

Cultivating Seed Sovereignty in Tarija, Bolivia

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Abstract

Seeds contain the technical and cultural knowledge of farming communities, accumulated over generations. If these communities have autonomy over their food system, campesino farmers can opt to save their own seeds, thus reproducing their ancestral biocultural materials and values while exercising control over the social and economic conditions underpinning their food systems. But when community control has been eroded through environmental change and through agricultural policy that devalues farmer knowledge, stewarding seeds as a vessel for cultural reproduction can be difficult.

In 2009, the Bolivian national government ratified a new constitution that solidified a permanent commitment to the principles of food sovereignty. But a tension has emerged between the narrative and aspiration of food sovereignty at the policy level and the lived experience of campesino farmers who are experiencing mounting environmental, socio-economic, and political challenges to saving seed.

This research explores the tensions in enacting seed sovereignty across national and local scales. The primary methods used included household surveys (n=28), life history interviews with community members (n=13), and semi-structured interviews with knowledgeable persons (n=8), complemented by participant observation within a critical ethnographic framework. I also explored the use of biocultural design as a methodological tool and practice for guiding inter-epistemic collaboration in support of community autonomy.

My findings indicate that modernity and coloniality continue to underpin Bolivia's political agenda around seed (Chapter 2). The national government centres productivity and marketability rather than local knowledge and community autonomy. However, campesino communities continue to practice diverse everyday forms of resistance in opposition to dominant neocolonial narratives (Chapter 3). These forms of resistance represent a critical dimension of organizing for seed sovereignty. They also indicate that a design practice, which respectfully draws multiple ways of knowing into the creation of a mobile museum (Chapter 4), can contribute to collective processes of seed sovereignty.

I conclude that while local communities face major barriers to shaping their seed systems according to their values and goals, they are also creative and resilient in safeguarding ancestral knowledge and fighting for community autonomy. Making these actions visible contributes to our understanding of enacting seed sovereignty by local communities.

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To the seed keepers, stewards of memory and cultivators of hope

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List of Acronyms

GATT	General Agreement on Tariffs and Trade
GM	Genetically Modified
GMO	Genetically Modified Organism
INIAF	Instituto Nacional de Innovación Agropecuaria y Forestal (National Institute for Agricultural and Forest product Innovation)
INRA	Instituto Nacional de Reforma Agraria (National Institute for Agrarian Reform)
IOC	Indígena, Originario, Campesino (Indigenous, Original, and Campesino peoples)
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IPR	Intellectual Property Rights
MAS	Movimiento al Socialismo (Movement towards Socialism political party)
MCD	Modernity Coloniality Decoloniality
MDRYT	Ministerio de Desarrollo Rural y Tierras (Ministry of Lands and Rural Development - Bolivia)
NACLA	North American Congress in Latin America
NGO	Non-governmental Organization
PBR	Plant Breeders' Rights
PNS	Programa Nacional Semillas (National Seed Program)
PROSOL	Programa Solidario Comunal (Solidarity Comunal Program - Tarija)
PVP	Plant Variety Protection
SEDAG	Servicio Departamental Agropecuario (Agricultural Service Department)
SPS	Sistema de Provisión de Semillas (Seed Provisioning System)
TIPNIS	Territorio Indígena y Parque Nacional Isiboro Sécuré (Isiboro Sécuré National Park and Indigenous Territory)
UN	United Nations
UPOV	International Union for the Protection of New Plant Varieties
USAID	United States Agency for International Development
WTO	World Trade Organization

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Chapter 1 - Introduction

Seeds have held a special place in the hearts of gardeners and small-scale farmers since the beginning of the agricultural era. A grower's selection of seed from year to year, or from generation to generation, reflects how social, economic, and environmental contexts, as well as individual values and relationships, shift over time. For La Via Campesina – a global peasant movement that unites social movements under a unified commitment to food sovereignty – “seeds are a vessel that carries the past, the accumulated vision, and knowledge and practices of peasant and farming communities worldwide”. Moreover, they reflect our social reality as human societies, reproducing the cultural values and social interests of those who steward them (Kuyek 2007).

But seeds, as stewarded and saved by small-scale agricultural communities over time, are also under threat. Beginning with the first ethnobiologists who believed they were ‘discovering’ new plant properties when they became exposed to Indigenous seed systems (Hunn 2007; Clément 1998), traditional seeds and the complex knowledge systems associated with them have survived ongoing attempts at colonization by dominant settler ontologies (Escobar 2008). Genetically modified seed stock has contaminated local seed stock, with devastating social, economic, and environmental consequences (Demeulenaere 2014; Gupta 2015; Shiva 2014a; Aistara 2011; Kloppenburg 2010). Colonial knowledge systems have delegitimized local knowledge systems, or destroyed the landscapes in which they are rooted (Shiva 2014b). Many contemporary seed governance regimes perpetuate these attitudes of colonial domination through the imposition of intellectual property rights (IPR) systems, the commodification and monopolization of seed varieties, the introduction of blanket seed certification standards, and the expansion of globalized trade that favours capital-endowed breeders (Wattne 2016). Seed has become a lucrative and powerful industry, and small-scale producers worldwide who wish to continue to practice dynamic and adaptive seed saving methods face barriers that can be difficult to subvert or overcome.

Despite these challenges, many individuals and communities are committed to keeping their seeds and seed stories alive. The discourse among communities engaged in seed conservation is shifting from ‘triage’ mode, in which the focus is necessarily on salvaging

endangered varieties from extinction at all costs, to one that emphasizes the strength and creativity of seed saving communities who steward and adapt seed diversity even amidst trying circumstances (Hoover 2015). Their resistance is informed by their socio-ecological relationships with place. Accordingly, any analysis of the resurgence of seed work needs to centre those relationships and situate seeds and seed stewardship within the broader matrix of knowledge systems, local histories, landscape, ecologies, and all that which makes up “place” (Escobar 2008; Gupta 2015).

After having the opportunity to work on small-scale ecological farms, and learning from Indigenous and peasant farmers in Ojibwe territory and in India as part of my master’s work, I became interested in the ways in which communities advocate for and exercise seed sovereignty even amidst trying environmental and socio-political circumstances. Seed stories are powerful stories, kept alive through the work of growers that see protecting, conserving, and adapting local and ancestral seed varieties as a critical part of their lifework (White 2020; Hill 2017). The global movement for seed sovereignty is powerful and skilled at building relationships among strong advocates committed to defending their lives and territories from the encroachment of corporate dominance over their seeds (Peschard and Randeria 2020; Brown 2013). But the intricacies of how those relationships with seeds are built and maintained in community while people cope with everyday challenges must be understood as foundational to that work (Pottinger 2017).

Seed work is both deeply personal and deeply political. Efforts to keep food traditions alive or continue saving seed amidst difficult political and environmental circumstances are important acts of resistance, even if the people engaging in those acts see them only as integral to their survival rather than as a political choice (Visser et al. 2015). The garden is itself a powerful site of resistance that grounds broader, more overtly-political resistance movements in the everyday reality of the people who work them (Adamson 2011). In the garden, seeds adapt to the territories in which they are planted, transforming over generations in relationship with those who plant them. Understandings how these relationships with seed are shaped over time in the garden, in response to the challenges of environmental change and the imposition of colonial systems of power, is a necessary component to a seed sovereignty framework (Andrews-Swann 2013). This dissertation enters the conversation from this place, in an effort to highlight the ways

in which everyday acts of resistance, even in communities that might not identify as militant seed activists, shape seed sovereignty movements.

