profits (p. 6).

Agritech Incubation Network at the Indian Institute of Technology- Kanpur (Ernst & Young, 2020). CropIn, a growing Indian agri-tech firm, collaborated with the Government of Karnataka's Department of Agriculture to utilize its SmartFarm software for digitizing already recorded farm data, providing real time crop monitoring and yield predictions, 'farm to fork' traceability, and precise weather advisories.

The national government similarly engages in international corporate actors. Most recently, in April 2021 the federal Department of Agriculture, Co-operation and Farmers' Welfare signed a Memorandum of Understanding with Microsoft to jointly collect and digitize farmers' personal information along with land records, fertilizer usage, and crop estimation (Saha, 2021). Farmers' data that is collected and stored in the state-owned *Agristack* database will be shared with Microsoft: "The government, through this Memorandum of Understanding, aims to provide 'required data sets' of farmers' personal information to Microsoft to develop a farmer interface for 'smart and well-organised agriculture'" (Kapil, 2021). India's agri-tech industry is estimated to reach \$24 billion USD in revenues by 2025, while currently holding roughly 1% market penetration (Srivastava, 2021). Journalist Srivastava (2021) further confirms: "So far, the government has seeded publicly available data for more than 50 million farmers of the 120 million identified land-holding growers." The state continues to cultivate the conditions for nationally-based firms to become major actors in datafying Indian agriculture, through a development rationale in which the state increasingly becomes the "owner, supervisor, and promoter of capital" (Alami et al., 2021, p. 18).

FaaS identifies smallholder farmers as both the reason for FaaS and as its primary beneficiaries. Stemming from the belief that small farms cannot produce enough food to feed a growing population, the Report suggests that small-land holdings (less than 50 hectares) and a

lack of access to technology and real-time information are the key obstacles to enhanced productivity and efficiency. Such farmers, the Report suggests, have chemically degraded soil due to their own poor farming practices; they often make bad choices in crop selection due to a lack of information about high-yielding seeds and chemical inputs (p. 7), both of which can be resolved using real-time advisory services and off-site expert monitoring. Smallholders are considered ‘low skilled’ and must be taught how to select and plan better for demand, crop selection and cropping patterns, achievable both through real-time advisory services and greater use of precision tools (p. 28). Such precision tools along with modern farm machinery are, of course, expensive for the income-poor smallholder, creating new needs for rental services at custom hiring centers, as well as greater access to credit and loans.

In accessing markets, ‘experts’ believe that smallholders are often taken advantage of by supply chain middlemen who skim their already meager profits. However, as development studies scholar Sally Brooks (2021) comments, these middlemen (who she refers to as ‘street level bureaucrats’) often work with smallholders to negotiate fairer terms for loans and financing, and thus present opportunities for smallholders to exercise greater agency when dealing with financial lenders (p. 385). Instead, under the FaaS model, smallholders will be left to directly negotiate with large retailers and supermarkets through digital platforms, diminishing what are already low levels of smallholder bargaining power. In FaaS, the smallholder’s agricultural ineptitude combined with institutional failures to provide him with access to agricultural technologies and institutional inefficiencies in supply chain mismanagement, constitute problems resolved through the service model.

In FaaS, acts of ‘nudging’ guide smallholders towards making correct, rational market-oriented choices deemed to be good for them (Brooks, 2021). Originating as a concept in

behavioral economics and psychology, nudging entails making micro-changes in a subject's environment so that the subject will adjust his or her behavior without coercion, or even without knowing that they are being induced into changing their behavior. The subject is made to feel that they are making their choices freely, if not intuitively, and for their own well-being. For example, in relation to nutritional habits, adding calorie counts to food menus is a nudge that steers consumer behavior towards making healthy food choices, rather than banning or taxing the sale of unhealthy foods. As economist Thaler & legal scholar Sunstein (2008) comment "to count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting the fruit at eye level counts as a nudge. Banning junk food does not" (p. 6). Nudging, then, offers a corrective to neoclassical conceptions of the subject as an already formed rational actor by suggesting that the subject often requires soft guidance in making rational choices. In FaaS and digital agriculture more broadly, nudging unfolds through smallholder use of mobile phones and digital platforms, where service providers and agri-tech firms constantly monitor farmer behavior. Prior to the introduction of Big Data in agriculture, participant farmers received text messages informing them about local pest outbreaks or expected weather disruptions:

...texts, voice messages, and specialized call-in radio shows let them [farmers] know about upcoming severe weather, or what to do to prevent pest infestation. Others link them to digital farm development loans tailored to their growing and lean seasons to make repayment easier. Many are simple tips to improve their soil

and crop yield, or reminders to help them stay on track (Grameen Foundation, 2021).³⁶

The language of ‘tips’ and ‘reminders’ exemplifies the neoliberal discourse of nudging or as the Grameen Foundation suggests: “Make self-help a way of life. One text at a time” (2021). ‘Tips’ and ‘reminders’ are not mandates or demands but present themselves as part of a menu of choices that the farmer, it is implied, can select or ignore. This makes the decision-making process appear to be a matter of the farmer exercising his or her agency, but, as Brooks notes, nudging actually aims to “steer farmers towards choices made for them, rather than mobilize their innovative capacity and agency” (2021, p. 384).

