

TOWARDS A TRANSFORMATIVE AGROECOLOGY:
SEEDING SOLUTIONS FOR FOOD SOVEREIGNTY AND CLIMATE
CHANGE AMONG SMALLHOLDER AND TRIBAL FARMERS
IN RAJASTHAN, INDIA

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THESIS ABSTRACT

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Title: Towards a Transformative Agroecology: Seeding Solutions for Food Sovereignty and Climate Change Among Smallholder and Tribal Farmers in Rajasthan, India

This thesis explores how the state-wide non-governmental organization (NGO), CECOEDECON, is using agroecology as a vehicle for promoting greater farmer sovereignty and preparing for negative impacts of climate change in Rajasthan, India. Based on three months of ethnographic research, I describe how a hybridized peoples' and NGO movement are galvanizing development agendas that work to forge new paradigms for participation for farmers, revitalize and maintain cultural and livelihood practices and foster greater climate resiliency through ecological farming. Through my investigation, I draw attention to the ontological distance between food sovereignty and agroecology at the theoretical and policy levels and the complex, constrained reality of how they are being realized at the grassroots level. In doing so, I unearth the challenges and opportunities of agroecology as an effective strategy for addressing the needs of smallholder and tribal farmers operating in the rapidly evolving environmental, social and economic contexts of food production in Rajasthan.

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CHAPTER I
INTRODUCTION

Introduction

In today's Rajasthan, many adverse effects of the Green Revolution¹ are still being felt by farmers. As the world economy continues to globalize agriculture and the projections of severe climatic events increase, rural farmers are facing increasingly uncertain environmental futures. This is particularly true among smallholder and marginal farmers of Rajasthan with whom I worked, most of which belong to Schedule Castes and Tribes². Despite a dominant consensus on the Green Revolution's³ contributions to political, economic and scientific advancement to agriculture, the way forward especially among smallholders still remains highly contested. With agriculture and its allied sectors being the primary source of livelihood for over 50 percent of the total population and about 70 percent of rural households, with 82 percent of those being small and marginal, exploring the importance of sustainable alternatives to the dominant form of chemicalized production is proving to be paramount to farmer's security, resiliency, health, and well-being (2015-2016 Agriculture Census). Farmers and civil society organizations

¹ The Green Revolution is a term coined by William S. Gaud of United States Agency for International Development (USAID) in 1968. The term is used to signal the introduction of new technologies and policies implemented in developing nations to increase food crop productivity. This included high-yielding varieties (HYVs), mainly rice and wheat, heavy fertilizer and pesticide usage and carefully controlled irrigation. The Green Revolution has been subject to many critiques, detailed throughout the thesis (Davies, 2009; Conway, 1997).

² Described in definitions and terms section

have put forth agroecology as a major alternative to industrial farming, with the promise of respecting land, farmers and the divergence from fossil fuel production. Within the last two decades, agroecology has been gaining popularity and recognition among an increasing number of scholars, activists, civil society organizations, farmers organizations, and larger development organizations such as the UNFAO in Rajasthan and beyond, to address the intertwined issues of climate change and instability in food and agriculture (Wittman et al., 2010; Rosset, 2011; Altieri & Toledo, 2011; Altieri & Nicholls 2012). Framed as a transdisciplinary, actor-oriented approach, agroecology serves as a set of practices for agro-ecosystem management, a guiding set of morals and values and a framework for social mobilization dedicated to transforming food systems and creating more resilience, regenerative human-agroecological relationships (Mendez et al., 2013).

While agroecology represents an alternative way forward for food and agriculture, significant political questions exist as to how exactly the concept can move from a set of ideals to wide-spread food system change in the capitalist-based production systems currently dominating rural and urban-based economies (Gaarde, 2017; Rosset & Martinez-Torres, 2012; Amin & Patel, 2011). Critical evaluation of the social, economic and environmental factors that encourage and constrain the adoption of ecological farming and promote farmer sovereignty in the context of climate change is necessary, however at present needs more attention in the academic literature.

In this thesis, I use an ethnographic approach to explore these themes and how agroecology is being taken up by farmers belonging to the Kissan Seva Samnti and

civil society groups (Village Development Committees, Youth Groups, Women's Groups) in association with CECOEDECON, a state-wide grassroots NGO, in three rural districts Rajasthan, at various stages of agricultural transition from chemical to ecological production systems. I focus on the potential of agroecological farming to build more equitable conditions for marginalized producers facing increasingly uncertain climatic conditions across Rajasthan while also unveiling how these concepts are not being taken up, or being contradicted, evaluating the challenges that exist among farmers who are themselves simultaneously influencing and promoting from the bottom up, and grappling with from the top down, interventions for agroecological farming while negotiating how exactly ecological agriculture intertwines with their own community-based concerns towards issues such as economic stability, autonomy and health.

In this introductory chapter I begin by outlining issues, aims and research questions. I then move onto to 'contextualize the crisis' highlighting the precedence for this research. In the section to follow, I provide a snapshot of smallholder agriculture in Rajasthan. I then follow by providing deeper context on the history of food sovereignty and agroecology as a science, movement and practice and introduce my working definition of agroecology as tool for critical evaluation of food systems. Following this, I discuss key terms and concepts that will be used throughout. I located myself in the research by providing my personal background and motivation for this work. I conclude by providing a 'roadmap' of how I will address my research questions throughout the thesis and introduce each chapter.

Issues, Approach and Research Questions

In 1947 when a newly independent India was experiencing starvation and malnourishment across the country, the government made significant commitments to both eradicate hunger and industrialize on a mass scale (Govindan 1992). The advent of the Green Revolution during the 1960s and 1970s signaled the beginning of modern agricultural production in India. Major US philanthropies such as the Rockefeller and Ford Foundations as well as global financial actors such as the World Bank reinforced this commitment to India's agricultural modernization through promoting capacity building, investment and technology transfer in agriculture (Walker, 2008). Since the advent of the Green Revolution in the 1960s, India has transformed itself into an agricultural super-power in the global market, being one of the world's top producers of important commodities such as milk, spices, wheat, rice, cotton, sugarcane, farmed fish, vegetables and tea (USDAFAS, 2014). Although the Green Revolution in India allowed the region to move from food shortages to beyond reaching effective demand within 25 years despite a significant increase in population (Hazell, p. 3472, 2010), this shift to highly industrialized and mechanized production led to a host of environmental and social consequences and is considered one the key drivers of the agrarian crisis India finds itself in today.

Small-holder farmers in India were encouraged to adopt high yielding varieties of food crops dependent on increased mechanization, use of fossil fuels, application of chemically-based fertilizer and pesticides as well as intensified irrigation systems. While at the same time, many were forced out of farming with consolidation of

large-scale farms and agri-business that started happening during this frame. This was due largely to the uneven distribution of subsidies for high-technological approaches to growing food, uneven distribution of extension services and the uneven distribution of government support between large farms and small-scale farms, as Srivastava et al. (2106) point to in their article “An Urgent Need for Sustainable Thinking in Agriculture- An Indian Scenario”:

The consequent boomerang effects of this Green Revolution technology, as evident in Punjab (Ludhiana), India is an exemplary of our underestimation of ecological interactions in sustainable management of soil/agro-ecosystem. Therefore, in spite of enhancing crop production, Green Revolution proved to be unsustainable, globally (Horrigan et al., 2002). It is primarily due to dramatic loss/erosion of biodiversity as well as their evolved spatiotemporal interactions (Daily, 1997), and associated traditional knowledge used in the past for efficient management of the former. This industrial technology favored agro-based industries and wealthier farmers, however left many small holding farmers in acute debt.

This increased adoption of industrial-based agriculture led to significant environmental deterioration due to the overuse and misuse of chemical fertilizers and pesticides, depletion of groundwater through intensified irrigation and the loss of biodiversity with the adoption of cash crops. These intensive cultivation practices depleted soil fertility, stripping the soil of essential micronutrients and thereby reducing the nutritional value of foods. The near exclusive focus on wheat and rice resulted in the disappearance of many landrace varieties of millets, legumes and wild fruits and vegetables (Shiva, 1993). While the food scarcity problem was largely solved by the Green Revolution, undernutrition and malnutrition were not. India is still home to nearly one quarter of all malnourished people on the planet, with 21.5% of the population living on \$1.90 or less per day (World Food Program, 2019). India

now finds itself 50-60 years from the onset of the Green Revolution, yet nearly 1 out of every 4 people face food insecurity and a great deal of cultivatable farmland has been left in a precarious ecological state. According to the World Food Program report, in the last two decades as per capita income more than tripled, minimum dietary intake fell. These disconcerting statistics point to how India's agriculture development goals and modernization agenda was based on the assumption that raising agricultural production would solve the set of more complex problems in rural development, ignoring that despite advancement in agricultural technology, agro-biodiversity preserved through traditional ecological knowledge continues to serve as the basis for human food production.

As we now know, however, this basis of production is deeply threatened on multiple fronts. At present in Rajasthan, many smallholder farmers are already experiencing more erratic rainfall patterns, higher frequency and intensity of drought, and higher temperatures and reduced crop yields in areas with already high rates of chronic food insecurity and high levels of poverty. These have been shaped in part by colonial and post-colonial agricultural reforms that privileged groups of farmers belonging to higher castes. Recent neoliberal policies have further exacerbated already precarious economic conditions. Climate change is projected to have a significant impact on smallholder farmers across the world and in particular across South Asia (Guiteras, 2009). Given these projections, it is important to enhance smallholder farming communities' capacities to adapt to these new conditions such as increased drought and flood, erratic and unpredictable rainfall and increased temperatures.

The localized movements for agroecology and food sovereignty are responding to these pressures a variety of ways. One of these ways is through taking a critical approach to agroecology, using it as both a set of farming methods and a lens to critically examine the political-economic embeddedness of inequality in the food system. Often drawing on India's history of resistance, a rich diversity of people's movements, farmer unions, and outspoken activists have aligned themselves with the food sovereignty frame with the aim of radically reimagining the food system in a way that puts control of natural resources in the hands of those who produce the food. In a theoretical context, food sovereignty by way of agroecology is working to reimagine the relationship to food imposed by the liberalization and globalization of trade and the industrial mode of production by reframing and resituating the dominant paradigm of food production as it emerges in opposition to the current corporate food regime, detailed in the next section (Fairbairn 2010).

With robust research showing how agroecology is increasingly recognized as the way forward for improved sustainable agricultural production around the world, particularly in Latin America (Altieri et. al, 2011; Toledo & Barrera-Bassols, 2017; McKay et al., 2014; Altieri & Toledo, 2011; Altieri & Nicholls 2008), further exploration of agroecology in the Rajasthan context will contribute to the ongoing, globalized dialogue around issues of agroecology and climate change adaptation. It is very relevant to Rajasthan given that increasing number of actors on various scales from village-level to state-level are consciously adopting ecological or organic farming and rights-based approaches to agriculture development.

While scientific-based assessments serve an important function in food systems transformations, Wittman and Heckelman's (2015) food sovereignty-based approach for assessing agroecosystems asserts that agro-ecological assessments that only measure aspects of production such as crop-yield, soil organic matter, biodiversity, flow of nutrients/biological activity of soils leave out important social, political, economic and health outputs of agrarian systems. Principles of agroecology provide a starting framework from which to critically examine the multiple 'inputs' and 'outputs' of agriculture and from the examination develop more holistic, systems-based approaches to improve livelihoods of farmers. As such, they argue, a systems-based approach built around these principles has the capacity to capture various dimensions and phenomena that affect the ability of agrarian communities to effectively respond to disruptions and threats to their livelihood such as climate change and hegemonic forces of the neoliberal food regime (Wittman & Heckelman, 2015).

To capture this, my research aims to develop a synthesized, contextually based understanding of food sovereignty and agroecology in practice that examines civil society, NGO and farmer responses to pressures and threats to farming systems in the context of climate change to understand the conditions under which aid and constrain the adoption of agroecology- to what scale and through what means. I engage with wider debates within agroecology and food sovereignty including politics of scale and institutionalization, addressing how institutions and actors involved in agroecological transitions are working locally, nationally and internationally to bring about agroecological transitions (Ferguson et al., 2019).

In addition, by placing significant focus on farmers' themselves and illuminating how they place or understand themselves as part of food systems transformations, I address some major critiques put forth towards food sovereignty: first, that it does not capture the socially-distinct, intersectional identities of rural farming communities such as ethnicity, class, age, gender, or idealizes and constructs an all-encompassing peasant-identity that is painted as the other side of capital whose reproduction is endangered by capital (Bernstein,2014); and second, food sovereignty's failure to move out of its theoretical contradictions and binaries towards a synthesis that yields a program for transformation (Bernstein, 2014) arguing that in fact agroecology is a platform that creates that synthesis. By contributing to the growing discussion of how food sovereignty and agroecology are utilized as a tool for farmers to deepen their sovereignty and protect environmental resources, I hope this work provides an empirical foundation that can serve as a critical framework for academics, NGOs, and policy-makers for assessing complex socio-ecological issues brought upon by rapid socio-ecological change. This is important to understand the broadening of multiple functions of diversity: ecological, social/culture and economic and developing appropriate policies, institutions, and development programs for improved livelihoods of farmers experiencing the highest degrees of oppression and repression.

My research questions are as follow:

To meet my aims I have constructed the following sets of questions:

- In the face of climate change, what conditions best facilitate agroecological production in Rajasthan among small and marginalized farmers? What

factors are currently constraining the adoption of agroecology as a primary means of production?

- How do farmers negotiate and understand these transitions for agroecology and climate resilient farming? What role do NGOs and civil society organizations play in this process and how do they negotiate these transitions?

As someone who considers herself an activist, researcher and an active member of wider movements for food sovereignty, agroecology and climate justice, it was important to me to undertake this additional set of goals with the aim of advancing the work of my non-academic collaborator, CECOEDECON, and the farmers and movements with whom they work.

These additional goals are as followed:

- Co-produce a short series of informational documents to be published by the organization that provides: details of the basic tenants of ecologically based production; the major environmental, economic, and socio-political issues afflicting agriculture in Rajasthan, particularly among smallholders; the means by which organic/agroecological farming is being used as a tool to alleviate some of these issues and the major practices that are beneficial in doing so; highlight the existing efforts of the organization in this realm; discuss future directions and ways forward in a Rajasthani context based on current policy trajectories

- Based on my research and findings, create a comprehensive list of new international donors and foundations that align with food sovereignty and agroecology's political aims who fund projects that the organization could partner with in the coming years to scale up their existing efforts, such as the SMART farming initiative currently active in 5 districts
- Representing what I learned about small and marginal farmers in Rajasthan at the sixty-fourth session of the Commission on the Status of Women (CSW64) at the United Nations in New York City March 9-20th, 2020 (*cancelled due to COVID-19 outbreak*)
- Represent my findings at future United Nations conferences and meetings as needed by the organization
- Beyond the scope of my research interest, support my host organization in editing funding proposals and reports, assisting with events and report backs and general administrative support as I am needed
- Maintain a commitment to continued engagement with the organization upon returning from field work to build partnerships with movements and organizations in the United States, connect future interns and researchers with aligning interests to the organization

Contextualizing the Crisis: Food Regimes, Climate Change and Agrarian

Distress in Post-Green Revolution India

As a broader, macro political-economic critique, food regime analysis addresses the increasingly consolidated flows of capital and the concentration of

control on regulation and policy in agricultural production. The concept of food regimes was introduced by Harriet Friedmann and Philip McMichael in their 1989 seminal article *Agriculture and the State System: The Rise and Decline of National Agricultures, 1870 to Present* in which they address the changing role of food and agriculture in the development of global capitalism since 1870. Defined as the “rule-governed structure of the production and consumption of food on a world scale” (1993, 31), the theoretical framework proposes links between power, rules, and norms that govern and organize what, how, and where food is produced and consumed. This thereby links the global relationship of food production and consumption to capital accumulation by nation-states.

In their analysis, Friedmann and McMichael frame two clear food regimes. The first is the colonial regime spanning from 1870-1914 that linked food imports from the Global South (primarily India, Africa, and the Americas) to European industrial expansion and the consolidation of national agriculture sectors in the settler-colonist states of Canada, the United States and Australia (Wittman, 2014). The second, post-war food regime (1947-1973), reversed the flow of food from the Northern to Southern hemisphere to fuel the Cold War and the industrialization of the ‘third world’. This resulted in subsidized, surplus foods, primarily grain imports from the US, to postcolonial states to both extend industrialization and mitigate the threat of communist expansion all while a complex chain of agricultural commodities was being solidified (McMichael 2009).

McMichael (2005) identifies a third food regime, the corporate food regime that is built upon the foundation of the post-war regime beginning in the 1980s with

the emergence of private trade and finance with the IMF as the leading agent. As he notes: “the combined dumping of subsidized food surpluses and growing agribusiness access to land, labor, markets in the global South cleared the way for corporate-driven food supply chains,” (2005, pg. 274). This process dismantled the preceding regime through a direct process of neoliberal expansion by way of wave of free trade agreements and establishing longer payment schedules for indebted countries under the new rubric of structural adjustment (Friedmann, 200). As a result, many countries in the global South shifted away from nationally centered agri-food policies towards corporate-dominated exports of ‘nontraditional’ commodities while deepening dependence on grain imports. Friedmann (2009) draws our attention that India is often seen as a key exception to this substituting grain imports with the adoption of industrial agriculture, otherwise known as the Green Revolution. However, this is not to say India does not strikingly embody characteristics of the contemporary food regime, a regime characterized by monopolies in the agri-food market dominated by few powerful trans-national corporations, dominating governments and multilateral organizations (McMichael, 2005). In the words of Holtz-Gimenez (2011), these dominating actors “make and enforce the regime’s rules for trade, labor, property, and technology” and are supported and reinforced by political-economic partnerships backed by financial superstructures such as World Bank and the IMF.

Agriculture development both during the Green Revolution and post- Green Revolution has been implemented in India using similar justifications under the guise of food security, prioritizing supply-side issues like increasing productivity and

efficiency through market mechanisms making India a strong example of the contemporary food regime formation (Jakobsen, 2019). This new neoliberalising agenda in food and agriculture has been well underway in India and the role of the state plays is significant. The Indian state progressively liberalized the seed and agricultural markets beginning with the Seed Act of 1966⁴ and continuing through the 1990's with the New Industrial Policy of 1991⁵ under a food security approach to agricultural development. Amy Trauger (2015) writes “The Green and Gene Revolutions were justified through the use of food security narratives and operate under the assumption that improved varieties and higher yields are a solution to the problem of hunger” (Trauger, 2015). This assertion is further developed by Trauger (2015) when she writes:

The legislative process, however, has been an effective arena for liberalizing governance of seeds and agriculture, especially in the context of the introduction of transgenic crops (Kim, 2006). The Government of India progressively liberalized its seed laws throughout the late 20th century, mobilizing discourses of development, food

⁴ The Seed Act of 1966 “aims at regulating the quality of seed sold for agricultural purpose through compulsory labeling and voluntary certification. Under compulsory labeling, anyone selling the seed of a notified kind or variety, in the region for which it has been notified, should ensure that:

1. The seed conforms to the prescribed limits of germination purity.
2. The seed container is labeled in the prescribed manner, and
3. The label truly represents the quality of seed in the container.

Under voluntary certification, anyone interested in producing certified seed may do so by applying to the seed certification agency for the grant of certificate. The agency grants the certificate and certification tags after satisfying itself that the seed has been after satisfying itself that the seed has been produced according to the prescribed standards and procedures.” For the full act see:

<http://extwprlegs1.fao.org/docs/pdf/ind18593.pdf>

⁵ The New Industrial Policy, 1991 seeks to liberate the industry from the shackles of licensing system. Drastically reduce the role of public sector and encourage foreign participation in India's industrial development. The broad objectives of New Industrial Policy are as follows: (i) Liberalizing the industry from the regulatory devices such as licenses and controls. (ii) Enhancing support to the small scale sector. (iii) Increasing competitiveness of industries for the benefit of the common man. (iv) Ensuring running of public enterprises on business lines and thus cutting their losses. (v) Providing more incentives for industrialization of the backward areas, and (vi) Ensuring rapid industrial development in a competitive environment. For more information see: <http://www.yourarticlelibrary.com/policies/major-objectives-of-indias-new-industrial-policy-1991/23441>

security and market reform of agriculture as justification. The Seed Act of 1966 centralized control over seed production, registration and distribution and created state monopolies for major crops.

The consolidation and liberalization of seed and agriculture markets in India in has had substantial effects on rural, small scale farmers, but seeds are just one of the many inputs or factors of production, while land grabs for large scale industrial and housing projects are another. Over the past five years there have been numerous marches, protests, demonstrations and hunger strikes by various farmer unions across the state trying to bring to light these vulnerabilities and externalities in their demands for the halt of land acquisition, debt forgiveness, guaranteed minimum prices for their crops, and land and agricultural reform. Of particular note is the now 10-year-old movement “Zameen Samadhi Satyagraha.”⁶ In this unique form of protest, hundreds of Rajasthani farmers have staged mock burials, burying themselves neck deep with soil as a symbolic gesture against the Jaipur Development Authority’s forcible agricultural land acquisition of 1350 bigha (540 acres) for a large-scale housing project. Recently in March 2020, a third demonstration was held in the village of Nindar, about 20km from Jaipur. A villager named Shekhawat told Al Jazeera reporters that “approximately 1,000 living in 18 residential colonies would become homeless.”⁷ The JDA claims that families are living on this land illegally, without proper titles or documentation. Landlessness, a major indicator of poverty in

⁶ Zameen meaning land, samadhi the final of meditation where one is said to reach union with the divine literally translating to “together with, completely, or perfectly” and satyagraha, a form of passive political protest that literally translates to ‘holding onto the truth’- all together this roughly translates to “in complete unity with the land holding onto the truth”

⁷ See: <https://www.aljazeera.com/news/2017/10/rajasthan-farmers-bury-protest-land-deal-171005112913045.html> & <https://economictimes.indiatimes.com/news/politics-and-nation/number-of-landless-agricultural-labourers-in-india-rises-to-14-43-crore/articleshow/52225793.cms>

India, is most often associated with agricultural laborers falling into Scheduled Castes or Tribes, often outside the concern of the state. This is the case for the nearly 144.3 million landless agriculture labor households as per the 2011 Census. Such extreme forms of protest, growing rates of farmer suicides and the outcry of prominent activists are bringing these issues to the forefront of the global and state-wide debates on food security.

The current regime crisis is marked by widespread malnourishment and undernourishment, social inequality and environmental degradation reflecting its deep vulnerabilities and multifaceted externalities. Across Rajasthan, these issues are coming to head. It is now evident that the current food regime is in crisis, not only to farmers, activists and outspoken leaders, but to the global community. However, any sort of significant resistance to this framework in India is often difficult because increased neoliberalization and corporatization is depicted as inevitable, especially by the current Modi government, which often reinforces these notions through powerful neoliberal discourses (Hursh & Henderson; Desai 2016). It can be argued that even those activists working to resist this framework in the food system are still subject to neoliberalist thinking and may, in fact, reinforce it by relying on labeling such as “fair trade” “organic” and or “locally grown” and consumerism and personal choice (Fairbairn, 2010).

To understand and ground the concept of food sovereignty in the socio-ecological context of daily life in Rajasthan, it is important to recognize the tensions embedded within agro-food production in the state and throughout India by way of the ‘food regimes’ approach. The drive towards modernization, simplification and

standardization in farming reflects political and economic hegemonic corporate and state interests (Weis, 2007). Confronting this helps to situate both the historic and contemporary conditions under which food sovereignty can actually take place, which is of particular important when trying to understand the processes of transformation of food systems during periods of crisis, transition and transformation all of which Rajasthan is currently experiencing (Tilzey, 2018). This is an important context to consider, as these dominating narratives are legitimized through many agricultural programs and policies put forth for both large and small farmers, which use modernization and food security motifs, drawing heavily on state power for implementation (Bezner Kerr et. al, 2017).

Pressure from the hegemonic food regime combined with climate change, rural farmers face in Rajasthan are facing a dually occurring crisis. Forces stemming from the current food regime are pressuring farmers away from ecologically based production and into the cash-crop economy for survival and climate change is making agriculture more precarious than ever before. The Earth's climate is constantly flux, however only recently has the changing climate become a matter of global concern as human-induced changes pose a major threat to humanity. As the global temperature continues to rise and the impacts of global warming become more severe and frequent, farming families and their communities are becoming increasingly challenged facing multiple, intersecting forms of agrarian distresses. It is well understood that climate change will impact the environmental, social and economic systems that determine agriculture and shape the prospects for sustainable agriculture and development in every part of the world.

Presently, climate change presents a large challenge to researchers to attempt to quantify its impact because of the diversity of agricultural systems and the variety of climatic and socio-economic conditions, however, various authoritative reports, most notably recent reports such as the World Resource Institute's *Creating a Sustainable Food Future* and a multi-agency report *The State of Food Security and Nutrition in the World: Building Climate Resilience for Food Security and Nutrition* by FAO, IFAD, UNICEF, WFP, and WHO have aimed to analyze the impacts and risks of global climate change on agriculture, food security and poverty outlining urgent responses are needed to protect those most vulnerable. The report concludes that without urgent and direct action, the changing climate will affect food availability and hinder access to food by disrupting the livelihoods of millions of people, rural and urban. These changes and risk will not affect every person and every climate equally, nor will the pathways to adaptation look the same. The adverse impacts on the vulnerability of small and marginalized farmers and poor communities are superimposed on existing vulnerabilities.

The state of Rajasthan, like the rest of India, relies heavily on agriculture. The effects of climate change, particularly global warming that has resulted in prolonged summers and the increasingly erratic rainfall that is directly affecting cropping patterns and are likely to threaten the welfare of the population, the viability of the land for production, and the economic development of the region as a whole. Rajasthan is nearly 70% rainfed dependent and is, therefore, more vulnerable as a high-risk geographic location with small and marginal farmers' heavy reliance on agriculture and natural resources, low income, savings, and assets (NRMC, 2012). In

addition to unpredictable rainfall, changing cropping patterns and diminishing crop yields, farmers have seen a huge loss in biodiversity with the adoption of monoculture. These environmental stressors further exacerbate the other long list of uncertainties that are inevitable in crop production.

It is important to realize that climate change for resource-poor, marginal farmers in Rajasthan will not be expressed just through changing weather patterns, increased temperatures and erratic rainfall, but through the transformation of social relations that will open up new opportunities for accumulation of land, water, capital and institutionalized political power to those who already exercise power in the agrarian environment. Therefore, processes of 'adaption' and 'resilience building' cannot have any meaningful advancements without redistribution of power across the physical and social landscapes of production (Taylor, 2014). Taylor's (2014) understanding of adaption stands in stark opposition to the blanketed rhetoric and strategies of adaption from the international and state levels which often employ uniform concepts of vulnerability and adaptive capacity to describe and represent extremely varied landscapes and people. Without consideration of the multi-scalar power dynamics that construct lived environments and actively yet unevenly reshape physical and social landscapes, top-down solutions will likely not take root in meaningful ways.

The food regimes approach put forth by Friedmann and McMichael is useful for understanding the dynamics of farmer movements working in Rajasthan and India at large, because it helps us historicize the trajectories of unequal power relations in agricultural systems over time and points to the political-economic

inequity that stems from colonialist and imperialist relationships while Taylor's (2014) understanding of the political ecology of climate change helps us to make visible these dimensions of power in the adaptation and resilience building processes, underscoring the importance of focusing on the differential abilities to adapt in terms of distribution of assets and access to public resources and services in conversation with, not abstraction from, the many dynamics that work to shape and reshape agrarian transformations including: the commercialization and industrialization of agriculture, land and capital acquisition, state formation, macro development and housing projects, technological change and the negotiation of new political movements (Taylor, 2014). The nexus of food regimes and climate change further draw out the externalities of industrial food system in India, as a contributor to environmental degradation, the erosion of socio-cultural landscapes, the loss agro-ecological knowledge and biodiversity – all of which are essential components to social and environmental conditions that could support ecological farming.

As a proposed solution, food sovereignty and agroecology can be seen as a pragmatic and effective responses to the causal roots of such loss, without ignoring the multifaceted power dynamics and animate the agrarian landscape. The employment of food sovereignty by way of agroecology as a lens through which to view the climate and economic crises that occurring addresses Taylor's (2014) argument that these phenomena go far beyond just the physical change and create a program for transformation that works to ameliorate constraints presented by the food regime through fostering territorialized, bottom-up processes of agriculture whose foundations are built by local and indigenous farming knowledge. By

prioritizing farmer-centered power and knowledge over agri-business, the replacement of industrial agriculture with small scale agriculture supported by agrarian reform, the banning of genetically modified technologies, and locally-adapted crops over commodity exports and circular economies based on local production and consumption this approach not only recognizes the uneven power relations, but actively challenges the dynamics of power embedded in the rural agrarian environments of Rajasthan. As one of the most significant contributors to climate change, the response we take now, especially towards small and marginal landholders who are often heralded as ‘planet coolers’ through their stewardship of complex landscape matrixes and traditional methods and practices will determine the severity of climate change impacts on agriculture in Rajasthan as well as how farmers will be able to adapt (Altieri & Nicholls, 2017).

An Overview: Smallholders and Agriculture in Rajasthan

Located in the northwest part of the country with an area of about 342,239 sq. km, Rajasthan is the largest state in India and covers about 10.5% of its total geographic area. As per the 2011 Census, the state has a total of 68.6 million people with around two-thirds of its population being connected to the agriculture sector. The agriculture sector constitutes 27% of Rajasthan’s total GDP, however, this is decreasing signaling a shift from traditional agrarian economies to service-based economies. This is 7% higher than the agricultural contribution to GDP of India overall which sits at around 20%. Rajasthan is highly dependent on agriculture but given the water scarcity and high temperatures, is also subject to extremely harsh

climate conditions. With only 1% of India's groundwater resources, agricultural production is around 70% dependent on rainfall.

Smallholders are classified as having 1-2 hectares with an average of 1.43 hectares, where marginal holders have 1 hectare or less farming on an average only .49 hectares. As per the State of Rajasthan Agriculture 2011-2012 (Swain et. al, 2012) about 5.4 million households are engaged in farming, cultivating 12.4 million hectares of cultivated area of Rajasthan. Of this 5.4 million, just over 60% of are small and marginal farmers; marginal farmers make up around 40% of this and small farmers make up 22%. Even though small and marginal farmers are by far the majority, collectively they hold only 18.5% of all land in agriculture production with semi-medium, medium and large farmers holding the other 81.5%. These numbers are not necessarily inclusive of the tenant farmers, landless farmers, migrant farmers and nomadic pastoralists who make up a significant portion of Rajasthan's agricultural workforce. While these statistics provide a broad overview of small and marginal farmers' land holding status, they do not account for the whole picture given that farmers are not very visible in GoI data.

Small and marginal farmers in Rajasthan in general:

- Produce small volumes of crop on small areas of land
- May produce one or more commodity crops as their main livelihood activity or as one of many activities
- Incomes are low and often income from crop production alone, which is not sufficient for meeting household requirements, engaged in pluractivity, or more than one economic activity to meet household needs, especially manual wage labor which is often migratory
- Less well-resourced than commercial-scale farmers in terms of on-farm resources, livestock, access to technology, education and agricultural extension services
- Higher rates of illiteracy as compared to commercial farmers

- Often are considered part of the informal economy and lack social protection, crop protection and wage protection
- Often beneficiaries of fragmented food security and employment policies and schemes such as the Public Distribution System (PDS) or the Mahatma Gandhi *Employment* Guarantee Act (MGERA)
- More vulnerable in supply chains and markets given their reliance on weather and rain conditions and less resilient to crisis, fluctuations and shocks in the market
- Engaged in traditional farming practices on various scales
- Often belong to Scheduled Tribes (ST), Scheduled Castes (SC), or Other Backwards Castes (OBC)

Alongside the landless and urban poor, small and marginal farmers make up the most economically disadvantaged and vulnerable group in India. Being highly dependent on farmland for their livelihoods the impacts of climate change are particularly significant to small farmers. According to the 2019 IPCC report climate change will result in the loss of soil organic matter due to soil warming and higher air temperatures are likely to speed the decomposition rate of organic matter resulting in loss of soil fertility and moisture. When soil quality decreases, vulnerability to erosion through wind and stronger rains will increase significantly. Superimposed with existing social vulnerabilities that interweave the fabric of rural society such as caste, class, gender and socio-economic status, small and marginal farmers have the most at stake in the climate change arena (Morton, 2007). Even being the majority, small and marginal farmers are very much excluded from existing policy frameworks for both climate change and organic farming nor is there any significant synergy between policies targeted at these groups who often occupied Scheduled Castes and Tribes such as the Forest Rights Policy or Public Distribution System.

On the other side of this seemingly grim snapshot of smallholder farmers and agriculture in rural Rajasthan is the revival of traditional agriculture systems which

Altieri and Koohafkan (2008) describe at length in their article “Enduring Farms: Climate Change, Smallholders and Traditional Farming Communities”:

[Smallholders]... can be part of the solution by contributing to climate change mitigation, through carbon conservation, sequestration and substitution, and establishing ecologically designed agricultural systems that can provide a buffer against extreme events. The diversity of these systems, and the creativity and knowledge of family farmers and indigenous communities are assets of great value for solving the daunting problems affecting agriculture in the 21st century.

In Rajasthan, many of the traditional practices are stewarded by smallholders, even if fragmented and not completely organic or ecological, and their ecosystem services provide resilience to climate change at various scales these practices potential for climate resilience and adaptability and mitigation.

Introduction to Agroecology, Food Sovereignty and Definition of Key Terms

Food Sovereignty and Agroecology

The concepts of food sovereignty and agroecology carve out a unique space in agricultural development discourse, arising from peasant-based struggles and rural movements in the Global South these uniting concepts have evolved into a critique against neoliberal agriculture development paradigm that assumes the best way to eradicate hunger is through preventing shortages and market failures by encouraging free trade, high tech scientific approaches to production, and further liberalizing food and agriculture (Shanbacher 2010; Patel 2009; Wittman 2011). Food sovereignty, as a body of knowledge, as a movement and as a set of objectives, is rooted in resistance to neoliberal globalization and free trade in food and agriculture. Since it was first articulated in 1996 by La Via Campesina as a rallying cry against a massive wave of

free trade agreements, consolidation of agricultural markets, and a flooding of cheap commodities, food sovereignty, commonly defined as the right of people to healthy and culturally food produced through ecologically sound and sustainable methods⁸, is now inspiring greater mobilization, debate and even policy reform. Food sovereignty is a signifier for a set of objectives: right to arable land, more equitable economic relationships, use of sustainable agro-ecological growing methods and farmer-driven agroecological knowledge. As a mobilizing concept, food sovereignty movements are working transform the dominant political, economic, gendered, environmental, and social constructs of industrial agricultural development by using highly politicized language that brings light to inequalities imbedded in the food system (Fairbain, 2010). Hannah Whitman (2011) highlights this when she says:

Knowledge around food sovereignty is an “emerging science” viewed not as an established paradigm/concept but rather a potential new framework emerging from a diverse set of contemporary grassroots production practices and political approaches. This consolidation of knowledge around the potential of food sovereignty is important because its proponents and practitioners- both in theory and practice- challenge conventional wisdom and policy on how to best “feed the world and cool the planet” and emphasize the importance of acknowledging communities of practitioners and indigenous knowledge in this agenda.