Purpose and research objectives

Farmers who can exercise seed sovereignty and control their plant biological materials enhance their capacity to innovate within small scale food systems and pursue their aspirations. The purpose of this research is to offer insights into how small-scale farmers in Tarija, Bolivia produce institutional arrangements to steward their seed and plant genetic material amidst the political, economic, social, cultural, and ecological dynamics that surround them. It aims to support *campesino* organizations in designing new institutional arrangements to enhance seed sovereignty strategies for food system innovation.

My research is guided by the following questions:

1. (a) How are seeds and plant genetic material situated in the value system of local and indigenous communities in the region of Tarija? (b) How are political, economic, and cultural values shaping and shaped by people's seeds and plant genetic material? (c) How are these values articulated across gender and generational differences?
2. (a) What are the opportunities and barriers people experience in exercising seed sovereignty? (b) How does seed sovereignty, or a lack thereof, impact one's ability to exercise self-determination and cultivate community autonomy?
3. What can a design process contribute to building seed sovereignty in local and indigenous communities?

Reflexivity

As a researcher, I am aware of the uneven power dynamics that are inherent between participants and academics, especially foreign ones. Throughout this process I have strived to be aware of those dynamics and take steps to minimize them, including centering community research goals and establishing strong partnerships with local groups. However, I am also aware that these dynamics are impossible to evade completely, especially during a relatively short doctoral project. Since I am not from these communities, my understanding of their relationships with seeds as agrarian people, as portrayed in this thesis document, is necessarily limited. That said, I

have made efforts to ensure this work is useful for the communities that shaped it by creating materials for community use and contributing to community work and to the work of the local organization that hosted me during my stay in a spirit of *convivencia*, becoming involved in the life of their small office and supported their various ongoing initiatives when time and resources allowed. This approach was informed by Escobar's work on the link between personal and collective transformation in a pluriversal context.

I draw on Escobar's work to inform my positionality in relation to this work because I believe that part of what makes design practice so powerful as a tool for enacting pluriversal transitions is its predisposition towards recognizing the role of individual agents in co-constructing a whole. Escobar (2018) talks about the imperative of cultivating complex relational networks among humans and non-humans to resist the disconnection from nature that the singular ontology of colonial modernity has produced. Drawing on Scharmer and Kaufer (2013), he explores how presencing – that is, allowing the self to embody the emergent future through collective creation – relies at least in part on “a significant personal transformation toward more relational modes of being” (Escobar 2018, 126). Personal transformation, in this sense, is about letting go of the ego in order to make space for compassion and authentic caring; we must work to cultivate an attitude of openness that can foster (re)connections. As a doctoral student engaging in ethnographic research, I became embedded in the systems and relationships that I was also studying. I do not mean to purport that spending 11 months in a community allows for the kind of depth of understanding of that place as those who have always lived there. But I do believe that it is important to recognize the personal transformation of all agents involved in an ontologically-oriented design process (including the researcher) is a critical outcome of said process. Only through engaging with one another in ways that make space for multiple ways of knowing and being can we begin to shift consciousness towards making other worlds possible. In this way, an ethic of being open to personal transformation, for me as a researcher involved in a design practice, cannot be ignored as a critical aspect of the methodology.

Theoretical framework

This thesis draws on decolonial theory and food sovereignty to understand how community seed systems shape and are shaped by political and environmental change. It also draws on design theory to explore how diverse collaborators can create spaces for decolonial resistance. Drawing

on these frameworks, I consider how campesino communities in Tarija are shaping alternatives to modernity through resistance and through the assertion of their own worldviews.

Decolonial theory

Colonialism has played an undeniable role in shaping reality at local and global scales. It has altered physical landscapes, social customs, cultural expressions, and economic infrastructure to serve the needs of the colonizers while remaining willfully blind to the existence of alternative ways of knowing and being. While there has always been resistance to colonial conquest, it is useful to analyze colonialism as an ontological project in order to understand how resistance movements have worked to undermine it.

The colonial project relies on the assumption that the Western worldview is the only valid, empirically-provable worldview, and that other forms of knowledge constitute little more than quaint folk belief (Sundberg 2014). For a long time within the academy, Western knowledge was considered immune to critical interrogation, despite its social basis in a particular culture and belief system (Shiva 2014b). Colonial power and Western dominance in social, economic, and political life are tied to this fundamental belief in the universality of Western knowledge. Ongoing processes of colonization have attempted to erase the diversity of local place through the propagation of a universal colonial modernity, ignoring unique *cosmovisiones* (Escobar 2008). Academic institutions have also upheld the notion of an essential difference between colonizer and colonized, legitimizing the subjugation of knowledges and of people (Mignolo 2000b).

A primary effect of the propagation of Western knowledge as universal has been the separation of humans from nature. Yet, an infinite diversity of particular worldviews exists, and many peoples continue to understand humans and nature to be interdependent, with all beings deserving of respect and active in relationships of reciprocity (Blaser 2009). But the colonial worldview that prioritizes human greed over ecological balance has infiltrated political, economic, academic, and social structures at local and global scales. Many contemporary development initiatives purport to value community participation and environmental health while continuing to advance a Western worldview (Blaser 2009).

The evidence of colonial thinking pervades the physical landscapes in which seeds take root as well as our emotional and theoretical conceptualizations of seed (Shiva 2014b). People

are physically removed from the lands that are imbued with their knowledge of seed through land theft and appropriation, and through the violence of phenomena such as the encroachment of unwanted GMO seed. But what is equally as important is the delegitimization of traditional seed knowledge and its relevance for agricultural planning today. Shiva (2014b) identifies this suppression of Indigenous knowledges alongside the theft of Indigenous lands as twin processes of monoculturalization. Colonial thinking transforms seeds into commodities, imposing a particular ontological perspective onto a vessel of alternative cultural and scientific knowledges. Identifying how universalizing colonial seed ontologies usurp both discursive space and physical landscapes serves to contextualize grassroots efforts to assert seed sovereignty while also creating space for alternative narratives to emerge.

Escobar (2008) considers how resistance movements are constituted by the particular historical, economic, cultural, and ecological features of their *place*. While Eurocentric notions of modernity attempt to universalize human experience and suppress diverse ontologies and cultures, centering place allows us to see how diverse knowledges, shaped by the experience of coloniality, produce alternatives to the notion of a monolithic modernity by cultivating deep relationships with local histories and landscapes. Herein lies the key to demystifying globalization and eroding colonial difference: we need to relocate the economy, the environment, and culture within their politics of place. This relocation is critical for both conserving cultural and biological diversity and advancing new possibilities for moving away from capitalism.

Escobar's work around the politics of place emerges out of a broader political project spearheaded by Latin American scholars called the modernity/coloniality/decoloniality (MCD) framework. During the rise of neoliberalism in the 1980s and 90s, Latin American movements and scholars saw the need to locate the political shifts they were experiencing through a lens of colonial modernity (Quijano 2010; de Sousa Santos, Arriscado Nunes, and Meneses 2007; Walsh 2010; Escobar 2007; Mignolo 2000a). The MCD project emerged as a frame for understanding and interpreting these dynamics with the aim of becoming better able to undermine them. Scholars aligned with the MCD framework explore both how modernity has become ubiquitous as a global design through the power of coloniality and how alternative visions for societal organization can subvert this power and contribute to building, as the Zapatista movement puts it, "a world where many worlds fit". The erosion of colonial power is not possible without a clear

analysis of how Eurocentric modernity as a cultural project serves to reinforce harmful capitalist, patriarchal, racist, and ableist systems of power.