By adding Big Data and predictive technologies into the fold, farmers receive digital recommendations customized to match their preferred language/dialect and literacy levels for chemical inputs suited for their specific soil conditions, long term weather forecasting, and market prices (Fabregas, et al., 2019). They will not be penalized if they ignore the recommendations. Yet, they are inserted into a scenario where their failure to adhere to these prescriptions renders them particularly susceptible to individualized blame and could subject them to further interventions that diminish their autonomy and decision-making in their farming livelihoods.

As FaaS utilizes such insidious ‘nudging’ techniques, it simultaneously deploys other disciplinary technologies to control its subjects more explicitly. Contract farming is a neoliberal legal technology that is designed to further manipulate and erode farmer self-sufficiency. Under

³⁶ The Grameen Foundation is a global development NGO that assists states and local finance institutions in administering microcredit loans to various national sectors, including agriculture. It is an expansion of Grameen Bank, founded by 2006 Nobel Prize winner and development economist/banker Muhammad Yunus. Grameen Bank became well-known in the 1990s/2000s as a leading lender in microcredit for development projects in Bangladesh and represented one of the earliest attempts at incorporating finance for development.

contract farming, buyers (large supermarkets and food companies) procure agricultural commodities directly from farmers. PepsiCo, for example, has engaged in contract farming in India to produce potatoes for Lay's chips since the early 1990s (Sinha, 2020). Buyers and farmers establish the contractual terms of production: a precise quantity of the desired crop, quality standards, time to harvest, and a specific remunerative price for the farmer, with technologies, agricultural inputs, and extension services typically provided to the farmer (Singh, 2002).

From the perspective of international financial institutions and institutional economics, contract farming represents an ideal pathway to modernizing agriculture while raising farmers' incomes (World Bank, 2007). It provides certainty and a sense of predictability for buyers in setting terms of production, while smallholders are enabled to access corporate (patented) seeds and inputs and receive a fixed price for their harvests (Eaton & Shepherd, 2001). For critics, however, contract farming is a "flexible strategy of accumulation" for agribusiness in the transition of smallholder farming towards market-oriented farming without burdening the buyers with the need to invest in land (Watts & Little, 1994). In a recent study on how contract farming in Malawi induces farmer dependence on corporate agribusiness, geographers Adams et al. (2018) argue that through contract farming, "corporations can secure access to land, [and] exert control over local communities", while at the same time the practice "changes rural agrarian relations, transforms local family institutions by carefully selecting a few household members with influence into the scheme and selectively dispossess[es] the poor community members" (p. 1435). Geographer Julie Guthman (2017) further suggests that contract farming is characteristic of rent-seeking behavior; the buyer can incorporate nearly all of their products (from inputs to

packaging and marketing) into the arrangement or charge fees for the inclusion of such goods “that build in above-normal returns to the buyer – economic rents” (p. 103).

The practice of contract farming further catalyzes a process of proletarianization or what critical food studies scholars designate ‘depeasantization’, whereby farmers directly contribute to agribusiness capital accumulation by working their land for fixed wages and, in essence, alienate themselves from smallholder farming practices (Araghi, 1995; McMichael, 2012; Dubb, 2018). Relatedly, depeasantization entails agricultural deskilling, the process through which farming not only becomes automated but the ability of farmers to innovate, experiment, and ultimately make decisions about their crops in interaction with local ecologies is diminished (Stone, 2007). As more smallholders are incorporated into contract farming tied to digital and ‘precision’ agriculture, the potential for deskilling and ultimately depeasantization is likely to proceed more rapidly than ever before imagined.

Contract farming represents a modern juridical mechanism to standardize, marketize, and discipline what rural development scholar Vicol (2019) designates the “biological rhythm” (p. 139), or the ecological uncertainties and risks, of smallholder agriculture. A contractual agreement, of course, cannot tame the ecological uncertainty inherent to smallholder agriculture. Buyers often extend loans to farmers to purchase the chemical inputs that the buyer makes available. It is an ideal scenario for buyers because they control the terms of production while the farmer incurs the risk in terms of crop failure or weather damage. These dimensions of contract farming have spurred the mainstreaming of agricultural insurance:

...both the grower and the buyer expect to benefit financially from a crop which is up to normal expectations in terms of both quantity and quality. Both therefore have an “insurable interest”. This means that an insurance product could be

structured so that each party receives an indemnity in the event of an insured loss (Roberts, 2005, p. 15).

Agricultural insurance schemes tied to digital agriculture have been constitutive of strategies of ‘financial inclusion’ in international development since 2009 (Soederberg, 2013).

Critical development studies scholars have also explored how international donors and financial institutions utilize digital platforms and mobile phones to extend loans and credit to smallholders previously illegible to them, creating new markets for investment of financial capital (Gabor & Brooks, 2017). This financial turn attempts to cultivate entrepreneurial behavior in smallholders, which institutions such as the World Bank and corporate agribusiness players deem essential to incorporating smallholders into global value chains (Brooks, 2021). S. Ryan Isakson (2015) suggests that in India, “insurance brokers and other actors who stand to benefit from the marketization of risk management have engaged in far reaching discursive and pedagogical interventions aimed at teaching farmers the “rationality” of insurance and “structurally adjusting culture,” with the aim of “creating effective demand” (p. 269).

Contract farming coupled with agricultural insurance typifies financialized agriculture. These two interconnected features of financialized agriculture rely on the accumulation of agricultural information:

Since contract farming arrangements are generally renewed annually, a record of production is built up over the years. This availability of accurate records, coupled with the existing financial linkages between contractor and grower, mean that insurance can be included in the range of services covered by the contract at minimal operational cost (Roberts, 2005, p. 15).