Or similarly as McMichael (2014) puts it, food sovereignty “ultimately concerns the question of appropriate ways of living on Earth at a time of rising urban redundancy and ecosystem crisis.” As Paul Nicholson, farmer, and founding member of La Via Campesina said the 2013 Yale Program in Agrarian Studies Forum on Food Sovereignty stated “food sovereignty is not solely a resistance

⁸ See <https://viacampesina.org/en/food-sovereignty/>

movement, it is a proposal⁹. The demands and strategies of sovereignty movement include: a new trade regime, agrarian reform, a shift to agroecological methods, attention to gender relations and equity, and the protection of intellectual indigenous property rights (Whitman 2014). A proposal for radical transformation, visions like these have been extremely important in helping galvanize broad-based, diverse movements around the need for radical change in agri-food systems.

The practice or methodology of food sovereignty is most commonly understood as agroecology, or the ecology of food systems (Francis et al., 2003). The wider goal of agroecology is to design agriculture systems to sustainably reconcile the economic, environmental, and social detriments of industrial agriculture through the application of ecological design and management of agroecosystems to improve overall functioning and productivity of farmland and the social and economic conditions of smallholder farmers' and their communities. Its underlying theoretical framework relies heavily on systems theory to unite the environmental and social factors that influence systems of production, land use and agroecological knowledge (Altieri, 1987).

Altieri (1995) and Gliessman et al. (1998) provide a set of common practices and principles associated with agroecological food production:

- Emphasis on the interconnected and synergistic components, elements, and complex dynamics of a particular agroecosystem to enhance the productivity of ecological processes, support the efficient functioning of ecosystem services

⁹ <https://www.youtube.com/watch?v=J8apjmw9MQM>

- Diversification across communities of plant, animal, and chemical environments through exhibiting a wide-range of genetic resources, species, and locally adapted climate specific varieties across various organizational levels (landscape, farm, individual plot) and over time
- Optimization of nutrient recycling, closed loop management systems that work to eliminate the need for synthetic and off-farm inputs while lowering economic and environmental costs and enhancing bioregulation
- Deliver resilience and climate adaption while contributing to greenhouse gas mitigation (reduction and sequestration) through a lower use of fossil fuels and carbon sequestration in soils acting as a buffer to not only environmental fluctuations, but social and economic
- Building favorable soil conditions that promote healthy plant growth, particularly through increasing biotic soil activity and building organic matter

To achieve this design of bio-diverse, energy-conserving and resource-efficient farming systems various methods, techniques and practices commonly employed include: growing complex polycultures, cover cropping or mulch farming, crop rotation, increasing soil organic matter management, practicing no-tillage, integrating agro-forestry systems, use of animals, replacing chemical fertilizers with nitrogen-fixing plants, replacing chemical insecticides and fungicides with insect repelling plants and the use of compost (Gliessman 2016).

It is important to distinguish the different approaches to agroecology as outlined by Wezel et al. (2009). Agroecology concurrently designates a scientific research approach involving the in-depth study of agro-ecosystems and food systems, while

also serving as a set of methods or practices that aim to enhance productivity that uphold social and economic integrity. Agroecology also functions as a socio-political movement that honors the cultures, traditional practices, and innovation of rural communities. As a socio-political critique, it focuses on transforming society's relationship with agro-ecosystems through challenging the injustices caused by government and corporate power domination in the food system (Wezel et al., 2009).

Agroecology As a Science:

As a scientific discipline, agroecology is a form of agriculture that uses an understanding of how ecosystem principles apply to agriculture, and how they can be applied to improve the resilience of cropping systems and enhance efficiency (Snapp & Pound 2008; Snapp & Pound, 2017). Initially the science of agroecology focused on ecological science as the basis for the design of sustainable agriculture however, as the importance of farmer's knowledge became more and more recognized, agroecology as a science became increasingly flexible through incorporating local knowledge, participatory action research and on-going education recognizing the need to design dynamic systems rather than steady-state ones (Snapp, 2008; Pimbert, 2018). As Holtz-Gimenez and Altieri (2013) emphasize, traditional forms of agriculture are the cultural and ecological basis for the development of agroecological science. The modern, scientific principles that serve as the basis of agroecology as we know it today are rooted localized and collective knowledge, practices and ecological rationale of indigenous and peasant agriculture(s) from around the world (Pimbert, 2018; Altieri, 1987). In the United States, agroecology has become recognized as a credible alternative to industrial, monoculture farming

due largely to the contributions of Stephen Gliessman and Miguel Altieri who together with other pioneers including Mexican agroecologist Efraim Hernandez Xolocotzi and French agroecologist Pierre Rabhi have developed the building blocks for agroecology as the transdisciplinary science we know today (Pimbert, 2018).

As a Set of Methods and Practices:

From a practice or methods perspective, agroecology is methodologically unique in comparison to other alternative approaches to sustainable agriculture development such as organic or fair trade because it is based upon a bottom up, territorialized processes that aims to deliver contextualized solutions to localized agricultural problems that encompass the environmental, socio-cultural, economic, and political dimensions of agriculture development (FAO, 2018; Rosset, 2011; Mendez 2013).

The synergy of agroecology as a science and as a practice comes from the dialogue between indigenous and peasant farming knowledge and scientific knowledge. It thus rejects the scientist or development professional as the 'expert' and instead prioritizes agriculture solutions that are built on people's knowledge, priorities, institutions and capacities for innovation. An increasing number of scholars are pointing out that knowledge of local ecosystems and their functions through the lens of local people is essential to the fate of sustainable farming. In a climate- environmental, social, and economic- that is changing at a rapid pace, sustainable and adaptive farming methods are central to maintaining rural livelihoods. In empowering farmers at the local level as the key agents of decision making, knowledge creation and change agroecology rejects the transfer of

technology model of research and development (R&D) for agriculture and opts rather towards a centralized process of participatory development tailored to specific contexts that fundamentally changes the dominant paradigm of food production and agriculture development towards greater democracy, equitable distribution of power and more sustainable methods.

As a Movement and a Critique:

More recent scholarly debates in agrarian and peasant studies have enriched our understanding of agroecology and its transdisciplinary origins while also building agroecology out as critique of the dominant paradigm of production. Mendez (2013) sees agroecology not only as a science or set of practices, but as embodied and multi-functional, constituting method of production as well as a movement, bolstered by an alternative vision of development that promotes multiple forms of sustainability and resiliency in midst of wider social, economic, and political constraints and pressures that impact farmers livelihood strategies. More recently, with the aim of bring about tangible food system transformation, agroecology has taken a political economy focus in order to confront and develop alternatives to the political, social, and economic barriers that keep food systems from changing (Meek, 2014)). Van der Ploeg (2009) has also analyzed agroecology as an active form of resistance to agricultural modernization and capitalist-based production that stands in stark opposition to social and peasants movements' struggle for autonomy, rights and land. Pimbert (2015, 2018) argues this normative vision is working to unite social movements, farmer organizations and social movements more closely in supporting alternatives to Green Revolution agriculture and industrial production, thereby while

working to reject the dominant R&D model also works to reject the ‘input model’ approach that maintains dependency on external suppliers for seed, fertilizer, etc. and commodity markets to dictate what, when and how to grow, instead prioritizing the re-territorializing of local and region markets which work to complement the functional diversification of agroecosystems, rather than impede them. As such, he argues, this has led to the strengthening, building and defending of agroecology as a pathway to more viable, sustainable and just food and agriculture systems that claim agroecology as a bottom-up construction of knowledge and practices. These knowledge(s) and practices need to be supported, rather than dictated by science and policy. For these groups, the counter-hegemonic vision of agroecology is explicitly linked with food sovereignty where the local farming communities are the major actors in their food and farming systems. This vision sees local intuitions as the main drivers of decisions in agro-ecosystem management practices and biocultural diversity (Borrini et al., 2007).

My Working Definition, Agroecology as Transformative Praxis:

Throughout this thesis, my understanding of agroecology recognizes the indivisibility of agroecology as a science, method/practice, social movement and critique. I take a critical approach to agroecology, seeing it as both a set of farming methods utilized by farming communities in which I worked and as a lens to examine the political-economic embeddedness of inequality in production systems. For my purposes, agroecology is a praxis through which local actors are seeking transformation and change. In this, I also recognize that the movements and organizations I talk about are embedded in complex socio-political and economic

arenas comprised of numerous and interwoven actors, who, inevitably do not always share the all of the same motivations, agendas, sets of knowledge or values but, overall share the same broad goal of attaining the ability for farmers to exercise their right to determine their own food and agriculture systems.

Additional Concepts and Terms:

In the space below I define key terms and concepts I will be using throughout this thesis. Some of these concepts are overlapping and I use them interchangeably; in my definitions I explain which concepts I use interchangeably. The concepts and terms and their respective definitions are as followed:

Adivasi: A collective term for tribes across India who are considered indigenous to where they live. “Adi” is derived from Hindi meaning “from the beginning” and “vasi” means inhabitant or resident. This term was coined in the earlier part of the 1900s to forge a sense of identity among political movements based on identity.

Adivasis are not integrated into the Hindu caste system, although Adivasi beliefs have overlap with that of Hinduism and vice versa. Adivasis face prejudice and often violence from higher castes and discrimination from the state. Occupying some of the lowest socio-economic indicators, Adivasis face significant economic oppression as their economic and environmental bases have been severely degraded through displacement of their land. Government programs aimed at increasing political representation and rights often work to mainstream Adivasis into society rather than respecting and upholding their unique ways of living (Minority Rights, 2020).

Scheduled Tribes (ST): The legal term for ‘Adivasi’ differs from state to state and even within states. The classification of ST has the tendency to leave out groups who

may be considered indigenous. As per the 2011 Census, Rajasthan has the 7th greatest concentration of officially registered STs coming behind Chhattisgarh (38%), Jharkhand (26%), Madhya Pradesh (20%) Orissa (22%) and Gujarat (15%). In this thesis, I will use Adivasi and ST interchangeably.

Dalit: Dalit is a broad term for those who belonging to the lowest part of India's caste system and face multiple forms of exclusion in society. Although the caste system was officially abolished in 1949, Dalits, also referred to as Untouchables, face severe discrimination due to engrained societal norms. Dalits often receive lower wages and perform polluting caste-based jobs, have a lower literacy rate than that of the national average of India and often face higher rates of mortality and malnourishment (Minority Rights, 2020).

Scheduled Castes (SC): This is the legal term for Dalit. In legal and constitutional terms, the government is required to define a list, or schedule, of the lowest castes for these groups to receive compensatory programs and benefits from government schemes. As per the 2011 Census, those belonging to Scheduled Castes make up 16.6% of the total population of India (Minority Rights, 2020). Throughout, I will use SC and Dalit interchangeably.

Smallholder/Marginal Farmer: Used to describe a farmer that is farming on 2 hectares or less of land.

Civil Society Organization (CSO): Considered the 'third sector' after government and commerce, civil society is defined by the World Bank as the "wide array of organizations: community groups, non-governmental organizations (NGOs), labor unions indigenous groups, charitable organizations, faith-based organizations,

professional associations, and foundations” (World Bank, 2012). For my purposes, when I refer to civil society or civil society organizations throughout this thesis, I am particularly speaking about formalized coalitions, NGOs, development societies and farmers unions who are in some way working to further sustainable, organic and agroecological farming whether it be through policy and institutional building or through direct projects and programs that coordinate directly with farmers.

Community-Based Organization (CBO): CBO is a broad term commonly used to categorize non-profits that work at the local level to improve lives of residents. CBO in the contexts in which I worked was used to define groups at the Panchayat and village level such as youth groups, women’s groups, health groups and farmer’s groups who were explicitly tied with the organization I worked with.

Village Development Committee (VDC): Village development committees are elected members of CBOs who serve as the steering committee and stewards of development projects.

Locating the Researcher: International Business Student to International Farmer

As a former business student radicalized in the classroom to become a climate activist, a climate activist radicalized in the field to get a B.S. in Sustainable Food and Farming and a farmer radicalized in critical theory to pursue a graduate degree, I hold the central assumption that ecologically based farming is one the most productive tools we have for social change and transformation to address the interwoven crises of climate, economic inequity and social injustice at the scale to which both the scientific community and social movements demand. From this

place, I stand among farmers and their movements, indigenous people, activists, academics and scientists who are moving the climate conversation forward and who are working to make tangible changes in our food system towards greater social and environmental equity. It is through this frame that I have undertaken this project.

The intersecting issues of viability and sustainability in food and agriculture in the face of climate change occupy the center of the table for many across the globe, whether it be policy-makers working on the Farm Bill in Washington DC or smallholder farmers engaged in dry-land subsistence production across the arid regions of Rajasthan. As the natural system we engage with most often and intimately the food system connects us all. By the same token, as human beings we have been, currently, or will be subject to various consequences brought upon by climate change with current estimations telling us that we must drastically change our behavior in order for global emissions of carbon dioxide to peak by 2020 in order to keep the planet below 1.5C in this century (IPCC, 2019). These important links between agriculture and climate change are well-researched and well-documented (Kang & Banga, 2013; Dinar & Mendelsohn, 2011; Wreford et al., 2010). On one hand, we know that industrially produced foods are emission heavy and fossil fuel intensive and therefore a significant driver of climate change and on the other, farmland cultivated in this input-intensive monoculture manner demonstrates significantly less resilience to the increasing extremes and uncertainties of the rapidly changing climate like temperature fluctuation, drought, and increased violent climatic events, not to mention the normal threats to agro-ecosystems such as pests and disease. With each passing day it is becoming more and more evident such great

environmental, social and economic problems our time can no longer be understood in isolation; they are systematic and thus any and all solutions must reflect their interconnectedness and interdependences.

Developing this kind of understanding is not an easy undertaking, with rapid urbanization taking place around the globe, an increasing majority of people are becoming less and less directly connected to their food system. As a young person who consciously chose to go into ecologically based farming, I know I am an anomaly, something that has been expressed to me by my US and Indian colleagues, mentors and peers alike. I will always remember my parents' expression as they picked me up from my freshmen college dorm, having told them I wanted to change my major from International Business to Sustainable Food and Farming. My father, an Iranian immigrant said "You are going to study... agriculture? What, and you want to be... a farmer? No, Michelle. This is not possible. You must change your major back to business. How will you have a life for yourself? What will you do? Be a farmer? No one will understand. I didn't come to this country for my daughter to become a farmer."

While they finally came around to the idea of their daughter being a farmer, in retrospect, my parents' line of questioning and concern was telling of the larger trend of disconnection between 'fork and field' and the perception of agriculture as an economically unviable profession. They were certainly not wrong. As a college loan-indebted young person who chose to go into farming, even in a resource-rich economy such as the US, opportunities to find success, especially in operating my own farm business, are scarce without access to significant capital.

Not only can ecologically-based farming be capital intensive, it is also incredibly labor and knowledge intensive. With four seasons of organic production farming and an undergraduate degree in Sustainable Agriculture under my belt, I am not unfamiliar with the dirty work that comes with ecologically based farming; the grueling hours from sunrise to sundown, the smell of week-old rotting vegetables in the compost pile, bee stings and bug bites or constantly fighting crabgrass, the ultimate, undefeatable foe who exists solely to spite you. Though I am not unfamiliar with joys, either. The moment when you see almost all your seeds have germinated, despite an unsteady hand in the cold, dark days of winter spent under the lights of the greenhouse. The feeling of satisfaction of biting into a cucumber or a snap pea that you have just picked off the vine before heading to the packing barn with the morning's harvest. The feeling of a head cold coming on and knowing exactly what herbs to pick from the farm's meadowed edge that you'll later make into a tea. Or the closeness and intimacy that comes with sharing recipes, stories, hopes and fears with your fellow farm crew members in the field as you meticulously hand-weed a field-length row of beets or carrots that, without your help, are days away from being overcome by that dreaded crabgrass.

After this time spent as an undergraduate farming ecologically and learning about issues in the food system in a Global North context, I have firsthand experience that taught me that in face of an unpredictably changing climate, severely worsening ecological conditions, and rapid loss of biodiversity on a world-wide scale, we must find a way to feed the world in a way that does not degrade the ecosystem services we so intimately depend on for food production. I also learned that in order to

enhance socio-ecological resilience to climate change the agricultural sector must exhibit high levels of plant and animal diversity and nutrient recycling while at the same time facilitating processes that aid in the economic empowerment of small organic farmers. However, at that time, what I how wasn't as aware of as I am now is how political that farming and eating ecologically actually is, how modern food systems have been brought about purposefully through policy mechanisms and dominant discourses, or how neoliberalism works to shape the scope of possibility for alternatives and what those alternatives can actually look like.

Now, with my combined six years of engagement, I can tell you this: any solution to challenges facing agriculture must work to not only aid ecological processes and empower small farmers, but to drastically transform dominant political, social and economic structures that privilege certain forms of production over others and privilege certain groups of people over others. To me, agroecology and food sovereignty represent the most viable way forward. Representing nearly 200 million peasant farmers, indigenous people, pastoralists, and fisherfolk, the concepts of agroecology and food sovereignty have been spearheaded by La Via Campesina (LVCs) and their member organizations. Through La Via Campesina, I learned about these concepts and the struggle for food sovereignty and agroecology that unites LVC members transnationally.

As I have found with my engagement in both India and the United States, there are many individual farmers, farmers' unions, civil society organizations, and people's movements in Global South and Global North contexts working to advance agroecology who are not explicitly tied to La Via Campesina. As a new graduate

student, I became interested in learning more broadly about these wider movements and how they connect to other concepts working to create change in the food system such as food justice, civic agriculture, community food security fair trade and slow food who, though not without tension or always united in their aims, all share the general goal of creating more equitable, democratic, healthy and sustainable food systems (Constance et al., 2014).

After working as an intern in 2018 with India's outspoken food sovereignty and agroecology activist, Dr. Vandana Shiva, I became fascinated by how global food, agriculture and climate activist discourses were influencing local struggles for food sovereignty, and how place-based socio-historical contexts such as the British legacy of colonialism shape how the struggles of farmers in the Global South articulate their struggle on the global platform. Embedded in this context as an intern, I witnessed both the synergies and tensions that exists between articulating food sovereignty's political vision, which is inherently anti-corporate, anti-neoliberal and creating lasting institutional change through the state, the market, or through civil society organizations like NGOs and CSOs. From that point on, I became keen to explore this further through focusing on food sovereignty in the everyday practice of farming or as Ehlert & Vobemer (2015) call it 'the real-world arenas of food sovereignty' and 'complex ecologies of practice' (Gartaula et. al, 2013). This thesis represents culmination of my journey with these concepts, my interests, passions, experiences and future aspirations, academic, professional and personal

Thesis Roadmap

The motivation for this work comes from my desire to bring to light the past injustices and present threats to livelihoods faced by traditional farmers. As a citizen, activist, a student, and an eater, I have always been disturbed by structures of inequity that continue to marginalize small farmers and am keen to understand how communities are working to foster empowerment as a way to come out of these cycles of past loss and present oppression. Through this qualitative study, I use concepts of agroecology, the political ecology of climate change, food regimes and food sovereignty as a critical lenses to highlight competing views of production and knowledge systems, grassroots empowerment and participation, and transformations of scale to describe the movements for ecological farming and sovereignty among small and marginal farmers in Rajasthan. I do so to highlight the importance of prioritizing viable and integrative solutions to pressing agricultural challenges that aid agro-biodiversity conservation, promote economic and social empowerment, foster greater gender equity and enhance agricultural livelihoods in the face of climate change.

This thesis is divided into 6 chapters. Chapter 2 provides an introduction that outlines my major methodological approach. The introduction is followed by a discussion of the research paradigm in which I introduce the lens through which I undertook this project, followed by a brief discussion on the scope of the project including limitations and delimitations. I continue by outlining the means of data collection, interpretation and analysis and conclude this chapter with a statement of positionality that gives detail on scholar-activism. In Chapter 3, “Understanding the

Competing Visions of Production, A View from the Ground: Holistic, Indigenous Farming Systems vs. Productivist Models,” I am concerned with the competing views of production, how farmers make sense of those spaces and how these visions of production shape the space for grassroots alternatives. I talk about these ‘visions of production’ through describing tradition and loss and the politics of knowledge embedded within rural agrarian-based areas of Rajasthan. I address the question ‘organic, climate resilient agriculture for who’ by taking a critical look at policies for climate change and organic farming by the state as well as small-scale solutions being innovated by farmers and NGOs on the ground. In Chapter 4 “The Transformative Power of Civil Society Organizations and Grassroots Movements” I address the process of hybridization of grassroots movements and NGOs and the power that this hybridized civil society has in addressing structural barriers to agroecology, equity and food sovereignty in Rajasthan. I talk about the power that civil society has in shaping and reshaping these forces and how agroecology and its complementary and inseparable counterpart, food sovereignty, in these areas of Rajasthan are contested and mean different things to different people. Chapter 5 *“Reimagining People’s Alternatives and Strengthening Agency and Power Across Scales of Transformation”* I uncover how at various scales that new forms of participation are being afforded to farmers and their NGO counterparts. I argue that these new forms of participation across local, national and international scales are quintessential to the redesign of broken systems characterized by uniform monocultures and linear production chains towards the transformative and transdisciplinary vision of agroecology. Chapter 6 *“Conclusions, Reflections and Ways Forward”* concludes with a reiteration of my

research questions. In this chapter, I summarize my major findings and reflect on my most influential moments in the field and suggest ways forward for the advancement of the movement in the contexts in which I worked.

CHAPTER II

METHODOLOGY

To answer my research questions, I chose to undertake a holistic case study of smallholder agriculture in agroecological transition, particularly among farmers that have participated in various forms of agriculture development programming, capacity building and political organizing through my host institution, The Centre for Community Economics and Development Consultancy Society (CECOEDECON) in the Jaipur, Tonk, and Arrah districts of Rajasthan. Stake (1995) differentiates between intrinsic and instrumental case studies, intrinsic in which the case is given or assigned to researcher not to learn about a general problem, but rather to learn about or evaluate a single particular case; and instrumental where the researcher aims to develop general understanding of a particular question or puzzlement and looks utilize a specific case or group of cases to learn about broader phenomenon, not just the single case in its specificity. In this qualitative case study, I take an instrumental approach and rely on a range of qualitative methods to collect my primary data. I draw from ethnography in my participant observation and semi-structured interviews with farmers and NGO staff. In addition to ethnography, I undertake some document analysis in which I discuss relevant policy frameworks and governmental programmatic interventions identified by my participants. However, compared to the scope of my ethnographic methods, this method of analysis is limited.

In both the ethnographic and archival -in the form of organizational documents, relevant policies, news articles and secondary literature- approaches I

take, I consider socio-historical contexts that have shaped the broader phenomenon pertinent to my research questions. Ultimately, my findings are not meant to construct or convey a singular truth, but rather to add depth to the understanding of the multifaceted dynamics that shape the lived socio-ecological realities of small and marginal farmers engaged in agroecology in the unique, contemporary Indian context.

The farmers I interviewed in these three districts of Rajasthan are at various stages of agroecological transition ranging from farmers who grow small plots of commercial cash-crops that utilize a mix of traditional Rajasthani dry-land farming techniques and conventional techniques and technology to fully operational, self-sustaining ecological farms that embody the major tenants and principles of agroecology. The range of farmers I spoke with helps to represent the diversity of people and their techniques and practices and motivations for practicing ecological farming. I chose these particular areas because in many ways they embody the numerous expressions of agrarian distress in rural Indian agro-food systems with a majority of the farmers in these areas being small, poor and marginalized, recipients of fragmented government support schemes and policies and coping with severe climatic conditions and highly threatened farmland.

Through taking this approach of interviewing farmers that I see are working to piece together agroecology or 'agroecological first responders' as I call them, rather than interview solely the small number of farmers who are fully organic, or agroecological in Rajasthan I aim to demonstrate the tension that takes place between making sustaining, systematic changes in the agro-food system and

negotiating the economic viability of ecologically based agri-livelihoods. I believe this case serves as an important microcosm through which to look at both the disruptions to local livelihoods caused by the neoliberal food regime and climate change within the rapidly transforming social, environmental and economic contexts of India and the grassroots struggles and efforts of smallholder farmers (Altieri & Nicholls, 2005).

Throughout my research, I took the central assumption that the social and ecological realities of a given place can be conveyed through narrative data, taking into consideration how these realities operate in dialogue with wider social, political and economic forces. This understanding of the character of social relations in the era of globalization still locates itself firmly in place, however, recognizes those places as globalized with multiple external connections, porous and contested boundaries, and social relations that are constructed across multiple scales. Thus, local struggles and global forces can be understood as mutually reinforcing, challenging and even re-forming the complex and fluid dimensions of the web which entangles them (Gille et al., 2000).

Research Paradigm and Process

Contrasted to more deductive and structured approaches, this research followed an emergent and iterative paradigm that allowed for the adaption of new ideas, findings and concepts throughout the research process accommodating adjustments in the conceptualization, collection, analysis and composition stages of research. The emergent process plays an important role in grounded theory, the major methodological approach this research took. As a set of inductive research

strategies for collecting and analyzing data, my employment of grounded theory relied on gathering empirically rich data from conversations, observations, experiences that were abstracted into conceptual categories to identify and explain patterned relationships. The initial levels of abstraction were built directly upon the data and any subsequent levels were checked and refined by gathering further data (Charmaz, 2006).

Grounded theory was particularly suited for this project because of its distinction from other qualitative methods in that: (1) it allows for simultaneous data collection and analysis (2) it uses the creation of analytic codes and categories developed from data rather than from a hypothesis (3) it works towards the development of middle-range theories (4) it assigns analytic codes and notes prior to drafting of a paper, and finally, (5) it relies on sampling for theory construction rather than representativeness of research population (Charmaz, 2006). Adhering to this methodological approach helped me stay within the bounds of my context because the data I collected was constituted primarily by interpretation of observable phenomena and explicitly united the research process with the generation of theory.

However, given that this study also takes a scholar-activist approach, detailed later in this section, I aim to diverge from grounded theory's modernist ontological origins opting instead for a critical realist perspective drawing heavily upon Redman-MacLaren and Mill's (2015) notion of transformational grounded theory.

Transformation grounded theory's aim is to "generate theory that can be used to challenge excluding and oppressive structures and systems for positive change" (Redman-MacLaren & Mills, 2015). Transformational grounded theory incorporates

both action research and decolonizing methodologies to actively deconstruct the researcher/research 'subject' power dynamic to negate, or by the very least mitigate, the power hierarchy that arises between interviewer and interviewee. Drawing upon Tuck and Yang's (2014) notion of 'refusal' of research as an anti-colonial method for conducting, analyzing and communicating data, throughout my project I actively worked to refuse to focus on suffering and loss of marginalized groups and counter narratives and images in social science research that diminish personhood and sovereignty. Focusing on strictly on marginalization and oppression rather than empowerment objectifies and reduces individuals as objects to be abstracted thereby detracting from their individual agency and identity. I tried to instead actively align my agenda as the researcher with communities in which I was embedded, placing their personhood and sovereignty at the center of every research decision. In turn, I was able to focus on questions around the institutions of power rather than the 'social problems' of marginalized groups which are generally exploitative and unproductive. Drawing from Escobar (2011) in *Sustainability: Design for the Pluriverse* I emphasized the co-creation of knowledge and focused on producing work that has the potential to dismantle attitudes and belief systems that contribute to unequal power relations, or narrow Western essentializations of cultural identities and puts equal value on pluralist knowledge and different epistemological traditions. In an attempt to adopt elements from participatory action research I emphasized high involvement with people participating in the research by aligning my investigation with my host institutions existing programs and incorporating their priorities into my agenda. Given that this project was proposed, researched, analyzed and written

within a relatively short timeline the depth and scope to which I could employ participatory methods was limited. This was especially true given the nature of working in collaboration with an NGO whose staff were working with multiple projects, timelines and deadlines. A sincere effort will be made to repatriate my data, although in the end, I can say I will have gained much more than I could ever give.

As someone who identifies as queer, Middle Eastern and female my identity and experiences have also largely shaped the lens through which I approached this project. These identities I carry have naturally sensitized me to the question of the authoritativeness and objectiveness of the Western research paradigm – dominant methodologies, theories, and writing styles – embedded in the social sciences. However, it is very important to recognize that growing up in the United States affords me an inherent privilege as these intersecting identities have not necessarily marginalized me economically. I thus made it a priority to constantly and purposefully considered my agenda, values, motives and desired outcomes and adopted a commitment to utilize the resources and networks privileged to me as a graduate student for advancing the work and efforts of my non-academic colleagues.

Research Scope and Limitations

As the researcher there were certain self-imposed limitations and certain limitations outside of my control that worked to define the scope of this project. Firstly, having only spoken to farmers and NGO staff who approach and engage agriculture development and social change in a manner and mindset similar to my own, I can only speak to their experiences and narratives as they fall within the bounds of my theoretical framing. I did not conduct interviews with large-scale or

industrial farmers, government officials or UN officials which would have provided alternate perspectives that would mediate my understanding of agroecology and level my inherent bias. Secondly, I chose to define the scope of my work in a way to be broad in its questioning but narrow in its geographic regional focus and sample size. I only interviewed a small number of farmers (roughly 15) in order to gather empirically rich data. This research choice does not allow me to make any broad sweeping conclusions about the country or state, but rather the specific localities in which I am embedded in relationship to these larger geographies. I believe these self-imposed limitations are appropriate given that this study's aim is to better understand and illuminate struggles for agroecological transitions in Rajasthan through agroecological praxis.

This research presented a number of methodological limitations outside of my control. First, given that all my data is self-reported, it is impossible to be independently verified. The legitimacy of my findings depended on the precision and variety of the methodological tools I use to collect my data and I relied on myself as the primary means of collection, interpretation and analysis. This required a great deal of basic observation, rendering my study difficult to replicate in another geographic area or even with the same group of people. However, I feel the combination of approaches I took the best suited methods for my particular research questions, motivation and aims and believe the richness of the data collected speaks to the complexity and dimensionality of my particular case, thus, sufficiently fulfills the need and purpose of my study.

As the researcher, I have my own set of limitations with the most significant being language and access. While my studies in Hindi- with a particular focus on Rajasthani dialect of Hindi- gave me rapport, access and insights otherwise unaffordable to me in English, with my intermediate-level language ability I was not always able to detect the nuances in respondent's answers or ask in-depth follow up questions. Given my limited time frame and the geographic distance between each interview site, I was not able to reasonably find a research assistant to accompany me on interviews. I conducted interviews myself with the help of organizational staff who were fluent in both English and Hindi. Staff helped explain interviewees responses to me in English and sometimes in simpler Hindi using sentence structures with familiar vocabulary, and vice versa, staff reiterated my questions if the participant wasn't clear on exactly what I was trying to ask in my question. To mitigate this limitation, I worked throughout the duration of Hindi intensive study to familiarize myself with vocabulary that would be particularly relevant to my interview questions including names of crops, terms on climate conditions and climate change, terms to describe the ecological components of farming systems and additional terms relevant to the socio-economic, political and cultural dimensions of farming. All interviews were recorded to ensure no details were overlooked. I relied on the interpretations of a third-party translator to translate and transcribe my data. Hiring a translator that is familiar with Hindi spoken in an American accent and the Rajasthani dialect of Hindi, but who has no association or stake in farmer's responses mitigates bias that asking my host organization to do the translation could have caused.

Although my language skills certainly led to choppy conversations and presented a large methodological limitation in terms of depth and nuance, it also made for many laughs and warm feelings. I realized that as Americans who grew up speaking English in a country with a large number of immigrant populations from around the world, we have heard our mother language spoken in many different accents: Spanish, Arabic, Chinese, French, Indian, alike. Given that all the farmers lived in remote or semi-remote areas of the state, nearly all of the farmers I spoke with had never heard a foreigner speak in Hindi. With the laughs (appropriately directed at me) also came unintended, important insights. The times when my framing of certain questions didn't resonate or necessarily make sense to the participants was very telling. These moments helped me understand the things they do and do not consider when practicing agroecology and participating in grassroots people's movements helping me to better understand how they placed themselves in broader movements.

All interviews with civil society/ NGO experts were conducted in English. Participants were informed that if there is a concept they do not know how to explain in English they were welcome to freely express themselves in Hindi to be translated at a later time with the understanding that there are not always direct translations to certain social and cultural concepts and understandings, especially of nature and agriculture. Conducting interviews in English with experts most of whom had been working in the field for anywhere from 10-25 years was extremely useful and helped me further refine and articulate my questions to farmers.

Access was another significant methodological challenge. As a foreigner, the success of my research depended on forming relationships with farmer movements and civil society organization working in areas and on issues relevant to my research. Knowing this, I started conversation with my host organization early on in my time in Jaipur while I was completing the language component of my Boren fellowship. Thus, before starting the research process the organization was familiar with the themes of my project and I became familiar with the scope of their work. From these early conversations we worked to make sure our relationship could be cross-pollinating. In addition, my in-depth understanding of agriculture, particularly the production side from my experience working as a diversified organic vegetable farmer for three summers, and my understanding of ecological farming drawn from my formal training in ecological-farming system design coursework and my practical, hands-on work with agroecology through the design and installation of a $\frac{3}{4}$ acre agroecologically based forest garden program at Umass Amherst allowed conversations and interactions to be more comfortable through our mutual identities as farmers and seekers of social change. By connecting with farmers and experts with mutual identities and personal aspirations, I had a certain level of positionality that added quality to the data and the project as a whole.

This being said, in future research projects whether they be in India, the U.S. or elsewhere, I would like to employ methodologies that contribute to more depth and understanding to farmer's subjective realities. In my case, I found my time too short and my interactions too transactional to fully understand the interwoven intricacies and nuances of people's lived experience that shape their daily lives, how

they make decisions, how they see the world and how that worldview is channeled and communicated. In my case, while farmers were accustomed to managing the power dynamics of working with an NGO, they had never necessarily been “interviewed”, participated in a project of this nature, or asked to speak in depth about their opinion on dimensions of farming outside of ecological ones. This brought about excitement, but also confusion in some cases. While a good majority of farmers were eager to give long and in-depth descriptions and responses, there was a disconnect with other farmers which made for an apparent dearth of thick and descriptive responses in some areas. This could have been mediated by having a more intimate grasp on specific realities of the local community through living with local families, meeting the whole community not just the farmers tied to the NGO and taking note of interactions and conversations outside my interview questions, since these are informal channels that help to construct their subjective realities. In this vein, I tried to observe and record how farmers were “doing” caste, gender, etc. by taking in-depth field notes at meetings and events.

The final limitation I would like to talk about is how the farmers and staff I spoke to actually viewed *me*. Since I started my M.A. right after my B.S., I am a young graduate student; in India this worked both for and against me. Women are considered ‘girls’ until they are married and thus, I was affectionately always referred to as “ladkhi” which means girl. I felt like within the communities I interacted with I was seen as “that smiley, small American girl who can speak Hindi and is interested in organic farming, who, for some reason, is here to learn from us about it.” I often got questioned on whether or not I was eating okay, sleeping okay, whether I felt safe

in my apartment (because I lived in an average working-class neighborhood in Jaipur, not a wealthy one as most foreigners do) and invited to dinners all the time, partially because I was a foreigner, but also because as an unmarried woman living alone everyone shared common concerns for me. To farmers, male and female and many of which were upwards of 40-60 years old, I was never seen as threatening or intimidating and was easily approachable. Similarly, like the staff treated me, there was a sense of wanting to look after my well-being and I got invited to dinners and farms in the villages. I could tell farmers felt very comfortable sharing with me, even political ideologies that were more controversial. They might not have felt comfortable sharing politicized views with someone they saw as more authoritative. On the other hand, I felt that sometimes being seen as a 'girl' and not a researcher detracted from my credibility. As a result, I perhaps did not gather as rich of information as I could have if I was perceived as such.