Tsing (2015; 2004) argues that insufficient attention has been paid to the ways in which ‘the universal’ is inevitably negotiated through cultural dialogue. Even as the literature begins to concede that global networks of ‘power, trade, and meaning’ have shaped local realities over long histories of interaction, the impact of local networks on global forces has been more challenging to demonstrate. The links we make across distance and difference shape our realities and how we choose to respond to them. Those connections are not one-way exchanges in which hegemonic global forces unilaterally shift local discourse. There is friction – the ‘awkward, unequal, unstable, and creative qualities of interconnection’ (Tsing 2004, 4) – in these encounters, and all actors come away changed. Like roads for a car, friction allows us to travel more efficiently but also constrains the path we are able to take. It makes global power effective but also creates new assemblages that interrupt its power to “rule out and rule over” (Mignolo 2000a). Considering friction helps us understand the opportunities and constraints that emerge out of interaction. Inevitably, friction between local and global forces supports the formulation of different forms of modernity. People shape their economic, social, and political institutions based on arrangements of local tradition and global influences that make sense in their particular contexts. Understanding the production of modernities through a lens of friction helps to relocate our interactions with the world within their politics of place, as Escobar suggests.

Seed sovereignty

I draw on the seed sovereignty literature to situate community struggles to assert their right to define and control their own seed systems and, relatedly, their own food systems. The framework of seed sovereignty emerged out of food sovereignty: fundamentally a call for increased political and economic control over the food system by peoples, communities, and nations (Patel 2009). How that control takes shape depends largely on the particular sociopolitical context of a place, as well as the visions and aspirations of the movements that have taken up the banner of food sovereignty.

Similar to the call of the MCD framework, McMichael (2014) identifies the need to understand food sovereignty movements within the political landscapes that produced them and

in which they must operate. Food sovereignty emerged as a response to the global capitalist food regime and their false solutions to rising global hunger (Wittman, Desmarais, and Wiebe 2010). International financial institutions have long advanced free trade, large-scale production, and technology-driven agricultural intensification as the keys to achieving food security and reducing poverty. This approach was heavily promoted throughout the 1980s and 90s as the political ideology of neoliberalism intensified its spread with the advancement of structural adjustment programs. International financial institutions all but forced poorer countries to adopt strict economic neoliberalization policies as a condition for receiving loans that would fill the gaps in their suffering national budgets (Kohl and Farthing 2009). Opening borders to free trade made poor countries vulnerable to ‘dumping’, in which highly subsidized agricultural industries in the North could flood southern markets with cheap goods (Otero, Pechlaner, and Gürcan 2013). Slashing social services increased poverty while making health and education less accessible to the most vulnerable (Bello and Baviera 2010).

As the global food crisis continues to keep food prices inaccessibly high, sparking food riots and social unrest without tackling poverty or inequality, social movements have responded by asserting food sovereignty as an ontological alternative (McMichael 2014). Wittman et al. (2010) identify the inclusion of agriculture in the World Trade Organization’s (WTO) General Agreement on Tariffs and Trade (GATT) as the catalyst for the emergence of food sovereignty as an organizing frame. The GATT negotiations made clear the extent to which national control over food production was being eroded, particularly for countries in the Global South. While agri-business subsidies in the North remained largely protected, countries in the South became restricted in their ability to increase domestic food production and support small-scale producers (AoA Review Working group 2003). Food sovereignty was coined in order to proactively name the free market liberalization dynamic for what it was and demonstrate the existence of alternative ways of organizing food production (Wittman, Desmarais, and Wiebe 2010).

Social movements during this time no longer saw food security as a frame that could meet their needs. Food security emerged in the mid-1970s amidst rising hunger rates and increasingly volatile grain markets as a way of framing concerns around global hunger. The original 1974 definition of food security focused on ensuring an adequate food supply to offset fluctuations in prices and meet rising food consumption needs (FAO 2006). As understanding about the sources of food insecurity deepened, the definition broadened to reflect the importance

of food access issues (Clapp 2014). By 1996, the definition had been refined to reflect a recognition of social and economic barriers to food access, as well as the need for food that meets people's nutritional needs and preferences (FAO 2006). The reluctance to tackle social justice issues within the paradigm of food security has led to its characterization as a largely technocratic, productivist approach employed in pursuit of Western notions of development (Jarosz 2014). While some have argued that food security should not be conflated with the oft-deployed neoliberal discourse on how to achieve it (Clapp 2014), its reluctance to incorporate a normative agenda and its insufficient socioeconomic analysis of food production issues made it a framework that many food activists felt the need to transcend. This tension between food security and food sovereignty is especially important to observe in Bolivia where the food production agenda promoted by the MAS government since the drafting of the new constitution in 2009 has been “seguridad con soberanía alimentaria”, or food security with food sovereignty (Catacora-Vargas 2016; Colque, Urioste, and Eyzaguirre 2015; Gabriel 2019).

Seed sovereignty, which recognizes the rights of people to reproduce their own seeds and participate in the systems that govern their use (Kloppenborg 2010), emerged in parallel with food sovereignty. Just as the neoliberalization of the global food system allowed power to become concentrated in the hands of corporate actors and the state infrastructure that supports them, so has the global seed system come under the control of a few gigantic companies. This enclosure of seeds through the undermining of seed sovereignty has been facilitated by two unique but interconnected processes: biological control, in the form of scientific advances in genetics and breeding, and socio-political control via legal changes that facilitate the patenting of, and profiting from, germplasm (Wattsem 2016).

Intellectual property rights (IPR) laws for plant genetic resources have enabled widespread dispossession of genetic material in the name of varietal improvement and profit (Otero 2008). Even in countries that are beginning to recognize the importance of farmer seed systems, international pressures including large-scale free trade agreements often effectively force countries to harmonize their IPR laws (see chapter 2). IPR laws authorize or legitimize the privatization of germplasm through a variety of mechanisms, including plant breeders rights (PBR) and patent laws (Wattsem 2016). They are designed to restrict farmers' ability to freely save and share seeds through informal systems, emphasizing a PBR holder's right to profit from their 'owned' genetic material, even when that material has been developed over generations in

the commons by farmers (Louwaars 2005). IPR laws have played a significant role in the commodification and corporatization of seed (Kuyek 2007).

Less researched but equally threatening to seed sovereignty are seed laws requiring farmers, breeders, and seed companies to grow and purchase only certified seed that meets certain quality standards to facilitate ‘barrier-free’ marketing and exchange. On paper, these laws resemble harmless and impartial attempts to ensure farmers have access to reliable and quality seed. In practice, the institutionalization of universal standards for producing, marketing, and exchanging seeds are actively dissolving farmer seed systems, posing a serious threat to agrobiodiversity and farmer livelihoods (Wattm 2016). Universal standards for seed certification are problematic because they classify certain processes and products as superior to others. When one particular body has the power to determine what kinds of genetic material are acceptable or unacceptable, it becomes difficult to reimagine alternative ways of being, even if those alternatives have existed for longer (Lampland and Star 2008).