Precise agricultural information, then, is a crucial input in contract farming and in the financialization of agriculture more broadly. The amassing and processing of Big Data in agriculture presents an opportunity to gather and utilize enormous amounts of information in a quick, economical manner. Combined with farm management platforms, this enables direct firm-to-farm communication and oversight while also augmenting buyers' ability to predict and coordinate crop prices with production and demand (Ravis & Notkin, 2020).

FaaS, therefore, relies on complementary neoliberal technologies to both shape and regulate the conduct of Indian smallholder farmers. While 'nudging' techniques work in a subtle, if not intuitive, manner, neoliberal legal technologies of contract farming and datafied agricultural insurance are explicit attempts to surveil farmers and correct what might be considered 'deviant' farming behavior under the FaaS model. Working together, this arrangement of neoliberal technologies renders farmers more 'useful' in capital accumulation while at the same time enhancing the ability of corporate and state actors to exercise disciplinary power over them. Contract farming enacted in conjunction with agricultural insurance carries immense potential to funnel already economically vulnerable smallholders into debt relations characterized by dependence and dispossession (McMichael, 2013 p. 671). These new modes of subjectification and discipline provide a glimpse into an imminent, bleak era of agricultural dispossession.

Fully instantiating data-driven FaaS is contingent upon the existence of an extensive digital infrastructure capable of delivering internet connectivity to rural populations. As noted in Chapter 1, the Modi government launched Digital India in 2015 as a campaign to build a national digital infrastructure in order to electronically deliver nearly all government services and further incorporate the country into the knowledge economy, with an emphasis on enhancing broadband

connectivity in rural areas. Its 2020 budgetary allocation reached over \$500 million USD (The Economic Times, 2020) in addition to attracting a monetary pledge from Google to invest \$10 billion USD over the next 5-7 years (Google, 2020). The digital mapping platform (Bharat Maps) is part of Digital India's "National GIS Mission", which provides a tool to visually represent geographic information pertaining to natural resources and governmental sites such as post offices, roads and railways, banks, and schools for location specific planning, decision-making, and monitoring (Govt. of Assam, 2019).

Digital India further spans *Aadhaar*, the world's largest national biometric identification system with 1.2 billion enrollees (Rao & Nair, 2019). *Aadhaar* stores fingerprints, iris scans, and facial recognition photos along with biographical information for each Indian citizen. Access to basic welfare services from food provisions to opening bank accounts and accessing loans, medical services, purchasing a cell phone, registering for a driver's license, and voting all run through *Aadhaar* and the 12-digit number assigned to each registered citizen. *Aadhaar* stores personal data within a centralized database comprised of 7,000 servers located in Haryana and Karnataka, providing a digital foundation for similar initiatives across various sectors. In 2020, the federal government announced plans to create the first *Aadhaar* authenticated database for farmers' data, which will include a broad range of agricultural information from individual farmer socio-economic data to farmland-specific data (The Hindustan Times, 2019). Indian states are beginning the process of verifying landholdings to link these with the farmer beneficiaries whose information is already stored in the central *Aadhaar* database. The collected and processed data will reside in *Agristack*, the first national digital database that will store data about farmers' and farming practices.

The *Agristack* database is one of several public-private projects intended to build an infrastructure for data-driven digital agriculture. Of India's approximately 630,000 rural villages, it is estimated that less than 1% are connected to the internet (Bellampali, 2018, p. 33). The *Kisaan Call Center* functions as an information gateway in enabling farmers (who are given mobile phones) to call agricultural scientists for advice on using pesticides, chemical fertilizers, and hybrid high-yielding seeds. Farmer's inquiries, whether orally communicated over the phone or through SMS, are recorded by Call Center operators. After several years of operation, the Call Center has collected a large amount of data which is now in the process of conversion into a structured dataset amenable to Big Data analytics (Tripathi & Agarwal, 2018). Mobile apps such as *Pusa Krishi* inform farmers about newly available crop varieties, tech-based agricultural tools, and insurance apps that can generate insurance premiums and loan amounts for crops based on farm conditions. Geographic Information Systems are used to test for soil quality, weather forecasting, and crop yield predictability (Bellampali, 2018, p. 32-35). The *Agristack* database will also be used to store information regarding farm soil conditions, as evaluated by the Soil Health Cards.

In response, Farmer Producer Organizations (FPOs), and state-organized farmer/producer collectives, now express concerns about the growing connections between the state and private actors:

Agristack could strengthen the asymmetry in information flow by providing all information about farmers and their farming easily to corporations who looked at farmers as a consumer base, be it agri-inputs — seed, chemical fertilizer and pesticides, machinery companies or fin-tech companies and to those for whom

farmers were suppliers like the food industry (Rajesh Krishnan, quoted in Kapil, 2021).

Without a national data privacy law in place,³⁷ it is entirely possible that Microsoft could sell this accumulated personal, land, and agricultural data to agribusiness and chemical input companies, as well as insurance companies and financial firms. The commodification of farmer data represents a new revenue stream within the emerging FaaS model, while also illustrating how such commodification is embedded within the CSV program as well as CSA at large.