Methods: Data Collection and Analysis

Review of the Literature

Inspired by an interest in locally based alternatives to the dominant and conventional agro-food system, this investigation began with an exploratory literature review into food justice and food sovereignty movements in praxis, with a particular focus on the Global South. This line of inquiry led to agroecology, broadly defined as the ecology of food systems, a movement and science within itself, but also the set of agricultural methods most commonly packaged with food sovereignty as a joint alternative to the neoliberal food regime (Holt-Gimenez & Altieri, 2013). Agroecology thus served as the natural guiding framework that defined the study.

Following the exploratory literature review, a more in-depth literature review was conducted to determine the principles of agroecology as a set of practices and a movement (Wezel, 2009). The principles of agroecology guided the thematic lines of inquiry. Informed by my personal experience and secondary information in the form of news articles, social media accounts and secondary literature from my review I formed my interview questions centered around farming methods, perceptions of agrarian change context of climate change and the neoliberal food regime, perceptions on the benefits and challenges of farming ecologically and finally, perception of roles in people's movements and social change in agriculture as understood through the lens of personal identities, locally and culturally informed farming knowledge and concerns for justice and equity in their communities.

Direct Participant Observation

I used participant observation as a core method of data collection throughout the duration of my research. I used this methodology in four major ways: formal organized meetings and events, administrative work, field visits and informal conversation and social events. Throughout the three-month period of my project I attended:

- CECOEDECON's Annual Meeting with around 100 representatives from the organization's staff, the organization's board and farmers and community members of the major districts in which they work. In this meeting I participated in the farmer 'break out' session where male and female farmers of different ages and from different geographic regions of Rajasthan discussed current most pressing challenges to their production

systems (ecological, social and economic) now and the foreseeable challenges in the coming five years, their priorities and the strategies they aim to employ to meet these challenges and work towards their goals of scaling out agroecological production

- UN National Consultation with Farmers on Leaving No One Behind and India's National Voluntary Review where farmers, civil society groups and UN representatives from across India convened to discuss issues pertaining to the most marginalized categories of farmers in India: Tenant Farmers, Landless Farmers, Women Farmers, Adivasi (Tribal/Indigenous) Farmers, Women Farmers and Livestock/Nomadic Pastoral Farmers. I attended the plenary session and the farmer's speak session in addition to each of the six farmer sessions. I was also responsible for compiling the report of the event
- Four Kissan Seva Samnti meetings
- Annual Strategic Planning of CECOEDECON where I attended the sustainable on-farm and off-farm livelihoods sessions
- Two Panchayat election receptions
- I was looking forward to attending the 64th Commission on the Status of Women in NYC, New York for three days as an observer to the sessions on agriculture and climate change. Although I wasn't able to attend due to COVID-19 outbreak, before leaving India I familiarized myself with the issues that were going to be addressed by host organization's staff who

helped convene the side-panel on women in agriculture, because I was going to help provide back-end support for this panel.

Active participation in organizational efforts and events of my host NGO relevant to my research helped me identify emergent themes that pertained to my project to guide initial and subsequent phases of data collection and analysis while also connecting me to farmers to interview. In addition to the active participation in events, meetings and conferences, I conducted a small number of field visits to agroecological or 'SMART farms' in the Chaksu village of the Jaipur district where I met the Village Development Committee Leaders and the women farmer responsible for the farm's production. Rather than conducting my interviews on-farm I conducted interviews at the events detailed above (workshops, meetings, election receptions, etc.) as farmers had already traveled from their field to my host organization's campuses. I felt that rather than taking time from farmer's already intensive and busy days it would be logistically sounder and more considerate to interview farmers on their days off when they were traveling, rather than interrupting their daily tasks. During most of the aforementioned meetings and events, farmers were already taking part in brainstorming, visioning, planning and other processes that had them thinking about the broader picture and their broader goals. Interviewing farmers in these spaces helped set the stage for my questions and having organization staff to help guide me was invaluable. Though I wish I could have visited more farms, I got invited to many, which I hope to return to soon!

As outlined in my aims, objectives and research questions section, I performed administrative work such as editing funding proposals or compiling case

studies at CECOEDECON. This included documents relevant to my research such as the Voluntary National Review on Farmer's submitted to the United Nations and a funding proposal to form women's agriculture groups and cooperatives based on agroecology principles and practices. This also included looking at proposals that were not as relevant to my research, including a proposal to the UNDP to prevent sex-trafficking and mainstream girls previously engaged in sex-work in tribal areas of Shahabd back into education. Engaging in this way helped me better understand social issues both inside and outside my focus area that are important to the communities in which I interviewed. This was also important to understanding the processes of mediation that take place between international and state donors, CSOs and farmers illuminating the constrained realities in which agroecology is becoming on different scales in Rajasthan.

Semi-Structured Interviews

I conducted 12 in-depth interviews totaling 15 farmers, 10 of which were one on one and 5 others in two small groups. Participants were asked the same set of interview questions and follow up questions varied among farmers based on their responses to the questions. Following the interview, I tried to set aside a time for open-ended conversation that was undirected, allowing interviewees to express themselves candidly and at length if they chose to do so. I recruited interviewees through snowball sampling, recruiting the same number of adult women and men of varying ages. Despite my sincerest effort, I was not able to take as many women farmer interviews as I anticipated; the ratio was roughly 2:1. This issue is something I address in the Chapter 4. Participants were recruited through existing social and

professional networks of the organization with all participants being members of the Kissan Seva Samnti (KSS) and/or Village Development Committees (VDCs) of CECOEDECON including women groups, youth groups and farmer groups. All of the farmers interviewed gave me permission to use their names, but I decided to change all the names except for the stories of Kamla ji and Kothabai ji whose names are mentioned in several CECOEDECON and United Nations publications.

In addition to farmers, I interviewed four NGO experts who work on agro-livelihood issues in Rajasthan. These interviews were important to help me understand the ways in which they position and represent these issues in the wider social understanding and contexts to gain a sense of the collective vision, critiques on the present, and their visions of a future in which agroecological ideals and principles are actualized (Blee and Taylor, 2002).

Data Analysis

Qualitative analysis using the Grounded Theory framework as outlined by Charmaz (2006) was used to analyze the data derived from interviews. Throughout my research period I worked to transcribe and code the interviews to allow me to gain a close understanding of what participants are saying, and what they struggle with, to help refocus interview questions when needed. Once the interviews were transcribed, I sorted the interviewees based on gender, location, and occupation and/or role in organization. The interview data then passed through two major phases: initial coding and focused coding. During the first phase, I used line-by-line coding to help separate the data into categories that fit my interviewee's experiences.

The focused coding narrowed in on the most important and frequent codes from the first phase and assign the more selective codes to explain larger themes and findings.

Statement of Positionality and Scholar Activism

Research in the social sciences is subject to what Thorne (1978, p. 73) describes as a “balance between being an insider or a participant in the world one is enmeshed in, and an outsider, observing, analyzing and reporting on that world”. Therefore, any successful qualitative research must involve a certain level of reflexivity through direct acknowledgement and examination of the researcher’s privilege, biases, self-identity, motivations and positioning. I make my biases and motivations explicit through utilizing scholar-activist approaches to produce knowledge that aligns with that of the struggle of oppressed and repressed communities and rejects, but does not ignore, the colonial and imperialist roots of social science inquiry.

Activist research can be understood as research that aims to bring about a change in the material conditions of people’s lived experience, or, theory made productive to work towards untangling systems of oppression and subjectivation. Without effacing the axis of power and privilege, it acknowledges the mutual existence of people concerned with issues of injustice and inequity with a desire to confront it through shared visions of collective change (Derickson & Routledge, 2015). By doing so, scholar-activism works to bridge the divide between academia and wider society through acknowledging research can be conducted through a collective frame rather than an individualist one and attempts to soften the boundary between researcher and movements to locate synergies that serve as the foundation

for solidaristic relationships (Chatterton et al., 2010).

Taking this particular approach did not require me to commitment to any sort of political cause or party nor required I interview solely activists, but rather worked as modifier to set an additional degree of ethics through which the research was carried out centering honesty and transparency in actions. This framing allowed me to recognize my inherent privilege and positioning while also being directly involved in what I was studying. While there is no guarantee of any sort of outcome or tangible change in the participants' material conditions, I do hope this project sets the stage for future collaborations and I plan to make all my results accessible to my participants and reconfigure my end product into mediums they identify as most useful and important to them (e.g., posts on social media, infographics, articles, condensed version of thesis, etc. in Hindi and English).

Looking Forward

Informed thus far by the historic contextualization and contemporary trajectories of agriculture development and climate change in Rajasthan, and the theoretical understanding of agroecology, food sovereignty and food regimes, I will now shift my focus to discuss the findings of my primary research. The bulk of the data was collected through interviews with roughly 14 smallholder and tribal farmers, 4 NGO staff with another significant portion coming from participant observation at the 2020 United Nations Voluntary Review on Farmers, the annual gathering of CECOEDECON members, field visits to ecological farm sites and

informal conversations in the office. The findings and analysis section to follow explores three themes of relevance to the participants of my study.

The first section *Understanding the Visions of Production: Holistic, Indigenous Knowledge Systems vs. Productivist Models* explores the role of dominant frameworks of discourse and policy and the politics of knowledge play in reshaping the ecological and social dimensions of agriculture. I discuss how the tension created by these competing views of production influence the possibilities of transformation for the agroecology that is currently being articulated, formed and put into action among farmers in Eastern Rajasthan while also exploring lost ‘building blocks’ of traditional agriculture that farmers consider important to revitalize if they are to strengthen the potential of ecological agriculture. I consider concepts of tradition and modernity and the role of agroecology in reconciling the two. The second section, *The Transformative Power of Civil Society and Grassroots Movements* examines the potential of grassroots organizations in addressing the most significant structural barriers to agroecology as identified by my participants through promoting the increased democratization of food system governance and horizontal forms of knowledge production and decision making. In this section I speak about my practical experience and observations being embedded in local civil society organization while also highlighting various case examples to demonstrate how farmers and civil society organizations are advancing agroecology for climate resilience. The final section *“Reimagining People’s Alternatives and Strengthening Collective Agency Through Alliance Building”* explores different scales of transformation and addresses how building

linkages between micro, meso and macro levels has support political empowerment among farmers.

These three specific themes were chosen based upon frequency and saturation in the coding process, and do not represent the full spectrum of what was discussed during interviews nor the whole of what observed in the field. Though other relevant themes were discussed and observed during my fieldwork period, these particular thematic topics were chosen because reflect the most noteworthy findings as relevant to the questions and objectives of my study. Throughout the chapters to come, I will be my presenting my findings and analysis in tandem. I rely on the use of short quotes and excerpts from conversations and longer testimonies from interviews. I put these findings into discussion with the key concepts I have used in this study as well as historical developments of agriculture development and current policies. I do so to explain how these concepts are substantiated through the data I collected moving between presentation and analysis throughout. In addition, I interject with narratives from my own experience in the field and use personal photos to bring greater representation of concepts being discussed and provide snapshots of my fieldwork.

CHAPTER III

UNDERSTANDING THE COMPETING VISIONS OF PRODUCTION – A VIEW FROM THE GROUND: HOLISTIC, INDIGENOUS KNOWLEDGE SYSTEMS VS. PRODUCTIVIST MODELS

Introduction

In this investigation, I set out to uncover the guiding principles and conditions that facilitate and hinder the advancement of agroecology in Rajasthan among small and marginal farmers in the face of climate change, while considering how farmers shape and understand these transitions as they are interwoven with their own concerns, motivations and goals. The issues related to the rise in agroecological production in Rajasthan mirror that of the more wide-spread agroecological movements unfolding around the world and reflect similar questions that arise in regard to how agroecology can move forward to tackle the pressing challenges of the current and mainstream agri-food system. In this chapter, I address the both the social and ecological side of this debate by looking at visions for agroecological systems versus industrial ones, discuss how these competing concepts have affected the ecological and social landscapes of production, and how these competing concepts continually shape farmers' perceptions on the viability of agroecology. To develop a comprehensive understanding of the lived relationships to agriculture and the environment, and how human relations with the cultural and natural world are being re-constructed and re-imagined through agroecology, it is important to compare and contrast these competing views of production as experienced by local people.

Similar to other documented food sovereignty and agroecology movements in Latin America and Europe (Meek et. al, 2019; Anderson, 2019) the farmers' movements and coalition of civil society organizations that I interacted with in the field in Rajasthan were participating in a more radical, politicized agroecology that, in addition to working to transform the ecological side of production, were explicitly aimed at agrarian empowerment. The hybridized movements made up of the farmer's organization KSS, CECOEDECON and other connection CBO's (something I speak to more of in the coming chapters) are shifting into increasingly political spaces using the lens of food sovereignty and climate justice to frame their aims and demands with a broader goal of restoring and uphold their systems of knowledge. However, in my interviews it was expressed time and time and again the idea of the 'gap' between and the ability to produce in a self-sufficient and ecological manner and the constraining reality that farmers are dependent on every single harvest for their livelihoods and basic needs. This was compounded by the fact that farmers were not even able to receive the minimum price for their crops, let alone the 10% increase they were supposed to get for producing organically.

Agroecology was a then a way to address the root causes of a problem-riddled framework of agriculture development and climate change adaption. It provided a solid and uniting framework through which to simultaneously shift to bottom-up, territorialized and participatory approaches, while incorporating tradition and indigenous farming knowledge and cultivation practices. However, it is being realized under extremely constrained conditions as shaped by the dominating

scientific and policy approaches whose focus is solely on output and economic growth (Kremen et. al, 2012; Frison, 2016).

In the introductory chapter, I provided context on the background on the agrarian crisis and response in Rajasthan, agroecology both in India and globally and gave background on the current state of smallholders and agriculture. I detailed the key themes and concepts that I will use as the theoretical framework for this research and explained the precedence for finding solutions to small, marginal and indigenous farmers' agricultural challenges in rural Rajasthan. In this chapter, I 'look back to look forward,' providing detail on the Green Revolution's lasting legacy on production systems in Rajasthan, particularly on smallholder and indigenous agriculture. I outline the factors that have shaped development and thus shaped farmers' perceptions of what 'productivity' looks like. I rely on farmer testimonies, data and observations from the UN's Voluntary National Review (VNR) on farmers, grassroots-level organizational studies and secondary literature to next provide detail on 'what has been lost' or the building blocks of agroecology: agrobiodiversity and agroecological and indigenous dry-land farming techniques/ technologies and discuss the resulting effect this has had on the social landscape of farming. In this, I also highlight how some of these practices are being revitalized, retained and preserved. Finally, I speak to the tension that takes place between these visions of production and between modernity and tradition in agriculture as farmer's work to innovate climate resilient farming methods combining new technologies and adapted Western concepts with local, indigenous methods. I underscore the importance of

shifting to more ecological methods and the simultaneous struggle for rights, recognition and empowerment within market-based systems.

Chemical-Intensive Farming: Impact on the Agriculture and Cultural Landscapes of Smallholder and Indigenous Agriculture

The introduction of land reforms in the 1950s marked the beginning of a series of purposeful policy mechanisms and state-led efforts towards the industrialization of agriculture and the nationalization and privatization of forests and natural resources across Rajasthan (Jodha, 1985; Shanmugaratnam, 1996). These that have had significant impact on the agricultural and cultural landscapes of production and undermine possibilities for collective action by local people while also working to shape their views of productivity. Since this period, the state of Rajasthan has experienced land reforms and other policy interventions that tend to disregard the needs of commons-based natural resource management and the livelihood strategies of those belonging to Scheduled Castes and Scheduled Tribes (who often overlap with the categorization of small and marginal farmers) whose survival and cultural reproduction are contingent upon the preservation of forest and agricultural land. The increasing privatization, nationalization and formalization of land ownership has resulted in the deterioration of commons: pastureland and forested areas, both are which are essential to the socio-ecological foundations of peasant and indigenous farming (Birkenholtz, 2009).

The reduction of cultural, ecological and survival dimensions of agriculture as a purely trade or economic issue in the context of macroeconomic planning has resulted in both the decline in area and deterioration of quality of common property

resources across Rajasthan including forests, agricultural land and pastureland. The introduction of these reforms paved the way for large-scale privatization and nationalization of once common resources and reduced the and slackened the upkeep or conservation of these lands by significantly disrupting traditional management systems, similar to Kar's (2014) work in Western Rajasthan, Eastern Rajasthan has been faced with a similar policy and development trajectory.

When thinking about the legacy of the land reforms and the Green Revolution on the physical and cultural landscapes of production, I think back to my conversation with Suneelaji, a 45-year-old female farmer from Chaturbhuj Pura. Suneelaji grows almost all of her own crops organically, but a portion of the crops she grows for the market, such as wheat, are not grown organically. Suneelaji was recently elected to serve as a Sarpanch, an elected position by the constitutional body of local self-government called the Gram Sabha, which together with other elected officials constitute the Gram Panchayat, the formalized village-level governing council. I was curious to understand how in her lifetime she has seen the land physically change and the role she'll now play as a community leader.

M: How have you seen the land [in your village] change over time?

S: There are two ways. Because over the past generation [my generation] we have seen so much increase in the use of chemicals in the fields, there are more strong weeds now than before. Now we use some fodder, what we would otherwise give to our cattle as feed, now we use it as green manure to try to bring back some fertility into the soil, because animals are less too. We do still use khaad [composted cow dung] that we can produce. Those things we need for our production. The other thing is, land is less, and forest is less. Less land can be used, and less forest can be used, and there are businesses, more housing and other government projects. The land itself has become more rocky, barren and less fertile. Due to the regular use of chemicals the land gets harmed, there is a decay of land quality over time. But we see

chemicals used because of less animals and there are less animals because of less forest. Now the soil is not fertile. And so, then more chemicals get used and land gets worse. These things are all connected.

M: I understand. So, you have told me a lot about these [environmental] problems that the land is facing, what would you consider the most straining problem to your production?

S: The biggest problem is water, what I did not say before is that water is less. So much is less! Soil is damaged and water is less. This time we got enough of rain, but since many years back the rains were not enough and there is not enough water in the land. So, we are using tap or tube well water and because of this land is become rocky and its turning towards becoming barren. We don't have much of a choice in the matter.

What I remember most about our conversation is the way that it ended:

M: Thank you for taking the time to talk with me. Best wishes in the Gram Sabha. May I ask one last question?

S: Yes.

M: You have told me about all of these issues, so now I would like to know your hope. What is your biggest hope for the future of farming? In India, in your village, and especially for your farm?

S: This is our employment.

A few moments later with the help of CECOEDECON staff, she better understood what I was trying to ask. I phrased the question as this: *bharat mein aur aapka guav aur apka khet mein, kheti ke liye aapki sabse bari umeed kya hai?* Which literally translates to exactly how I transcribed above: in India, your village and on your farm, what is your biggest hope/wish for farming? In this question I wanted to be purposively broad, as part of my aims in interviewing farmers were to understand how exactly they position themselves or interpret movements for agroecology happening within their communities and beyond. With the translation help, she ultimately answered this way:

CECOEDECON Staff Member: She is saying that agriculture is the source of our livelihood. So, let me phrase it this way: Suneela ji, so what is that ray of hope for you to continue farming?

S: Yes, livelihood is my biggest hope. This is our economic livelihood so of course that is my wish. We should continue with agriculture and we should not stop farming just because of problems like lack of water in this year and all. We should not give up agriculture because of this and we should work to fix it to make a strong agriculture. Horticulture we should promote horticulture, less of cash crops and more of organic farming. But now things are ok, since we have rain, if you do any work with proper care then you will be able to save from it. We have two crops Rabi and Khareef, and if we keep continuing with this pattern then we are able to save and be secure in our production. We want to be independent in our production and have it give to us livelihood, without these issues that keep from market and from the outside.

While most farmers answered the question similarly to the way Suneelaji ultimately did, often expressing sentiments of “anna swaraj” and “kissan swaraj” or other phrases to describe empowerment and self-sufficiency, some certainly more animated than others, what struck me about this particular moment is the immediacy to which she responded: “this is our employment” which to me, did not sound ‘hopeful’ or ‘wishful’ at all. During another part of our conversation she had spoken to other hopes. She told me that in her elected position, she wants to promote jaivik [organic] farming where she lives among other farmers:

Michelle: You said you want to do more organic farming because now you are only doing some and some land you feel you must spray. Now you are an elected leader, does this help your ability to do organic farming?

S: I don’t understand exactly what you are asking.

CECOEDECON staff: She wants to ask this good question, as you have become the Sarpanch, so now how will your Panchayat promote this organic farming?

Suneela: Of course, we wish to. Of course, it is my wish as an official. It is a wish for my village and for the Panchayat. First of all, we will start it from our own home. I feel fortunate because I have buffaloes, so I can make my jaivik production more, and when one does such things, then others also start to do the same things. I am determined to start awareness related to organic farming but, I will start with myself first. So, that she I say that she is doing

organic farming and others should do the same. So, we can promote this amongst people by doing it ourselves first.

Farmers continually described themselves to me as being 'ready', but unable to fully transition to ecological production because they lacked financial and policy support, the land itself has been heavily damaged and they are unsure of the changes coming because of global temperature increases. They did not lack the ability or knowledge, but rather are denied the space for their cultural ways of knowing and valuing of nature in the market economy structures that dominant the rural agrarian landscape and land reforms that have physically reshaped their landscapes of production. There was a constant back and forth that existed between the concepts of 'traditional farming knowledge' deeply rooted in the traditions of small-scale family farming in which human, animal, plant and microbial communities work harmoniously to provide agricultural outputs and ecosystem services, and industrial farming, often seen by farmers as the only viable means to provide for their families.

This reflects the reality that industrial farming in conjunction with market rationales and values, have been so deeply entrenched in these areas, that they are by far the dominating 'vision' of production. Even farmers like Suneelaji who politicize their aims for agroecology, occupy elected positions and genuinely are seeking change in their villages, see this vision as almost inevitable, given their lived experience of the dismissal of their knowledge in development and conservation projects over time. The systematic forces of oppression on small and marginal farmers contribute to the inability to pursue greater collective action and shape their

immediate social and ecological realities, so despite the desire and the want to pursue more agroecological farming, are only able to do in fractions.

The increased commercialization of agriculture, decline of common property resources, and the devaluation of peasant and indigenous farming knowledge go hand and hand. Land reforms coupled with past modernization policies and schemes have made way for larger, mechanized and chemical intensive farms and the reorientation of production towards export markets instead of subsistence agriculture. Similar to other states of India, subject to heavy agricultural modernization such as Punjab, Rajasthan's policy framework has provided incentives and disincentives that explicitly favor industrial production, the use of HVY seeds, application of fertilizers and pesticides all of which are oriented towards large-scale farms. Such efforts reflect the state's priorities towards industry and corporate agriculture and large-scale development projects (Pearse, 1980).

These disruptions are backed by a strong neoliberal discourse coming largely from the state who are not accountable to the disruptions to local livelihoods. These processes have resulted in institutional changes in villages that have undermined the sustaining links between communities' social landscapes and their sources of livelihood, a process that is inherently conflictual and destabilizing undermines their ability to be self-sufficient as their traditional agricultural knowledge becomes less valuable to their production (Mazhar et al., 2007) This was reflected in Sanjay's statement. Sanjay is considered a marginal farmer operating on less than 1 hectare of land in the tribal region of Shahabad. He said:

S: Yes, I have to go outside for work. I do benefit from the MGNREGA

scheme. I either go to Kota or Ajmer for work and sometimes to Jaipur which you know is 7 hours away. Farming here [in Shahabad tribal area] is no longer enough to feed my family and to meet their needs. Farming like this [ecologically] we know needs to be done, we know the soil is now hard. This is from the use of chemicals over time, but we still are using chemicals sometimes because we need a production, we need to take a crop. We can use cattle and khaad [composted manure] for fertilization, but there is a problem with grazing, there is not much to support them [the cattle]. Our village can't support it even with the laws passed to protect it. They [laws] do some good, but they also do harm. We do the ecological farming with the help of our organization [CECOEDECON]. You see, outside there is the vermicompost and kitchen garden.

During my interview with Ritu Tiwari, head of CECOEDECON's livelihood department, she spoke of the loss of traditional farming knowledge and the entrenchment of Green Revolution-era farming practices in rural, agrarian-based villages across Rajasthan, in particular, she spoke about the districts she has worked in during her 17 years in the field, and about the districts where I conducted interviews: Jaipur, Tonk and Arrah:

In Rajasthan, the knowledge is lost. It is completely lost. Our traditional system of farming, lost. The system where people do not use any pesticides, do not use any fertilizers and where everything, every weed is removed by hand. Many of the native species are also lost too. Farmers started learning these new systems of production from the outside, from development agencies or through the government, even we thought that chemical farming was okay, because we support farmer's needs and this was what they wanted, as you know in early years of the organization. This was what was being promoted by the government and university extension, and we did not know better, and this is where funding was going, so even we supported this, but we learned from our mistakes. Because the people don't receive education around these things, around the harmful effects of industrial farming they [farmers] just keep on farming as the generation before has, and some of the older farmers now, they were direct recipients of Green Revolution era technology and set of practices, farmers are now their children and they follow as their parents did. So more often than not it is like this: farmers do not have a lot of power to choose, or agency in the matter, they are simply the recipients of the practices of the times which are coming from the outside. At any cost, because farmers have been struggling and continue to struggle, they just want to have production and profit to meet the needs of their families. As we can

already see with erratic rainfall and increase in temperature, these struggles that farmers face because of chemical farming and because of their status in society, are further exacerbated with climate change and the resulting environmental challenges. Still we see their knowledge is ignored in development process. So, for them, the farmers young and old, it is very hard when these things overlap and when these things combine.” (Tiwari, Interview, February 1st, 2020)

In her narrative she points to the generational challenges farmers’ face due to lack of education on sustainable methods and lack of economic agency and how, as a result, their option for livelihoods based solely on ecological agriculture is highly restricted. Her narrative as followed describes the position of small and marginal farmers in Eastern Rajasthan who face limited choices as they grapple with the myriad of environmental consequences associated with climate change, the relatively recent and rapid shift towards dependency on chemical inputs, compounded by the existing structures of inequality prevalent across India. In addition, she speaks on the loss of traditional farming methods and agrobiodiversity in Rajasthan pointing to the connection between the adoption of methods ‘from the outside’ a phrase echoed by many of my participants that denotes the ‘single plant’ or monoculture paradigm and chemicalization.

The picture that Ritu is painting here is not an uncommon one. Across Rajasthan, traditional farming systems have slowly been replaced by vast areas of mono-cultured cash crops (primarily wheat, soy, sugarcane and oilseeds (International Plant Nutrition Institute, 2013). As a result, farmers in Rajasthan have been facing severe problems with stagnation in production due to the heavy focus on the adoption of cereal-based monocropping vs. multi cropping or poly cropping systems, abandoning other crops such as native pulses, mustard, millets and

vegetables. In addition to the prevalence of monoculture farming, the increased application of chemical-based inputs such as pesticides, fertilizers, weedicides and fungicides as well as increased mechanization and intensive irrigation systems further increased the cost of cultivation. Despite this massive increase in cost to production associated with the transition to more chemicalized farming, farmers have received marginal support within the liberalized economic policy frameworks of the government and continue to experience significant difficulties coping with the free market system resulting in rising household indebtedness (Holtz-Gimenez, 2011). In my study area, indigenous and smallholder farmers are also facing increased land alienation, dispossession and landlessness due to land grabs, increasing privatization of previously common resources and coercive forest policies that have further disenfranchised them and their ability to be self-sufficient in production (UN NVR, 2020).

As Ritu detailed during our interview, these realities are shaped by historical, structural and systematic policy mechanisms and are now only exacerbated by climate change induced land degradation and weather invariability. This is particularly true of the many rainfed farmers who made up the majority of my participant demographic, farmers characterized by tribal populations, high poverty and high rates of hunger and malnutrition who like 72% of farmers in Rajasthan depend on annual rainfall for both major seasons of production. (Govt. of Rajasthan, 2017). Many of the farmers I interviewed discussed that the challenges and vulnerabilities they face are compounded by a number of other factors including marginal and poor soils, significant risk of crop loss without insurance, no minimal

guarantee price for their crops, limited access to institutions and services, underdeveloped market access (especially organic market access) and little access to capital (Chaksu Focus Group, 2020).

3.3 What Has Been Lost? Looking Back at the Past to Build a Climate Resilient Future

Climate change models project that smallholder farmers will be most disproportionately affected by the adverse effects of climate change. Although (Altieri, 2012) cautions this is only a “broad-brush approximation” that does not account for the incredible variability in capacity for resilience and adaptation strategies. Revitalizing diverse and complex cropping systems through indigenous technology is crucial to the sustainability and stability of small, marginal indigenous farmers in Rajasthan, especially given the environmentally stressful conditions that agriculture finds itself in today.

Any substantial, systems-wide change is proving to be challenging in Rajasthan, as espoused at length by farmers and staff at CECEOEDECON, due to the prioritization of irrigated crops and large-scale farms. While the government further prioritizes corporate agriculture, many CSOs and farmer unions such as KSS and CECEOEDECON are working to revitalize, retain and document and promote agroecological methods such as using drought-resistant and native varieties, implementing water harvesting, strengthening watersheds, promoting mixed and poly-cropping, increasing the use of agroforestry and forest produce cultivation and

gathering to reduce climate-change induced vulnerability with the aim of expanding agroecology to have an impact of scale in Rajasthan.

Organic farming as defined by the Government of Rajasthan's 2017¹⁰ policy summary is indeed a direct response to the need of more sustainable farming, with strengthening living ecological systems, equity and fairness as underlying principles. However, contrasted to agroecology, which is not-market driven, organic farming has clearly defined and rigorous regulations and restrictions and implies a system of control and certification (Migliorini & Wezel, 2017). As far as the participants of my study are concerned, state-centered policies for converting organic land whose focus remains on large-scale cluster approaches (minimum 50 acres) will likely not reach them given their marginal and small status. Various state-initiated programs¹¹ and financial assistance¹² schemes such as the Rashtriya Krishi Vikas Yojana, Paramparagat Krishi Vikas Yojana, the Rainfed Area Development Programme and the National Horticulture Mission incentivize the promotion of 'jaivik' (organic) have converted a significant amount of land to organic (211,119.92 hectares with about 1/3 completed and 2/3 in conversion) which represents some movement in shifting state priorities. As many of my colleagues expressed these top-down schemes have lacked proper implementation and have yet to make an impact of scale to the groups of farmers that my collaborator CECOEDECON works with (Alok Vyas, Interview, January 2020). Though this small group of farmers can't speak to the whole of Rajasthan, their experience points to the larger trend of state-led organic

¹⁰ https://cuts-cart.org/pdf/Rajasthan_Organic_farming_Policy-2017.pdf

¹¹ https://cuts-cart.org/pdf/Rajasthan_Organic_farming_Policy-2017.pdf

¹² <http://www.agriculture.rajasthan.gov.in/content/agriculture/en/Agriculture-Department-dep/farmer-facilities/facilities-for-farmers/organic-farming.html>

production following the same top-down vision and implementation as industrial agriculture development does, often lacking any significant equity components (Shattuck et. al 2017).

On the other hand, however, this also shows that despite the wider consensus on the contributions of the Green Revolution to the development of agriculture in Rajasthan, the prevailing 'vision' or way forward for agriculture remains highly contested, even within the government and demonstrates that there are indeed alternative ways forward. Although small in scale in comparison to the roughly 18 million hectares not in organic production in Rajasthan, the government has commitment significant capital to the development of sustainable systems-based solutions that farmers and civil society-based organizations have been demanding. However, it is important to note that given the fact large-scale organic conversion relies on other industrialized practices such as the use of farm machinery, these large-scale projects will likely benefit those farmers who are already financial stable, land-owning and from a higher socio-economic bracket as compared to than small farmers or farmers that belong to Scheduled Castes and Tribes. This dynamic was well understood by CECOEDECON and their partner organizations, and although it was expressed to me that the organic farming policies and associated schemes were not necessarily meeting the needs of the communities in which they work, they will continue to put pressure on Rajasthan's Ministry of Agriculture, capitalizing on the existing political will to demand their vision of production be upheld, which, as they argue should be based rather on the knowledge of smallholder and peasant agriculture.

The reorientation of the agrarian landscape to be more chemically and industrially oriented has reshaped the land and people's perception of it over time, but the shifting and resituating of this perspective that is happening among farmers belonging to CECOEDECON and its partner networks are helping to bring about more holistic and multidisciplinary methods of management of natural resources and agriculture production, those are which are in line with agroecological ideals and visions of production. Despite the notion of a lost past, there were significant and sincere efforts towards incorporating the holistic nature of indigenous knowledge into agriculture management and climate change adaptation or what Santos (2007), Visvanathan (2006) and Pimbert (2018) refer to as "epistemic justice" or "cognitive justice". Cognitive justice is defined as "the constitutional right of different systems of knowledge to exist as part of a dialogue and debate" which would constitute the continued existence of "the ecologies that would let these forms of knowledge survive and thrive and not just in a preservationist sense but as active practices (Visvanathan, 2005). With this, as Pimbert (2018) argues, the alternative approaches or constructions of agriculture that result from the process of democratizing knowledge for agriculture, or epistemic justice create conditions under which both the ecologies and the meaningful relationships which people maintain with these ecologies are be supported. Ultimately these alternative constructions or 'visions' of production are powerful tools and shapers of progress and change. Agroecology stands in stark opposition to the prevalent models of growth and is among the many alternative development pathways which have found expression in 'degrowth' 'deglobalization' to spiritual and ethical approaches such as civic agriculture,

environmental stewardship, climate change as a moral and ethical question, and the rights of mother nature.

Farmers and their civil society counterparts still have significant concerns as to how the levels of productivity needed to achieve self-sufficiency in ecological farming can be achieved. Moving the vision from rhetoric to practice becomes even more difficult when those heralded as keepers of traditional agricultural and conservation knowledge and insights into practices that forge social and ecological harmony- agro-forestry, traditional medicine, biodiversity, conservation and resource management themselves view this knowledge as lost. A sentiment reflected often among interviewees was this idea of 'looking back to look forward' or the idea that past practices must be protected, revitalized and disseminated in order for agroecology to have an impact that results in greater farmers sovereignty and empowerment. These past practices, however, are a result of a large body of lived experiences with the environment, culture, tradition and worldviews which farmers developed over centuries and now consider 'lost' within a matter of several decades. Farmers and NGO staff expressed these complex sets of knowledge are very difficult to simply revitalize on a large scale due to the overarching constraints and dependencies on the market, changing land use patterns and the negative effects of climate change. In effort to answer my first research question 'what constrains and what enables agroecology' I want to now look at the ecological building blocks of agroecology in Rajasthan as informed by my own observations, participant response and secondary literature to help envision the conditions necessary for agroecology to take deeper root.

Agro-Biodiversity

Receiving an average rainfall of less than 700 cm with mean daily highs anywhere from 38C to 43C in the summer months, the semi-arid and humid of the Jaipur, Tonk and Baran districts of Eastern Rajasthan without a doubt present very harsh, even unforgiving farming environments, yet they have traditionally hosted an array of both cultivated and uncultivated biodiversity used by smallholder and tribal farmers for food and fodder. The many crops native to eastern Rajasthan are in general landraces, or a domesticated, locally adapted varieties that have been developed over time, through isolation within natural and cultural environments of agriculture and pastoralism of the particular region (Pound, 2017).