PBR laws were designed to support the seed industry’s ability to own and profit from genetic material. The World Trade Organization (WTO) encouraged individual countries to align their PBR laws with the Convention of the International Union for the Protection of New Plant Varieties (known by its French acronym, UPOV) in order to establish uniform global standards for seed certification. UPOV established guidelines for authorizing breeders to propagate a variety for commercial purposes. A breeder’s right was granted when a variety was deemed to be ‘distinct, uniform, and stable’ (UPOV 1991). UPOV 1978, while clarifying PBR laws, also included a ‘farmer’s privilege’ clause that protected farmers who saved seeds to plant from season to season. UPOV 1991, however, scaled back these privileges, by expanding breeders’ rights significantly while restricting farmers from selling their harvest as seed if they used protected varieties. Many countries took this legislation a step further and restricted farmers from saving or exchanging seeds in both commercial and non-commercial settings without permission from the breeder who holds the PBR (Wattm 2016). UPOV rules have been slower to spread throughout Latin America. Currently, 13 countries are members, only two of whom have ratified the highly restrictive UPOV 1991. Bolivia is a member of UPOV 1978.

The legacy of high-modernist seed certification systems that originated in Europe has failed to preserve agrobiodiversity and has created a hierarchy and false dichotomy between ‘farmers’ and ‘breeders’. Breeders are portrayed as expert stewards of varietal purity, upholding

the distinctness, uniformity, and stability of a seed as required by UPOV 91, while farmers are downgraded to recipients of seed products, incapable of producing quality seed. When farmers are no longer considered qualified to save seed, the organic integrity of the agricultural system becomes subordinated to the task of upholding a plant's genetic purity (Aistara 2011). Local cultures that have long nurtured seed are replaced with 'audit cultures' (Strathern 2000) in which farmers have to spend so much time documenting the lineage of their genetic material that they are left with little time to actually farm, let alone to cultivate seed and knowledge exchange networks among friends and neighbours. In this way, restrictive certification regimes change agricultural landscapes from dynamic interactions of nature and culture into transactional environments imbued with power dynamics that devalue a farmer's ability to make effective choices about their seeds' characteristics. Genetic diversity is reduced to breeder choice, which is constrained by profitability and marketability considerations. Seeds become displaced from the social networks, or their 'kin' (Aistara 2011), that have nurtured them for generations, and are responsible for their genetic make-up. Farmer seed networks have developed over thousands of years, efficiently disseminating seed, expanding over vast geographies, and enhancing their resilience amidst a range of political, economic, and environmental pressures (Coomes et al. 2015) (see chapter 3). When seeds are alienated from these networks, they become commodities for free exchange, rather than materials embedded in the social and environmental systems that surround them. The only place where agrobiodiversity can meaningfully exist is within the broader context of practices and relationships that produces it (Escobar 2008).

Food justice movements have organized to oppose seed certification laws (Gupta 2015; Brown 2013), recognizing the risk they pose to small-scale farmers and their seed networks, making it difficult for standards to pass as apolitical. Farmer seed networks are imbued with their own forms of social and cultural capital (Bourdieu 1977), fully capable of disseminating seed across large territorial scales, making seed accessible to a variety of growers, and providing resilient spaces for local seed varieties to continue to flourish (Coomes et al. 2015). Resistance also takes shape in quieter ways as committed individual gardeners maintain their seed collections at micro-scales, in backyard gardens and community plots, reliant on small-scale social networks to perpetuate diversity and the security of seed stock (Visser et al. 2015; Ellen and Platten 2011). Indeed, many agrobiodiversity hotspots are located on the margins of society,

where growers are motivated to fight back against biological and social encroachment on their well-established resource management systems (Nazarea 2005).

The political economy of seed is changing rapidly, with diverse but parallel impacts in different sites. The specific impacts of IPR laws, seed certification, agrobiodiversity conservation approaches, and resistance movements on local seed production in Tarija are the subject of examination in this thesis.

Design theory

Design is emerging as a tool for communities looking to pursue alternative development paths by mobilizing their knowledge and material resources in partnership with other designers to meet their goals (Davidson-Hunt et al. 2012). Design harnesses local creativity and innovation to imagine new products, services, institutions, and ideas and turn them into something concrete. A conversation is emerging among some design theorists and practitioners around what it could mean to decolonize design's internal processes to mitigate unequal power dynamics between local communities and external 'experts' by questioning design's ontologically Eurocentric underpinnings (Escobar 2018), thus reconceiving of design as something that everybody and anybody can (and does) practice (Manzini 2015).

Design is one of the most fundamental of all human activities; it is part of the universal human experience (Nelson and Stolterman 2003). Through creativity and innovation, humans are constantly imagining products, systems, services, landscapes, and institutions to construct the world around us. At its core, design is 'the ability to imagine *that-which-does-not-yet-exist*' (Nelson and Stolterman 2003), an answer to a particular problem or set of problems, and turn that into something concrete. This process involves combining available *materials* with a designer's individual or cultural *values* and particular *knowledge* or skill sets as they relate to addressing a given problem. It recognizes the importance of human agency in building community according to endogenous values while recognizing that inspiration is drawn from and entangled with meaningful materials coming into being around us. Design does not purport to offer any ultimate or permanent answers to the problems it sets out to solve. Rather, it is a tool for imagining possible solutions that should be continually re-evaluated over time (Davidson-Hunt et al. 2012).

Some scholars have taken to applying a capabilities approach to design in order to maximize support for individuals and communities seeking to draw upon their materials, values, knowledges, and other resources in order to achieve their goals (Oosterlaken 2009; Davidson-Hunt et al. 2012; IDEO 2011). This work emerges out of Sen's (1999) writings on development, emphasizing the importance of processes that enhance people's freedoms and capabilities to meet their goals. A capabilities approach to development recognizes that individuals and collectives are embedded in social, economic, political, environmental, and cultural contexts, which makes for highly diverse sets of needs and values that inform the choices that people make (Oosterlaken 2009). Development that enhances an individual's or community's capabilities enhances the domains in which they can exercise agency, which in turn reveals new ranges of capabilities in a cycle of becoming (Davidson-Hunt et al. 2012).

As scholars begin to apply design thinking to a wider variety of situations, efforts are being made to emphasize inclusiveness in design and ensure that marginalized voices are centred in the process. One such effort is the development of a framework for biocultural design (Davidson-Hunt et al. 2012, 41). Biocultural design brings design teams together to innovate products or services inspired by biocultural heritage as a set of capabilities that 'reflect[s] the contemporary needs, values, and aspirations of a group of people' (Davidson-Hunt et al. 2012). Those most affected are active participants in the innovation process, and multiple knowledges and values are able to interact in a multi-pronged dialogue that recognizes diverse worldviews as equal. Biocultural design is an iterative process that is evaluated on an ongoing basis as the product or service becomes part of a community's interaction with the world.

It is apparent through such emerging approaches that design is grappling with internal issues around power that have traditionally plagued development practice (Hunn 2007; Clément 1998). Decolonizing process, whether in research or in design, is a critical aspect of breaking down ontological dualisms in favour of planting a more level playing field where all parties might approach research, design, or development on equal footing. But unequal power dynamics do not stop at the internal process level. They also characterize the political, economic, cultural, and ecological systems in which those processes are taking place. Power limits the emancipatory and participatory potential of a given process, constituting a kind of wicked problem (Buchanan 1992). For Indigenous communities in particular, power is tied up with ongoing colonialism that continues to constrain the choices people are able to make. Colonial frameworks of land

governance, food harvesting rights, and materials access continue to limit the exercise of Indigenous agency. The ways in which design can become more responsive to these constraints, and move towards dismantling external power structures that hinder the exercise of agency is the subject of chapter 4.