As of 2019, CCAFS began explicitly incorporating Big Data analytics into CSVs. The “Big Data Analytics to Identify and Overcome Scaling Limitations to Climate-Smart Agricultural Practices in South Asia” project is a follow up to the pilot Haryana CSV project. CCAFS is working with India’s National Research and Extension Systems (NARES) and the private sector:

The Big Data analytics for climate-smart agriculture in South Asia (Big Data 2 CSA) project responds to the limitations of plot-based agronomy by developing digital data collection systems to source, data-mine and interpret a wide variety of primary agronomic management and socioeconomic data from tens of thousands of smallholder rice and wheat farmers in India, Nepal, and Bangladesh. This is carried out in partnership with national research systems and international partners in digital agriculture across the region (CCAFS, 2019).

The project intends to deliver customized CSA recommendations to at least 500,000 farmers.

The first completed activity involved capacity building activities to enhance digital data collection, while ongoing activities range from developing crop advisories transmissible through

³⁷ The proposed 2019 Personal Data Protection Bill currently remains under deliberation in the Joint Parliamentary Committee.

digital formats, converging existing data from remote sensing and spatial collection into a single dataset and transferring it to a customized cloud platform for processing, and utilizing previously collected data in machine learning to build a predictive capability on crop performance pertaining to CSAs triple goals. It is clear, then, that past and future CSA/CSV projects squarely align with the neoliberal FaaS model, as well as with the imperatives of state-supported corporatized and financialized agriculture at large. I will continue demonstrating this crucial point in the following and final substantive subsection pertaining to the 2020-21 Farm Bills and the consequent farmers' protests.

After nearly three years of planning and deliberations, the central Indian government publicly introduced a trio of legislative bills in August of 2020 intended to fundamentally reshape the contours of national agriculture. By September, Parliament passed the three bills (the Farmers Agreement on Price Assurance and Farm Services Act; the Farmers' Produce Trade and Commerce Act; and the Essential Commodities Act) collectively titled 'The Indian Farm Reforms of 2020.' As PM Modi tweeted on September 20th "Our agriculture sector is in desperate need of [the] latest technology that assists the industrious farmers. Now, with the passage of the bills, our farmers will have easier access to futuristic technology that will boost production and yield better results. This is a welcome step" (Modi, 2020).

Shortly thereafter, farmers' unions in Punjab, Haryana, and Rajasthan initiated mass protests against the reforms and eventually mobilized farmers from around the country under the slogan of 'Dilli Chalo' ('Let's go to Delhi'). By late November, twenty farmers' unions from across the country organized 200,000-300,000 Indian smallholders in marching towards Delhi in what some have deemed the single largest protest in human history (Mahajan, 2020; Ebrahimji, 2020), culminating in a nationwide general strike involving roughly 250 million people (Joy,

2020). The central and state governments responded to ongoing protests with force, arresting 72 farmer leaders (The Tribune, 2020) in the midst of citywide violent confrontations between police and farmers (Pandey, 2020) with the use of tear gas and water cannons to disperse protestors. At the time of writing, farmers are conducting relayed hunger strikes as they negotiate with central state authorities with the objective of repealing the Farm Reforms.

The Farm Reforms and the protests they have provoked build upon and amalgamate elements of the Green Revolution and Knowledge Economy assemblages while pointing with either zeal or alarm to the intensively digitized and datafied CSA and FaaS that constitutes the likely future for farming in India. The Essential Commodities Act amends eponymous 1955 legislation, enacted alongside the PL-480 agreement to distribute food aid from the US to India. As I argued in chapter 2, PL-480 was crucial, not only in ushering in the Green Revolution into rural areas but as a tool of statecraft through which the Indian state catalyzed industrialization for the purposes of national development more generally. The 1955 Act granted the central state control over the production, supply, distribution, and trade over particular commodities ranging from foodstuffs to fertilizers and food-crop seeds. In the context of India's mid-20th century famines and struggles over food production, the Act prevented food hoarding and cemented high modern state control through agricultural regulation. The amended 2020 Act removes agricultural commodities from those considered 'essentials', generating social concerns about the development of speculative market practices in foodstuffs as the neoliberal state deems deregulation necessary to attract private investment in agricultural supply chains. The Farmers Agreement on Price Assurance and Farm Services Act establishes a national legal framework for contract farming, which will further cement the FaaS model.

The Farmers' Produce Trade and Commerce Act deregulates the crop pricing that had long been state overseen through the Agricultural Produce Market Committee (APMC). Farmers often sell their produce at the APMC markets (mandis) established by each state, which previously guaranteed farmers a minimum support price for their produce. Minimum support prices function as an agricultural social safety net by ensuring a baseline price for farmers' harvests in case of market fluctuations or crop failures. Commission agents, or the 'middlemen' I discussed previously, act as go-betweens to facilitate the storage, then sale, and transport of goods as part of social and transactional networks. State officials now argue that these intermediaries stifle competition through inefficient management practices. The new Act enhances a 'free flow' of trade by encouraging direct sales between farmers and wholesalers and potentially large new retailers. It supports the central state's new policy preference for harmonizing agricultural markets across the sub-states through the electronic-National Agricultural Market system (e-NAM), "a pan-India electronic trading portal which networks the existing APMC mandis(markets) to create a unified national market for agricultural commodities" (GoI, 2020).