Defined as “a dynamic population(s) of a cultivated plant that has historical origin, distinct identity and lacks formal crop improvement, as well as often being genetically diverse, locally adapted and associated with traditional farming systems” (Villa, et al., 2005) these landraces represent diversity in farming knowledge passed down through generations and offer defense against vulnerabilities and enhance harvest security in the face of disease, pests, and other stressors, particularly climate-change induced stressors such as drought and increased variability in monsoon seasons. The land supports a wide-range of these crops which are grown using rainfed conditions in two distinct cropping seasons: the Kharif or monsoon crop which is planted usually in the late spring/early summer with the onset of heavy rainfall and harvested as early August or as late as February, and the Rabi crops or winter season crops usually planted in mid-fall and harvested by late winter/early spring.

Smallholder and tribal farmers (Adivasi farmers) have also historically relied on non-cultivated or 'wild' biodiversity to meet their dietary and livelihoods needs including edible leaves, roots, tubers, seeds, stems, berries and fruits. Some of these foods are collected during times of crop failure and famine, some during particular seasons or for particular celebrations, some are collected routinely as staple foods while others remain delicacies. These wild foods provide an additional, vital safety net during ecological crises caused by climate change and the ongoing externalities of industrial farming including the increasing crop failures, erratic rainfall, ecological and degradation, water scarcity and depleting soil health (Ingram et. al, 2010).

Along with crop diversity, both cultivated and uncultivated, Rajasthan has traditionally hosted a wide range in diversity of native livestock that function as key components to their agricultural system. These include primarily camels, cattle, buffalos, goats, sheep and chickens. In addition to providing diverse income and food sources, a wide range of livestock diversity, or animal genetic resources enables farming communities the ability to better cope with climate change given that indigenous breeds can sustain on poor quality feed, are tolerant of extreme temperatures and drought, can tolerate or resist diseases and have the ability to walk longer distances for water and pasture (FAO, 2018).

Coming back to Ritu's original comment, much of this diversity produced and maintained through farmer innovation and guardianship has been lost over the past several decades in eastern Rajasthan due to the shifting focus a singular vision of production, or industrial, mono-crop farming that focuses on a few staples, or cash crops and the promotion of hybrid or exotic livestock. Take for example, the

testimony of Sunil, a farmer from Chaksu who, in an interview, spoke to me and said:

We still try to use our traditional methods, the methods from our grandparents and their parents, and the generations before, they are the methods that do not use chemicals and make use of Rajasthan's different livestock. We are using those methods and we are trying to practice farming as nature intends, but most of us, we have to buy seeds from the market. We don't have much of a better option. We do not have the capacities to save our own seed at the scale we need to be profitable, and without saving our own seed, how can we have these same varieties that they [the generations before us] did? Costs for everything are higher and now we are buying seeds, it has become hard to save them. Many of the local varieties are lost because of this reliance on the market for seed. The generations before us could trust in these things, but now it has been diminished.

Sunil's testimony is full of important insights about the loss of genetic diversity, rising costs of production and the difficulties of practicing agroecology in the modern era, but what I want to particularly bring light to is when he says "the generations before us could trust in these things, but now they have diminished". In this statement he seems to be reflecting on the fact that generations before could put their trust in genetic mixtures of cultivated and uncultivated plants and livestock. These genetic mixtures had the ability to not only reduce yield variability, but also offer insurance to meet future environmental, social and economic shocks and disturbances to agriculture systems, simultaneously constituting a natural resource and cultural asset (Pandmanbhan et al., 2013). Thus when he says "trust" he is pointing to these sophisticated systems that have functioned as a complex and layered form of food production that is biodiverse, ecological and local which stands in stark contrast to monocultural systems that have a fragile and precarious relationship to the market, often delinked from local people's diets, communities and ecosystems. The genetic diversity of plants and animals are an integral part of

Rajasthan's agroecological systems, their properties are intimately related to the natural and social environment in which they occur. Cultivated plants and domesticated animals in particular have a unique position in that they directly or indirectly serve livelihood needs of people (Weltzien & Chistinck, 2017) and as such many of the farmers I spoke to pointed to this need to uphold these interwoven systems to produce food in the immediate and secure future wealth and resources.

Detailed in the next section, I speak to specific techniques, methods and skillsets detailed by farmers that are associated with agroecological production that they consider as 'lost' or 'forgotten' and the implications of revitalization of these methods for strengthening agroecology and reducing the burden of climate change.

Techniques, Methods, and Skillsets

Pictured below (Figure 1, Figure 2, Figure 3 and Figure 4) are four panels that were displayed at the UN Voluntary National Review on Farmers that was held January 20th, 2020 in Jaipur, Rajasthan. These panels titled "improving irrigation, livestock farming and its benefits, tree planting and its benefits and land and water conservation activities are representative of CECOEDECON's, and other NGO and civil society organization's package approach to outreach for farmers seeking change and improvements to their livelihoods. In the sections below I talk about the techniques, skillsets and methods identified in my interviews and participant observation that were most important to advancing agroecology in the region.



Figure 1
 भूमि तथा जल संरक्षण क्रियाएँ
 "Bhoomi Tatha Jal Sanrakshan Kriyaen"
 Land and Water Conservation Activities



Figure 2
 वृक्षारोपण
 "Vrkshaaropan"
 Tree planting



Figure 3
 कटी भूमि का सुधार
 "Katee Bhoomi ka Sudhaar"
 Improving Irrigation

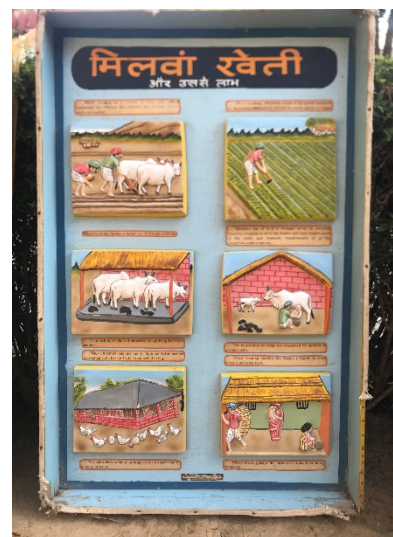


Figure 4
 मिलवां खेती
 "Milvan Khetii"
 Livestock Farming

Seeding

Seeds are the most basic and vital inputs for smallholder and indigenous farming communities in Rajasthan. Until quite recently in India's history, breeding was done only by farmers. The activities associated with seed and plant breeding constitute a part of their major agricultural practices and generally include a combination of mixing, exchanging, selecting and storing seed. Selection by farmers is based upon their understanding of environmental adaptation, capacity, quality requirements and yield and is thus closely related to local knowledge and cultural traditions (Weltzien & Christinck, 2017). To obtain high quality seeds, farmers must carefully execute the multiple step process which includes timely sowing, timely flowering, proper pollination, seed maturation, timely harvest, seed processing, transportation and storage in order to produce the most viable seed crop for the seasons to come.

Across Rajasthan, farmer-selected and farmer-produced seeds continue to be the source of seed for some, however, within the communities I spoke to, this was not the case. Most farmers are highly dependent, if not completely dependent, on the market for seed accumulation. From my interviews with both staff and farmers I learned that they primarily attribute this loss to pressure from market forces government modernization policies and note that new shifts in growing conditions stemming from climate change and industrialization of the agriculture sector have strained their ability to save seed: the rise in temperature is increasing the dormancy period of seeds and the increase in synthetic fertilizers and pesticides have contributed to the extinction of many species of microorganisms, insects, pollinators all of which contribute to the farmer's ability to grow, process and save

healthy locally-adapted seed through their traditional methods. Farmers and civil society organizations have the sincere desire to scale up seed production, however at present note that without a supportive policy and financial support systems, they have limited to do so with (Annual Meeting, 2020).

Plowing

In preparation to loosen the soil to sow seeds or saplings, in Rajasthan, as in many other parts of India and the world, traditionally fields have been plowed using oxen and a plow. This highly labor-intensive job was often done by two young members of a given farming family or community. The use of oxen increased soil organic matter by providing an additional source of manure, while also raising the number of livestock a family holds. Oxen were used in many other components of agriculture production systems including irrigation, grain processing and oil mills. Utilizing the oxen, the field was typically ploughed in a zig zag pattern thereby improving moisture retention as less area was exposed to sunlight versus the horizontal ploughing pattern of the modern-day tractor. Though replacing oxen with tractors has led to greater volume of production through decreasing the time it takes to plow a field during a given season, it has significantly increased the cost of agriculture and many families cannot afford to use a tractor. In our interviews farmers told me that with the onset of climate change-induced weather irregularities, including the rise in temperature and less rainfall, they are now often are having to plow their field twice during the Kharif season, increasing the cost of production and decreasing the soil's capacity to hold moisture. In my time in the field I did not encounter any farmers who were still utilizing oxen to plow their fields, however, at some farms including the 'SMART' farm, an example I will detail later in Chapter 4,

plowing is not necessary when no-till methods are employed. For the most part, small farmers without a means will hire a tractor-owning neighbor for 300-400Rs per day. Critical to advancing agroecology in general is advancing farming methods that do not require significant tillage, where crops serve multiple functions (i.e. tillage radish) and organic matter and carbon are able to be stored in the soil rather than disrupted every season.

Irrigation

Dryland agricultural areas of Rajasthan typically demonstrate less productive soils due to low soil organic carbon, poor water availability and frequent occurrence of dry spells and drought due to the erratic and scanty rainfall and low water table, resulting in lower crop productivity to that of other areas of India that receive much more rainfall (Govt of Rajasthan, 2019). Traditionally, fields were irrigated using Rahat, Laav-chaas, Bawaris, Taankas Kunds and Nadis along with other local methods for irrigation. The lack of adequate rainfall and sandy soil makes it difficult to store water for any length of time in a dug pit due its porous nature and thus rainwater harvesting, and storage made rainwater harvesting systems was and still is imperative for farming communities. Most typically, farmers irrigated their fields using nadis, or dug out village ponds used for drinking, irrigating fields and livestock often surrounded by local trees to bind the soil around the trenches and ponds. Noted by staff at CECOEDECON, despite large and medium scale irrigation projects by the Government of Rajasthan under schemes such as MNREGA¹³, many villages in the Jaipur, Tonk and Baran districts of Rajasthan lack adequate drinking water and

¹³ <https://nrega.nic.in/netnrega/home.aspx>

do not have enough water supply to sustain more than two or three months if rains are variable. CECOEDECON and other civil society organizations active throughout Rajasthan are working to revitalize these traditional storage techniques by supporting community irrigation ponds. During a field visit to an irrigation project in the Chaksu area (in Jaipur district) we took a walking tour with the head of the Village Development Committee (VDC) in Chaksu- the VDCs are a branch of CBOs that work with CECOEDECON to ensure that development projects done at the village level are participatory from conception, implementation to long-term management. During our visit, the head of the VDC spoke to me and my colleague Ritu about the flood that happened the last monsoon season and how the community dealt with the aftereffects. Ritu translated the story for me as followed:

During the last monsoon season, there was a massive flood. We were thankful to have the talab (pond) here [built by CECOEDECON] because otherwise we would have no way of containing and capturing the all the excess water for our land, for our cattle. The floods did major damage to the talab. The structure itself was damaged and it was the youth group that stepped up to block the flood from the roads and from the fields. They organized the community and we used many different things to block the flow of water, because it is the community's pond. There wasn't enough time to depend on the government's response, and CECOEDECON is always supportive to us, but this problem was immediate and we as a community inspired by the youth's initiative figured out how to stop the leakage and that is something we can say we are proud of (VDC head, Oct 12).

In CECOEDECON's model, funds are raised at the village-level by farmers and community members to support the construction and basic maintenance of the ponds coupled with support from the organization itself to foster community ownership and autonomy as demonstrated through this quoted excerpt.

Weeding/Cultivation

Traditional or ecologically based farmers in eastern Rajasthan have developed an understanding of insects such as earth worms in the process of promoting soil fertility, pollinators and other beneficial insects. The system of knowledge associated with beneficial insects is affectionately referred to as “किसान की खेती के मित्र कीट” or kisaan kee khetee ke mitra keet, meaning insect friends of the farmers. Presently, the use of agro-chemicals including pesticides and weedicides is an integral part of many farms in the Eastern regions of Rajasthan and among several of the farmers that I spoke with, even those farmers who are working to farm exclusively agroecologically. Not only are systems dependent on the chemicals, they are often misused and overused resulting in major ecological imbalances that give rise to groundwater contamination, insecticide resistance, pest resurgence and pesticide residues. The relatively new yet commonplace pest management methods that are being adopted by farmers were dependent on the advice of governmental agricultural extension efforts, NGOs and independent advice from vendors and marketing companies as well as farmer to farmer, in the process of over spraying farmers inadvertently kill the beneficial insects or the mitra keet such as praying mantis, beetles, wasps and flies which protect crops from harmful insects (CECOEDECON, 2017).

Pictured (Figure 1) is one of the many laminated posters hanging on the walls of the different offices of CECOEDECON. This particular training aid poster focuses on agroecological farming efforts underway in Malpura, another one of the tehsils in which I conducted interviews.

The various activities read left to right: “compost pit program, vermicompost program, SMART farm overview, demonstration for the protection

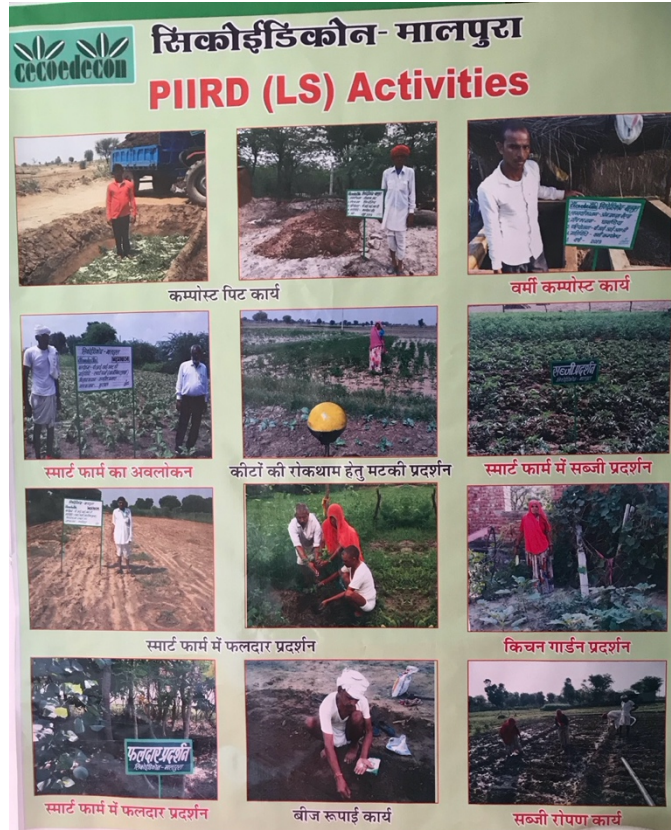


Figure 5

of insects (integrated pest management), SMART farm vegetable demonstration, demonstration of the fruits (benefits) of SMART farming (showing barren soil to fertile soil hosting a variety of crops), kitchen garden demonstration, seed saving/processing, and vegetable planting demonstration.” These posters served as an informal way of information for agroecological sharing and I often saw farmers looking at the posters and having discussions. The concepts of SMART farm and kitchen gardens are borrowed concepts from larger agroecological discourses and thus they are written in English (in Hindi script). Most of the farmers in attendance were familiar with these concepts from their interaction with CECOEDECON and other farmers in their villages who were doing these practices. Of particular note are

the first two pictures in the third row which show how barren soil was transformed into fertile land which could host many crops. In our interviews and informal conversations, all of the CECOEDECON reflected a similar sentiment that it was very important for farmers to actually *see* how jaivik (agroecological) farming could transform their neighbors land and once they witness the transformations for themselves they become motivated to adopt it which is why the organization arranges trainings, exposures and information sharing among farmers doing these practices in different villages and with farmers who are practicing chemical farming.

Social and Communal Landscapes

Over time, the major shift towards chemical-based, capitalist production systems have increasingly delinked rural people to their environments with their livelihoods becoming more and more separate from production leaving farmers and their families without a sustain linkage to their homes, as livelihoods are becoming increasingly separated from food production. Agriculture production and its development in Eastern Rajasthan have shifted substantially over time as a result of purposeful policy mechanisms in land, water, marketing, national and international trade, subsidies, etc. This has resulted in a significant loss of knowledge surrounding traditional methods and an entire host of environmental issues related to agriculture. Smallholder and tribal farmers that I spoke with are not only subject to disruptions to local livelihoods caused by large-scale macroeconomic planning, they are sometimes even out of reach for poverty alleviation programs, or micro-development schemes hence the overwhelming focus of civil society organizations like CECOEDECON's

on the 'most marginalized' including those belonging to Scheduled Castes and Tribes whose livelihoods are more explicitly linked to their environments because they are more dependent on cultivated and uncultivated biodiversity, as compared to landowning small farmers growing fewer number of crops primarily for the market.

Vibhuti eloquently express here the importance of maintaining and strengthening the social fabric of agriculture:

Community-Based Organizations (CBOs) serve as the backbone for improving agricultural livelihoods, they are at the front and center of rebuilding organic agriculture, an organic agriculture that is based diversity of nature and diversity of people. These groups started as farmer's groups but, now have evolved into a bigger people's movement that is present across the state. When it comes to solving any farmer issues, we start here, with existing social institutions, they are still there, but we have also help to form these CBOs to increase their agency to advocate for their own rights. We go to the farmer groups themselves to try to understand what their concerns are and we try to integrate their knowledge of their own strengths and issues. It is a very participative approach, we try to ensure that it is inclusive by involving youth and women in addition to male farmers because inequality is there too, it is not just because of outside, inequality exists as part of society too. We strongly believe that much more research is needed into traditional methods and practices because they are very relevant to us in the context of climate change. With the significant uncertainties on the horizon, it is the need of the hour to revive these practices for resilience and those methods and that knowledge comes only from people themselves. We try to support and document this knowledge to build demonstrations on these practices like organic manure, multi cropping, SMART farm where the farmer can sustain household requirements on small piece of land. Also, we are trying to integrate traditional irrigation practices also bringing back some seed understanding and preparation, soil related practices apart from manure, and grow traditional crops to use as herbicide and pesticide. Local, low-cost solutions to some of the changes coming from climate change. It is important, in all of this revitalization and documentation, to focus on the social dimensions, not just environmental dimensions, because it is only when people have the capacity to assume the responsibility and rights over their own systems, their economic and their farming systems that they can be secure. It is through these social networks and village-level government that these things can happen and it where efforts need to be focused, but it is not what we see in mainstream today. (Joshi, February 2020).

In our interview, Vibhuti Joshi echoed the literature on the social landscapes of production when she pointed to the fact that when agriculture with its cultural and ecological dimensions is reduced to a transactional relationship to the capital accumulation, it leaves the ability to provide livelihoods to the free labor market without consideration of the livelihoods strategies that have been built by rural communities throughout history that has put them in constant interaction with the myriad of natural and social resources (Buckles et. al 2007). Development policy trends broadly, fail to consider strategies employed by the rural poor and in particular Scheduled Castes and Scheduled Tribes and thus sideline or even destroy strategies of the rural farming poor and result in the fragmentation, privatization and enclosure of the social landscape, such as communal pasture and water resources, which has a significant impact on livelihood options for people who depend on these spaces (Ayres et. al 2016).

Vibhuti points to the critical relationship between institution building, or the bolstering the social landscape of agriculture, food sovereignty and ecological and biodiversity-rich production systems resulting in the desired outcome which is enhanced resilience to climate change. While these local institutions are not ‘lost’ per se, they are often ignored in poverty alleviation schemes because of the emphasis on off-farm employment activities, access to market, and the increased use of technology instead of focusing on building upon the existing localized, ecological and social basis of production activities.

In her narrative, she is referring to Community Based Organization (CBOs) that exist at the village level across the districts that CECOEDECON is active. Some

CBOs were formed by the organization to ensure local capacity of agri and no agri-livelihood enhancement programs and projects, while some were built out of existing unions and institutions such as farmers groups. These CBOs serve various purposes, during my time interacting with members of CBOs and seeing the CBOs at work in various functions and meetings, I observed that their major aim is to strengthen and feminize local decision making in order to strengthen the capacities of local peoples and their communities to assume the responsibility and rights of governance over their institutions that guide and regulate community processes such as health, environment and education, with an emphasis on economic activities. With agriculture being the largest economic activity for people living in these rural regions, the CBOs have been central to creating a bridge between civil society and government institutions to work towards interventions that not only alleviate symptomatic effects of industrially-based agriculture development, but are working towards an alternative grassroots-based development that has the power to transform how development in the agriculture sector actually happens, moving toward an approach that takes into consideration locally-adapted methods and inputs, farmer innovation and foster socio-economic equity.

Though farmers and NGO staff alike expressed their discontent with the speed of this process, lamenting that government schemes leave out the voices and priorities of farmers and their commitment remains artificial, there have been significant progress and successes made as a result of the formation of the CBOs, including the People's Manifesto (see Chapter 5) that have brought the demands of the grassroots to the government. It is important to highlight where Joshi speaks to

the particularly salient point, that on the one hand, while it is important to avoid the romanticized notion that rural institutions are without inequality, there is real importance in supporting local institution building to strengthen the capacities of local farmers to assume responsibility as stewards of their land and communities, rather than feeding into the narrative that the rural farming poor is trapped in a cycle of poverty outside their control and can only be pulled out through increased use technology and corporate agriculture (Akhter, 2019). In their article *Cultivating the Social Landscape* (Mazhar et. al 2007) posit there is a critical relation between survival strategies, ecological and biodiverse-rich production systems and the customary rights of the rural poor to define and govern their own food systems. Strengthening social and cultural landscapes of production and the institutions that guide them through concrete actions such as creating Village Development Committees to tackle issues related to development, biodiversity, climate and sustainable agriculture was one concrete way that the villages who partner with CECOEDECON were progressing towards more democratic and socially-equitable production systems that are more directly governed by local people.

Reconciling Modernity and Tradition for Agroecology

The development of farming practices among those farmers practicing agroecology or those in agroecological transition combine expressions of both indigenous knowledge and Western, or 'modern,' knowledge in a manner that meets their needs and goals while utilizing the resources that are available to them. The concepts of modernity in farming knowledge and tradition in farming knowledge

remain contested though for my purposes I refer to traditional methods as locally-rooted techniques developed and stewarded by small and tribal farmers, and modern methods to include methods adopted over the past several decades with the advent of the Green Revolution including the use of machinery. The system I observed and spoke with farmers about currently in Tonk, Jaipur and Arrah regions of Eastern Rajasthan borrow from both conventional methods such as the use of tractors for plowing and sowing, and agroecological methods such as dry-land irrigation systems, the use of locally-adapted seed and the application of traditionally prepared khaad [compost] and together are constantly co-evolving as farmers and civil-society (NGOs and CBOs) negotiate market forces and economic viability of agroecology, the lasting environmental degradation Green Revolution and dependency on chemical farming, the effects of climate change, international and national policy and constantly shifting donor priorities.

These aforementioned challenges have led civil society organizations like CECOEDECON and KSS to prioritize agroecological methods, while not ignoring the benefits of new technologies and concepts. Farmers that I spoke with who want to grow totally agroecologically, but do not have the means to fully transition, are actively working to decrease their dependence on chemicals because they have observed how the overuse of chemicals has contributed to hard and nutrient deficient soils. In some communities I spoke with, this manifested in spraying with natural insecticides, rather than chemical ones or keeping home gardens that served their family's food and nutritional needs while growing a single cash crop on small plot to meet other needs such as education, housing and transportation. Though in

contradiction to the aims of agroecology, this reflects the constraints under which agroecology is 'becoming' a path which has no defined trajectory.

Traditional and indigenous practices are managing to be commercialized through adding elements of modernity. An example is the concept of 'organic farmers market' in every village. The concept of 'organic' produce, or produce free from chemicals, is a concept borrowed and localized from the Western alternative food movement that reflects new rural development strategies that aim to cope with the challenges of globalization and climate change, and the externalities of productivist models. In my conversations with CECOEDECON staff I learned that going forward this is going to be a priority for their agricultural development programming because they recognize that simply revitalizing what is lost isn't enough to meet the pressure of the market that is constraining farmers' ability to transition to ecologically based production. Traditional agriculture is not able to adapt and adjust to rapidly changing circumstances in all cases and this reality is recognized by farmers and civil society alike. According to staff, though borrowed, appropriating and localizing concepts such as the 'organic market' with input from the Community Based Organizations and the Village Development Committees works to foster increased dignity and autonomy that comes with being able to access the means to raise and sell food where local farmers work and live while supporting local economies. In my interviews, when asked about the economic biggest challenge associated with growing 'jaavik' or ecologically, the most frequent response from

farmers was that they are not even able to get the Minimum Price Support¹⁴ for their crops, let alone the 10% increased price that should accompany produce and grains produced without the use of chemicals. Participants prioritized a response from the government to incentivize and support ecologically based production, especially during the period of transition from chemical to agroecological farming, however concepts such as the ‘organic market’ that are built by farming communities and civil society organizations such as CECOEDECON on the basis of mutual trust and social networks bridge the gap when the government support that exists is not meeting the needs of the local people.

3.5 Conclusion

Historically Rajasthani food crops, wild and uncultivated edibles and farming methods have been the product of traditional agricultural knowledge, obtained through research conducted by the farmers for centuries. In many of my interviews, I was always told about the ‘desi’ variety such as desi green gram or desi mustard seed vs the new cultivars or seeds from the outside. I was often told about the ‘desi’ way of farming, composting, irrigating, etc. versus the methods that have been adopted since the onset of the Green Revolution in India. These two visions of production are at odds with each other within the villages I went to, but overwhelmingly so, the dominant vision constrains the scope and scale at which traditional methods are being restored and revitalized. Top-down, broad policy trends that have favored Green Revolution-style methods and technologies and as a result have restructured

¹⁴ The MSP is set by the government of India twice a year for 24 commodity crops to safeguard the farmer to a minimum profit for the harvest, if the open market has a lesser price than the cost incurred. http://agricoop.nic.in/sites/default/files/MSP_2019-20%20%28English%29.pdf

the social and ecological dimensions of agriculture. This restructuring has greatly impacted small, indigenous and marginal farmers' ability to be self-sufficient in production and will prove more precarious as the effects of climate change magnify.

What has been 'lost' or the elements of successful agroecological production are considered important by farmers and NGO staff to bolstering ecologically based agriculture and increasing resiliency to climate change in the region. These 'building blocks' of agroecology as I identified above, are built from living tradition that shapes the religious, cultural, and social relationships as well as the fundamental connection between humans and nature. Farmer's perception and understanding of their agroecological ecosystem including the surrounding ecology, crops, land, livestock, and labor had a profound impact on how they performed day to day operations and adapt to change. Stitched together these relationships are what constitute indigenous institutions that govern community values, decision making, and cultural practices related to agricultural production. The strength of these institutions "depend on how successfully future citizens are introduced to the heritage that generates respect for these institutions" (Mahale, Soree 199, pg. 41). The work of CECOEDECON to restore these relationships and institutions was grounded both in the physical aspects of improving infrastructure and aspects of production such as traditional compost and water storage well as the social and cultural aspects of production that allowed for tradition and modernity to co-exist, efforts which I saw as potentially strengthening the possibility of wider-spread change and deepening food sovereignty. Still there is much tension that take place in the modern-day arena of agroecology as farmers work to meditate contradictions and challenges that come with combining

traditional methods associated with agroecology with modern technology in a time of significant uncertainty.

In the chapter to come, I discuss the transformative power of grassroots movements and civil society organizations in mediating inequalities that are in opposition to realizing agroecology. I provide details on the various intersecting forces of inequality in agriculture that exist in the region and how participatory programs that prioritize agroecology are working to mediate these inequalities. I speak to my experience working ‘on the ground’ and provide insights into how civil society organizations are collaborating with farmers to create participatory and empowering spaces that center farmer voices and priorities.

CHAPTER IV

THE TRANSFORMATIVE POWER OF CIVIL SOCIETY AND GRASSROOTS MOVEMENTS

Introduction

The food system across Rajasthan is in a constant and unstable state of flux as it responds to and absorbs a wide range of forces stemming from the neoliberal regime such as (re)negotiation of trade agreements, shifting consumer demands, and ever-evolving technological changes in production, processing and distribution (Andree et. al, 2019). At the same time, across the Rajasthan and in Northern India in general, there is a bubbling cadre of grassroots farmer, artisan and producer movements, thought leaders and activists and civil-society organizations that are responding to this instability in the food system. Mirroring rural agrarian transformations around the world, the food and agricultural systems in Rajasthan are characterized by increasing corporate control and privatization of land, volatile and globally dictated markets, rampant commodification and trade liberalization, ever-widening disparities in power and wealth, and increasingly erratic climatic conditions. Civil society and grassroots farmers movements are responding directly to this volatility and instability by organizing around alternatives that work to build a more equitable and sustainable path forward (Amin & Patel, 2011). The externalities of the neoliberal food regime across Rajasthan are causing significant agrarian distress as systems seem to have reached a breaking point after decades of intensive, chemical farming.

This historic rupture in the dominant paradigm of food and agriculture, the urgency at which the scientific community in India is imploring the country to undertake a rapid and drastic response to the impending climate catastrophe, and the increasing public awareness among Indian citizens in regards to the health, environmental, economic consequences of industrially farmed food are all culminating into a unique time, space and place for negotiation by the movements, organizations and the initiatives they spearhead to further assert their ‘place at the table’ (Andree et. al, 2019). As a result of this juncture, some aspects of alternative paradigms to industrial agriculture that food sovereignty and agroecology have been brought more into the main frame of agriculture and climate change policy and development. This echoes the work of Gaarde’s (2017) conclusions on peasants envisioning a path for global society when he writes: “peasants, indigenous people and other historically marginalized groups of society are presenting themselves as a solution to feeding the planet, protecting the environment, and limiting global warming” and as a result, many of these actors working across the spectrum have:

Coalesced to lead an agroecology movement which integrates food sovereignty within a framework that foregrounds ecological and food justice goals, espousing an alternative vision with a food systems approach that pays equal attention to ecological regeneration, producer livelihoods, well-being, and food justice.

During my collective 10 months in India working within the agroecology and food sovereignty movements as an intern and researcher, I myself became embedded and entwined within the many overlapping circles of NGOs, activists and farmers unions from Delhi to Rajasthan, Odisha to Kerala, Uttarakhand and

beyond who, driven by a strong sense of hope, are determined to chart a new course for agriculture that is pro-poor, pro-farmer, ecologically and socially sustainable, economically viable and importantly- fair and just, for kisan swaraj and anna swaraj (farmer sovereignty and food sovereignty). From this vantage point I witnessed and experience the transformative power of the grassroots from many angles, from participating in a protest with Navdanya against FSSAI who, in 2018, were passing a regulation to allow up to 5% GM-positive contaminated foods to go into mainstream consumption channels unlabeled. In a symbolic move, we delivered a bouquet of foods that tested GM-positive and a basket of foods that contained native seeds, pulses and oils. Another memorable engagement was during my field work in 2020 while at CECOEDECON I worked providing event support at the UN India's National Voluntary Review on Farmers where I monitored 6 different sessions and checked in farmers, grassroots leaders, UN officials giving them their name tags and tote bags with notepads, pens and the day's official agenda. In addition, I was involved in working on editing project proposals such as PAHAL, a women-led farmer initiative that aims to recognize tribal women engaged in agriculture as farmers aimed at:

[...] Helping women in agriculture in Rajasthan realize their true potential as farmers, to work collectively to showcase their knowledge and demand their space through creating champion women farmers that have the ability to develop, refine and share agriculture, food and nutrition solutions in their local communities. The approach is based on promoting the traditional wisdom of women and local practices and the focus is on reducing input intensive production practices and reviving low cost technologies and agro-ecological ways.

Doing administrative work such as proposal editing was equally as valuable and insightful as participating in events and demonstrations, going to the project field sites and farms, and interviewing farmers. Through engaging in the movement as an intern, I was able to actively participate in the spaces and containers that the civil society sector aims to carve out for farmers, their rights, and their livelihoods and the scaled-out projects that support these aims. From these firsthand experiences as a researcher, intern, and activist, I witness how the global instability in food and agriculture systems is deeply reflected in the local contexts of the conditions under which small, marginal and tribal farmers operate. This instability shapes the issues which both grassroots movements and civil society organizations like KSS and CECEOEDCON take up as their priorities thus shaping the transformations taking place.

These transformations I witnessed were brought about by a hybridization of peoples' movements and NGOs that are occurring from 'below' from the grassroots and civil society levels, from 'within' through policy mechanisms and civil society lobbying change from the state level, and 'above' from negotiating space within international governing bodies. These forces are all impacting small and marginal farming in Rajasthan while also being influenced by them, something I will discuss in more depth in Chapter 6. In the previous chapter, I provided a 'view from the ground' on the competing modalities of production and how these modalities are working to shape both the agricultural crises currently unfolding across Rajasthan and the initiatives of the grassroots 'agroecological first responders' who are using agroecology as the main vehicle to forge a pathway for increased farmer sovereignty

and resilience to climate change. In this chapter I look at the transformative power of the grassroots in the ‘real world arena of food sovereignty’ (Ehlert & Voßemer, 2015) by focusing on the everyday practices and challenges of farmers and their supportive NGO counterpart (CECOEDECON) face in trying to push for agroecology. I build upon my discussion from the previous chapter by taking a deeper look at what structural forces farmers are pushing up against, and the transformative power of civil society and grassroots movements have in shaping and reshaping these forces. I do so by putting the findings from my interviews on the major barriers to enhancing the capacity of agroecology with the literature, while providing concrete examples of how these are negotiated on the ground. In doing so, I also reveal contradictions that are happening among farmers and NGOs whose priorities and rhetoric did not always align with their actions and in some cases, did not align with the typical framing of agroecology and food sovereignty in much of the academic literature which squarely focuses on ‘working against’ neoliberal food systems and the reconfiguration of political and economic relationships in food and agriculture.

With any critique I offer in this chapter, or throughout the thesis in general, my goal is not to criticize the efforts of my non-academic collaborators, efforts which I commend greatly and efforts who help shed insight not only onto the struggle of farmers in Rajasthan, but onto small farmers all around the world. Rather, any critique I offer is meant to foster mutual learning and suggest ways forward that could mediate some of the friction for agroecology to have longer-term and more resilient, salient societal impacts.