Design is a tool for tackling complex problems with practical solutions. But in order for a design process to be effective, particularly with local and Indigenous communities who have longstanding ties to their territories, it must grapple with power dynamics that constrain the realization of practical solutions. Design works with materials, values, and knowledge to harness the creativity of local communities. But if creativity is constrained by a lack of control over materials, a systematic undermining of cultural values, or the theft of Indigenous knowledges, design cannot pursue the practical at the expense of tackling power. Interrogating the systems of power that constrain their ability to innovate empowers people to change the political conditions of their existence in order to make space for material innovations. Making these stories part of the design process represents another important step in creating decolonial alternatives to modernity. Chapter 4 explores how campesino women in Tarija, in partnership with local NGOs and a global research team, are using design to practice creativity and foment everyday bricolages of resistance.

Weaving decolonial theory, seed sovereignty, and design

Seeds fare best when the communities in which they have thrived for generations can continue to nurture their seeds on their own terms. When people can control their own plant genetic materials, they nurture biological and cultural diversity. Where diversity flourishes, seed stories stay alive and creative solutions to conservation problems can emerge from vibrant communities. In situ conservation is not about preserving some ancient way of doing things with no relevance for the present day; on the contrary, it recognizes that seeds have a role to play in cultivating alternatives to modernity. They adapt to new circumstances and conservation methods and incorporate new tastes and preferences according to the desires and skills of the people who save them. Seeds respond to the changes in the places where they are planted and continue to thrive where diverse knowledges interact with each other, enhancing the viability and adaptability of the seed. Seeds present an opportunity to support ontological resurgence and the formation of

alternatives (Escobar 2008) if communities can maintain a relationship with their seeds and continue to steward them into the future.

This work requires a diversity of approaches. Seed and food sovereignty activists must keep up the pressure to resist the enclosure of seeds by state and corporate power. Farmers and gardeners must continue their efforts to steward and nurture seed diversity, helping our food system stay resilient, especially amidst the escalating threat of climate change. This thesis offers insight into some of the ways this work is happening in Tarija by analyzing different dimensions of seed sovereignty in the current context. It explores the evolution of seed policy at a national level, highlighting how the continued perseverance of a neoextractivist development model in Bolivia perpetuates seed hierarchies and seeks to delegitimize campesino seed systems. It explores how that policy agenda, in conjunction with the forces of environmental change, have impacted the community of Laderas Norte and their relationship with seeds, as well as the ways in which the community continues to find ways to resist these forces in ways that are unexpected and often invisible. It zooms in further on a group of women from Laderas Norte who, in collaboration with our research team and with local organizations, are using design to ensure that their knowledge about food and seed systems is passed on to future generations in ways that are creative and engaging. Drawing on these three theoretical pillars of decolonization theory, seed sovereignty, and design theory, I seek to demonstrate how the slow work of cultivating seed sovereignty is carried out across multiple scales of analysis.

Research Methodology

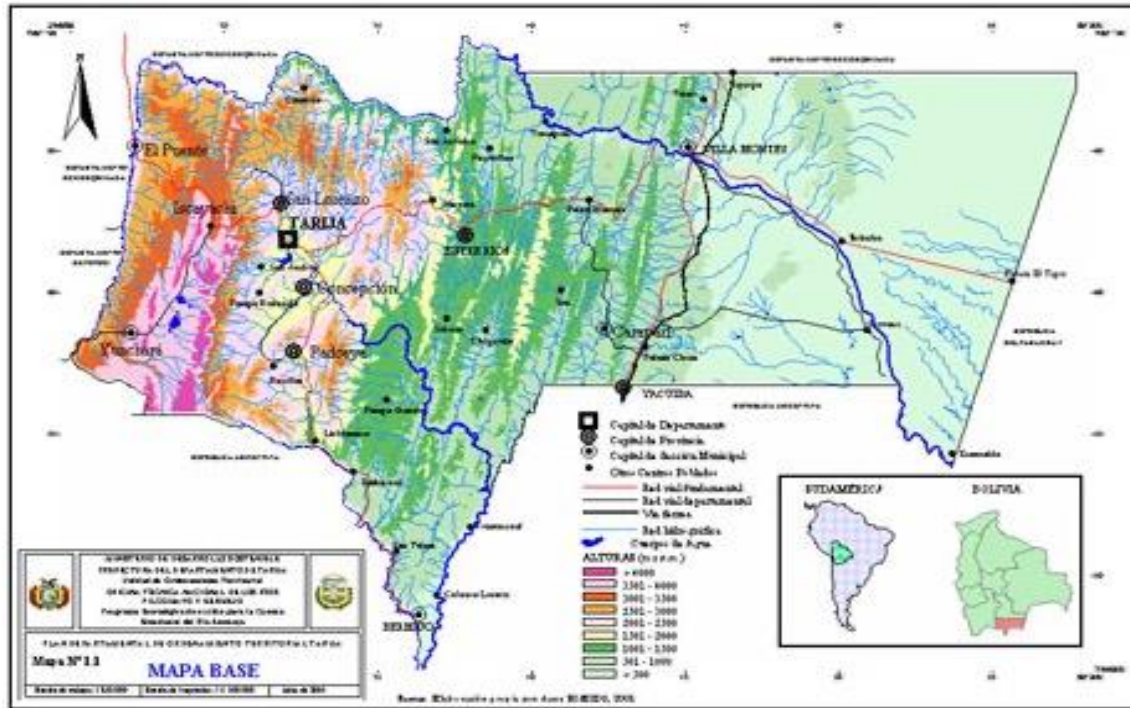


Figure 1.1 Map of Tarija (source: franciscanosdetarija.com)

Context

This research emerged out of a larger project documenting case studies of innovation in small-scale food systems (Turner, Davidson-Hunt, and Hudson 2018; Valencia 2021) through the lens and practice of biocultural design (Davidson-Hunt et al. 2012). It includes an international set of case studies exploring how communities, enterprises, or organizations are innovating to meet locally-defined needs utilizing biodiversity. One of the partners for this project is JAINA, an organization based in the department of Tarija, Bolivia (see Figure 1.1) that works with local communities for a more inclusive, plural, decolonized, and equitable society (JAINA 2016). JAINA has been working with Laderas Norte in the department of Tarija, Bolivia for several decades, and has established a strong relationship with the *campesino* community.

Building on that relationship, this research project engaged participants from Laderas Norte, located in the department of Tarija on the southern border of Bolivia (Figure 1.2). Over the course of ten months between April 2017 and February 2018, I split time between the community of Laderas Norte and the city of Tarija. Time spent in the city involved working closely with Jaina in a spirit of *convivencia*, collaborating on their projects while conducting my own field work. As Jaina was generously supporting my research work through the provision of their knowledge, connections and office space, I wanted to also support their activities and so I became involved in the life of their small office and supported their various ongoing initiatives when time and resources allowed. One of these initiatives was their participation in a local food fair, where I supported the launch of the *museo en movimiento* (see chapter 4). My time outside of the community was also spent interviewing local officials (n=8) and occasional travel for



Figure 1.2 Location of the department of Tarija

relevant events such as the Seed Congress in Santa Cruz (see chapter 2). While in Laderas Norte, I connected with community members, built relationships with people by (trying to) helping with farm work, and participated in community life including attending community meetings, participating in public events at the local school, and joining in celebrations.