Advocates of these legislative developments perceive the Indian Farm Reforms of 2020 as the state's final achievement of the "1991 moment for agriculture" (Gulati, 2020), which alludes to the ways in which these Reforms represent the fulfilment of India's agricultural liberalization and incorporation into global agricultural and financial markets that began in 1991. This narrow framing, however, neglects both the current political and legal context as well as the ways in which the Bills connect India's modern agricultural history to the past, present, and future. The policy rationales underpinning these Reforms intend to steer Indian agriculture ever

further into the fold of the datafication and financialization that increasingly dispossess agrarian smallholders.

4.6. Conclusion

In summary, this chapter attempted to outline the contours of an emergent assemblage centered on the datafication and financialization of Indian agriculture. The global policy precursors to CSA were crucial to India's embrace and implementation of CSA/CSVs, which were important development programs in not only introducing precision agriculture to India but also in the ways in which they attempted to construct and prepare the neoliberal Indian farmer for the subsequent introduction of Big Data in farming. This introduction was preceded by the Digital India project, which was crucial to building a national digital ecosystem necessary to fully embrace the datafication of Indian agriculture. The agri-tech firms that emerged out of the Digital India initiative are now key actors in the Farming as a Service model, which will ultimately hasten the dispossession of smallholder farmers particularly in conjunction with the implementation of the Farm Reform Bills.

Food scholar and journalist Raj Patel (2021) recently commented with respect to the farmers' protests against the Reform Bills that "in the camps outside Delhi, you'll hear "Sarkar ki Majboori—Adani, Ambani, Jamakhori," or "The government is beholden to the hoarders, Adani and Ambani", referencing Indian billionaires Mukesh Ambani and Gautam Adani. These two men, known to have close relationships with Prime Minister Modi, own Reliance Industries Ltd. and Adani Enterprises Ltd., two of India's biggest agribusiness conglomerates. Rather than protesting the intrusion of multinationals into national markets, which I explored in the Knowledge Economy chapter, farmers are now protesting against the dominance of domestic corporate power. This recognition and action catalyzes the history and future of current and

forthcoming battles in Indian agriculture. More crucially, the protests indicate an awareness that all forces now seem aligned with a global neoliberal governmentality that wholly enmeshes all players, including those representing 'Indian' capital, into vectors of global agri-capital accumulation through dispossession.

5. CHAPTER 5: CONCLUSION: CONNECTING HISTORIES AND FUTURES OF DISPOSSESSION AND STRUGGLE

5.1. Introduction

Throughout the last century, significant international and national interventions in Indian agriculture have simultaneously been celebrated as harbingers for solving global and national problems pertaining to hunger, food security, and sustainable development and simultaneously denigrated as increasing the industrial corporatization of farming and food production, while increasing agrarian dependency and dispossession. Each of the main eras of such technological development -- the Green Revolution, the introduction of agricultural biotechnologies, and most recently the push towards the datafication of agriculture -- have involved a substantial reconfiguration of the relationship between international powers, the state and Indian farmers as these technological developments have been brought to bear upon and by different levels of government through exercises of multiscalar agency implemented by and sometimes resisted by diverse actors. In this dissertation, I argued that these projects of agricultural change in India should be understood, not in terms of singular policies or as discrete initiatives, but as historical, cumulative, and continuing projects of colonial and neocolonial governmentality involving international and transnational actors mediating the relationship between the Indian state and its agrarian classes. Each of these eras has been addressed as a conjunctural assemblage in which, law – in its colonial, common law doctrinal, domestic legislative, and international treaty, declaration and convention forms, as well as in its regulatory manifestations – was a generative force in establishing the grounding conditions, while connecting various elements across the assemblages.

In this concluding chapter I recap the arguments made in this dissertation by returning to my primary research question: how were the legal, political, and social legacies of the Green

Revolution and India's incorporation into the global knowledge economy influential in shaping and/or undermining the emergent discourses, practices, and regulatory rationalities of India's current (CSA) development initiatives? This question was premised upon my conceptualization of each historical period as a conjunctural assemblage composed of various interactions between governmental technologies, discourses, practices, rationalities, and actors with distinct and sometimes competing aspirations. My objective in each chapter was to show how these elements were reinforced and entrenched in new historical conjunctures, and how and with what effects various actors reassembled and reconfigured these elements in subsequent assemblages. Law's productive or socially constitutive capacities were integral to the construction of each assemblage, both in generating the conditions for subjectification and dispossession and in providing the basis for political action. For the remainder of this final brief concluding chapter, I will focus on three key themes that exemplify what the law *did* in these conjunctures: the role of law in governmentality, its role in the processes of subjectification, and the role of law in relation to the ideologies and practices of dispossession. In so doing, I further illuminate and emphasize the dissertation's contributions to the broad field of Socio-legal Studies and its sub-fields of Law and Development, Law and Globalization as well as in TWAIL/postcolonial scholarship as a critical subfield.

5.2. The role of law in governmentality

At its core, Socio-legal studies is concerned with what the law actively does in its relationship with society, a relationship which is largely understood as coproduced. This has led some scholars to suggest that the field is properly oriented towards capturing how law "sheds light on significant social processes or problems" (Friedman, 1986, p. 770), while others argue that it should be concerned with demonstrating that it is "law which renders society possible"

(Fitzpatrick, 1995, p. 106), or to go beyond the mutual constitution thesis to show, instead, that law and society “are not really separate entities at all” (Calavita, 2016, p. 5).