“So How Do We Break Cycles of Chemical Dependency and Deal with the Changing Climate?” Piecing Together Agroecology as a Means to Address Gaps Between Farmer’s Immediate Needs and Socio-Ecological and Economic Realities

As food systems across India face threats and challenges on multiple fronts, from a climate and environmental point of view, Rajasthan faces unique challenges being the largest state with 10.5% of India’s land mass holding 14% of India’s cultivatable land, but only 1% of water of the entire nation (Rajasthan State Water Resource Planning Department, 2010). The Rajasthani farmers that I spoke with who hold small and marginal status face social, environmental economic challenges that mirror that of other farmers of similar status across India such stagnated production (higher production costs and reduced income resulting in indebtedness), a decline in the water table, increased environmental toxicity and overall land quality degradation. The ecologically precarious condition of farmland is one significant factor that contributes to the diminishing viability of farming as a sole and profitable livelihood option. Combined with social and economic challenges, there were varied intensities of expression across the districts in which I worked, with farmer suicide and severe hunger, poverty and malnutrition being some of the most brutal and being driven out of farming into the informal wage economy being less brutal, but nonetheless incredibly straining on farming families and their communities. This environmental erosion, erosion of knowledge systems for ecological farming and the response from civil society is described at length by Ritu Tiwari in her narrative:

In farming, the biggest challenge which we face is because of climate change which is in some ways caused by industrial farming itself, but it causes insecurities in all types of farming, especially subsistence. The environmental reality is that now environmental systems are completely unpredictable. In Rajasthan, environmental realities are harsh, we are used to getting little rain, especially in desert, but farmers have traditionally used dry land farming techniques that are suited for this climate, which are very low input. Farming is completely dependent on the weather conditions and in Rajasthan mainly farmers are smallholders as compared to other places in India whose climates can support larger, industrial farms. We can't support that as much, but still using those methods. Why? And the farming is mainly for subsistence, especially the farmers with whom we work, their farming it is not the commercial farming. Many farmers in this area have shifted to cash crops, but it is on small plots. As we fall into a dry climatic zone, farming is completely rain fed agriculture- we don't have many other irrigation sources available in our area. Farming is completely, completely dependent on the rain fall. Due to climate change the rain fall is unpredictable, you cannot predict whether it will rain or not sometimes we get abundance of rain. In Rajasthan we have the least amount of ground water availability in all of India, less than 1% so you can assume how grave the situation is. The second challenge is that because of government policies during and after the Green Revolution period they used to spread chemicals and other things, like anything, chemical fertilizers or pesticides or insecticides, anything, they didn't care they just wanted to have bigger yields and this was a direct result of policies that supported this. If the government is saying to farmers "Ok you have to apply for example 10kgs this chemical" and if I don't have that much awareness, I am thinking that "OK if 10kgs will work why don't I put 12kgs or 15kgs so I can get more benefit out of that crop?". From this excess, water has been contaminated. From this excess, soil has been completely contaminated, the soil quality itself has been greatly reduced. And the water sources are very scarce like I said, now they are contaminated too. All these things completely impacted the agriculture of this area, so this is the major challenge we face, it is this combination of climate change and the externalities of industrial farming. So how do we break these cycles of chemical dependency and deal with the changing climate? We have to build awareness through education, through modeling and through participatory governance and that is what we try to do.

-Ritu Tiwari

Fertilizer, pesticide and fungicide-intensive technology has been so heavily promoted in Rajasthan's agriculture that it has brought about extensive damage to soil quality in terms of its physical, chemical and biological ability to support healthy plant growth and crop production (Sharma et. al, 2015). The continuous nutrient

mining that occurs from intensive planting of crops that require high nutrient levels has led to a cycle of depletion and replenishment that necessitates a basic reliance on fossil fuels, thereby significantly increasing pollution of surface, atmospheric and groundwater resources in the production stages (Ghosh, 2004). In my interviews it was expressed that over the past several decades, the once short-term rewards of higher yields and higher profits have significantly diminished as farmers face head on the environmental consequences from long-term usage of chemicals and the relatively newer challenges associated with climate change. Not only have these methods proven to be counterproductive ecologically, but at the same time economically unviable for farmers who have taken on increased financial burden and are now not seeing the financial benefits of chemically-based agriculture, especially given the withdrawal of subsidies for inputs and exposure to global competition after the liberalization of the agriculture economy in the 1990s which has transformed soil to be intensified as a commodified resource in search of higher productivity and profit margins (Ghosh, 2004).

Take for example my conversation with Ramesh, a farmer from Jaipur district:

M: What is the biggest challenge you are going to face in coming future related to climate change?

R: First of all, it is the chemicals that we cannot continue. Today farmers are running after the government, but one day government will have to run after the farmers. We can't eat money and we can't eat the chemicals, then they will ask the farmers to grow crops this way [ecologically].

M: What are your thoughts to resolve the problems which are arising because of chemical farming you have described? Are any current government policies affecting your production?

R: If we go as per their policies then we have to suffer many losses.

R: We should go to all the villages and we should inform farmers about it, we are spending a lot on tractors and machines, in spite of this if we go the way of old methods of our ancestors, using animals to plough the fields and all, then our life will be better. There are no second thoughts about this, we do not need mobile phones, tractors or any machines for farming. The amount of money we are spending on all these, if we stop that then our lives will be better.

The ecological reality of agriculture in Jaipur, Tonk and Arrah districts is that farmers are dealing with the ecological consequences of chemical-farming and the impending changes associated with climate change, while at the same time depending on aspects of chemical farming each season, given that their livelihoods and economic security are intimately tied to each harvest. Thus, they are presented with a set of constrained choices each season, which despite being part of a broader movement for agroecology, results in them having to take part in actions contradictory to their motivations and ideals such as having to spray their crops in an emergency situation or choose to grow a cash crop that may be more profitable in the short term over a local variety. These risks of production are unevenly distributed between social groups within the immediate localities of the tehsils, but also beyond the immediate locality within the district and state (Taylor, 2014). The multiple and overlapping dimensions of agrarian distress felt by small and marginal farmers in these three villages cannot be understood in abstraction from the dynamics of power, access to water, inputs and credit and neither can their movements for transformation. In my observations, the political contention and friction felt between the state, rural development organizations and farmers movements has been one of the driving factors that has set in motion the precedence for developing and scaling out ecologically based alternatives.

However, given that the success of agro-ecological production can only be realized fully if implemented within wider frames of systemic socio-ecological and economic transformations, there needs to be some sort of bridge between point A and point B that addresses the gap between farmers' immediate social, economic and environmental needs and wide-scale change towards building more equitable and sustainable agrarian conditions. As previously mentioned in the introduction to this chapter, during my time in the field I witnessed farmers working with rather than against NGO community in a hybridized manner to formulate and piece together agroecology on the scale of the farm through adopting components as the resources to do so became available to them, with the larger recognition and vision that working from the farm level was powerful compromise of articulating alternative paradigms that have the potential to alter the dimensions of power in the long-term while also addressing the constrained realities on the ground in the immediate.

Addressing Inequalities: The Formation and Power of Hybridized Movements

During my time in the field, both grassroots movements and civil society organizations stood out as the most prominent of actors in agroecology. Some organizations such as CECOEDECON focused on changing physical conditions and realities of agrarian communities on issues related to livelihood security, education, governance and gender equity, while others I interacted with such as PARVI worked on larger-scale policy change at the state, national and international level in the realms of food and agriculture related issues, engaging in political forums, research and advocacy work. Farmers belonging to grassroots unions such as KSS also worked in connection with these larger organizations, across these various scales. In

my conversation with a farmer from the Tonk district, Rishabh, he told me about this connection:

M: Can you tell me about your work as a member of KSS?

R: We conduct a meeting every month in KSS and if anyone has any issues related to Panchayat or related to Tehsil, or related to pension or any other issues, then we give them suggestions regarding that and that how they should take their concerns further. This is what we do, we conduct a meeting every month and our board is parallel to Panchayat, we conduct these meetings on CECOEDECON grounds or in big open areas in the village. And we help to instruct farmers and also the Panchayat.

M: As a KSS member, what do you do with CECOEDECON? I know your meetings are here, but what else?

Male: If farmers are facing any issues then we go to them [CECOEDECON] to address these concerns at different levels, we use their letter pads for concerns and raise their concerns all the way till New Delhi, we inform Central Government as well regarding their issues.

Here, Rishabh draws upon the connection with CECOEDECON, a formalized civil society organization with his farmers union. This connection ultimately allows him and other members of KSS to be able to bring their concerns all the central government or as he puts it “all the way till New Delhi”. This is not to say that Rishabh and KSS would not have the ability to do otherwise, but the advocacy and work of CECOEDECON has broaden the container, opening up greater space for the concerns of farmers to be heard directly. Their relationship is mutually enriching as they collaborate to address wider and shared concerns to centralized forms of power.

Something else important about Rishabh’s comment that I would like to point out is when he says: “we use their letter pads for concerns”. At the annual meeting in Chaksu, UNVR on farmers in Jaipur, and in my field visits I always saw members of different villages using notepads with the CECOEDECON label on them. They used these notepads to keep track of crop data, track progress with

different initiatives in the village such as irrigation pond projects or to brainstorm and record ideas generated from group meetings. On the surface this may not seem like it holds much significance, as it is only small provision from an organization that receives a good amount funding each year from different foundations and multilateral organizations, however, the simple act of providing the materials that allow people to address their concerns is powerful in small villages that might not have a stationary store or the financial means to spend extra income on pads and pens. I remember witnessing the chipper expression of farmers as they picked up their nametag, notepad, pen before meetings and I noticed farmers would often show up to these spaces on their motorbikes with CECEOEDCON notepads already in hand. Even I got handed a diary on my first day as an intern in the fall of 2019, which I have just now finally filled. The notepads opened up spaces for creative expression, too. While I was attending a panchayat election ceremony in Niwai in Tonk district, a farmer wanted to read out his poem to me:

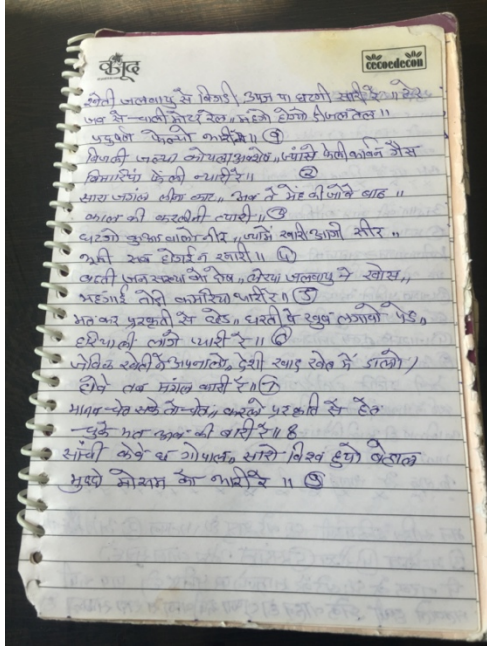


Figure 6



Figure 7

When we start all the machines, diesel and petrol increased and with it, pollution
 When we start fossil fuels, the carbon gas increased and with it, disease
 The population is increasing, and with it, the price of inputs to farm
 The water level of the well is decreased and with it, chemicals in water increase
 We cut down the jungle, but my dear friend you are waiting for rain?
 I am calling everyone: do not intervene in the processes of nature
 If you are to intervene, only plant, plant trees and plant them by the many
 We will become a green globe
 I am calling everyone: we need to start organic farming now if we are to adapt
 Indigenous knowledge, indigenous compost, indigenous way
 When you begin this way, everything will be better
 The time to start is now, it already has been time
 If you are playing with nature you must understand the consequences
 My name is Gopal, and I am saying these truths from here this village
 As the whole world is experiencing the same

The CECOEDECON notepads to me, were a strong and significant symbol. A symbol that represented the connection between farmers and their existing grassroots unions and organizations with CECOEDECON and civil society at large and how, in their melding, their ability to address issues to GoI and international levels of agricultural governance was strengthened. These notepads

were the only thing consistent thing in all of these spaces and traveled back to villages serving as records of the conversations and discussions held.

While the difference between grassroots movements and formalized, professional civil society organizations (non-profits and NGOs) can be stark, their approaches are not mutually exclusive, nor do they have to work in opposition to each other. While recognizing the critique that in India NGO dependence on donors inevitably alters in some ways their agendas and priorities, thus potentially weakening the links to the communities and movements within which they work (Roy, 2014) in my observations, the reality on the ground was more complicated and nuanced.

The spectrum of civil society actors I interacted with who were working towards a transformative agroecology, ranged from more de-politicized NGOs such as CECOEDECON, to very politicized NGOs to professional development organizations who receive funding from state or bilateral, multilateral or foundations to implement specific, usually time-bound projects and of course grassroots people's movements and farmers unions organized by rural communities. These groups were most certainly distinguishable, however, as I experienced and spoke to, their melding is fostering creative solutions that advocate and mobilize around the interests and needs of local communities based on the resources available to them and their mutual goals.

In the middle of this spectrum is what Hasenfield and Gidron (2005) call 'hybrid organizations' which combine methods of development and of resistance, organizing and developing projects that addresses the weaknesses of grassroots

movements such as fragmented political environments and organizational issues and work to address the major critique of the civil society organizations: the 'NGO'ization' and co-option of the movements by learning from their approaches and working for specifically for communities subjected to the highest forms of marginalization in Indian society. On the ground, these hybridized movements find powerful synergy and resonance in their shared aim of revitalizing, retaining and protecting aspects of traditional Indian agriculture knowledge and practices while creating new paradigms of participatory governance, women's leadership, rights and justice for those who are marginalized. I believe it is important to adopt a more holistic view of what constitutes movements vs. civil society organizations, seeing movements and the NGOs that work with them as diverse and vibrant people-centered approaches that enrich the mutually supportive components of civil society, rather than focusing on what divides them. As described in the previous section, the resulting socio-ecological infrastructures and institutional configurations that provide access to inputs and water as well as land and credit are interwoven by caste, class and gender and subject to the complex socio-ecological power relations that animate the agrarian environment as are the processes of climate change adaption (Taylor, 2014). The hybridized movements with whom I interacted with are focused on mediating these forces by building empowerment and agency among those most acutely affected by the intersection of climate change and inequality to facilitate the conditions under which agroecology can take place.

CECOEDECON Parivaar: Seeing the Whole Community

In their work, CECOEDECON focuses on several aspects of community-based development and empowerment in agrarian communities: gender, education, youth empowerment and protection, health, entrepreneurship, natural resources and agriculture. They explicitly focus on “sustainable agriculture and economic justice” as a single united theme of work. The following excerpt from their materials describes their aims in this realm:

It is the vision of CECOEDECON that the sustainable economic development will contribute to achievement of the goals of reducing hunger and poverty. Our aim is to demand justice from economic development through ensuring equitable benefit sharing, participation in decision making, assertion of basic human rights in the development process and government accountability towards the general public for the impacts of its decisions. The three issues covered in this theme are Biodiversity, Climate Change and GMOs. The overall goal of Economic Justice theme is to catalyze people’s participation in decision making and to ensure protection of human rights in the process of economic development. In livelihood security, we are focused on sustainable agriculture through farmer-to-farmer learning approach, access to productive resources, risk reduction initiatives, promotion of off-farm and non-farm livelihoods and linkage to multi-level action on policies related to food and agriculture - in order to achieve security of agriculture based livelihoods of the partner community. Over the years the organization has built up understanding on climate change impacts on agriculture. The organization has promoted rainwater harvesting, tree plantation, organic manures, seed saving, agro-horticulture, agro-ecology, kitchen gardening and livestock breed improvement for sustainable agriculture. Discussions with community have led to identification of these practices for climate change adaptation (CECOEDECON, 2020).

Notice here the use of the term ‘partner community’. In every one of my conversations with CECOEDECON staff I never once heard the word ‘beneficiary’ or ‘recipient’ communities. The communities in which the organization worked were often referred to as the teachers, the innovators and the catalyzers of change. See the last sentences in the excerpt above: “The organization has promoted rainwater harvesting, tree plantation, organic manures, seed saving, agro-horticulture, agro-

ecology, kitchen gardening and livestock breed improvement for sustainable agriculture”. Discussions with the community shouldn’t seem so radical, however, farmers historically have little to no involvement in the formulation of policies for agriculture development or the development programs that affect their livelihoods, the roles and rights of farmers have in the past often been neglected by both governments and donors and sometimes even implementing partner organizations. More recently farmer empowerment has been put on the agenda on various scales from the UN, government and donors and is now an integral part of many international development organizations and NGO’s policies for supporting agrarian communities and rural development. However, the organization functioned more than just a space of empowerment, it was community, a base, a home and a family to many people, staff and community members. A phrase I heard more times than I can count was the: “CECOEDECON parivaar” meaning, the CECOEDECON family. This phrase was echoed at formal meetings such as the 2020 Annual Meeting, during interviews with farmers, during informal conversations with coworkers, and were some of the last words spoken to me as I was making my return home to the United States “you will always be part of the CECOEDECON family”.

While the organization focuses specifically on agrarian-based communities, many of which belong to STs and SCs, they do not only focus on agricultural programs and projects. The organization focuses lessening socio-economic inequalities by demanding equitable distribution of the benefits of economic development, assuring community’s rights and access to basic services, and enhancing the overall ability to hold productive livelihoods, both on and off farm.

Agroecology was often a vehicle to do so but was used in tandem with other strategies that aimed to address wider issues of socio-economic inequity. Many of these were directly and indirectly tied with agriculture sector, such as their efforts for water conservation and natural resources management, but there were also significant efforts towards other issues such as sex trafficking and education with a strong focus on strengthening local institutions. I appreciate the way that Mr. Paul, coordinator of programming, places himself in these efforts:

The major objective of us as a civil society organization is to build power and capacity of rural communities by addressing underlying root causes of social and economic inequities. This is how we work with communities to design projects. Very often most of our projects do this by design so they, [farmers] can take action directly through village level institutions. Capacity building and empowerment on the local level and at the same time, when they require support to take up their own issues such a crop failure, minimum support price for crops, this is where we try to help at bigger levels. We do capacity training on institution building, to enable people to build the structures that will allow them to take action, to claim rights and then at the same time we also work with these local institutions to demonstrate on these things we've learned work to mend some inequalities: women's groups, intercropping, cover cropping and we provide this directly where we help with inputs and infrastructure such as compost or irrigation ponds. So, it is like hardware and software. Hardware is there, but we mostly do software to build their own capacities. Network, relationship and capacity.

As evident from this quoted excerpt, the staff at CECOEDECON “see the whole community” rather than solely focusing on building the capacities of farmers for organic/agroecological farming, they focus on the community as a whole and their ability to build out their own institutions and capacities which results in empowerment from multiple fronts. A memorable moment from my time in the field was at CECOEDECON's annual meeting which I speak more to in the next chapter. Held at the Chaksu campus, the annual meeting happens once a year over three

days' time and is a chance for CECOEDECON and the communities with whom it works to reflect on the past year and vision for the coming year. At the end of three days, there was a small award ceremony to honor the work of certain CECOEDECON staff and community members of the partnering communities. What stood out to me from this ceremony is that as the MC, my officemate Alokji, started to describe who the award was for giving details on who this person was and what this person did but withholding their name, the audience began shouting the person's name. Farmers at this meeting came from different parts of the state, yet they all immediately knew whose name was about to be called just by the description of who the person was as a human being and the efforts they had brought the previous year. As I spoke to above, the organization served as a home-base and family to many, farmers, communities and staff alike. At the annual meeting, I got to talk to a few farmers about their experience with the organization and how they saw themselves as agents of broader change. I wrote down in my notepad a quote from one farmer saying:

Many difficult things are happening in farming from the climate side, economic side of things too. But I think the solution is simple. We should plant more trees, and this would help some of those affects. And it is happening here. We are planting more trees and because of our organization these problems helping us a lot. And what I have learnt from being here is that our organization is doing good work (Anonymous, Dec 2019).

The way this farmer talks about “our organization” and “we are planting more trees” is the same way that nearly all of the others did. As an outsider, it was sometimes hard to tell who staff members were, and who were long-time members of a partner community, Village Development Committee or CBO, because these

roles seemed almost interchangeable. By the end of my time at the organization I had a much better grasp who was who, but it was clear to me that this “CECOEDECON parivaar” that had formed throughout the nearly 40 years of the organization’s working history was a key factor in the successes communities have seen.

By taking an explicit focus on the root causes of socio-economic inequity through project design, creating self-empowering institutions the organization could address wider issues related to farming communities, not just agricultural ones. This worked to not only empower, but to create a community, or “family”, that worked to ameliorate typical barriers in India society that otherwise hinder the strengthening movements for agrarian change: rural/urban, education/uneducated and upper caste/lower caste to advance the shared vision of upholding agrarian communities, and attaining the ability to exercise not only their right to determine their own food and agriculture systems, but to build out on their ability to adapt to the changing climate thereby strengthening the local institutions that guide these processes. I touch on two of the most social significant barriers to realizing a stronger agroecology in Rajasthan: caste and gender in the following sections.

“I’d Like to Speak to Only the Women” On Grassroots Women Leadership, Climate and Agroecology

Vulnerability to climate change is shaped by peoples’ relative position in society and access to knowledge, as is their ability to adapt (Taylor, 2014). While climate change poses a significant threat to smallholder farmers across South

Asia, men and women are being affected differently. Social processes and relations that dictate the potential for adaptation and resilience to the negative effects of climate change – including marginalization and exclusion - are often deeply gendered and are layered by other forms of social inequality such as class and caste (Bezner Kerr et. al, 2017). It has been well-documented that women are often excluded from extension services and shown that the gendered nature of agriculture science, women have unequal access to resources and their knowledge and vision of farming is not reflected or adopted in policy formations (Sachs, 2018; Chiappe & Butler, 1992).

At my field sites, women participated in the majority of agricultural labor, but were not recognized as farmers, hence they are unable to get direct access to credit and other benefits of government schemes directed at farmers. The large number of women who engage in agriculture labor in Rajasthan are often clustered around the poverty line and are thus more vulnerable to the variances in production due to climate change especially given their layered roles in social and ecological spheres of daily life as child bearers, caregivers to children, elderly and animals as well as their migratory roles fetching fodder, fuel, and water as well as having to seek wage work significant distances from their villages. Women farmers' mobility and access is hindered due to socio-cultural constraints that dictate the roles and duties of women, thus limiting their access to technology and knowledge (Ferguson, 1994). Their work in agriculture is virtually invisible in the dominating policies and technological approaches that dictate production. High-scale technological approaches effectively make obsolete women's roles in agriculture and “with them their roles as the

maintainers of sustainable soils, forests, and food for humans and animals” (Ruether 2005).

This was reflected in the way Ms. Aparna Sahay framed these issues in her summary of the women-led discussion on issues facing women in agriculture at the UNVNR on “Leaving No One Behind, Women Farmers”:

Masculinist technological innovations and new knowledge systems have posed a double-edged sword for women farmers. While technology applications have reduced labour requirements, they have displaced women from labour opportunities and largely ignore small farmers; technological applications for the drudgery and tedious tasks that are women’s roles in the gendered division of labour are few and far between and receive little investment. Technology choices have also shortchanged women and nature in terms of the priority set for enhancing productivity over addressing basic needs and maintaining ecological balance.

In the areas in which I worked because most women fell into the category of small to marginal farmer they engaged directly in production. While some women used components of ‘technological’ and ‘new knowledge systems’ as Aparna ji categorized, these approaches these were often low scale. Women still had a close proximal relationship to agriculture and forest management, providing them with a deep and grounded experience and knowledge of farming activities such as soil management and fodder and seed quality. Despite this, as Bezner Kerr et. al (2017) point out, the gendered nature of agriculture knowledge in science largely shapes political and economic processes of agriculture, from which women are excluded. This exclusion often results in the lack technical information that might assist them in farming and their needs and their preferences while systematically excluding their concerns from research priorities of the state. As a result, the gendered nature of agricultural science and knowledge distribution has implications for women’s labor,

limiting their exposure to both the dominating technological approaches and alternative methods such as agroecology that could enhance food security and facilities greater resilience to the negative effects of climate change.

When I attended meetings, gatherings or election ceremonies, I usually got to interview several farmers who were in attendance. Typically, myself and a member of CECOEDECON's staff would pull two or three farmers aside before the programming started, or after it had concluded and go through my interview questions in a group or one on one. If I wanted to speak to women, I would specifically have to ask "I'd like to speak only to the women" and even then women were sometimes accompanied by men or were represented in a group by 3:1 or 4:1. I can only recall one specific instance where I was able to talk only to women. When asked "what are the largest issues facing women farmers" and "how does climate change affect female farmers" women often did not distinguish their social issues with economic or environmental issues. Take for example my conversation with Aditi, a female farmer from the Niwai district:

M: As a female farmer what is the biggest challenge for you? How does climate change affect you?

Aditi: If there are no rains then we lose our crops, we are always worried about that and during winters at times we have hailstorms and the crops get destroyed. We face such problems. Not getting proper electricity and lack of water. It affects our budgets if crops go in loss then we have no livelihood.

This trend was present throughout all my interviews with women at different CECOEDECON campuses. In my interviews, I also posed this question to all the men to better understand their view of gendered ecological production and climate change adaption:

M: We spoke a lot about climate, social and economic issues facing farming today, and especially organic farming. What do you think women in your village are facing because of this?

Sunil: There is no such difference, these days it is same for all, women are doing the equivalent work too. They work in the fields along with men.

The way that the female and male farmers I spoke to represented women's issues in agriculture and adaptation stood in contrast to the way that CECOEDECON represented these issues. Expressed by CECOEDECON staff, it is difficult to change these entrenched realities given the fact that despite doing the majority of agricultural labor, women don't necessarily see themselves as farmers nor do their male family members. Without entitlement to land, access to market structures and extension resources and access to government schemes directed at benefiting farmers, women are structurally and systematically excluded from the decision-making processes that dictate production. This is only exacerbated when layers of discrimination overlap for women belonging to Scheduled Castes and Tribes who face social stigma as well as higher rates of illiteracy. In my conversations with Ritu ji and Vibhuti, we discussed these issues at length:

A huge social challenge, you see from the farming perspective, you won't find female "farmers" but in farming, 70%... 75%... no 80% of the farm work in Rajasthan itself is done by women! With land entitlements and the ownership, production and decision making- what to grow, where to sell, whom to sell, what prices we need to get, women don't decide on those things- only men decide on those things. So, addressing gender in land ownership and on-farm decision making is itself a huge social barrier that we need to address. We are trying through SHGs and CBOs as well as making women leaders in sustainable agriculture, especially ones from marginal positions such as SC or ST because they hold a lot of knowledge that is not valued as such. Building these capacities of women farmer to know their rights and act on those rights and also spread awareness on agroecological farming. This is the female perspective and probably the only way forward

as I see it.

-Ritu Tiwari

We are facing pressure, but we need to understand that we need to give what is due to the farmer who is putting food on our plates, the due economic value to their production. If we fail to do this, we will not be prepared for the future challenges. But who do we consider the farmer? The problem here is women don't have identity as economic actors or as farmers. Schemes to address this are in name, but not in action. Women *are* farmers, do a majority of agricultural labor thus should be treated as such, not as marginal contributors to production. They do not make decisions around markets, credit or land entitlements as this is dictated by men, so the labor is theirs, but not the access. We are actively trying to voice this at different platforms and support women farmers getting their rights and also getting them recognized as farmers and their contribution to agriculture and household economy. But, that area needs a lot of resources and efforts as even now women might not see themselves as such.

-Vibhuti Joshi

The transformative power of CECOEDECON lies in its ability to create layered platform or 'nested ecologies' (Bronfenbrenner, 1979) for issues in agriculture production establishing linkages between micro, meso and macro issues in agrarian communities. The work done in the realm of women, agroecology and climate is no different. The people-centric, bottom-up planning and implementation approach works to ensure equal participation of women and fosters women-led programs bound to local institutions of governance, feminizing agriculture development through recognizing women's contribution to agriculture and educating women as grassroots leaders.

While grassroots farmers movements across India have gained national and international platforms, women often lack representation and voice in these spaces and this results in the lack of negotiation of power and exclusion of decision making even in the counter-hegemonic spaces that the unions and movements are aiming to create. Despite the multilayered of challenges that women face due to the climate

change including increased physical, disease and care burdens of both family and land, increased emotional stress stemming from uncertainties in production and potential security risks that come with migratory labor, the close engagement women have with manual labor associated with production on agricultural and forested land gives them a unique understanding of the biological, social and cultural webs of production. The organization's view of on this role of women in agroecology offers a pathway to aid in the redistribution of gendered power and shifting of social relations by placing women at the center of solution building and in leadership positions which value their roles in food, agriculture and nutrition. Through women's social identities as nurturers of household and land, they are uniquely situated to spearhead agroecological solutions that aid in enhanced nutrition in food insecure areas and climate solutions through the use of traditional methods and landrace crops that are better situated to foster ecological restoration and resiliency. At the village-level, CECOEDECON is working to train individual women, for example, Kamla ji an organic farmer in the Jaipur district on integrated agro-farming models and techniques such as poly-cropping, vermicomposting and composting, integrative weed and pest management, soil health management, detailed in the next section. In addition to training individual farmers, the organization aims to create a network of these "champion" women farmers specifically from tribal communities to lead the sustainable agriculture movement at the grassroots.

The platform and network they are fostering strengthens the individual capacities of women by offering low-cost technical inputs that are based on existing, indigenous farming knowledge and work to help women create demonstrations of

integrated consumption and production practices based on local knowledge, agro-ecological approaches, traditional food and nutrition practices. In addition, the project which targets a large number of villages from the Sahariya and Bhil tribal communities aims to scale women's leadership through promoting farmer to farmer learning approaches. The goal of this particular initiative is that by training individuals, the individuals will then receive enough training to become trainers themselves and can disseminate information to women in their village, building linkages with relevant government schemes when the alignment is there. The farmer to farmer and farmer network approach is a means for women to engage in dialogue on agricultural issues and pool ideas and financial resources. As women rely on informal networks for information this approach challenges the dominant paradigm of knowledge production and dissemination by making it female-centered. Through taking a focus on tribal women and working to elevate their perspectives and knowledgebases, concerns and priorities in agriculture these initiatives are working to challenge dominating social ideas of whose knowledge is valuable and whose knowledge counts in agriculture.

In her article, Sarah Jewitt (2002) engages in the ecofeminist debates regarding women's agriculture knowledge and the dangers of overestimating women's agroecological knowledge assuming they can easily participate in projects and warns of the "mainstreaming" of gender issues will conceal problems women face in navigating the social relations which limit their power to form agricultural and environmental knowledge and the right to express them. The work of Bina Agarwal's (1994) on land rights and forest management in India demonstrates that female

empowerment within the nexus of forest and ecological/organic agriculture management does often lead to less intensity of food insecurity and malnutrition while aiding environmental sustainability, but she too cautions against the natural 'congruity' between women's interests and environmental/agroecological concerns and cautions against viewing women as "full-fledged agents" and as full and equal participants women function are the key to attaining environmentally sensitive development without consideration of the social, political and economic factors that influence women's interactions with the environmental and their power to develop and articulate knowledge for agroecology.

As Tiwari said in our interview, it is not only about women "knowing their rights" but "knowing their rights and acting on their rights' and gaining the recognition as farmers in policy and in practice, however, it is important as to, as Jewitt (2002) and Agarwal (1994) caution not to gloss over the material realities of women's lives as well wider community, socio-economic and cultural forces that shape women's capacities to "accumulate, vocalize and use agroecological knowledge notably the enforcement of certain gender divisions of labor by taboos coupled with socio-cultural restrictions (mediated by wealth) on women's mobility" (Jewitt, 2002). In the absence of wider structural change, participatory methods alone are not sufficient in addressing the root causes of male/female discrepancies in knowledge for agroecology, access to schemes and services, control over biological and environmental resources and access to political institutions and public spaces. Schemes targeting women and political measure such as India's Seventy-Third Amendment Act of 1992 which specifies that 1/3 seats in local government bodies

must be women have created more opportunity for women in theory, in practice rural women are still not properly recognized as economic agents and progress continues to be slow.

During my time with the organization, CECOEDECON staff and other activists or representatives I met with shared the sentiment that “change is happening, even if it is too slowly” One meeting, I took down this quote around change and female farmer empowerment:

 Ten, twenty years ago women would never be sitting at these meeting like this, like we see now. Women would not be sitting here even at the meeting, or up there in front of all of us giving a formal address. They would not be sitting with the political leaders and they would not be addressing the UN representatives in a manner as they are now. This is something tangible we have seen change in our time and now what we see is women looking to each and following suit. The work is nowhere close to being done, but we at least can see that change is happening.

Although progress is slower than civil society advocates and organizations would like to see, agroecologically based development initiatives with a female farmer empowerment focus, such as the initiatives being carried out by CECOEDECON, are able to work around existing socio-cultural and political structures that are site-specific, giving them the flexibility to investigate more thoroughly inequalities in local property rights, forests rights, and resource allocation and management as well as wider socioeconomic, political, gender- related constraints given that their approaches are long-term and locally-oriented. This results in the formation of adapted socio-cultural and political structures that create real opportunities for women to take leadership roles and utilize and expand their agroecological knowledge for tangible benefits in their livelihoods and communities (Jewitt, 2002).

Dalit and Adivasi Inclusion

What we are talking about empowering marginalized farmers and women if we don't talk about the caste system and the tribal peoples? How can we talk about organic farming if we don't talk about them? The major barrier in the existing system is that people cannot take benefits from government schemes because they are outside the system's reach. Scheduled castes and tribes they are not entitled, like Shahabad area of Baran, it is their land, it has always been their land, yet they do not have land entitlements, even if they are practicing farming this way [agroecologically] they don't benefit from the schemes meant to address the same without land sovereignty first. Without these rights they cannot develop themselves so that is why we see this top-down development happening that is removed from their contexts, but actually there, there is not even top-down development, there was nothing at all in those areas, aside from dispossession and taking- which is not development you see. Our presence is thus even more important. In general, the information is not even available, there are in fact many schemes, but people are not aware of it and even government cannot disseminate. Not much visibility and awareness by the tribal peoples and no capacity to disseminate from the government, these are two sides of the same problem. There is a mistrust there, too. Between government and tribal peoples.

-P.M. Paul

The intersection of caste within agriculture results in experiences that are highly differentiated, whether these experiences are in conventional/modern approaches to farming or agroecological farming. However, how can these differentiated experiences be validated, or experience positive change if they do not have political visibility? During my time working at CECOEDECON the issues facing STs and SCs were always part of the conversations. I remember one morning speaking at length to my officemate Ritu on about the following Arundhati Roy quote:

If you're an *Adivasi* [tribal Indian] living in a forest village and 800 CRP [Central Reserve Police] come and surround your village and start burning it, what are you supposed to do? Are you supposed to go on hunger strike? Can the hungry go on a hunger strike? Non-violence is a piece of theatre. You need an audience. What can you do when you have no audience? People have the right to resist annihilation.

This quote brought to light many concerns of the CECOEDECON staff, especially Mr. Paul who before coming to CECOEDECON had worked on issues of nomadic headers that raise cattle across the state. How can agroecology take place without soil to plant in, forests to harvest from or land to live on? In this sense, for tribal people land and forest sovereignty is a precursor to food sovereignty, and they have a special set of concerns and issue when it comes to realizing any agroecological farming of scale. The role of the grassroots in addressing these unique issues was critical to Adivasis gaining political visibility, agency and land rights while also working to promote institution building for agro-food system governance when the state continues to ignore the importance of Adivasi's socio-cultural basis of production in their schemes and reforms.

Ancestral land loss, dispossession and the deterioration of agricultural and forest-based livelihoods have characterized the experience of Scheduled Castes and Tribes over the past several decades but have affected Adivasis (indigenous people) in unique and particular ways. Data from the National Sample Survey Organization (NSSO) survey 69th Round (2012) shows that the proportion of rural Adivasi households that do not own any land – not even homestead land – increased from 16 per cent of all Adivasi households in 1987–88 to 24 per cent in 2011–12. Common property resources, which are very important to the livelihoods and survival of Adivasis, are an important part of wealth that has been lost by Adivasi households. While these statistics of land loss clearly show that the number of Adivasis engaged in migratory agricultural labor, the loss of these communal property resources does not show up in government statistics.

Current data tells us that Rajasthan has 7.10 lakh scheduled tribe (ST) population (15%) as per the 2012 census, of which nearly 95 percent reside in rural areas (World Bank Group, 2016). The major tribes are scattered throughout the state, but a majority are concentrated in the southern part of the state, where I was able to visit. The major tribal groups residing in these areas are Bhil, Meena, Damor, Patelias, and Saharaiyas. The Sahariya are the main group that CECOEDECON works with in the Shahbahd region of Baran and according to the 2010 Social Assessment, the Sahariya is among the most backward tribal groups in the state (Government of Rajasthan, 2010). The people that make up these communities statistically have significantly higher rates of illiteracy, malnourishment and poverty, and face social and geographic isolation in comparison to the rest of rural agrarian-based Rajasthan.