Area of Study

The department of Tarija is located in Southern Bolivia, bordering Argentina and Paraguay to the south and east. Its capital is the city of Tarija, standing at an altitude of 1,905 metres above sea level (BIVIKA 2009). The department has a population of over 500,000 inhabitants, and encompasses six bioregions. To the West, it is characterized by high plains and valleys. These provide optimal conditions for grape vines, making Tarija a

significant winemaking region. To the East lies the Gran Chaco plains, a semi-arid lowland region that spreads out over parts of Bolivia, Argentina, Paraguay, and Brazil.

The region's mild climate makes it well suited to a variety of agricultural products. Potatoes, quinoa, corn, wheat, barley, and certain fruits are all cultivated throughout the region, in addition to grapes for wine. Natural gas reserves discovered in the 1990s became another significant economic driver for the region with the aim of generating fiscal resources that might better integrate Tarija with the rest of the country, as well as its bordering nations through building the export economy (Hinojosa et al. 2015). But natural gas development has also fueled political disputes, particularly where extraction projects have impacted the territories of Indigenous populations thus exacerbating longstanding dynamics of discrimination and exclusion (Humphreys Bebbington 2013).

The community of Laderas Norte (Figure 1.3) was officially established in 1971 and is located about 30km east of the city of Tarija. However, the families who currently live in Laderas Norte and the other communities that make up the present day subcentral San Agustin



Figure 1.3 Location of Laderas Norte in relation to the city of Tarija

are descended from the original families that have worked that land for generations (Vacaflores 2011). Laderas Norte is part of the municipality of Cercado in the *subcentral* (regional governance council) of San Agustin. Prior to Bolivia's revolution in 1952, the land that now makes up the *subcentral* of San Agustin was a collection of *haciendas*

under the control of a few large-scale landowners (Francescone 2012). The land was worked by campesino farmers who were obligated to pay rents to the hacienda owners while eking out a modest living for themselves on small patches of land for which they did not possess the title

(Fundación Tierra 2009). The passing of the Agrarian Reform Law (Decree 3464) following the 1952 revolution promised to break up those haciendas and redistribute land to peasant farmers who worked it while compensating landlords in the form of government bonds. However, the Agrarian Reform Commission took decades to carry out the process, and it wasn't until 1971 that the five communities making up the subcentral of San Agustín (Laderas Norte, Laderas Centro, Cristalinas, San Agustín Sur, and Alto Potreros) were officially delineated and families given title to their lands.

Approximately 100 households make up the community, and most are involved in some form of cultivation and pastoral agriculture at a small-scale (between 1 and 6 hectares under cultivation) (JAINA 2015). The community has experienced significant increases in out-migration over the last several years; some of this is temporary, and some is more permanent. Many reside in Tarija for extended periods of time for work, while others migrate over the border to Argentina in search of better paying employment or a different lifestyle.

For many, increased levels of drought or plant disease has made farming much more difficult in the last 10 years (Gonzales 2008) (also see chapter 3). Fishing and cattle raising are also common (BIVIKA 2009). In Laderas, most families have a small herd of goats, sheep, and/or cows that graze in communally-held and managed pasture lands on the hillsides and provide valuable compost for cultivation and meat for consumption (Vacaflores Rivero 2017; 2005). Most people would identify feeding their animals as a key reason for continuing to grow out their ancestral varieties of corn. They are dependable and animals consume the husk (*chala*) as well as the cob (*mazorca*).

Campesino communities like Laderas Norte are one of the recognized groups of Original Peoples¹ whose autonomy was recognized by the 2009 redrafting of the Bolivian Constitution. The constitution recognizes the existence of these nations within the national structure and grants them rights to self-government and free determination. Indigenous and campesino peoples fought hard for these rights and recognize the significant step that formal recognition in the constitution marks. However, many have argued that recognition is only a starting point, and implementation of these rights is key. This requires intentional action on behalf of the national and departmental

¹ The acronym used for these groups in Bolivia is IOC – Indígena Originario Campesino.

governments, as well as local governance councils and communities (Colque, Urioste, and Eyzaguirre 2015; Fundación TIERRA 2009).

Decision-making in Laderas is collaborative and democratic. The community meets altogether once monthly to hear about new community business and vote on proposals. Each family must send a minimum of one household member to the monthly meeting. The community elects an executive committee that meets in between these sessions and connects with the regional governance council for the Subcentral of San Agustín. The overarching governance body to which all campesino unions in Tarija belong is the Union Federation of Campesino Communities of Tarija (Federación Sindical Única de Comunidades Campesinas de Tarija - FSUCCT). The FSUCCT is responsible for advocating for the demands of its members and representing campesino communities in the departmental government. As will be discussed in chapter 3, the FSUCCT administered the campaign for a separate campesino municipality so as to grant its members more autonomy over their own financial and territorial resources than they are able to exercise while part of a municipality that also includes the urban centre of Tarija.

Research paradigm

This research utilizes a qualitative approach, which emphasizes an exploration of how individuals and groups ascribe meaning to the social, economic, political, cultural, and other contexts that make up their lives (Creswell 2009). It emphasizes the presence of complexity in a narrative. My philosophical worldview aligns with Creswell's participatory worldview (Creswell 2009, 9) which advocates for action-oriented research that supports people in addressing the various forms of oppression with which they interact. Through the creation of collaborative life history narratives and an emergent design project, this research seeks to advance a form of research that acknowledges inherent power dynamics within research collaborations while seeking to subvert them by drawing on decolonizing research methodologies (Kuwai Smith 1999; Bagela 2012).

Strategy of Inquiry

Ethnography, in the broadest sense of the term, refers to "the systemic description of customs, habits, and points of reference of social groups" (Thomas 1983). It has been used as a strategy of inquiry by anthropologists and sociologists since the turn of the 20th century, when researchers would set off for far-away, remote communities and document the lives of peoples they

considered foreign and exotic, often to bolster the colonial project of domination. Despite its evolution as a practice, many continue to critique ethnography, claiming the practice often continues to prioritize the agendas of the academic establishment over those of the ‘researched’ (Biolsi and Zimmerman 1997).

Critical ethnography emerged as a strategy of inquiry that might respond to such critiques of ethnographic research. As a strategy of inquiry, critical ethnography is trying to push research into a more critical, collaborative, and social justice-oriented space. By actively reflecting on the power dynamics at play between researchers and participants, incorporating a commitment to collaborative research design, and centering the voices and experiences of marginalized communities, among other efforts, more and more researchers are producing ethnographic texts that hold intellectual, political, and ethical value in a variety of contexts (Lassiter 2005).

Power shapes the ethnographic process in important ways. In order to honestly grapple with this dynamic, researchers engaged in critical ethnography must be aware of their positionality in the process (Madison 2005). Who benefits from the investigation? To whom are we accountable? Having a political stance rooted in social justice is insufficient without reflexivity – that is, the active consideration of the influence and power a researcher holds in the research process (Venkatesh 2013).

In addition to reflecting on our own positionality, critical ethnography calls on us to use the resources available to us to contribute to emancipatory knowledge (Madison 2005). Done well, it gives both researcher and participant the opportunity to develop a critical consciousness and hone the skills to work for societal transformation in a way that is meaningful for the marginalized communities with whom we work. This becomes possible when ethnography is understood not merely as a representation of marginalized voices through the interpretive lens of the researcher, but as a constant and engaged dialogue (Lassiter 2005). In dialogue, there is a reciprocation that allows researchers and participants to learn from each other and support each other in the project of emancipation. While this does not resolve the question of power completely, considering ethnography as a dialogue attending to both community concerns and academic rigour helps to reconcile the divide historically erected by a researcher’s interpretation trumping a participant’s analysis of their own lived experience.