Governmentality studies are fundamentally concerned with analyzing the subtle and mundane forces and dynamics of power and governance that constitute and continually retransform society, its institutions, its subjects and its understandings of its development (Rose, 1999). This dissertation has adopted and advanced these fundamental observations by showing how the construction and deployment of governmental technologies and regimes are directly or indirectly rooted in law. Through my case studies, I situate both law and development within broader relations of governmentality. I show how technologies of government and fields of regulation are established, sustained, and contested within the fields of law and the institutions and ideologies of development in order to demonstrate the generative capacities of law within this larger field of power.

The first ‘moment’ in the sub-field of Law and Development focused on state-led uses of law to achieve national industrialization and domestic development. Here, the law was understood to be instrumental in expanding state power and fostering desired forms of social engineering. However, I have endeavored to argue that to understand such processes we need to understand how the law was critically implicated in technologies of government. In Chapter Two, I show how law was utilized across various scales in the restructuring of international/national agricultural systems and markets, the sending or receiving of ‘food aid’, and in social engineering projects to transform Third World peasantries. I expand conceptions of this first ‘moment’ by showing how the relations between law and governmental technologies were rooted in enduring historical legacies. For example, colonial governmentality in India introduced new technologies of government such as mapping, counting, and measuring, which

were then utilized to enact governmental interventions in both agricultural territories and in the classes of people who labored upon these lands themselves. The 1793 *Permanent Settlement Act* officially recognized “gentlemen farmers” (known locally as ‘Zamindars’ or landlords) as landowners while mandating that these landowners pay specified revenues to the state or face state expropriation of the lands they maintained. Zamindars then directed peasants and agricultural laborers towards a productivist agricultural system predicated upon commodity crops for export, in order to generate greater revenues. The Act effectively created and formalized rural class hierarchies; the colonial state created and enriched a class of Zamindars who met their obligations to the state and retained land by locking peasants into feudal relations and steering them away from the cultivation of traditional crops. In the Green Revolution, the selective provisioning of state credit was intended to induce the adoption of new agricultural technologies (eg: high-yielding seeds, chemical inputs, farm machinery) among large and small farmers. These financial technologies effectively enriched already wealthy landowning elite farmers at the same time that they subjected smallholders to debt relations with the state. At the level of state-state relations, Public Law 480 which set the terms of food aid between the US and India, opened a larger field for the exercise of Indian state agency. While the terms of this food aid law were highly beneficial to the US in exerting control over an important postcolonial state in the context of the Cold War, this law also created the conditions for India to industrialize and pursue its national development objectives.

5.3. Law in the processes of subjectification

By the 1980s, what is recognized as the second ‘moment’ in Law and Development was seen to be characterized by its conception of law as an instrument to create and expand markets. Private property rights and the enforcement of contracts were deemed integral to achieving

economic development by harnessing the power of science and technology in market dominated relationships. While this thinking corresponds to a conceptualization of an incremental paradigm that prioritizes economic development, I showed in Chapter Three how law, in the form of international trade regimes (and their incorporation of IPRs), environmental treaties, soft law instruments, and biocultural rights (and their domestic implementation), was crucial in producing the Indian state both as an object and as a subject and agent of neoliberal governmentality while simultaneously creating the conditions for the emergence of the subaltern cosmopolitan legal subject in Indian agriculture.

Global neoliberal institutions worked in conjunction with an array of disciplinary international legal instruments typified to produce the Indian state as an object of neoliberal government. The governmentalization of the Indian state unfolded in a dialogic process in which the state was constructed as a ‘macrosubject’ through the deployment of neoliberal discourses and technologies of competition and evaluation. In its engagements with international law, the state had little choice but to accept the dictates of the Global North because of its own lack of technical expertise, particularly in negotiations over IPRs. This led to the state exercising its agency in order to become a more competent actor in international legal arenas. India’s engagement with TRIPs, for example, facilitated the state’s domestic legal-capacity building activities as it incorporated itself into the global knowledge economy and its particular modality of transnational governmentality. As a corrective to the ‘second moment’ of Law and Development, I showed how the postcolonial Indian state was not solely an object of neoliberal marketization and discipline from international financial institutions and corporate actors, but also a subject of the neoliberal government which afforded states with particular forms of agency to advance their national development objectives.

Neoliberal international legal instruments ranging from TRIPs to the CBD facilitated the commodification of plant genetic resources and created new fields of action for exercises of both state agency and resistance among farmers. The CBD created the conditions for the regulatory influence of India's domestic legislation pertaining to plant genetic resources and biodiversity. The 2001 *PPV&FR* and the 2002 *NBA* moreover, spurred the deployment of neoliberal technologies such as ABS, biocultural protocols, TK databases, and biodiversity inventories, which, in the hands of Indian farmers were used towards new ends, to illustrate the oft made point that neoliberal government regularly fails when the subjects of its exercise take up its affordances to assert their agency.

The Indian state clearly subjected farmers to neoliberal government in agricultural development through the disciplinary imperatives of global institutions and international legal agreements. The Green Revolution was embedded within the broader international system of food regulation characterized by surplus regimes and food dumping. The attempted neoliberal reforms of this system in the 1990s-onwards forged the conditions for the emergence of the subaltern cosmopolitan legal subject. Various Indian farmers' movements reconfigured and deployed the nationalist discourse that had emerged in the Green Revolution. Anti-neoliberal globalization movements utilized this discourse to articulate the WTO and agricultural trade liberalization as a threat to Indian sovereignty, while pro-globalization/liberalization groups seized upon a nationalist discourse to assert a new political imaginary of the 'global' that tied Indian cultural traditions to a more open, liberalized world under the auspices of neoliberal globalization. Some of these groups would eventually take on the subaltern cosmopolitan legal subject-position in forms of direct action against the forces of neoliberal globalization, while others worked more directly to refashion neoliberal technologies to achieve their own social and

political objectives under the banner of farmers' rights. Law was thus critically implicated, both in new processes of subjectification and in creating the social fields in which various actors exercised their political agencies. While *Law and Globalization/TWAIL* has often understood legal subjectivity as produced almost entirely through discourse, I have instead illustrated how legal subjectivity is constructed in the interplay between ideology, discourse, and governmental technologies.