There have been several acts that aim to protect members of Scheduled Castes and Tribes against discrimination and ensure their rights. In 1989 the GoI passed the *Prevention of Atrocities (SC and ST) Act* which stipulates stringent punishment to those who commit atrocities against any tribal. In 2006 the *Forest Rights Act* was passed as an attempt to right past wrongs of both Schedule Castes and Tribes. The law concerns the rights of forest dwelling communities to land and other resources, denied to them over decades and is thus aimed at giving ownership rights over forestland to traditional forest dwellers. Some important rights mentioned in the Act include:

1. Right to hold and live in the forest land under individual or common occupation for habitation or self-cultivation for livelihood.
2. Community rights.
3. Right of ownership, access to collect, use and dispose of minor forest

produce.

4. Rights for conversion of *pattas* or leases or grants on forest land.
5. Conversion of all forest villages into revenue villages.
6. Right to protect, regenerate or conserve or manage any community forests resource which they have been traditionally protecting.
7. Right of access to biodiversity or community right to intellectual property.
8. Right to in-situ rehabilitation including alternative land where scheduled tribes or traditional forest dwellers have been illegally evicted without receiving legal entitlement to rehabilitation prior to 13th day of Dec 2005 (Government of India, 2011)

The combined use of the FRA (2006) and the SC/ST Prevention of Atrocities Act (1989) have aimed to help advance the rights of the marginalized giving them the “legal teeth” or legal vehicle through which to intervene and access justice while also giving human rights activists and NGOs a better framework through which to operate. Though the passage of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act (hereafter FRA) was an attempt by the GoI to make amends by recognizing the historic injustice and customary rights of forest dwellers, including the right over common areas and the right to manage and sell forest produce as well as to prevent deforestation and forest degradation, the implementation has been fragmented at best (UN NVR, 2020).

While the FRA is undoubtedly a progressive law that overturned colonial-era legislation on forest management Indian Forest Act, 1927 which did not recognize the right and responsibilities of Adivasis as stewards of and traditional management systems, it is mired with challenges. The overall implementation of the FRA suffers from the lack of proper funding, community awareness within tribal communities, conflicting state and local-level legislation, lack of dedicated structure and staff for implementation and administrative roadblocks that impede the smooth processing of

claims (UNVR conversations). In the Shahabad area, the framework of the FRA has proven to be inadequate to counter the economic agenda of liberalized India and the struggle for assertion of rights over forest and common resources continues in these communities (Trauger, 2017).

When I talked to tribal farmers, I posed similar questions to farmers in other regions, however, in addition to organic farming I asked: “Have you seen any changes in your village as a result of government schemes you have been a part of specifically directed at STs such as FRA/MGNREGA/PRA?” Participants belonging to STs noted that while there are many schemes meant to benefit ST/SC the ones they rely on the most are the Mahatma Gandhi National Rural Employment Guarantee Act (hereby MGNREGA) and the Public Distribution System (hereby PDS) and received no such benefits from anything related to ecological production or agriculture. Although I only interviewed three tribal farmers, not receiving any assistance in organic farming from the government was consistent with all but one of my participants. My interview with CECOEDECON staff confirmed that although support for organic farming is in Rajasthan and India-wide legislation, that in the 500 villages they have worked, they have seen little support across the board.

MGNREGA¹⁵ has been and continues to be important to tribal communities. It comes after nearly 6 decades of other rural employment programs, those sponsored by the state and by the GoI. MGNREGA is considered to be landmark legislation

¹⁵ *"The National Rural Employment Guarantee Act 2005 (NREGA) – Operational Guidelines"*

that affirmed India's position as a welfare state and is often referred to as the "silver bullet of poverty reduction" by way of generating demand for rural labor.

MGNREGA provides legal guarantee every financial year to adults of rural households for 100 days of public work at the minimum wage. Though MGNREGA is inarguably well-thought-out legislation and a powerful tool in the hands of rural people to attain access to employment, like the FRA, it has received significant critique for its poor and varied execution.

Economic growth or increased income is not necessarily an indicator of greater food security; India is great example of this (Gani & Prasad, 2007). As detailed in the introduction, while GDP grew between 1990 and 2012 the Global Hunger Index was continually decreasing. While these statics don't speak to the whole of India, they point to the fact that while economic growth can be important, it is not sufficient alone to reduce food insecurity or alleviate the multifaceted agricultural challenges that indigenous people face. Coupled with the absence of any subsidies for organic farming, the lack of a minimum support price for non-commodity crops such as forest produce, poverty alleviation schemes like MGNREGA and PDS aimed at providing income and access to food insufficiently their ecologies and their food cultures are explicitly linked to forests and their vital role as provider of food, provider of inputs to grow food such as insects for pollination, fodder for livestock and other vital resources such as medicine.

While the FRA attempts to reconcile this through its explicit focus on forest rights, there is significant disconnect between the poverty alleviation schemes meant to target tribal people and their socio-cultural bias of production and rightful mistrust

for the government undermines the possibility for alternatives to industrial production put forth by the state. In the Adivasi session of the UN VNR on Leaving No Farmer Behind I jotted down in my notebook a quote from one of the farmers attending the session. He said: “We don’t want their [GoI] help managing our forests and we don’t want their [GoI] seed.” This sentiment echoes what Trauger (2017) writes in “We Want Land to Live, Making Political Space for Food Sovereignty,” in that the problem farmers are profiling by not wanting government interference is not the market or the lack of need for proper institutions of governance and management of agricultural and forest resources, but that the right to food is conditioned by what the state (reinforced by corporations) dictates to be legal, safe and profitable. This is in juxtaposition and often opposition to what Adivasi’s think is right in terms of their health, their environment and their communities, as evident by the farmers testimonies in the UN VNR.

Another conversation I remember having at the National Voluntary Review on farmers in Jaipur was with an Adivasi rights activist who has been working in Odisha on issues related to revitalizing traditional farming practices and cultivars among tribal farmers for decades. His project works with nearly 116,000 Dalit and Adivasi families in 2150 villages in Odisha to strengthen the indigenous community’s agency by aiding them in the critical examination of the structural causes of undernutrition with the ultimate goals of finding locally appropriate solutions and making contributions to the agency and empowerment of communities towards self-reliance, all while upholding the cultural ethos of forest-base communities. These efforts are in hopes of addressing the existing and changing the agricultural patterns

and use of forests and other commons and restoring the symbiotic relationship of the community with the forest and health. He was the facilitator of the session on Adivasi farmers at the UN VNR on Farmers and we happened to sit next to each other at the keynote address.

As the speaker was addressing how the Sustainable Development Goals could bolster traditional farming, not realizing I wasn't Indian (this sometimes happened because my Iranian complexion and features lend themselves similarly to some parts of Northern India), he leaned over to me and whispered in Hindi "*immidar nahin hai*" (he is not honest) and I whispered back "*main sahamat hoon*" (I agree). Hearing my obvious accent, he proceeded to speak to me in English in our many conversations throughout the day. His sentiment reflects the reality that although grassroots organizations rely on funding from the government to implement some of their projects, there is often distrust between those working in the grassroots and civil society and the state and larger development rhetoric and goals such as the SDGs. NGOs with critical consciousness such as the one this activist founded work to put pressure on larger funding agencies to have their goals and aims reflect that of the people they are meant to support. In the absence of state-intervention, or intervention in name but not in practice, community-based solutions are required. The various programs supported by CECOEDECON and by its collaborators and networks such the activist with whom I spoke to, illustrate a range of real methodological alternatives that are consistent with that of agroecology discourse. Many of these approaches uphold the cultural ethos of tribal communities while not ignoring the

fact that much of their agro-ecological foundations have been eroded, and work both within and without of state.

The entitlement approach taken by the PDS, MGRENA the FRA and other related GoI schemes recognizes the need for supporting tribal peoples' livelihoods, but reinforces a discourse that oversimplifies tribal peoples' relationship to the cultural and social dimensions of food and agriculture and does not acknowledge the fact that people's struggles to have better access to food and strive for quality of life and better wellbeing using the social, cultural and ecological resources available at their disposal. Not acknowledging these foundations has posed consequences for sustainable production and consumption systems and will continue to do so unless these tribal foundations are including in the formation of policy and programs. Between entitlement approach taken by the GoI and food sovereignty-based approaches is what Gartaula et. al (2013) calls "the complex ecology of practice" where local livelihoods are built upon the ways in which local tribal villagers negotiate wider factors of institution, structure, ecology and market and the viability of agricultural livelihoods. Given that the adoption of industrialized methods leads to the erosion of indigenous farming knowledge, any grassroots approach must recognize this reality and adopt programs that build platforms for indigenous farming knowledge to not only be valued, but to be revitalized, disseminated and institutionalized. The grassroots approach taken by CECOEDECON both reinforces and rejects the entitlement approach. While CECOEDECON facilitates Shahabad villagers to claim their right to and enroll in such government schemes, their approach still recognizes that the ultimate goal is to facilitate self-determination

rather than allowing livelihoods to be solely guided by structural forces and the market, recognizing local actors as active participants in the process of agrarian change. CECOEDECON is facilitating the food sovereignty approach by working with farmers to scale-out a variety of agroecological farming techniques. The organization recognize the need to work in this middle space or 'complex ecology of practice' both working to build the foundations for agroecology through providing demonstrations on vermi-compost, composting and poly-cropping and assisting farmers in building infrastructure to do the same and working with government schemes to assure tribal farmers have the access they wish to.

In addition to creating programs specifically designed from their long-term interaction with tribal farmers that take into consideration their connection to forest resources and aim to uphold local institutions ability to govern ecological resources for production, the organization also has been transforming attitudes around caste in other non-tribal villages in which they work. By focusing explicitly on most marginal farmers in villages where they conduct projects and programs, they challenge stigmas against people belonging to SC by mobilizing community members to act on their behalf. Take for example the narrative of Gopal, a farmer from Jaipur district:

I am presently a member I have been associated with organization from 10-11 years now. I am a farmer; I have one bigha (two hectares) of land. I have learnt just one thing during my time with this organization, to help the poor, to eradicate the poverty. I am getting support from our administration here of the organization, and people have been kind to me the staff and the others in my village who work in the organization. I am making enough money from my land. So, I am ok now. Wherever we go, with the help of our organization we help the blind, handicapped people, the scheduled castes. The work is not done here so we take them in our own vehicles, fare of which is taken care by our organization. We get their check-up done from the doctors and then we get their pensions started. We help them in

completing their food allocation forms and the pensions forms. We do all this from here only. In villages, we distribute forms to them free of cost. And communities who are below poverty line, like (gaadi duag, bhang, bopa, kalgeria) [castes] we do more with such communities. Why? Because their financial condition is very bad, and our organization's main aim is to help the people in need and there is no such village where we have been where we have not helped people.

Destigmatizing and making other rural farmers aware of class-discrimination empowers farmers to help others in their community and counters dominant narratives that have continually marginalized and oppressed those belonging to lower castes and tribes for centuries. Again, notice how Gopal never says 'the organization' or 'this organization' it is always 'our organization'. Many farmers I spoke to continually refer back to the CECOEDECON family, and speak about empowerment through a feeling of community, a feeling which I experience and carry with me still.

Agroecology as a Seed of Transformation: Propagation, Modeling and Package of Practices, a Case on "SMART" Farm Initiative

It was a sunny Saturday morning in Jaipur. The normal work week throughout most of India is Monday through Saturday, with only 1 Saturday off per month. So, for my colleagues being in the office on a Saturday was routine. I remember sitting on the stairwell with my familiar friend, Jojo, as company. Jojo, the Jaipur campus' big black dog, loved me because I always shared the last bits of my lunch and scratched his belly before I caught a ride home every evening. We began to get ready around 10am. Soon, a large white SUV pulled up, piloted by one the NGOs drivers with whom I would often chat to practice my Hindi,

catching up on the day's happenings or exchanging what we ate for dinner the night before. After having tea, we departed for Chaksu, a tehsil of nearly 2.3 million, nestled 40km outside of Jaipur to visit Kamla Devi Sharm, a proud champion of a 'SMART' ecological farm. Weaving through narrow and bumpy roads stopping only to let the pastoral farmer and his herd of goats or a group of stray cows to cross the road, we arrived in Bhadhwa, a small *gauv*, or village in the tehsil.



Figure 8

Approaching the farm (pictured in Figure 8), I could tell this was something very special to my colleagues. Rituji, who provided me with translation help, was filling me in on the history of their work in the Chaksu area and the excitement around the SMART farming initiative taking root here. Despite wearing traditional dress, I couldn't help but feel like an outsider showing up in a big, white and shiny SUV, taking time out of farmers' busy days. Because of this strong feeling 'out of placeness', something that ultimately shifted once I got to know better the farmers

active in the KSS and CECOEDECON's wider network of CBOs and VDCs, I decided not to use this an opportunity to practice my budding Hindi, but rather to listen, learn and observe, asking a few questions to the farmer, Kamla ji, when it felt appropriate.

Being roughly 1 hectare, Kamla ji's farm falls into similar land holding category of nearly two-thirds of Rajasthan's farmers. As per the 2015-2016 Agriculture Census, 62% of all agricultural land holdings are considered marginal and small meaning they are 2 hectares (4.5 acres) or less. Even though small and marginal farmers are by far the majority, collectively they hold only 18.5% of all land in agriculture production with semi-medium, medium and large farmers holding the other 81.5%. However, production wise, Kamla ji's farm is much different than the average marginal or small farmer. Upon stepping out of the car and through a woven fence of thin branches and thorn-covered vines, I could immediately smell the aroma of flowering bushes in the air and the buzz of the insects was visceral.



Figure 9

Kamla ji proceeded to show us the various leguminous cover crops growing next to the vegetables covering around ½ of her cultivatable land. Legume production plays important roles in delivering multiple services in line with agroecological principles: at the food system level for consumption by humans and livestock and as a source of plant protein, particularly pertinent for populations with higher rates of malnutrition such as the tribal areas; at the production-system level due to legumes' capacity to fix atmospheric nitrogen making it a core component of low-input systems, and their role in mitigating GHG emissions; and at the cropping-systems level for diversification and for breaking cycles of pest and disease through rotation (Stagnari et. al, 2017). Legume production for consumption and market and legume usage in cover cropping make up just one component of the 'package of practices' developed by CECOEDECON in consultation with CBOs and VDCs. In addition to leguminous cover crops, on the outer perimeter of the fields grew what seemed to be an endless amount of marigolds, a plant used in Hindu celebrations and in making 'फूल मालाएं' (phool maalaen) or flower garlands commonly used in the adoration of men and women and as offerings to gods in temples, domestic rituals and public ceremonies of devotion. I recognized this flower both from my experience working on organic farms in the US where we would utilize them as a natural insecticide, similar to Kamla ji, and from the busy streets of the old city in Jaipur where "फूल बेचने वाले" (phool bechne wale) or flower sellers would be sitting roadside stringing flowers from sunrise to sunset. Similar to that of the legume, the marigold served multiple functions both culturally and ecologically.

Kamla ji boasted a wide variety of vegetables: tomatoes, eggplants, peppers and many whose name I cannot recall. While doing a farm walk, Rituji told me that because of the way the land is intensively managed Kamla ji and her family are able to have very stable earnings throughout the entire year, rather than taking one or two crops per season. If not done in an intensive manner, vegetables are often not economically viable as other cash crops grown in Rajasthan such as wheat and mustard. A sentiment consistent in my interviews, is that in tandem for working towards self-sufficiency and self-reliance in production, it was important to farmers to maximize their earnings on their smaller plots of land given their small and marginal status. Agroecological multifunctionality was key strategy to do so. Important to the broader adoption of agroecology is training and support for farmers to embrace the myriad of approaches and techniques, as opposed to relying on chemical inputs for short-term conveniences and gains. A critical feature of these holistic systems is that they replace fossil-fuel and chemical intensive systems with knowledge and observation intensive systems. This transition requires time, dedication and patience and a strong network system. In accordance with the government of Rajasthan, the formal transition of chemically treated land is three years. Although there is some policy precedence for agroecological practices through Rajasthan's "Implementation for Promotion of Organic Farming" scheme and the National Sustainable Agriculture Scheme, there is no specific framework for 'agroecology' therefore the process of dissemination is largely being led by civil society organizations and farmer to farmer learning through initiatives such as the

SMART Farm. In one of our interviews, Vibhuti spoke to the importance of projects such as the SMART Farm:

As an NGO what we can do is to work with farmers to help to form a package, or bundle of ecological practices, and you see this package contains many components. There are the physical components like infrastructure such as building a farm pond on community land or distilling and existing ponds, building a vermi-compost, and the physical aspects of the crop production like agroforestry, mixed-cropping, inter-cropping, crop rotation and also building infrastructure for traditional seed saving storing. Our capacity is limited and so is the number of farmers who we can work with to adopt these all fully. So, demonstrations are important for modeling this package of practices. There are many have been doing for a long time like kitchen gardens, horticulture, multi-cropping, seed saving, vermi-compost, crop rotation, and others. SMART farming is the first time we have worked with the farmers to integrate this whole system on one piece of land. This is the important thing is working with the farmers to design this. Once it is there, it continues to provide for the farmers and the community around them. It is a source of food, income and pride for them. Really this is our role in the movement, trying to train both ourselves and farmers on best practices and provide some package of inputs to help farmers build these up to scale. It is important to bring out their [farmers'] past learnings and provide some small inputs such as seeds and saplings to strengthen what is already there and support their knowledge and movements. In transition to jaivik (ecological) farmers are learning from farmers from their own village who have seen results from putting jaivik (ecological) practice into their fields and they tell the other about the benefits they see, and tell them about the risks too and what problems and what solutions have been tested. Agriculture is experimental something is going on all the time- it is very different from any other science, not a standard science it is evolving all the time even on daily basis between farmers in villages and also from hearing about what is going on in surrounding villages, too. So, as I said there are many components, networks is one of the most important so we also help provide these exposures through connecting farmers from other areas of similar climate who have had success farming like this [organically/ecologically], build out these networks and understanding on solutions to issues that are relevant to their communities. Like I said, once the actual SMART farm is implemented, farmers take many benefits from this not just in profit, but in becoming leaders in their villages, in the preservation of traditional methods, and that is how we hope to spread this program further than we can reach with just our resources.

Vibhuti speaks to many important points here, but two important pieces of insight she shares are on agroecology's multifunctionality and agroecological

networks. The leguminous crops and marigolds were just two examples of agroecological multifunctionality. Other notable features of her farm that serve multiple functions included pit in which she used a mixture of neem and other plants to create natural, traditional insecticide. While serving a function on-farm, neem is also grown for use in traditional medicine against a variety of ailments. Kamla ji also had multiple polycultures where vertically growing vegetables and vegetables that grow on the ground were planted with flowers, herbs and medicinal plants in the same plot. The agricultural multifunctionality of her farming enterprise points to the distinctive potential of agroecological to meet the livelihood needs of small farmers, both tangible and intangible. Tangible in the sense that the approaches are providing greater food and dietary security than that of their industrial counterparts, economic stability through providing a steady income all year round rather than two distinct crop seasons, the conservation of native variety of seeds and greater resilience to the fluctuations in the climate and intangible. Intangible yields of agroecology's multifunctionality can include the higher valuation of quality of life, identity, the preservation of cultural heritage and the ability to resistance against agricultural liberalization and industrialization (Amekawa et al., 2010).

The network approach and social learning that she speaks to is also particularly important. As Vibhuti pointed out, farming, and agroecology in particular is dynamic across time and space. Reorienting production systems to be more aligned with nature will entail new patterns of relationship with the environment that require different types of knowledge depending on the particular climate, type of soil, crops being grown, etc. These kinds of learnings cannot be prescribed by one linear

formula or recipe of uniformity and thus require an adaptive approach that is contingent on the sharing of knowledge between community networks, science and development organizations such as CECOEDECON. Knowledge networks and partnerships then can be seen as a vehicle for facilitating the innovation of techniques, technologies and monitoring those systems to develop place-based agroecological farming systems. As Vibhuti pointed to as did many of the farmers with whom I spoke, the partnerships that exist between farmers, CBOs, VDCs and CECOEDCON have both created new relationships and intensified existing ones through bolstering institutional capacities within the villages that ultimately serve as the connective tissue through which new knowledge to better manage and integrate ecological relationships into farming systems can be generated and disseminated (Warner, 2007)

Conclusion

When going to meetings or visiting villages, I often drove with Alok Vyas, or as I call him Alok ji. Over the course of my field work, Alok ji and I exchanged conversations on topics ranging from Indian philosophy and yoga, politics, cultural diversities, social activism and agriculture. We often spoke on our concerns for the way agriculture development is progressing riddled with inequities and continually pushing those at the margins further so, but we also often spoke on the positives movements and solutions we have seen have success in our home countries. In this short, paraphrased excerpt from one of our car conversations, Alok ji talks about the difference between small and tribal farmers' 'smart agriculture' and the contrasting paradigm of climate-smart agriculture that is being pushed on countries belonging to

the Global South by global donors and foundations. I took this quote down on the front lawn of CECOEDECON after getting back from a trip to the Chaksu campus from a KSS meeting:

We hear of this climate-smart agriculture. But, what does this really mean? It sounds impressive, but what it promotes is technical fixes for large farmers that require large investment. It does not mean sovereignty over land, seed, and production for small farmers to be able to produce what they need and what they want. The agriculture of small farmers is what is really smart. That is what the SMART farms are, an integration of these low-impact methods we have always been using. Though, if you asked me to name 30, 50, 100 farmers who are farming perfectly organically, or ecologically, as nature intended, I could not answer you, but the important thing is that they are trying. We are trying.

-Alok Vyas

The organization often borrowed and re-appropriated language and concepts such as SMART and 'organic market', but in practice this meant totally different things than what we conventionally think of. In his reflection, Alokji points the tension between technocratic and capital-intensive response to climate change adaption and resilience in agriculture in Rajasthan versus the response of the agroecological 'first responders' belonging to the grassroots. His concern reflects the sentiment that although recognition of climate change and its impact on agriculture from the government and from international institutions, the solutions they support are not informed by farmers or civil society. His quote reflects what I have tried to share in this chapter, that these 'hybridizations' both of grassroots movements and civil society organizations and of resistance and institutionalization, created spaces of friction that in some ways resonated with food sovereignty and agroecology discourse, particularly with the efforts that are being put into practice to reshape social and ecological relations towards greater social, economic and environmental

equity in food production, with climate change being a central vein, or priority to mobilize, that connected the local level with the national and international.

Through concrete initiatives focusing on women and farmers belonging to Scheduled Castes and Tribes the organization created has tangible solutions that have seen success in being scalable, although frustrations from staff still exist, the tangible progress in creating initiatives such as the SMART farming actively challenge gender roles and norms, class and caste stigmas and empower farmers socially and economically. This resulted in a multidimensional expression of the intentions and ideals of agroecology which are being put into practice by actors at the local level while simultaneously connecting up to regional and international networks through gatherings, forums and exchanges.

In other ways, however, these intentions, ideals and associated practices were contradicted in some ways among farmers who espoused a 'kissan swaraj' and 'anna swaraj', but in actuality wanted more control over capital and access to credit, resources, land, and to be food secure, without necessarily standing in opposition to the state or to the neoliberal market systems. These spaces of friction opened up important questions around the institutionalization of food sovereignty and agroecology such as, how would food sovereignty be maintained if actualized?

CHAPTER V

REIMAGINING PEOPLE'S ALTERNATIVES: STRENGTHENING AGENCY AND POWER ACROSS SCALES OF TRANSFORMATION

Despite the many and multifaceted challenges to agroecology espoused by farmers and CECOEDECON staff alike, the cases and examples I have highlighted show that promoting agroecological practices have demonstrated a positive impact on small farming communities' economic livelihoods and are working to restore ecological integrity of farmland to ameliorate the negative impacts farmers are already feeling because of climate change. Not only this, the employment of agroecology has worked to mediate social and economic inequities and social stigmas thus granting more agency and decision-making power among resource-poor small farmers, particularly women and Dalit and Adivasi farmers. While the dominant paradigm of farming shaped by past and present policy, research and extension services and the cash crop market has surely shaped farmer's perspectives on the viability of agroecologically based livelihoods as well their ability to imagine alternatives, there is a consensus among the farmers I spoke with in Rajasthan that agroecological farming is the only way forward.

There is a sense of hope among farmers to improve their resilience to climate change as well as their economic, social and ecological conditions through the adoption of elements and principles of agroecology, sharing the politicized aim of gaining more sovereignty over their food and agricultural systems. Given this, and the fact that agroecology is particularly suited to smallholders who comprise the large majority of the farmers in Rajasthan suffering from the negative effects of

climate change and marginalization, why hasn't it been undertaken on a larger scale? How are farmers creating space at the state and international levels for their voices and demands to be heard? What roles do civil society play in this process of scaling out?

The strong prioritization of conventional methods over time has been a major source of strain to ecological and cultural systems which greatly contributed to the agrarian crisis the region finds itself in. While 'agroecological first responders' in civil society and the grassroots are actively working to address the crisis in production that is happening on the ground their efforts are mediated by the loss of traditional agricultural knowledge and realizing any sort of agroecology of scale cannot happen in the absence of major reforms in policies, financial institutions, market structures and research and development agendas and collaboration across networks and scales. Moving the movement forward, of key importance will be the formulation of political will and research agendas with the active participation of farmers in the process of agroecological innovation and dissemination that actively cuts across levels of international institutions to the state to civil society and the grassroots (Altieri & Toledo 2011).

In the previous chapter I described the transformative power of grassroots movements and civil society that have come together as a hybridized movement to bring about a somewhat unified movement for agroecology in several districts of Rajasthan. Despite challenging and multifaceted forces working to shape their perspectives and ability to bring about lasting change in agriculture, the conditions created by their efforts enables a greater sovereignty among marginalized farmers. In

this shorter chapter, I address these issues by examining transformations of scale, or how farmers and their civil society supporters are leveraging their agency to influence their networks, approaches and resources to open up new spaces for participation in discussions happening at the state and international levels. Given that the core of approach of CECOEDECON and their farmer group is to address rural issues in agriculture through building linkages between micro, meso and macro levels and the importance of transformations of scale to the agroecology literature, this discussion is of particular relevance to address my research questions as they are situated with evolving scholarly debates on scale, institutional co-option, climate and agroecology. I address these in the three sections to come: “*Transformations from Below, Transformations from Within: Agroecology, Climate and the State*, and *Transformations from Above: Carving Out Counterhegemonic Space in Global Governance* providing narratives and reflections on participant observation to substantiate my claims. In my concluding section *Extending Opportunities: New Spaces and Places for Participation* I sum up how the efforts at these three scales have reshaped helped to alter farmer’s perceptions on their ability to create change and their abilities to participate in agroecology as it evolves in the complex ‘real world arenas of food sovereignty’ (Ehlert & Voßemer, 2015) and ‘ecologies of practice’ (Gartaula et. al, 2013).

Transformations from Below: The Grassroots Struggle and Response

Making political space for farmers, agroecology and climate issues at the state and international levels is just important as educating farmers on the ground on how transformations, discussions and policies at these scales will impact their production and livelihoods. Through engaging in these debates at the village level, farmers are

afforded greater political education that informs how they place themselves in larger movements and politics. As I have touched on in previous sections, farmers and CECOEDECON often referred to industrial methods, inputs and seeds as coming ‘from the outside’ as if they are removed from local contexts, the concept of industrialized agricultural development all comes from the ‘outside’, but what and where is the ‘outside’?

CECOEDECON as an organization engages with the ‘outside’ i.e. top-down methods of decision making and governance in food and farming, through discussions and debates as a means to educate rural villages from within. As an NGO in Consultative status with the Economic and Social Council (ECOSOC) of the United Nations CECOEDECON and their partner organization PAIRVI attend multiple global debates every year aiming to bring the marginalized female, Dalit, Adivasi farmers’ voice to these spaces. Sometimes, farmers are actually sponsored to attend, although for the most part various members of CECOEDCON and PAIRVI attend these meetings and either speak or coordinate panel sessions. Attendance and engagement at these meetings contextualize to staff- who also function as political advocates in their own right- what is actually happening ‘on the outside’ and from this place of being informed take the time to distill this information to their partner communities through the yearly Annual Meetings. Although only once a year, these meetings serve as important places for farmers to engage with farmers from other districts, share knowledge, skills, observations and insights gained from the previous growing cycles and foster a collective identity as farmers trying to make positive change in their communities. In this section, I draw mostly upon

observations from the 2020 Annual Meeting among CECOEDECON as a case to highlight why ‘transformations from below’ matter to transformations in the state and at the international levels.

A place where this bridge is brought to life is during the annual meetings held by CECOEDECON. This year the meeting was held at their Chaksu campus which lies about 41km from Jaipur. The modest campus has facilities for farmers and other community members to stay when they have traveled for trainings, a kitchen and a small auditorium. Tucked away in one the larger villages in the area, pulling into the side street one would be greeted by beautiful murals, garden demonstrations and the campus dogs. My officemate, Alok ji, once told me that this place feels like home to him and he is always happy when meetings and events are held here. This was the first office of the organization and upon stepping onto the campus you can feel a sense of rootedness.

The Annual Meeting itself last three days and consisted of different sessions that would divide meeting participants into several different groups. The meeting was one of my most memorable moments from the field because I was put on the spot to introduce myself in Hindi on the microphone in front of a crowd of somewhere between roughly 100-150 people all from rural villages in Rajasthan, meaning I couldn’t speak in the “Hinglish” I had been using in classes or in the city where English words were substituted into Hindi grammar structures to communicate. To my surprise, I was able to clearly communicate who I was, why I was at that meeting and my interest in jaivik krishi, or agroecological farming and got a round of applause from the entire audience once I was finished talking. As a

language learner just starting off my field work, this was a moment I will always remember.

Each day, the meeting began with Alokji inviting 5-10 farmers to reflect on the most important thing they took away from the day before and invite discussion among the larger group before the sessions broke out. After the reflection session, a staff member from the organization would speak to national and international policies, changes, events or conditions that would have an impact on farmers livelihoods and production. For example, new trade policies were discussed as were the most recent efforts of GoI's national policy on climate change. Distilling science and policy into communicable language to farmers belonging to small villages allowed farmers to contribute to these discussions in greater depth by contributing to horizontal knowledge sharing that centered farmers as the primary agents rather than those being acted upon by the inevitable authority of the market and state. This was also reflected during the breakout sessions, where strong focus was not just put on the issues facing farmers, but rather what they want and plan to do about these issues, how they plan to engage

with the government and joint solutions they wish to put forth.

Figure 10 depicts one of these breakout sessions and brings back warm and fond memories.

For me, this was the first time I met the farmers pictured above,



Figure 10

but by the time I left after 4 months I had interacted with nearly everyone pictured multiple times and knew many by name, whether I went to their localities or they came to Jaipur for events and trainings such as the UN VNR. In this session, farmers were asked to discuss the following prompts: “Where do we envision ourselves in the coming 5 years? What are the biggest challenges now and what will be the biggest challenges to come? Please outline specific issues and proposed solutions noting where do we need support, where have we been successful and consider where government support is already”. Pictured below is a sample from my field notes:

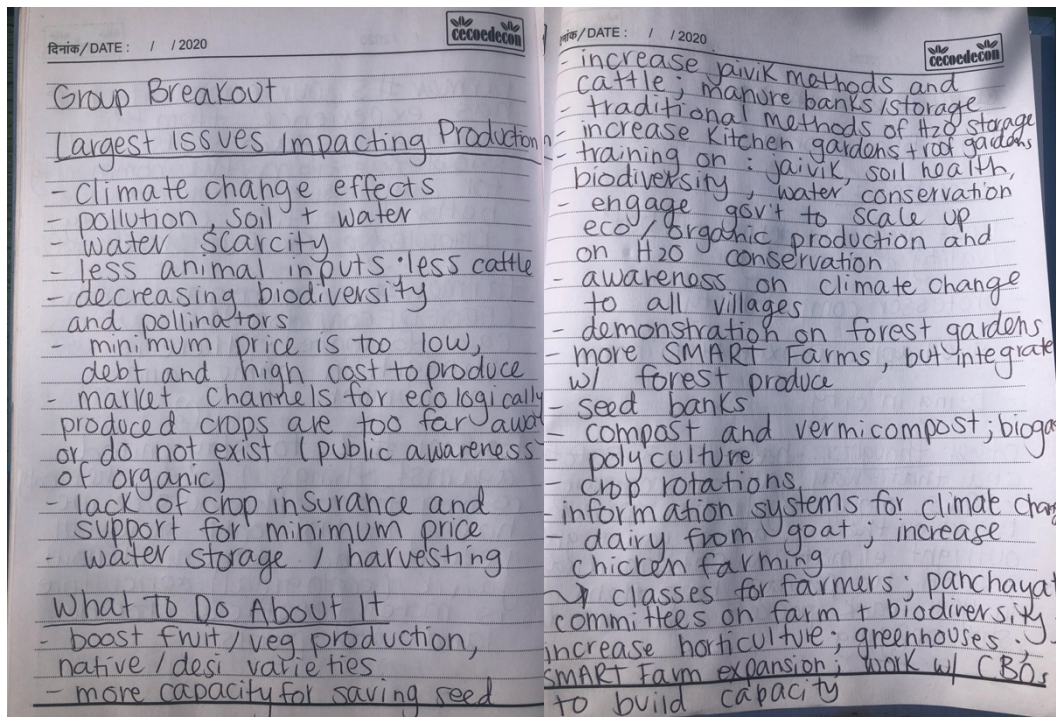


Figure 11

As the farmers outlined above and I have demonstrated thus far, there are a number of constraints largely coming from the state and the market that discourage the adoption and dissemination of agroecological practices thus impeding its adoption on scalable levels. The barriers the farmers identified range from the

technical issues such as lack of proper information by farmers and agricultural extensionists, lack of land tenure, lack infrastructure and market structures for crops grown without chemical inputs, policy distortion that favor industrial production and large-scale farmers, the myriad of issues brought about by a changing climate, and the erosion of indigenous farming knowledge that builds the basis of agroecological production. These constraints are brought about by and bolstered by the very powerful interests of state and corporate actors and their institutional counterparts who have backed research, development and dissemination of conventional practices while on the other hand, have largely ignored and even discredited traditional and indigenous approaches (Altieri & Nicholls, 2012). The Annual Meeting gave space to farmers to learn about alternatives such as agroecology that counter the dominant narrative of development and open spaces with intention and commitment to farmer/stakeholder participation and design of programs from the onset.

While it is important to recognize that civil society has experienced significant institutionalization since the 1990s, a process that had a hand in taming and transforming social movements into formal NGOs that carry out the interests of multilateral, bilateral and state interests, CECOEDECON has negotiated this process rather differently. In my eyes the organization can be seen as taking a less radical stance than the biggest actor in the food sovereignty movement and strongest advocate for agroecology, La Via Campesina, the hybridization of civil actors (CECOEDECON and their various organization partners) and peoples' organizations such as KSS has fostered an environment and political culture where resistance to the dominant framework of neoliberal institutions is possible through

gathering in spaces such as these. Meetings of this nature strengthen principles of participation, consultation, accountability and representativity among the organization and the partner communities in which they work (Gaarde, 2017).