Through critical ethnography’s commitment to privileging marginalized voices and producing socially and politically relevant research, this strategy of inquiry offers a counter

narrative to neoliberal's denial of the structural inequalities that exist within capitalist societies (Davis and Craven 2011). While not activist per se, critical ethnography can help society to uncover the insidious effects of capitalism at multiple scales. Davis and Craven (2011) discuss how feminism's longstanding concern with inequality helps it respond to neoliberal policies and practices that reduce citizens to consumers of services. For instance, when a critical feminist lens is applied to ethnography, it provides researchers with an important vehicle to understanding the impact of neoliberal policies on the lives of those experiencing this oppressive reduction. These voices, not often valued as meaningful sources of truth in research, can be privileged on their own terms in critical ethnographies. Providing a space where people can speak their truths and have those validated in a way that is meaningful to them counters capitalism's reductionist tendencies that would have narratives discredited as a valid form of data collection. This process illuminates hidden dynamics of power and dispossession within neoliberal policy.

Privileging these voices also gives ethnographers the opportunity to use their position as academics to advance the struggles of those with whom they are working, lending legitimacy to voices not often considered credible when it comes to shaping policy. Critical ethnography is uniquely positioned to become activist scholarship, disseminating findings not only around the ivory tower, but in the real world where the impact on people's lives is tangible (Davis and Craven 2011). Grandia (2015) argues that this use of academic privilege to expand marginalized peoples' access to public spheres is not only possible – it is necessary. The world needs more ethnographers who are willing to work as allies in the places trampled on by neoliberal expansion and the colonial project of globalized capitalism, whose stories are not often told. The deep, long-term relationships cultivated through ethnographic research offer liberation and reconciliation through grounded research that embraces 'subversive slowness' (Grandia 2015) in a world that values quick and efficient thoughtlessness.

Given its history as a strategy of inquiry, ethnography has a long road ahead of it in order to reconcile historical injustices it perpetuated. Ethnographers openly identifying as activist scholars and aligning themselves with a commitment to real world change in this way would represent a positive step. Some even argue that the disciplines that have embraced ethnography have 'decolonizing dues' to pay (Grandia 2015). As rapid climatic changes and intensifying corporate grabbing of lands and resources spark resistance movements all over the world, ethnographers has an obligation to pay up through solidarity research.

Biocultural design as a methodological framework

Biocultural design is an emerging framework for supporting innovation in rural and remote communities (Davidson-Hunt et al. 2012). Biocultural diversity and the knowledge, practices, and values of a particular place are constantly interacting, in non-linear processes, to produce complex social and ecological landscapes (Davidson-Hunt et al. 2016). People's aspirations are informed by these processes, as well as economic, institutional, technological and political dynamics specific to their communities. Biocultural design offers a process for exploring how people can use nature to meet their goals in a way that is socially and ecologically sustainable. It recognizes people as agents who play a role in shaping the natural world around them, thus influencing their potential future options for nature-based development. Innovation does not emerge in a vacuum; rather, it is made possible through the cultivation of biological and cultural diversity over time. Design processes that centre meaningful participation, knowledge diversity, and local materials can support the cultivation of these diverse economies.

Davidson-Hunt et al. (2012, 10) outline a set of guiding coordinates that distinguish biocultural design as a process. They include:

1. A design team composition that balances knowledgeable community members and supportive external experts
2. Clearly defined roles and responsibilities for members of the design team that consider 'self-reflexivity, equity, respect, and compromise' (10)
3. Political and institutional support for the design approach
4. A design process guided by local cultural values, traditions, and identity and sensitive to language differences
5. Utilizes local materials
6. An understanding of the diverse resources members of the design team bring to the table, and a plan for ensuring the process can be sustained
7. A long-term plan for distributing benefits, harms, and responsibilities
8. Roles that can be played by community organizations are considered, centering self-determination in all aspects of the process
9. The distributional effects of networks of beneficiaries are assessed over time
10. The design process leads to a culture of innovation that can continue to grow over time

My methodology utilizes, in part, a biocultural design framework to guide the collection and utilization of data. This framework recognizes that people's social and ecological environments are dynamic, and that people make choices about how to live based on a wide variety of factors. In order to consider how seeds might contribute to people's ability to meet their aspirations using nature-based approaches, we must understand first how people relate to their seeds, and how those relationships have evolved over time amidst ecological, political and economic transition. Biocultural design involves coming to an understanding of how people use and value their materials and then collaboratively engaging in a process to sustainably harness the power of those materials for the realization of community goals. This approach allows for time to be spent in building relationship and trust through the collection of stories, and then for action-oriented, project-based collaboration to emerge organically, reflecting the worldview and spirit of inquiry that underlies this project. This was the process followed to arrive at the design innovation profiled and discussed extensively in chapter 5.

Importantly, biocultural design also takes as central to its process a commitment to supporting 'the rights of rural indigenous peoples and local communities to control their own heritage as a means to achieve sustainable livelihoods and self-determination' (Davidson-Hunt et al. 2012, 11). It recognizes that many forms of knowledge collaborating for a shared vision rooted in Indigenous and local autonomy can enhance people's ability to face new challenges. This approach acknowledges the tensions, both real and perceived, involved in balancing a need for economic opportunity with a desire to conserve biocultural heritage. It seeks to overcome them by supporting endogenous development efforts, transforming the friction created by the interaction of local and global processes into positive change for local communities.

Sampling procedure and data collection

The data collection for this project (see Table 2) was conducted in two phases. Phase 1 involved a preliminary scan of initiatives and examples relevant to seed work in the region. Phase 2 used 4 primary methods to concurrently gather data: a household seed use survey, document review, the documentation of life histories, and design prototyping.

The first phase involved conducting a scan of initiatives in the area of Tarija that involve the use of traditional varieties of seed and/or agrobiodiversity. This took place during my

scoping trip from October to December 2016. During this time, I attended many ferias, workshops, and markets to understand the local food system a bit better. I also had some initial informal conversations with people in the region knowledgeable about the local food system. Many of these leads came from the local partner, Jaina, and I would then follow up on any emergent leads that came out of those conversations. None of the information gathered during this preliminary scan was formally used in the research, but it did help inform my data collection procedure when I returned to Bolivia in April of 2017 to embark on phase 2 of the research.

Once I arrived in April 2017, before data collection began, I collaborated with Jaina to connect with the elected authorities for the community of Laderas Norte and discuss the project with them. Jaina and the community had a pre-existing agreement struck between them for authorizing research within the community that members had approved by majority vote at a monthly community-wide council meeting. We met to discuss specific goals related to seed and the executive members expressed an interest in documenting the diversity of what was being grown in Laderas Norte as well as stories from community members about their varieties and the barriers they experience when growing them. Together we came up with a plan to begin with a household scan that would involve asking consenting community members to share what they grow (see Appendix 6 for list of varieties named) and where the seed they use for particular varieties comes from, followed by a phase that would involve connecting with any community members who were willing to share more about their experiences with seed (see Appendices 4 and 5 for informed consent forms). I was also invited to participate in celebration days and any other formal gatherings put on by the community throughout the year.