The SLS subfield of Law and Development suffers not only from a paucity of studies utilizing governmentality approaches, but in understanding governmentality as field of socio-technical relationships constitutive of development practices. The subfield was recently critically assessed in relation to neoliberalism in an edited volume titled *The Limits of Law and Development: Neoliberalism, Governance and Social Justice* (Adelman & Paliwala, 2020). Governmentality rarely appears in this entire volume, except in the late Peter Fitzpatrick's essay, which (while insightful as always), still lacks any application of a governmentality approach to a distinct case study in Law and Development. In each conjunctural assemblage, I have shown how law plays an integral role in creating governmental technologies that work as fields of discipline, incentive, and reward, in shaping both subject-positions and resistance to the subjectivities it attempts to cultivate. Bringing a governmentality approach to studies of Law and Development corrects the instrumentalist conception of law imagined "as the institution which can produce civilization or development" (Adelman & Paliwala, p. 4, 2020). Instead, as my studies of these conjunctural assemblages illustrate, it enables us to see how law is generative of those governmental technologies which are so conspicuously absent in *The Limits of Law and Development* volume. If critical Law and Development scholars are concerned with the relations between law and/or development and the politics and social movements that attempt to challenge

Western modernity and its dominant epistemologies, then the construction, deployment, and uses of governmental technologies must be studied to understand how the conditions for such resistance are formed.

5.4. Law, ideology, and dispossession

The relationship between law, ideology, and dispossession is another key thematic that has animated this dissertation. Historically, the emergence and extension of private property rights has always fueled processes of dispossession, acknowledging the ways in which systematic theft is the dominant means through which property relations are forged, a process in which liberal ideologies have historically provided justification and legitimation (Nichols, 2019). In Chapter Two, I showed how the ideology of progress first shaped the premises of the 1793 *Act* by inscribing the category of wasteland into Indian law and land revenue policies to illustrate how the creation of private property represented the evolution from a state of nature to one of state civilization. Later, key high-modern discourses of scientism and nationalism animated the imaginary of progress which informed the Green Revolution and Knowledge Economy assemblages.

For both the state and farmers, during the course of this historical journey, progress entailed the path from a pre-modern state of tradition to one of modernity. Farmers were historically presented as backwards due to their traditional social systems which were deemed responsible for their hesitance to embrace new technology as part of the wider construct of Western modernity. The deeply held belief in the power of science and technology to achieve modern status underpinned the Green Revolution. Farmers would become modern by accepting and utilizing new agricultural tools; the state could become modern by first feeding itself, then industrializing and developing in the image of the West. Farmers would become modern liberal

subjects by assuming the mantle of valued members of society making unique contributions to the nation-state. Though historically perceived as obstacles to capitalist modernity, farmers were now instrumental in feeding the industrializing nation and ultimately achieving its independence from foreign dominance. Fulfilling their duty to the state, however, required the steadily increasing adoption of productivist industrial agriculture which fostered their dependencies on modern agricultural inputs controlled by foreign economic actors.

In Chapter Three, the ideology of progress informed neoliberal discourses of development and scientism in relation to agricultural biotechnology and GM seeds. Advances in biotechnology leading to GM seeds were framed as objectively beneficial to the universalized interests of humankind. Again, smallholder and indigenous farmers were constructed as traditional and incapable of feeding a rapidly growing global population due to their non-modern and often non-capitalist forms of farming. In a parallel process, states resistant to strict IPRs over agricultural biotechnologies and GM seeds were similarly deemed backward, undeveloped and inadequately prepared to participate in the global knowledge economy. Local communities were to allow bioprospecting, or the theft and commodification of their carefully stewarded plant genetic resources, so that the agricultural and life science industries could create new and better seeds to meet global objectives. Science and technology were essential to feed the world and only what were predominantly Western corporations possessed the ability to harness their power. Smallholders and local communities could either embrace the use of new agricultural biotechnologies or, if they rejected them, bear their designation as backwards and primitive, while being disciplined by state and corporate technologies.

In Chapter Four, I developed a political economy of law in the Global South by utilizing the insights of Critical Data Studies to indicate how digital technologies are introducing new

means of dispossession. I showed how law in forms of property, doctrines of contract, and fields of regulation emerged from multi-scalar policy mandates that forged and implemented means to mitigate climate change, enhance agricultural productivity, and spur greater capital accumulation through financialization. Most notably, law was a disciplinary technology in contract farming under FAAS and the proposed Farm Bills. Similar to their classical function in Western modernity, contracts in this scenario were advocated to provide guaranteed stability and predictability for buyers disingenuously assumed to be in a position to set the terms of production. Contracts instead further eroded farmers' control over decision making, lead to their agricultural deskilling, and ultimately and in the longer term, appear to be oriented to contribute to the disappearance of the autonomous farmer.