Transformations from Within: Agroecology, Climate Change and the State

There have indeed been advancements, development and progress in traditional farming in Rajasthan. Farmer experience from my observation, and documented cases of CECEOEDCON show that it is possible to improve livelihoods, increase food productivity and build resilience to climate change by making more effective use of composting technologies, increasing integration of crops, refining ecological landscape design, enhancing the capacity of local seed and seed saving, making effective use of livestock, increasing the diversity of crops, and enhancing traditional irrigation practices. As Rosset and Giraldo (2017) frankly put it “agroecology is now in fashion”. Coupled with pressure of farmers movements, activists, multilateral institutions, research institutions and NGOs, these advancements have not gone unnoticed by the state and now agroecology or at least components of it constitute political frameworks in India such as the National Mission on Sustainable Agriculture and Rajasthan such as the scheme for the “Implementation for Promotion of Organic Farming”.

The danger in mainstreaming agroecology comes with the narrowed and essentialization of agroecology as a set of technologies or methods while existing power structures remain unchanged. In absence of any significant agrarian reform, the state of Rajasthan has set monetary rewards for farmers for individual ecological farming practices (as dictated by the Ministry of Agriculture) that in many ways

conform rather than reject the industrial paradigm and embedded power relations transforming the means of production and consumption both material and immaterial (Rosset & Giraldo, 2017). Although CECOEDECON staff saw the acknowledgment of agroecological practices and their incentivization as a start, the efforts put forth by the state by no means rupture the paradigm of agricultural modernization on the part of state institutions, given the small scale through which it is being undertaken and the fact that farmers only get rewarded for their practices *after* verification of the activities. Of the 14 farmers I talked to, only one had received training from a government program on sustainable agriculture and the training lasted five days. None had seen any benefits from the scheme for organic farming, despite adopting many of techniques the state claims to prioritize. Take for example my conversation with a group of farmers in Niwai:

M: You've all told me about what you have adopted certain jaivik (agro-ecological) methods, but you need to take a profit and also grow a cash crop each season. What would make growing only this way [agroecologically] easier? Have you seen any benefits from the government for this?

Farmers in unison: No!

Farmer 1: So far, we have not received any such benefits.

Farmer 2: The government had said they wanted to make vermi-compost beds for farmers, but no farmer has gotten the benefits of it. They had associated twenty farmers from each village near us, there was a meeting day before and we discussed. No money has come so far. No money has been received by SC, OBC or general category. We all need the support for these things.

M: But have you all benefited from any of the government's current policies at all? For organic farming or farming otherwise?

Farmer 2: None!

Farmer 1: Our problem, it is not the problem of our production, there is the lack of will from the government to promote organic farming. In Rajasthan we have this policy, and the organization [CECOEDECON] has made us aware of this, but unfortunately it has not been promoted in a wider range that we don't get support. So, that is one issue and another issue is that if we want to shift to organic farming, there is not a market for the crops that are organic, they sell the same as it is now. Then for two to three four years we

have to prepare our land for that. For those years, what will be the source of our livelihood? If government ensures us that they will take care of their livelihood then we can grow only jaivik [agroecological], because this is what we want and what we are working for, but now, if our crop fails, what should we do? We are aware of the benefits because of our association [with CECOEDECON], but people [other villagers] are not, as diseases like cancer and all are spreading, they will see they should do organic farming. Like earlier in my village we used to all grow millet, it used to give fragrance in all of the neighborhood. Now it is chemicals everywhere and not much more of that beautiful fragrance.

M: And you? What do you think would make it easier for your production?

Farmer 3: I am associated with CECOEDECON from last fifteen years and they organize camps or trainings and we learn new things from them. I am using millet instead of urea and I am doing it from 7 years now. If the state government organizes more and more camps like we do here, then more farmers will benefit from it. Like CECOEDECON does this, similarly if we will have more exhibitions related to this then it will be beneficial, and it will arise farmers interest in it. So, I think the government could give more support to CECOEDECON, maybe they organize more instead of government. They are doing this work and know the benefits we have seen from growing this way. I think farmers here [Malpura] are not doing it because of lack of awareness, if they get proper training then they can also benefit from this like we have.

As the scaling up of agroecology is important to bolstering farming sovereignty and resilience to the changing climate, it does need to be recognized on a larger and wider scale. However, pathways to these changes will not be possible if the ‘institutional machinery’ in Rajasthan continues to favor agribusiness and industrial agricultural technologies through research and extension, credit and subsidies. The fact that the government is recognizing alternatives represents an important juncture between social movements, or in the case of CECOEDECON and its partner communities ‘hybridized movements’ who are responsible for revitalizing and stewarding these methods and practices and the state offers new spaces and places for participation and negotiation for these actors to promote more sustainable farming and changes in the food system at the state level.

As an organization, CECOEDECON takes advantage of their political leverage by working to dually engage and oppose the state. As a result, they have had tangible successes in advocacy worth celebrating. Vibhuti eloquently expounds on how she understands the interplay between the government and civil society:

V: As civil society, it is important we are provided space to engage with government machinery to ensure gaps and loops are filled to effectively address the actual needs of people, of actual farmers if we ever want to see these methods [ecological ones] grow. We do our best to fulfill that role to the best of our capacities because the government has their own set agenda own set power and politics, so our voice is limited there, but we are still working because we understand the importance of this to bring these issues to the state level. For example, you know about the People's Manifesto we put forth. We know the system is not as open minded as it should be. The policies do not serve the people in the best possible way and we have seen with industrial farming for example these policies actually can be harmful to the farmer. The polices need to be planned in more inclusive and participatory way. For this, the networks of civil society are there and should be used because people's knowledge is institutionalized there. As an organization we always have maintained that we are not the permanent system to provide and support, we have to become self-sufficient as people. Our end goal is for farmers to not need any support. But, the government can actively oppose this and undermine progress by pushing these industrial farming policies and others. We now are the bridge for the right kind of policies to reach the right kind of people, we want to bring this together. We try to always engage and collaborate first, but when we see a policy as being harmful we have to show that this will be harmful to the people and they do not want this and you should not take this forward. As we are an NGO, we don't take a stance where we are violently in opposition, that is sometimes limiting to us. We try to engage before we oppose. Continuously engage, in support or in opposition. We take this approach in advocacy and yes, I do think we have seen results.

Like Vibhuti, in my conversations with other CECOEDECON staff, they were often very politicized in their aims, especially towards farmer sovereignty, food sovereignty and issues related to climate change adaption and resilience building that could ultimately work to change conditions for marginal farmers belonging to STs and SCs and female farmers. Often it was easy for me to connect with both staff and

farmers on these issues because we shared similar politics, stances and aims and could reflect on parallels between India and the US and other case studies which we knew in common. While staff and farmers were often quick to critique the government's responses, or lack thereof, like Vibhuti said they aimed to "collaborate first, oppose second". The staff communicated to me their role as a bridge from the people to the government participating in different degrees of resistance but aimed at creating political power among farmers.

During my time with CECOEDECON, while working on editing various funding proposals, reports and documents I came to know more intimately the way the organization engages on the state level. After editing the 2018-2019 report I learned about the "Jan Ghoshna Patra" or People's Manifesto (Figure 12) and got to ask questions during my time in the office. The People's Manifesto was a collaborative effort between CECOEDECON and various partner organizations across Rajasthan, Madhya Pradesh and Chhattisgarh with the aim of making political parties accountable and sensitized towards people's participation in processes of development. Organized in 2008, 2013 and more recently in 2018 the process of drafting this document consists of a series of in-depth discussions with community, civil society, political leaders and government representatives to be shared with leading political parties of the states. Within the community, the voices of Dalits, Adivasis, and deprived and marginalized peoples, farmers, women effort was well received by the political parties and 40 demands mentioned in People's Manifesto got space in elections of different political parties. Demands range from education, agriculture and food security, health, women and children development

to Dalit and Adivasi rights. While the 2018 document has yet to be translated below are examples of some demands from the 2013 Manifesto related to agriculture, food security and climate change:



Figure 12

- Ecological agriculture should be given top priority in the development agenda and for this purpose a special task force may be formed.
- Keeping in view the effects of global warming or climate change on agriculture, special action plan may be formulated on adaptation in order to build the understanding and capacities of farmers.
- Production of crops and seeds through genetic engineering should be banned and Rajasthan should be declared a GM-free state.
- In order to make the state self-sufficient in the production of seeds, agricultural research centers, agricultural universities and other agriculture research institutes may be strengthened with proper and adequate means and infrastructure.
- Sustainable and ecological agriculture education should form a part of the school curriculum up to secondary level.
- The procedure of certification for organic farming should be simplified and a single window scheme should be introduced for promotion of organic farming.
- The activities of farm labor should be linked with MNREGA so that the farmers do not have to bear costly labor.

- Special incentives should be given for the ecological farming of medicinal plants and local grains and pulses
- Electricity should be made available to the farmers for agricultural activities for at least 12 hours in a day.
- In context of various treaties of the World Trade Organization, participation of people of the state should be ensured through the state WTO Cell in order to protect the interest of the people.
- Animal husbandry is a major source of livelihood in Rajasthan. Therefore, for the protection and preservation of shrinking pastures and Oran lands in the state, Pasture Encroachment Law should be strictly enforced; special efforts should be made towards cattle development, especially for improving indigenous breeds of male and female cattle.
- Land reform laws such as FRA should be vigorously enforced, especially the land rights of Dalits and Adivasis should be protected and ensured and their land should be freed from encroachment.

While many of these demands are far from having been met, including community voices from agrarian communities in aligns with principles of agroecology as a participatory and action-oriented approach that is politically engaged to provide voices to actors who have previously been excluded not only in the research processes in agriculture, but political processes as well. The emphasis on the political participation of farmers overlaps greatly with principles of agroecology including empowering farmers through multi-stakeholder collaboration, seeking to make change on whole systems and adapting to align with the needs of farmers (Mendez et al., 2012). Central to these demands is upholding ecological integrity and cultural ways of life, farmer self-determination, and the demand for justice and equity in the face of climate change and decreasing viable farm and pastureland. Farmers and NGO staff spoke about a success that they had engaging the government and opposing GM trials in the state. This was central to their demands in the People's Manifesto:

M: Can you give me an example of a result or change you've seen from your engagement with and/or opposition to the state?

V: One of the bigger issues in India based off our food security issues, they are trying to introduce GM in our food. As I'm sure you know there are many unanswered questions and research that has been conducted shows this technology is harmful. We said unless you have strong proof that is not going to harm people and land and be economically unsustainable you should not promote what you don't understand. We joined hands with other organizations. The government signed with Monsanto without people's knowledge and they were going to start field trials. There were these back channel agreements between government of Rajasthan and Monsanto so the GM watch network of India (I forget their name, sorry) they informed possible trials and this was not open source information, so we planned a campaign of the farmers on the issue, peaceful rallies held near Jaipur near legislative assembly to protest against back channel agreements. These protest and lobbying efforts were done by civil society and farmers, not just KSS, and other farmers too. While it was a collective effort by many organizations, our CBOs created a movement in the state to stop the government from doing this and they did stop the trails. It was a big success. Since then the CBOs have engaged with the agricultural minister whichever party government it has been, they have been able to sensitize them to the issue and since then we have avoided field trials or any big trial in the state. The minister now was a farmer and he recognizes now that there is not enough scientific research we have to stay away from this, he committed on several platforms, based on our understanding. I think there will be another push, so we will be ready to mobilize again.

M: What is your largest concern for agriculture in your village?

P.S: The outside stuff which is coming, it should not come. The worms and the germs inside the soil are dead now, as many use chemicals now, so they have died because of its smell, this is the change which I have seen. The GM stuff should not come, either.

...

M: So, now that you have told me about these issues, what do you think can be done or should be done?

P S: We are facing a lot of problems because of the climate change and these days a lot of diseases are spreading, like cancer, TB, attacks. All these things never used to happen before. We should stop them and promote jaivik [ecological] agriculture on a bigger scale. It is not just the chemicals, we must stop seeds from the outside as the organization did. I was there when they were stopped. The GM trials. It was a great effort of KSS and others. The seeds and chemicals both from the outside should not come. That is what we are asking for, for so long. I believe that because of organic farming there will not be any spread of disease in my family. I do not trust chemical farming, as those outside seeds require a lot water but if we grow grams [names local varieties] they grow without the water. And those GM seeds

can't be used again, then we have to sow new seeds and we are not doing that. We are using our own seeds.

The space in which CECOEDECON and the farmers they work with engage with state is reflective of the tension regarding the potential of agroecological alternatives to create meaningful and lasting change and institutionalizing and reproducing those changes to achieve larger scale, state-level transformations. Individual organizations, farmers unions and small sets of actors in Rajasthan are engaging in localized social and political struggles that without a doubt are working to change the dominant paradigm of production in specific localities while also having state-level successes such as introducing the People's Manifesto and stopping GM trials. They are presently engaging to the widest reach their knowledge, resources and capacity to distribute in order to accomplish what is possible within the confinements of existing opportunity and barriers in the state utilizing their dual strategy of engagement and oppositions. Successes such as bringing the People's Manifesto and building coalitions to stop GM trials in the state are actively responding to the denial of rights for farmers, the devaluation of and economic exclusion, however, there lacks any significant national coordination of these local and regional efforts within the GoI itself.

Transformations from Above: Carving Out Counterhegemonic Space within Global Food and Agriculture

CECOEDECON and their farmer constituency seek to build social change across scales, from digging irrigation ponds on community land to consulting with the GoI on national policy frameworks. The actions they take across these scales

share the same goal of creating a stronger political will for ecologically based agriculture and climate change resilience building that directs farmers livelihoods towards more autonomous futures. Aspects of their international activities cannot be understood in isolation from local contexts and vice versa; the local and national dimensions require us to adopt a global outlook (Appadurai, 1990).

Building multiple pathways of engagement allows for interaction, cross-pollination, evolution and synergy building between different forms and levels of activism, advocacy and program design. In this sense, the organization is working to build out their movement where global engagement can enrich their understanding, both farmers and staff, of local struggles as they are influenced by global forces and bring to light local struggles in global arenas and debates. This strategy of global activism in food and agriculture is not new, scholars in food sovereignty and agroecology have shown how rural organizations and movements, especially La Via Campesina, are increasingly working at global levels while working to build a model that focus on re-localization and re-formation of peasant and small-farmer identities (Desmarais, 2007; McMichael, 2006; Claeys, 2013). These movements or in this case 'hybridized movements' are increasingly becoming more involved in transnational networks, debates and discussions. Although not formally a member organization of LVC, their transnational strategies of engagement draw parallels to how Rosset and Martinez (2010) describe the synergy between place-bound struggles of peasant farmers and rejection of the internationalized, corporate model of agriculture characterized by monoculture, input-intensive and mechanized farming methods:

In the neoliberal era, supranational corporations and institutions dictating neoliberal policies have negatively affected most sectors of society [...] rural

organizations and peasantries around the world share the same global problems even though they confront different local and national realities.

With the severity of the corporate model of production increasing and farmers the need to unite on international platforms for the restructuring of food and agriculture is a vision shared more strongly by many organizations and CECOEDECON is no different. Similarly to the way the organization engages with the state, CECOEDECON aims to create platforms for farmer issues and climate issues that extend far beyond their localities to international levels while also fostering political education among farmers who will not get to travel to these international forums, but are certainly effected by policy and development decisions that happen in these spaces such as the WTO and the UNFCCC. Some years back, CECOEDECON sponsored several Rajasthani farmers to go speak at the WTO trade agreements. In a conversation with Vibhuti we spoke about this at length:

The organization [CECOEDECON] took farmers to WTO discussions and farmers voiced their concerns on trade issues in agriculture and how they impact them. And, you see, they are speaking in their local language on trade issues, you hear French being spoken by people from African countries, Spanish from people from Latin American countries and of course English and other languages too, but you don't hear the local Rajasthani dialects, no. Their voice is their native language is powerful, it brings faces to the issues. When farmers are in this space like this, I don't think they can be ignored. Even small, it does make some impact. I believe that. It is a challenge to get them there now because this is something funding agencies don't want to support. So often is it like this, us representing them at international talks. When they do get a chance to go, it is impactful for the discussion and more importantly for the farmer.

While there is no doubt that farmers associated with CECOEDECON and KSS are building spaces for peasant and indigenous agriculture and politicizing spheres of public debate (Patel, 2009; Desmarais, 2007) as a result of increased

representation of farmers being in these hegemonic spaces, how much have we really seen change in Rajasthan? According to many of my participants, conditions in agriculture and the rural economy in general have been worsening significantly in the last decade. It is important to consider what farmers being in these spaces actually accomplishes. This is how Ritu felt in her testimony:

We recognize now at the global levels there is some sense around the need to recognize impacts around climate change on small and tribal farmers and to recognize their other social and economic problems, as well as the need to support them in sustainable farming. We see the recognition is there and this is changing, this is something new. But, be it UNCCC or other forums, I don't feel they are really talking about how to solve it. It is not as much a discussion on how to actually solve it or support those affected or listen to their solutions or their ways of doing things. All in all, they do not seem to be very concerned about issues at the grassroots. This always has been championed by us and we have to fight to get our perspective heard to them. Although, definitely from our side, there is a big success in that we could bring a small case study to this level of forum. From a tribal village in Rajasthan we brought a story of a tribal woman, Kothabai and her story of how she is fighting the impacts of climate change and bettering irrigation for agriculture through low-cost indigenous technologies, just in her regular life. That case study has been published in UNCCC and the world report. So definitely, that is a great success of our work that at least we can bring that issue at that level, it is a matter of pride for us, but on the other hand we feel sorry that no, still it's not done. The work is not done. Still it's not the prime, or even one of the prime concerns of the policy maker or the decision maker but instead: "Okay we are rising by 4 degrees centigrade or 2 degrees? What will happen what will not happen who will be affected who will not be affected? Are the developing countries the major contributor or the developed? Whose responsibility is it to fix it? Where do we start?" Everyone at those levels is just trying to pass the parcel.

One process that I have mentioned throughout this thesis is the United Nations National Voluntary Review, a process by which the progress of SDGs are tracked through substantive, knowledge-based assessments with a particular focus on the "poorest, most vulnerable and those furthest left behind" (UN NVR, 2020). Farmers from across the entire country were divided into six broad categories: Women, Rain-

Fed, Adivasi, Landless, Tenant and Pastoral/Livestock engaged in debates and these debates were summarized and compiled into a long report which will be used to supplement the GoI's Vienna report. This was the first time that the GoI consulted civil society in such an extensive and comprehensive manner. CECOEDECON was chosen to coordinate, execute and compile the national review on farmers which is very significant given the many organizations representing farmers in India across the 29 states of India.

I remember being in the office that afternoon watching staff prepare the grounds and building, asking to help with set up, but being told that they rather wanted me to pass out the agendas, nametags and conference materials the morning of. I instead sat and drank tea with Manjuji the wife of the late Sharad Joshi ji, founder of the organization. That afternoon we took a walk together outside to get some sunlight and in both English and Hindi she was expressing her excitement and nervousness for the event the day to come.

While the spaces themselves might not change very much in the immediate, nor do the entrenched bureaucracies, processes and mechanisms of decision making, the perspectives of the farmer surely do change by engaging in these spaces. When asked about his experience at the UNVNR, this tribal farmer from Shahabhd was smiling at me and continuously described his experience as “bahut badhiya, bahut bahiya” which means very great, brilliant, wonderful. The translation of his responses is as followed:

I came to Jaipur last month and represented all Adivasi (tribal) farmers, as a farmer from my village in Shahbahd area at the conference [the United Nations National Consultation with Farmers on Leaving No One Behind and India's Voluntary National Review 2020 on the SDGs]. It was a great

experience for me. A really great experience. We discussed many issues and I shared my perspective on how these things are affecting us, affecting me and my village and my family. So climate change I learned more and forest management and resources I learned more too, what is my own understanding of nature and farming, our own native crops and forest crops, and what is the way forward to put control back in our hands, of our forests and land. I want to continue this. It was a great experience for me.

We shouldn't overlook the significance of legitimizing tribal farmer's presence in the international arenas of decision making around agricultural development.

For the tribal farmers of Shahabad, the women farmers, the rainfed farmers, tenant farmers, livestock and landless farmers, this wasn't just a space to legitimize their presence and voice issues and concerns, but also a space of learning. India as a whole is increasingly experiencing increased access to the Internet and new technologies, providing the ability to connect farmers in rural movements, share resources, strategies and methods, coordinate actions and learn about issues facing agriculture such as climate change. As one farmer spoke to when he said: "We discussed many issues and I shared my perspective on how these things are affecting us, affecting me and my village and my family. So, climate change I learned more and forest management and resources..." by engaging in this internationalized space, farmers who participated not only worked against the narrative that rural actors are 'backwards' or require more modernization in agriculture to improve their conditions, showing the possibility of an ontological alternative, but gained insights to bring back to their villages (McMichael, 2010). While in Shahabad I got to speak with a few farmers who did not attend the UNVR and asked them questions about climate change. The farmers did not know the term in Hindi and although they were very aware that

the timing of the crop seasons is changing, the patterns of rainfall are becoming more variable and the use of chemicals is making the soil 'hard' as they expressed, the great body of information and research around climate change and ecologically based agriculture is simply not accessible to them in the same way it is for others who are connected with the Internet more readily. Farmers who got to attend these meetings therefore served as the communicators of this information, building channels of horizontal forms of knowledge distribution, participation and 'dialogic education' (Freire, 1970).

Two important observations I had were at the UNVR in general, there was an overarching narrative of the panel speakers or 'experts' those who work within policy and civil society organizations that clearly articulated that small and marginal farmers should be the key agents of large-scale transformations needed to respond to the global challenges of inequality and climate change perpetuated by the dominant mode of production. The prioritization of farmers who historically and contemporarily comprise the margins presents their solutions as better suited to the complex global challenges of feeding the planet, protecting the environment and limiting global warming (Desmarais, 2007; Gaarde, 2017). Despite this significant push from those located within the UN institutions to prioritize the margins, encourage inclusive policy, more democratic knowledge production, etc. another important observation I had during the UNVR was the fact that in the larger panel sessions, many farmers were actually falling asleep. Farmers had traveled long distances to speak at the panel sessions, regardless of how much they took away from the sessions and hearing the narratives of

officials, this did not change their lived realities of being physically tired and overburdened with farm work and travel. To me this highlighted the fact that there are still significant challenges in building inclusive processes for people to have meaningful international participation and dialogue that can impact their everyday lives and questions such as how sustained engagement is possible and the mandates of institutions affect civil society's ability to engage and shape the overall discourses (Gaare, 2017).

Increased access to international spaces of decision-making and dialogue have enhanced farmers perspectives, building out both horizontal and vertical networks for participation that are undoubtedly increasing the political will to address issues of climate change and ecological agriculture among smallholders, tribal farmers and others at the margins (Borras & Franco, 2009). Building agency through engagement in all of these spaces was extremely important in how farmers place themselves and value their knowledge in wider movements for agroecology also served as a space of learning for farmers who could bring these learnings back to their villages. While frustrations voiced by Ritu, who lamented that grassroots organizations have to constantly be fighting for space and voice and she doesn't feel their international engagement has resulted in enough change in national and local contexts are certainly valid, CECOEDECON and their networks shared with me that they will continue to try to build synergy and convergences between rural farmers movements and international institutions, making way for their demands.

CHAPTER VI

CONCLUSION

I sit and write this conclusion in lockdown due to the COVID-19 outbreak from the comfort of my air-conditioned room in Massachusetts. I do so as farmers in rural Rajasthan are bearing the brunt of the COVID-19 induced lockdown, the lowest prices for crops they have seen in years and significant crop damage from the massive locust swarm that happened in May of 2020. I think about these farmers I met who moved me and made me optimistic for a future where ideals and principles of agroecology can be realized. These farmers, who I can imagine now are repairing their fences with new barbed branches, sowing seeds by hand, or digging new compost pits or irrigation ponds. These farmers, who are undoubtedly more greatly impacted by the devastating impacts of drought, invariable rainfall and floods, increased storms that come with climate change in India and the wider global south than we are here in North America; these farmers, who are most closely interconnected to the impacts of rising temperatures. I keep in mind these farmers and a future where small farmers all around the world who are responsible for producing most of our food, can grow their crops without being overburdened by debt, worsening ecological conditions and social injustices.

Throughout this thesis, I have tried to highlight how projects being conducted through CECOEDECON and its partner organizations are creating the potential for greater sovereignty and resilience while increasing farmer participation and mitigating the severity of impacts caused by the changing climate. The unique hybridization of peoples' movements and NGOs across the state are utilizing local,

national and international platforms to work to forge new paradigms for engagement and participation for farmers to determine and control more aspects of their production while working to maintain cultural livelihood practices related to agriculture. The experiences I had in Rajasthan have made me more optimistic than ever before for a farmer-centered and ecologically sound future for agriculture, yet I am also well aware of the many challenges that exist in these realms. The realities in which agroecology is ‘becoming’ are tangled within complex and constrained social, economic and environmental conditions of rural Indian society shaped by capitalist, industrial agriculture. What I hoped to communicate throughout this thesis is that it is these entangled and constrained realities that point to the need of urgent action to address climate change and justice for small and marginalized farmers.

In this concluding chapter I will briefly summarize the arguments I made throughout the thesis and while summarizing the challenges and barriers I have identified. I will also comment on the opportunities of agroecology as a vehicle for systems change and the role of Rajasthan’s civil society in bringing this about. I will then outline ‘ways forward’ and my recommendations based on my observations and synthesis. Following this, I present a ‘call to action’ for my readers and reflect on my most important takeaways and learnings from the field. I will finally conclude by highlighting several research questions that merit further exploration based on the findings of this study and touch upon new challenges and dimensions brought about by the COVID-19 outbreak.

As I explained in Chapter 3, a few of the biggest challenges or tensions constraining the adoption of agroecology is the dominating vision of production and

productivity that shapes farmers abilities to perceive alternative futures. While the measures that small and marginal farmers who have adopted various aspects of agroecology on varied scales and intensities are certainly helping mitigate greenhouse gas emission, reduce chemicalized inputs, lessen pollution and close ecological loops, understandably farmers are weary to adopt a fully ecological production given their close dependency on every harvest for livelihood. Rather than seeing agroecology and food sovereignty as a unified movement in the areas in which I worked, I saw agroecology coming together piece by piece brought about by champion farmers, activists and organization professionals who were the ‘agroecological first responders’ addressing crises on multiple fronts.

The groups of villages and their NGO counterparts who were working to build out agroecology by strengthening its building blocks were well aware of the limitations they faced, especially the devaluation of traditional agricultural knowledge, the entrenchment of Green Revolution-era practices and the prioritization of those practices to this day. The interventions that have taken place across these three regions are backed by a strong neoliberal discourse that has gotten even stronger in the era of Modi, with the state being largely unaccountable to the disruptions to local livelihoods that explicitly delink people to sustaining links between their homes, communities and sources of food; processes which are often seen as ‘inevitable’ for progress. These processes have resulted in institutional changes in villages that have undermined the sustaining links between communities’ social landscapes and their sources of livelihood, a process that is inherently conflictual and destabilizing undermines their ability to be self-sufficient as their

traditional agricultural knowledge becomes less valuable to their production.

Farmers however, are 'looking back to look forward' and many projects to revitalize cultural farming practices are underway.

As I argued in this chapter, agroecology is an essential concept to reconcile these competing visions and that of modernity and tradition in terms of both articulating the methods, techniques and practices or 'building blocks' of ecological and climate friendly production and connecting those practices with institutions, networks and movements that have the ability to help this kind of agriculture expand all the while not ignoring the upsides of on-farm technology. Realizing transformations for a more ecological sound and socially just and economic equitable production is proving to be paramount for improving the livelihoods of small and marginal farmers who find themselves trapped between debt-laden production and chemical reliance that has been promoted by the state and more recently corporations for several decades. Given this and the fact that moving from fossil-fuel reliant practices to agroecology is both labor and knowledge-intensive, transformation thus far have relied on the continued commitment of the farmers and civil society organizations.

As I argued in Chapter 4, I saw the transformative power of the grassroots working to produce the conditions that facilitate the adoption of agroecology as a primary means of production that goes far beyond simply ecological conditions. As a hybridized movement, CECOEDECON's networks are working to change social narratives as well as the visions of production that dominate the agrarian landscapes, challenging the status quo of conventional agriculture being unquestionably efficient

and necessary to feed the expanding population. Projects such as the SMART farm initiative are contributing to more diversified biocultural landscapes, encouraging integrative and agroecological farming methods, techniques, and practices and bolstering climate-friendly agriculture through carbon sequestration methods such as perennial production and legume production. Additionally, as CECOEDECON is demonstrating, there is a budding movement for agroecology beginning to take root in Rajasthan. Some farmers belonging to their networks are well aware of these concepts and active in resisting industrial agriculture, framing their motives as political aimed at agrarian transformation aligned with food sovereignty struggles, while others are adopting agroecology simply as a means to stabilize and make more secure their production and livelihoods.

While I touched on the role of the NGOs/civil society as both putting forth projects and ideas for a transformative agroecology and mediating social stigmas (gender and indignity/ caste) it is still important to recognize where efforts can be improved in this regard. I caution overestimating women's knowledge of agroecology, willingness to engage in the movement and willingness to engage in agriculture in general. Using the example of falling asleep during the panel sessions at the United Nations National Voluntary Review on Farmers, I pointed to the fact that growing food in ecological manner is not only labor intensive, but also mentally taxing. Therefore, farmers belonging to Scheduled Castes and Tribes who are heralded as the originators and keepers of agroecologically knowledge and climate friendly farming techniques have limited capacity to advocate for themselves and the movements that they represent.

In Chapter 5, I explained how I saw the role of the NGO in working as the mediator between the grassroots, state and international levels and the tension between evading co-operation and scaling up alternatives to industrial agriculture. As I discussed, the bridges and containers created by CECOEDECON were important to provide political education to farmers so that they could understand and situate themselves with forces and practices coming from 'the outside'. Through these processes of contextual and distilling complex scientific and policy information to farmers and connecting farmers and farmer unions to state and international platforms as well as, farmers were afforded greater agency within their local systems ultimately leading to greater sovereignty. CECOEDECON's international engagement allows for the enhanced access of these spaces to farmers which have ultimately enhanced farmer's perspectives and ability to bring about alternatives, building out horizontal and vertical networks for participation.

To summarize, despite the strength that a vision for agroecology holds, and the sincerity with which farmers want to bring this reality about, people still have significant concerns as to how the levels of productivity needed to achieve self-sufficiency in ecological farming can be achieved because of past and continued physical degradation of landscape: pollution (water/soil), loss of diversity on a wide scale, hardened and compacted soil with low organic matter, deforestation etc., as well the disruption of social/cultural landscape of production: loss of traditional knowledge, methods and skillsets. In addition, the inequitable distribution of resources and infrastructure including water/water storage, alternative energy, seed

storage, market channels, transportation limit the scale at which small-scale agroecological farms can operate. This is further mediated by the ideological barriers to legitimize agroecology as a primary means of production given the dominance that more industrial-based methods hold. Most farmers had not seen or witness successful agroecological farms in their lifetime, many, being in their 40s have grown up using chemical inputs given that was promoted on mainstream; these ideas have been deeply entrenched and are seen almost as inevitable. Farmers livelihoods were constrained to the point where their most immediate concern is survival, despite the desire and the want to pursue more agroecological farming are adopting it piece by piece. In addition, there was significant lack political will and lack of resonance between policies, schemes and programs that do exist for climate change, organic farming, STs/SCs and the on-the-ground reality of small and marginalized farmers trying to participate in more sustainable production. While there is policy precedence for organic farming and developing resilience to climate change, there has been a severe lack of implementation and has yet to make any significant impact on farmers given its focus on large scale producers.

Mier y Terán et al. (2018) identify eight key drivers of the process of taking agroecology to scale: (1) recognition of a crisis that motivates the search for alternatives, (2) social organization, (3) constructivists learning processes, (4) effective agroecological practices, (5) mobilizing discourses, (6) external allies, (7) favorable markets and (8) favorable policies. CECOEDECON and members of KSS were contributing to multiple of these key drivers including the recognition of a crisis that leads to the search of alternatives, social organization, effective practices,

mobilizing discourses and external allies. Of significant importance was reviving and maintaining building blocks of production and the knowledge that constitutes them: agrobiodiversity, localized techniques, methods and skillsets as well as climate-specific crops/livestock. Civil society and farmers are co-learning and co-creating these building blocks, as described by both farmers and staff – a lot has been lost. The knowledge for these building blocks is centered around farmers' unique and climate and culturally specific knowledge, but much was facilitated with through the organization by way of actually funding these projects, sharing outside/expert knowledge around these methods and fostering networks that help shared learning and dissemination taking place. Some of the many examples I saw in the field were dry land farming techniques, traditional water storage, the promotion of indigenous livestock, herb-based insecticide, the use of khaad or compost, growing polycultures and multi-cropping and agroforestry. The systematic exclusion of farmers belonging to ST/SC and women in policy and research often results in the lack technical information that might assist them in farming and their needs and their preferences while systematically excluding their concerns from priorities of the state. This limiting their exposure to both the dominating technological approaches and alternative methods such as agroecology that could enhance food security and facilities greater resilience to the negative effects of climate change. However, through social networks/organization of the VDCs and CBOs and constructivist learning processes such as the annual meetings horizontal networks of knowledge sharing were created that allowed for the dissemination of information through the farmer-to-farmer methodology. These teaching methods are more oriented towards

collective, horizontal learning, discussed variously as the co-creation of knowledge (Coolsaet 2016) and integrate cultural components with technical training, enabling people to experience meaningful learning (Ausubel 1983) through example.

I witnessed farmers working with rather than against NGO community in a hybridized manner to formulate and piece together agroecology on the scale of the farm through adopting components as the resources to do so became available to them, with the larger recognition and vision that working from the farm level was powerful compromise in the short term while building power for an alternatives in the long term. I original split my second research question to examine farmer and civil society response, I did so because I expected to find more tension, what I came to learn through my experience in the field is that the line between the organization and the farmers themselves was very blurred. While the literature in food sovereignty often points to conflict between NGOs and farmers wants/needs, from my experience, farmers felt a strong sense of pride belonging to the organization, or as affectionately referred to the “parivaar” or family that they carried around literally (in the form of the notepads, pens, and bags) and not so literally, in the gusto with which they shared stories at these larger forums, organized and collectively brainstormed at joint-sessions and expressed their excitement and gratitude for being a part of these larger conversations. This melding I felt was how progress was actually taking root. The formation of Village Development Committees and Community-Based Organizations helped communities steer their own development and take greater agency in their production with the ultimate goal is to facilitate self-determination, recognizing local actors as active participants in the process of

agrarian change. The social organization was a significant medium upon which agroecology was taking root. Social-process methodologies accelerate this growth (Rosset 2015; Rosset and Altieri 2017). The organizational fabric allowed for a multiplier effect on the adoption of agroecological methods and helped to construct social processes collectively.

The resulting programs designed by grassroots civil society organizations for the grassroots were focused specifically on SCs, STs and women who have intimate relationships with people they work with and understandings of the intricacies of every life, the culturally and socially distinct issues, struggles and the strengths of the communities. CBOs, VDCs and CECOEDCON have both created new relationships and intensified existing ones through bolstering institutional capacities within the villages that ultimately serve as the connective tissue through which new knowledge to better manage and integrate ecological relationships into farming systems can be generated and disseminated. The organization found strength in their ability to facilitate and demonstrate concrete and tangible 'solutions' that can be scaled up and replicated. An example of this was the SMART Farm which they want to help farmers replicate across a much broader scale to weather the impacts of climate change and empower farmers from the grassroots.

All of this being said, expanding agroecology in Rajasthan would mean seriously confronting the capitalist food system, including corporations and state-led modernization of production. This calls for an advancement of food sovereignty and agroecology politically, some of which we are seeing. Gaining political recognition and footing could result in direct policy formations,

initiatives and schemes that would contribute to agroecology's expansion in Rajasthan, such as that of the Special Programme for Promotion of Millets in Tribal Areas in Odisha. While the Government of India and the Government of Rajasthan have indeed listened to the push from farmers and civil society, taking measures to promote sustainable agriculture and climate as well as more equitable conditions for those most marginalized through industrial, corporate food systems (namely women and those belonging to marginalized social classes like SCs and STs), CECOEDECON and their partners with whom I interacted are the major agents putting forth concrete ideas and programs for transformation and continue to push on the government(s) to follow suit. As such, we can anticipate there being increased tension that will take place between working to popularize this form of production and evading co-optation. Efforts in this regard such as the People's Manifesto and opposing GM trials are noteworthy and demonstrate that a vision counter to industrial agriculture which centers marginalized classes, castes and women is not only possible, but can be successful. However, the political-economic embeddedness of power within Rajasthan's food system that historically has and continues to marginalize farmers, farmer organization's and civil society organizations will likely not see a huge shift in their ability participate in policy shaping process any time soon. Farmers, however, remain hopeful, as one said to me: "Today farmers are running after the government, but one day government will have to run after the farmers. We can't eat money and we can't eat the chemicals, then they will ask the farmers to grow crops this way [ecologically]."

Ways Forward, Recommendations and Reflections

Successfully realizing any sort of agroecology of scale in Rajasthan depends on taking concrete actions against mainstream agricultural development by confronting the capitalist centered food system and employing mechanisms that strengthen farmers' ability to participate in and determine their food systems all while recognizing the entrenchment of Green Revolution-era practices that have reshaped social and ecological relationships. As the examples I have given show, the right social, political and ecological conditions can create an opening for the adoption of agroecological practices where this confrontation can take place. The strategy of working through the micro, meso and macro levels allows CECOEDECON, KSS and their partner organizations unite to form a hybridized movement, constructing a space such that “socially embedded and trusted methods and rules of mutual support amongst people who are poor become a normative guide” (Wilkinson-Maposa, 2009).

This approach offers a promising approach to dismantle dominant approaches to agricultural development by opening a space for greater agency and autonomy among farmers across multiple scales (Escobar 1992). While farmer, development professionals and activists are hopeful that Rajasthan and India at large will see more just, agroecological and climate friendly agriculture as a result of their purposeful engagement, it is important to recognize that without shifts in the embedded power relations that animate the agrarian environment no real change will be possible. To this end, it is also important to not romanticize or idealize that tribal, women and small and marginal farmers have all the answers nor that transferring all power to the local level will fix decades of problematic,

top-down intervention in these areas. Given the global recognition of climate change, CECOEDECON and other organization with similar aims and goals have found significant success in mobilizing these climate change discourses at the international and state levels and will likely find success when pairing these discourses with agroecological ones. This will likely continue to be a key place for participation and for building power, agency and legitimacy.

While the work in these areas has seen some progress, there is still a long way to go for agroecology as a science, practice and set of methods to reach their full potential and contribute to meaningful development. Based on my observations, interviews and practical and theoretical knowledge of agroecology I propose some short- and long-term strategies for meeting these goals that centers farmer participation in the process of envisioning new trajectories:

- Mediate the ideological barriers to agroecology and the bias towards industrial agriculture that hinder political recognition and validity
- Expand and strengthen farmer and civil society networks and peer to peer action research; Strengthen village-level institutions and ensure continued political participation and improved food and agricultural governance
- Continued empowerment of marginalized actors (women and SC & ST) through specifically designed programs led by NGO sector
- Connect employment and food security schemes to agroecological production
- Continue to push on global governance agendas, climate change debates and link the local with the global
- Promote the production of climate-specific varieties and landraces and indigenous livestock
- Continue to push for significant investment in agroecological research agendas and education

I want to finally conclude with a poem written by the Zimbabwean Peasant

Movement, published by La Via Campesina, followed by some personal reflections:

Oh! Oh! Nature mourns, Humanity perishes!
Why? Seasons have changed
Now unpredictable and unreliable!
Hotter, drier and shorter!
Winds and storms harsher and destructive
Mother Earth mourns, the land is barren.
Women, men and children, plants and animals perish!
Capitalist industrial agriculture, what have you done?
Everywhere, Mother Earth crumbles
As toxics and harmful GMO seeds swell her belly.
Heavy machines trample her belly
Their dark plumes polluting the sky,
A new baby, Climate Change, is conceived and born!
Oh! What is all this?
Ecological niches shrink
Biodiversity fast disappears
Greater uncertainty hovers everywhere
Heightened risks for us the food producers
Traditional agriculture knowledge is fast eroding
What and who shall save us?
Climate change knows no peace,
Hungers for only for destruction!
Greed for profits feed him!
Extreme, extreme, extreme weather phenomena, his fruits!
Environmental and humanitarian disasters!
Floods, droughts, landslides, diseases!
Humanity cries: No Food!
Nature cries: Inhabitable! Inhabitable!
Is there a remedy?
Yes, but we hear only false solutions!
Free Markets, REDD, Climate Smart agriculture,
Green economy, Agrofuels, Carbon trading,
land grabbing, more industrial farming,
Massive use of herbicides, inorganic fertilizers and
More GMOs!
Oh Lord! All to grow climate change! Why?
Profits! Profits! More profits! cries Capitalism, his father!
But hope looms in the horizon
Food sovereignty, our hope!
Comes to restore social justice to humanity,
Ecological sustainability to nature
Biodiversity and cultural diversity to all peoples of Mother Earth!

Arise ye peoples, women and men, the landless, peasants,
indigenous farmers, forest and fisherfolks,
Let your hope be heard in all the corners of the earth!

Climate Justice and Food Sovereignty Now!
Globalise the Struggle, Globalise Hope!
Viva La Via Campesina, Viva
(Mpofu, 2016)

The multiple, urgent and intersecting crises in agriculture that impacting the agri-food system and the billions of people who make it run call for drastically urgent and revolutionary responses. Farmers, civil society advocates, and activists have taken the lead and mobilized millions of people on behalf of food sovereignty and agroecology. As researchers, academics, consumers and engaged community members we must take seriously our role in this global movement. While agroecology is now on the table and recognized by a wide range of actors, it is significantly underrepresented in agriculture research strategies in the sciences and social sciences alike. A stronger priority must be given to research about agroecology and food sovereignty in response to the widespread loss of biodiversity, the rapidly changing climate, soil and land degradation, food insecurity/malnutrition, economic inequality and more recently, the 2019 coronavirus pandemic that is bringing new, unforeseen challenges to the agriculture sector.

As one of the principle drivers of climate change and ecosystem degradation on a mass scale, a radical and new approach is needed. We must envision a world where our food production does not degrade the ecosystem services we so intimately depend on, does not push farmers to the margins, does not contribute to the rise in dietary disease, malnutrition, undernutrition and nutrition inequality but rather

contributes to restoration of landscapes, to the mitigation of climate change, to human health and to meeting the needs of an uncertain future that lies ahead of us. While achieving these sorts of transitions will present a wide range of barriers, constraints and challenges on many fronts, it is my genuine hope that ultimately, the importance of creating pathways towards agroecologically based transitions will rise above the importance of yields and profits; it is my hope that agriculture can contribute to the reconciliation of food security, human health and environmental sustainability; it is my hope that food sovereignty can be realized in the deepest sense of the term and farmers are given the respect that they deserve.



Figure 13

Thank you, farmers!

REFERENCES CITED

- Ashlesha Khadse & Peter M. Rosset (2019): Zero Budget Natural Farming in India – from inception to institutionalization, *Agroecology and Sustainable Food Systems*, DOI: 10.1080/21683565.2019.1608349
- Agarwal, B., & Bina, A. (1994). *A Field of one's own: Gender and land rights in South Asia* (Vol. 58). Cambridge University Press.
- Altieri, M. A., & Koochafkan, P. (2008). *Enduring farms: climate change, smallholders and traditional farming communities* (Vol. 6). Penang: Third World Network (TWN).
- Altieri, M. A., & Nicholls, C. I. (2017). The adaptation and mitigation potential of traditional agriculture in a changing climate. *Climatic Change*, 140(1), 33-45.
- Altieri, M.A., 1995. *Agroecology: The Science of Sustainable Agriculture*. Westview Press, Boulder, CO.
- Altieri, M. A., & Nicholls, C. I. (2005). *Agroecology and the search for a truly sustainable agriculture*. United Nations Environmental Programme, Environmental Training Network for Latin America and the Caribbean.
- Altieri, M.A. 1987. *Agroecology: The scientific basis of alternative agriculture*, Boulder, CO: Westview Press.
- Altieri, M. A., Funes-Monzote, F. R., & Pemtersen, P. (2012). Agroecologically efficient agricultural systems for smallholder farmers: contributions to food sovereignty. *Agronomy for Sustainable Development*, 32(1), 1–13.
<https://doi.org/10.1007/s13593-011-0065-6>
- Altieri, M. A., & Toledo, V. M. (2011). The agroecological revolution in Latin America: rescuing nature, ensuring food sovereignty and empowering peasants. *Journal of Peasant Studies*, 38(3), 587-612.
- Altieri, M. A., & Nicholls, C. I. (2008). Scaling up agroecological approaches for food sovereignty in Latin America. *Development*, 51(4), 472-480.
- Altieri, M. A., & Nicholls, C. I. (2012). Agroecology scaling up for food sovereignty.
- Amin, S., & Patel, R. (2011). *Food movements unite!: Strategies to transform our food systems*. E. Holt-Gimenez (Ed.). Oakland, CA: Food First Books
- Amekawa, Y. (2011). *Agroecology and Sustainable Livelihoods: Towards an Integrated Approach to Rural Development*. *Journal of Sustainable Agriculture*, 35(2), 118–162. doi:10.1080/10440046.2011.539124

- Anderson, C. R., Maughan, C., & Pimbert, M. P. (2019). Transformative agroecology learning in Europe: building consciousness, skills and collective capacity for food sovereignty. *Agriculture and Human Values*, 36(3), 531-547.
- Appadurai, A. (1990). Disjuncture and difference in the global cultural economy. *Theory, culture & society*, 7(2-3), 295-310.
- Ariel Dinar & Robert Mendelsohn (ed.), 2011. "Handbook on Climate Change and Agriculture," Books, Edward Elgar Publishing, number 13942.
- Bezner Kerr, R., Nyantakyi-Frimpong, H., Dakishoni, L., Lupafya, E., Shumba, L., Luginaah, I., & Snapp, S. S. (2018). *Knowledge politics in participatory climate change adaptation research on agroecology in Malawi. Renewable Agriculture and Food Systems*, 33(03), 238–251. doi:10.1017/s1742170518000017
- Bernstein, H. (2014). Food sovereignty via the 'peasant way': A sceptical view. *Journal of Peasant Studies*, 41(6), 1031-1063.
- Birkenholtz, T. (2009). Irrigated landscapes, produced scarcity, and adaptive social institutions in Rajasthan, India. *Annals of the Association of American Geographers*, 99(1), 118-137.
- Blee, K.M. & Taylor, Verta. (2002). Semi-Structured Interviewing in Social Movement Research. *Methods of Social Movement Research*. 92-117.
- Borrini, G., Jaireth, H., Pimbert, M., Farvar, M. T., Renard, Y., Kothari, A., ... & Ramírez, R. (2007). *Sharing power: learning-by-doing in co-management of natural resources throughout the world*. Earthscan.
- Bronfenbrenner, U. (1979). *The ecology of human development*. Harvard university press.
- Brown, T. (2016). Civil society organizations for sustainable agriculture: Negotiating power relations for pro-poor development in India. *Agroecology And Sustainable Food Systems*, 40(4), 381-404.
- Burawoy, M. (2000). *Global ethnography : Forces, connections, and imaginations in a postmodern world*. Berkeley: University of California Press.
- Charmaz, Kathy. 2006. *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*. London: Sage.
- Chatterton, P., Hodkinson, S., & Pickerill, J. (2010). Beyond Scholar Activism: Making Strategic Interventions Inside and Outside the Neoliberal University. *Acme: An international e-journal for critical geographies*, 9(2).

- Chiappe, M. B., & Butler Flora, C. (1998). Gendered elements of the alternative agriculture paradigm. *Rural sociology*, 63(3), 372-393.
- Constance, D.H., Friedland, W.H., Renard, M., & Rivera-Ferre, M.G. (2014). *The Discourse on Alternative Agrifood Movements*.
- Conway G. *The doubly green revolution: food for all in the 21st century*. London: Penguin Books; 1997.
- “DECLARATION OF NYÉLÉNI.” Nyéléni 2007 - Forum for Food Sovereignty. 23rd 27th February 2007. Sélingué. Mali, Feb. 2007, nyeleni.org/spip.php?article290.
- Davies WP. An historical perspective from the green revolution to the gene revolution. *Nutr Rev.* 2003;61(6 Pt 2):S124–34.
- Denzin, Norman K., and Michael D. Giardina. *Ethical Futures in Qualitative Research: Decolonizing the Politics of Knowledge*. Left Coast Pr, 2007.
- Derickson, K. D., & Routledge, P. (2015). Resourcing scholar-activism: Collaboration, transformation, and the production of knowledge. *The Professional Geographer*, 67(1), 1-7.
- Desai, R. (2016). The slow-motion counterrevolution: developmental contradictions and the emergence of neoliberalism. In *Social Movements and the State in India* (pp. 25-51). Palgrave Macmillan, London.
- de Sousa Santos, B. (Ed.). (2007). *Cognitive justice in a global world: Prudent knowledges for a decent life*. Lexington Books.
- Desmarais, A. A. (2007). Globalization and the power of peasants: La Vía Campesina. *Halifax: Fernwood Publishing*.
- Dev, M. 2017. Small Farmers in India: Challenges and Opportunities. Retrieved March 2017, from IGIDR Working Paper: <http://www.igidr.ac.in/pdf/publication/WP-2012-014.pdf>
- Ehlert, J., & Voßemer, C. (2015). Food sovereignty and conceptualization of agency: A methodological discussion. *ASEAS – Austrian Journal of South-East Asian Studies*, 8(1), 7-26.
- Escobar, A. (2011). Sustainability: Design for the the pluriverse. *Development*, 54(2), 137-140.
- FAO (2020). India at a glance. Retrieved April, 2020, from <http://www.fao.org/india/fao-in-india/india-at-a->

glance/en/#:~:text=Agriculture, with its allied sectors,275 million tonnes (MT)

- Fairbairn, M. (2010). Framing resistance: International food regimes and the roots of food sovereignty. In *Food Sovereignty: Reconnecting food, nature and community*, ed. by H. Wittman, A.A. Desmarais, and N. Wiebe, 15–32. Halifax: Fernwood Publishing.
- Farnworth, C., & Hutchings, J. (2009). Organic agriculture and women's empowerment. *IFOAM, Germany*, 86.
- Ferguson, A. E. (1994). Gendered science: a critique of agricultural development. *American Anthropologist*, 540-552.
- Ferguson, B. G., M. A. Maya, O. Giraldo, and Cacho, M. Terán Giménez M. Y., Morales, H., & Rosset, P. 2019. Special issue editorial: What do we mean by agroecological scaling? *Agroecology and Sustainable Food Systems*, 43(7–8), 722–723.
- Food and Agriculture Organization of the United Nations. (2014). *Agroecology for Food Security and Nutrition: Proceedings of the FAO International Symposium* [PDF File]. Retrieved from <http://www.fao.org/3/a-i4729e.pdf>.
- Food and Agriculture Organization of the United Nations. (2018). *The 10 Elements of Agroecology: Guiding the Transition to Sustainable Food and Agriculture Systems*. [PDF file]. Retrieved from <http://www.fao.org/3/i9037en/i9037en.pdf>.
- Francis, C., Lieblein, G., Gliessman, S., Breland, T. A., Creamer, N., Harwood, R., ... & Wiedenhoft, M. (2003). Agroecology: The ecology of food systems. *Journal of sustainable agriculture*, 22(3), 99-118
- Francis, Charles, et al. (2003). Agroecology: The Ecology of Food Systems. *Journal of Sustainable Agriculture*. 22. 99-118. 10.1300/J064v22n03_10.
- Friedmann, H. (2005). From Colonialism to Green Capitalism: Social Movements and Emergence of Food Regimes. *New Directions in the Sociology of Global Development Research in Rural Sociology and Development*, Volume 11, Emerald Group Publishing Limited, pp. 227 – 264.
- Friedmann, H. (1993). International Political Economy of Food: A Global Crisis. *New Left Review* no. 197, pp. 29-57.
- Friedmann, H. Discussion: moving food regimes forward: reflections on symposium essays. *Agric Hum Values* 26, 335 (2009). <https://doi.org/10.1007/s10460-009-9225-6>

- Friedmann, H., & McMichael, P. (1989). Agricultural and the State System: The rise and decline of national agricultures, 1870 to the present. *Sociologia Ruralis*, 29(2), 93-117.
- Frison, E. A. (2016). From uniformity to diversity: a paradigm shift from industrial agriculture to diversified agroecological systems.
- Gani, A., & Prasad, B. C. (2007). Food security and human development. *International Journal of Social Economics*.
- Gartaula, H., Patel, K., Johnson, D., & Moghariya, D. (2013). Entitlement vs. Food Sovereignty Approaches: Challenges for sustainable food and nutrition security in the changing agrarian landscape in Tamil Nadu, India. In *Food Sovereignty: A Critical Dialogue International Conference, September* (pp. 1-31).
- Ghosh, Nilabja. (2004). Reducing Dependency on Chemical Fertilizers and its Financial Implications for Farmers in India. *Ecological Economics*. 49. 149-162. 10.1016/j.ecolecon.2004.03.016
- Gopalsamy, Poyyamoli & Editor,. (2017). *Agroecology, ecosystems & Sustainability in the tropics*.
- Government of India . (2006). The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. New Delhi: Ministry of Law and Justice.
- Groundswell International (n.d.). Agroecological Farming. Retrieved from <https://www.groundswellinternational.org/approach/agroecological-farming/>
- Gille, Z., & Riain, S. (2002). Global Ethnography. *Annual Review of Sociology*, 28(1), 271-295.
- Gliessman, Steve .(2016) Transforming food systems with agroecology, *Agroecology and Sustainable Food Systems*, 40:3, 187-189, DOI: 10.1080/21683565.2015.1130765.
- Gliessman, S. R., Engles, E., & Krieger, R. (1998). *Agroecology: ecological processes in sustainable agriculture*. CRC Press.
- Guiteras, R. (2009). The impact of climate change on Indian agriculture. *Manuscript, Department of Economics, University of Maryland, College Park, Maryland*.
- Hale, C. R. (2001). What is activist research? *Social Science Research Council*, 2 (1-2), 13-15.

- Halberg, N., & Muller, Adrian. (2012). *Organic Agriculture for Sustainable Livelihoods*. Earthscan food and agriculture. Hoboken: Taylor and Francis.
- Hazell, P. B. R. (2010). Chapter 68 An Assessment of the Impact of Agricultural Research in South Asia Since the Green Revolution. *Handbook of Agricultural Economics*, 4, 3469–3530. [https://doi.org/10.1016/S1574-0072\(09\)04068-7](https://doi.org/10.1016/S1574-0072(09)04068-7).
- Heckelman, A., & Wittman, H. (2015). Food Sovereignty: A framework for assessing agrarian responses to climate change in the Philippines. *ASEAS – Austrian Journal of South-East Asian Studies*, 8(1), 87-94.
- Holt-Gimenez, Eric. *Food Movements Unite! : Strategies to Transform Our Food Systems*. Oakland, CA: Food First, 2011. Print.
- Holt-Gimenez, E., & Altieri, M. (2013). Agroecology, Food Sovereignty, and the New Green Revolution. *Agroecology And Sustainable Food Systems*, 37(1), 90-102.
- Holtz-Giménez, E., & Shattuck, A. (2011). Food crises, food regimes and food movements: rumblings of reform or tides of transformation? *The Journal of Peasant Studies*, 38(1), 109–144. <https://doi.org/10.1080/03066150.2010.538578>
- Hursh, D. W., & Henderson, J. A. (2011). Contesting global neoliberalism and creating alternative futures. *Discourse: Studies in the cultural politics of education*, 32(2), 171-185.
- India: Act No. 33 of 1989, Scheduled Castes and the Scheduled Tribes (Prevention of Atrocities) Act, 1989 [], 30 January 1990, available at: <https://www.refworld.org/docid/3ae6b52a1c.html> [accessed 23 October 2020]
- IPCC, 2019: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.-O. Pörtner, D. C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)]. In press.
- Jewitt, S. (2000). *Unequal Knowledges in Jharkhand, India: De-Romanticizing Women's Agroecological Expertise*. *Development and Change*, 31(5), 961–985. doi:10.1111/1467-7660.00185
- Jakobsen, J. (2019). Neoliberalising the food regime 'amongst its others': the right to food and the state in India. *The Journal of Peasant Studies*, 46(6), 1219-1239.

- Jodha, N. S. (1985). Population growth and the decline of common property resources in Rajasthan, India. *Population and development Review*, 247-264.
- Kang, M. S., & Banga, S. S. (Eds.). (2013). *Combating climate change : an agricultural perspective* (Ser. Gale virtual reference library). CRC Press.
<https://doi.org/10.1201/b14056>
- Kar, A. (2014). Agricultural land use in arid Western Rajasthan: Resource exploitation and emerging issues. *Agropedology*, 24(02), 179-196.
- Khadse A., Rosset P.M., Morales A., & Ferguson, B.G. (2018) Taking agroecology to scale: the Zero Budget Natural Farming peasant movement in Karnataka, India, *The Journal of Peasant Studies*, 45:1, 192-219, DOI: [10.1080/03066150.2016.1276450](https://doi.org/10.1080/03066150.2016.1276450)
- Kremen, C., Iles, A., & Bacon, C. (2012). Diversified farming systems: an agroecological, systems-based alternative to modern industrial agriculture. *Ecology and society*, 17(4).
- La Via Campesina. 2007. *Nyeléni Declaration* Sélingué, Mali: Forum for Food Sovereignty. Available from:
<http://www.foodandwaterwatch.org/world/global-trade/NyeleniDeclaration-en.pdf/view> [Accessed 1 March 2009] [[Google Scholar](#)]
- La Via Campesina, 2015. Declaration of the International Forum for Agroecology, Nyéléni, Mali: 27 February 2015. *Development* 58, 163–168 (2015).
<https://doi.org/10.1057/s41301-016-0014-4>
- La Via Campesina. 2018. Declaration by Organizations of Small-Scale Producers and Civil Society Organizations at the II International Symposium on Agroecology Convened by FAO. Rome, 5 April 2018, Second International Symposium on Agroecology. <https://viacampesina.org/en/declaration-at-the-ii-international-symposium-on-agroecology/>.
- Lewis, A.G. (2012) Ethics, Activism and the Anti-Colonial: Social Movement Research as Resistance. *Social Movement Studies*, 11:2, 227-240
- Lewis-Beck, M. S., Bryman, A., & Futing Liao, T. (2004). *The SAGE encyclopedia of social science research methods*. Thousand Oaks, CA: Sage Publications, Inc. doi: 10.4135/9781412950589
- Mazhar, F., Buckles, D., & Satheesh, P. V. (2007). *Food sovereignty and uncultivated biodiversity in South Asia: Essays on the poverty of food policy and the wealth of the social landscape*. Academic Foundation.

- Mahale, Prabha, and Hay, Soree. "Cosmovisions in Health and Agriculture in India." *Food for Thought: Ancient Visions and New Experiments of Rural People*, edited by Bertus Haverkort and Wim Hiemstra, Zed, 1999, pp. 33–42.
- McKay, B., Nehring, R., & Walsh-Dilley, M. (2014). The 'state' of food sovereignty in Latin America: Political projects and alternative pathways in Venezuela, Ecuador and Bolivia. *Journal of Peasant Studies*, 41(6), 1175-1200.
- McIntyre, B. (2009). *East and South Asia and the Pacific (ESAP) report (Agriculture at a crossroads; v. 2)*. Washington, DC: Island Press.
- McMichael, P. (2005), Global Development and The Corporate Food Regime, in Frederick H. Buttel and Philip McMichael (eds.) *New Directions in the Sociology of Global Development Research in Rural Sociology and Development*, Volume 11, Emerald Group Publishing Limited, pp.265 - 299
- McMichael, P. (2009) A food regime genealogy, *Journal of Peasant Studies*, 36:1, 139-169, DOI: [10.1080/03066150902820354](https://doi.org/10.1080/03066150902820354).
- McMichael, P. (2014) Historicizing food sovereignty, *Journal of Peasant Studies*, 41:6, 933-957, DOI: [10.1080/03066150.2013.876999](https://doi.org/10.1080/03066150.2013.876999).
- Meek, D. (2014). Agroecology and Radical Grassroots Movements' Evolving Moral Economies. *Environment and society*, 5(1), 47-65.
- Meek, D., Bradley, K., Ferguson, B., Hoey, L., Morales, H., Rosset, P., & Tarlau, R. (2019). Food sovereignty education across the Americas: multiple origins, converging movements. *Agriculture and Human Values*, 36(3), 611-626.
- Méndez, V.E., C.M. Bacon and R. Cohen (2013) Agroecology as a transdisciplinary, participatory and action-oriented approach. *Agroecology and Sustainable Food Systems* 37(1):3-18.
- Merton, R. (1957). The Role-Set: Problems in Sociological Theory. *The British Journal of Sociology*, 8(2), 106-120. doi:10.2307/587363.
- Migliorini, P., & Wezel, A. (2017). Converging and diverging principles and practices of organic agriculture regulations and agroecology. A review. *Agronomy for sustainable development*, 37(6), 63.
- Ministry of Rural Development (2005). *"The National Rural Employment Guarantee Act 2005 (NREGA) – Operational Guidelines" (PDF)*. "Ministry of Rural Development", *Government of India*.
- Minority Rights. (2020, June 30). *India*. <https://minorityrights.org/country/india/>.

- Morton, J. F. (2007). The impact of climate change on smallholder and subsistence agriculture. *Proceedings of the national academy of sciences*, 104(50), 19680-19685.
- Nicholson, P. (2014, March 18). Paul Nicholson: Food sovereignty A critical dialogue. Retrieved from <https://www.youtube.com/watch?v=J8apjmw9MQM>
- Omar Felipe Giraldo & Peter M. Rosset (2018) Agroecology as a territory in dispute: between institutionality and social movements, *The Journal of Peasant Studies*, 45:3, 545-564, DOI: 10.1080/03066150.2017.1353496
- Parayil, Govindan, 1992, 'The Green Revolution in India: A Case Study of Technological Change', *Technology and Culture*, Vol. 33, No. 4, pp. 737-56
- Patel, Raj. (2009). Food sovereignty. *The Journal of Peasant Studies*, 36(3), 663-706. <https://doi.org/10.1080/03066150903143079>.
- Perfecto, I., Vandermeer, J., Wright, A. (2009). *Nature's Matrix : Linking Agriculture, Conservation and Food Sovereignty*. <https://doi.org/10.4324/9781849770132>
- Pearse, A. (1980). Seeds of plenty, seeds of want: social and economic implications of the green revolution. *Revisiting Sustainable Development*, 139.
- Peschard, K. (2014). Farmers' rights and food sovereignty: Critical insights from India. *The Journal of Peasant Studies.*, 41(6), 1085-1108.
- Pickerill, Jenny & Chatterton, Paul & Hodkinson, Stuart. (2010). Beyond Scholar activism: Making Strategic Interventions Inside and Outside the Neoliberal University. ACME.
- Pimbert, Michel P (2018). *Food Sovereignty, Agroecology and Biocultural Diversity : Constructing and Contesting Knowledge*. Abingdon, Oxon ; New York, NY: Routledge, an Imprint of the Taylor & Francis Group. Print. Routledge Studies in Food, Society and Environment.
- Pimbert, M. (2017). Agroecology as an Alternative Vision to Conventional Development and Climate Smart Agriculture. *Development*, 58(2-3), 286-298. <https://doi.org/10.1057/s41301-016-0013-5>.
- Pimbert, M. P. (Ed.). (2017). *Food sovereignty, agroecology and biocultural diversity: constructing and contesting knowledge*. Routledge.
- Redman-MacLaren, M., & Mills, J. (2015). Transformational grounded theory: Theory, voice, and action. *International Journal of Qualitative Methods*, 14(3), 1-12.

- Rosset, P. (2011). Food sovereignty and alternative paradigms to confront land grabbing and the food and climate crises. *Development*, 54(1), 21-30.
- Rosset, P. M., & Martínez-Torres, M. E. (2012). Rural social movements and agroecology: context, theory, and process. *Ecology and society*, 17(3)
- Roy, A. (2014). The NGO-ization of Resistance. *Massalijn News*. <http://massalijn.nl/new/the-ngo-ization-of-resistance/> (accessed 23 January 2020).
- Andrée, P., Clark, J. K., Levkoe, C. Z., & Lowitt, K. (2019). *Civil society and social movements in food system governance*(p. 216). Taylor & Francis.
- Sachs, C. E. (2018). *Gendered fields: Rural women, agriculture, and environment*. Routledge.
- Schanbacher, W. (2010). *The politics of food : The global conflict between food security and food sovereignty*. Westport, CT: Praeger Security International.
- Smith, A., Fressoli, M., & Thomas, H. (2014). Grassroots innovation movements: challenges and contributions. *Journal of Cleaner Production*, 63, 114-124.
- Smitha, K. C. (2018). Agrarian Movements in Neoliberal India: A Case Study of Andhra Pradesh Vyvasaya Vruthidarula Union. *Agrarian South: Journal of Political Economy*, 7(2), 123–144. <https://doi.org/10.1177/2277976018778626>
- Snapp, S., & Pound, Barry. (2008). *Agricultural systems : Agroecology and rural innovation for development*. Amsterdam ; Boston: Elsevier/ Academic Press.
- Sharma, H., Burark, S. S., & Meena, G. L. (2015). Land degradation and sustainable agriculture in Rajasthan, India. *J Indus Pollut Control*, 31(1), 7-11.
- Shanmugaratnam, N. (1996). Nationalisation, privatisation and the dilemmas of common property management in Western Rajasthan. *The journal of development studies*, 33(2), 163-187.
- Shiva, V. (1993). *Monocultures of the mind: Perspectives on biodiversity and biotechnology*. Palgrave Macmillan.
- Schanbacher, W. D. (2010). *The politics of food: the global conflict between food security and food sovereignty*. ABC-CLIO.
- Srivastava, P., Singh, R., Tripathi, S., & Raghubanshi, A. Singh. (2016). An urgent need for sustainable thinking in agriculture – An Indian scenario. *Ecological indicators*, 67, 611-622. doi: [10.1016/j.ecolind.2016.03.015](https://doi.org/10.1016/j.ecolind.2016.03.015)
- Stagnari, F., Maggio, A., Galieni, A. *et al.* Multiple benefits of legumes for agriculture sustainability: an overview. *Chem. Biol. Technol. Agric.* 4, 2 (2017). <https://doi.org/10.1186/s40538-016-0085-1>

- Stake, R. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.
- Swain, M., Kalamkar, S., & Ojha, M. (2012). *State of Rajasthan Agriculture 2011-12* (Publication No. 11445). Sardar Patel University: Agro-Economic Research Centre For the states of Rajasthan and Gujarat.
- Thorne, Barrie. (1978). Political Activist As Participant Observer: Conflicts Of Commitment In A Study Of The Draft Resistance Movement Of The 1960's. *Symbolic Interaction 2*: 72-88.
- Tilzey, Mark. *Political Ecology, Food Regimes, and Food Sovereignty : Crisis, Resistance, and Resilience*. Cham, Switzerland: Palgrave Macmillan, 2018. Print.
- Tom, A. (2012). The Urban–Rural Divide and Food Sovereignty in India. *Journal of Developing Societies*, 28(4), 379–402.
<https://doi.org/10.1177/0169796X12462735>
- Trauger, A. (2017). *We want land to live: Making political space for food sovereignty* (Vol. 33). University of Georgia Press.
- Trauger, A. (Ed.). (2015). *Food sovereignty in international context: discourse, politics and practice of place*. Routledge.
- Tuck, E. and K.W. Yang. (2014a). Unbecoming claims: Pedagogies of refusal in qualitative research. *Qualitative Inquiry* 20 (6): 811-818.
- Tuck, E. and K.W. Yang. (2014b). ‘R-Words: Refusing Research’ in D. Paris and M. T. Winn (Eds.) *Humanizing Research: Decolonizing Qualitative Inquiry with youth and Communities*. Thousand Oakes, CA: Sage Publications.
- United Nations & Government of India (2018). Sustainable Development Framework 2018-2022. Retrieved from <http://4dj7dt2ychlw3310xlowzop2.wpengine.netdna-cdn.com/wp-content/uploads/2018/12/UNSDF Print Oct12 web.pdf>
- USDA Foreign Agriculture Service. (2014, August). International Trade Report: India’s Agricultural Exports Climb to Record High. Retrieved from https://www.fas.usda.gov/sites/default/files/2015-02/india_iatr_august_2014.pdf
- Van der Ploeg, J. D. (2009). *The new peasantries: struggles for autonomy and sustainability in an era of empire and globalization*. Routledge.
- Villa, T. C. C., Maxted, N., Scholten, M., & Ford-Lloyd, B. (2005). Defining and identifying crop landraces. *Plant Genetic Resources*, 3(3), 373-384.
- Visvanathan, S. (2006). Alternative science. *Theory, culture & society*, 23(2-3), 164-169.

- Visvanathan, S (2005). Knowledge, justice and democracy M. Leach, I. Scoones, B. Wynne (Eds.), *Science and Citizens: Globalization and the Challenge of Engagement*, Zed Books, London; New York (2005)
- Walker, K. L. M. (2008). Neoliberalism on the ground in rural India: Predatory growth, agrarian crisis, internal colonization, and the intensification of class struggle. *The Journal of Peasant Studies*, 35(4), 557-620.
- Warner, K. (2007). *Agroecology in action : Extending alternative agriculture through social networks* (Food, health, and the environment). Cambridge, Mass.: MIT.
- World Food Programme. (2019). India. Retrieved from <https://www1.wfp.org/countries/india>
- Windfuhr, M., & Jonsén, J. (2005). *Food sovereignty: towards democracy in localized food systems*. Retrieved from <http://agris.fao.org/agris-search/search.do?recordID=GB2013202621>
- Wittman, Hannah. "Food Sovereignty: A New Rights Framework for Food and Nature?" *Environment & Society Environment & Society* 2 (2011): 87-105. Web.
- Wittman, H., Desmarais, A., & Wiebe, N. (2010). The origins and potential of food sovereignty. *Food sovereignty: Reconnecting food, nature and community*, 1-14.
- Wezel, A., Bellon, S., Doré, T., Francis, C., Vallod, D., & David, C. (2009). Agroecology as a science, a movement and a practice. A review. *Agronomy for sustainable development*, 29(4), 503-515.
- Wreford, A., Moran, D., Adger, W. N., & Organisation for Economic Co-operation and Development. (2010). *Climate change and agriculture : impacts, adaptation and mitigation*. OECD
- Bank, W. (2012). *Civil Society*. <https://www.worldbank.org/en/about/partners/civil-society/overview>.