The ideology of progress may not appear as evident in current era of big data and financialization as in the previous assemblages, but it has not disappeared. In the current discourse of datafication, technological and societal progress will be achieved through the collection and processing of massive amounts of data. More and better farm and climate data, for example, is believed to lead to more precise farming tools and methods. Resource-intensive industrial agriculture will be fine-tuned, and its worst environmental effects will be mitigated. Humanity can thus avert the imminent catastrophic consequences of climate change while still producing massive amounts of food. As in the deployment of the progress narrative in relation to agricultural biotechnology, however, capacities to exercise agency under these conditions are unequally available; only a handful of corporate actors possess the ability to refine, analyze, and do something with all this collected data. Smallholders who are unable or unwilling to comply with the disciplinary imperatives of these actors' data-collecting activities become mere

obstacles to a universalizing, world-saving form of progressive salvation which manifestly disenfranchises them.

In the previous assemblages, it was clear that the South was the source of raw materials for the North to take (as seen in biopiracy) and convert into final products marketed and sold back to the South for their own good, even if these technological products failed to meet their ecological or nutritional needs. If we take seriously the claim that data constitutes a new ‘natural’ resource similar to oil, then it becomes evident that the discourse of the datafication of agriculture carries its own ideology of progress. Just as the raw materials of the biodiversity-rich South long deemed “the common heritage of mankind” were seen as new resources that would spur development in the biotechnological era described in Chapter Three, the newly acknowledged data-rich South is ideologically promised an opportunity to ‘catch up’ to the North by developing the capacity to convert raw data into commodified information that can be capitalized upon to create new goods. To some extent this promise has been fulfilled, to the extent that those who are in a position to exploit these new raw materials are no longer limited to Western states and Western-based multinational corporations. India, as my case study in Chapter Four showed, has prepared itself and its domestic agribusiness industries to supplant foreign entities in the activities of exploiting and dispossessing Indian farmers. A distinct, new form of dispossession led by an emergent state/corporate coalition runs on digital agricultural platforms that nonetheless serves global corporate industrial needs. Farmers, I posit, are increasingly aware of this, as evidenced in the ongoing protests against the Indian Farm Bills.

This dissertation further provides a case study of a unique modality of statehood in relation to dispossession in the Global South; a postcolonial state that appears to be on the cusp of becoming an ‘economic superpower’ is marked by a unique colonial history and continues to

represent itself as a limited but willing champion of Southern interests at large. I also identify this as a contribution towards Law and Globalization and TWAAIL scholarship; my analysis demonstrates the increasing governmentalization of the Indian state through the interplay of distinct and cumulative rationalities, technologies, and discourses in each conjunctural assemblage. This point is crucial in disrupting simplified notions of North/South relations. TWAAIL and Law and Globalization scholars clearly recognize that “there are Souths in the geographic North and Norths in the geographic South” (Mahler, 2018, p. 32), a point that is welcomed and taken seriously. Yet, there has been little attention paid in this literature to how increasingly influential Southern states, like India, have mobilized their historical experiences with colonialism and/or imperialism, not to forge radical futures (such as those envisioned by the New International Economic Order in 1974), but to re/produce conventional and novel forms of domination and dispossession within their territory.

Sustained and rigorous interrogations of neocolonial/imperial relations remain essential, but it is also imperative to develop a more sophisticated understanding of the changing configurations of power, not only in terms of the interrelationship between state, corporate, international and transnational institutions and organizations, but in terms of *how* these relations are forged through governmental technologies that connect the past, present, and future. As I suggested in Chapter Four, Indian farmers are recognizing that foreign domination and the ‘Monsanto-ization’ of Indian agriculture has not ceased but is now supplemented by *domestic* forces of dispossession that have emerged out of a deepening relation between the Indian state and Indian agribusiness. The work of international laws, institutions, and modes of regulation clearly established the conditions for these domestic forces to emerge and farmers understand that resistance to such forces must itself involve transnational agrarian agencies (as the recent

emergence of transnational peasants' rights under the leadership of La Via Campesina illustrates). A recognition of these new configurations of power and agency in particular fields of capital accumulation and dispossession is a key contribution to advancing the agenda of critical post/de-colonial work in TWAIL particularly, and Law and Globalization studies more generally.

The Green Revolution and the Knowledge Economy assemblages have significantly shaped the ongoing CSA/datafication assemblage by forging generations of politically mobilized farmers who are now staging what might be the single largest organized protest in human history. Although each of the conjunctural assemblages explored here revolved around farming and agricultural production, they each provided multi-scalar arenas for government via technologies which also afforded new opportunities for alternative articulations. I have endeavored to show how the relationship between Indian farmers and the Indian state has been and continues to be established through interactions between governmental technologies and the subjects that such technologies work through and upon, while also illustrating how these interactions always provide affordances for resistance, sometimes resulting in contradictory regulatory outcomes which offer conditions for future political contestation. If we are to seriously investigate the relations between agriculture-climate change-technology or agriculture-rural development-law, then we must view this through a broader lens to see how this triangulation of domains also constitutes the historical and future spaces of both the postcolonial state and its sites of subject-formation, as related forms of political action and resistance; “the past is never dead. It's not even past” (Faulkner, 1950, p. 73). It does, however, reappear in ever-reconfigured rationalities, discourses, technologies, and the constitution of those subjected to these forms of legal power.

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