After this goal setting process, I conducted a household survey (see Appendix 1) in Laderas Norte to understand what people were growing, how much access to water they had, what size of acreage they had under cultivation, and where they typically sourced their seeds for the different crops they were growing. The survey was *not* designed with the intent of undertaking an accounting of the agricultural biodiversity in the community, nor a detailed



Figure 1.4 Images of crops used for household survey

account of how much water access each family had at each of their plots scattered across the territory. Such an account would be interesting to build as a future research project should the community desire

that this work be done but was outside the scope of this survey. My main intent with the surveys was to develop familiarity with the crops being grown in the community and get to know people by asking basic questions about the kinds of crops they grew and whether they saved seed.

I walked around the community visiting households at times that locals suggested would be most convenient for people. If an adult member of the household was available and willing to speak for about 15 minutes, we would sit down and do the survey. Part of the survey involved showing pictures of crops (Figure 1.4) and asking if folks grew the specific crop. Pictures were helpful for overcoming language barriers and making sure that my pronunciation of certain words, especially early on in my fieldwork, was not hindering comprehension. Using this method, I surveyed 28 households, which represents the majority of the families who live in the community full-time. If the person seemed keen to talk more about their experiences, I would suggest a follow up meeting to speak more and ask what might be a good day and time to come by again.

Following this household surveying phase, I conducted follow-up semi-structured life history interviews with 13 knowledgeable community members who had expressed an interest in

speaking more about their experiences after conducting the household survey. The interview guide was adapted to suit the person being interviewed, but followed a similar structure, which included asking how their relationships with seeds had changed over time and what their goals were for cultivating a seed system that worked best for them (see Appendix 2 for a sample community member guide). A few of these interviews occurred over the course of multiple sessions, and often took place while shucking corn seed, planting potatoes, or making dinner. These interviews allowed me to become more familiar with people's values and aspirations around seeds and the issues they felt impacted their food system broadly. Providing space for people to tell their stories can provide insights to shape environmental policy around local ontologies that are often more in tune with ecological realities than empirical evidence alone (Cruikshank 2005). Life history narratives differ from interviews in that they seek to understand how people's lived experiences have informed their relationship to a given subject (Cruikshank 1992). They allow people to share their experiences over time, in the form of stories that communicate their relationship to place in a way that is meaningful to them, rather than directed by the researcher. These narratives helped me to construct a timeline of people's relationships with their seeds and genetic material, as well as how people's values associated with those materials have shifted over time, in response to various processes of change. This work was critical to informing the project's design prototyping stage, in accordance with the guiding coordinates of a biocultural design process. Through my relationship building in the community, and drawing on existing relationships held by members of Jaina, we were able to identify people who were interested in collaborating on a design team for the project that would become the *museo en movimiento* (see chapter 4). Wherever consent was given, I recorded interviews to ensure important learnings were not missed due to the limitations of my language abilities. All interviews were transcribed afterwards with support from a field assistant employed by Jaina.

In addition to life history interviews, I also interviewed 8 knowledgeable people from the city of Tarija who informed my understanding of the policy landscape for seed and agriculture in the department. These included people working for the National Institute for Agricultural and Forest product Innovation (INIAF), which is responsible for seed certification in Bolivia; the Agricultural Service Department of Tarija (SEDAG), which manages technical capacity building for the department's agricultural sector; the Juan Misael Saracho Autonomous University; and

local NGOs. The interview guides for each of these interviews was customized according to the expertise of the person being interviewed (see Appendix 3).

To ensure data validity, I presented initial survey results to the community at a monthly community meeting near the end of my fieldwork phase to give people the opportunity to comment and further share their experiences. The data yielded from life histories and surveys was also complemented by participant observation and a review of key documents including the regional development plan, tourism development plan, population data, and historical accounts of agricultural development in the region.

The design prototyping phase was emergent over the course of the project. I elaborate more extensively on this process in chapter 4. But after hearing from people about the importance of traditional recipes in conserving traditional seed varieties, some women from the community, in collaboration with Jaina, developed a mobile museum to showcase campesino women's knowledge about traditional foods at the department's annual Tambo event – a celebration of regional foods. The core criteria for selecting this project as a biocultural design prototype included:

1. A clear focus on biocultural heritage, in particular traditional crop varieties
2. Participant interest in developing novel products, technologies, institutional arrangements, services, or a combination of these
3. Participant interest in sustainable economic development
4. An established positive relationship between the researcher and participants.

This phase of the project emerged out of ongoing conversations and relationship building between myself, Jaina, community members in Laderas Norte, and organizers of the Tambo feria – a local food fair celebrating regional gastronomy.

Table 1.1 Data Collection - objectives and timetable

Phase of Project	Research Question	Participants	Methods	Deliverables
Phase 1: Preliminary scan (October 23, 2016 – December 5 th , 2016)	2.(a)	Community leaders, NGO workers, knowledgeable experts, key community members, union leaders	Document review, observation, informal interviews	Timeline of political changes with regards to formal seed system Communities/ cases agreed to proceed to ph.2
Phase 2.1: Household survey (May 2017 to August 2017)	1.(a)	Community members living in Laderas Norte – diverse genders and age groups	Household survey. Also used to inform who was interested in participating in life history interviews in later phase.	28 households surveyed, Data about crop varieties grown in the community, common sources of seed, differential access to water, and common acreages.
Phase 2.2: Interviews and life histories (August 2017- January 2018)	1.(a) (b) (c) 2. (a) (b)	Community members (young, middle-aged, older generations), seed activists, knowledgeable experts	Life history narratives, group workshops, participant observation, document review	13 detailed life histories 8 semi-structured interviews with knowledgeable experts Understanding of community aspirations to proceed with phase 2.3

Phase 2.3: BD Prototyping August 2017- November 2017	3	Community members, local partner (Jaina), knowledgeable experts	Focus groups, workshops, ethnographic interviews (see chapter 5)	Community-wide innovation ‘event’ Infrastructure and model established for hosting future events
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Coding and data analysis

Data collected during phase 2 of the project was qualitatively coded for the purposes of data reduction, organization, and analysis (Cope 2008). This included transcribing interviews and then coding them according to emergent themes. Dedoose was used to code interviews. The coding process identified key values and aspirations associated with seed systems, as well as barriers and challenges that community members identified to realizing the seed system they aspire to build. These themes were verified with participants at a community meeting and over the course of different life history sessions to ensure the salience of the data. Analysis of the design process included additional interviews with design team members to identify key challenges and successes related to the process. Themes emerging from interviews were triangulated against additional sources of data, including my own field notes and existing documentation.

Ethical considerations

In conducting research with Indigenous communities, one needs to acknowledge the legacy of oppression associated with these research relationships. The process of colonization relied on the extraction of local knowledge and materials by researchers to buttress the colonial project and advance Western notions of progress (Kuwai Smith 1999). There is a need to invest time into building dialogical, collaborative relationships between researchers and Indigenous peoples so as to support the self-determination and autonomy of Indigenous communities over their lands and resources (Davidson-Hunt and O’Flaherty 2007). Thanks to a local partnership with JAINA, a

foundation for such relationships already existed. But as part of my research, I also spent time building trust and collaboration into all aspects of the project by incorporating such strategies as:

- Involving participants in the research process by hosting an opening workshop to explain the research project and invite feedback relating to the research objectives
- Conducting pilot interviews to limit conflicts with cultural protocols or other ethical sensitivities
- Ensuring that information gathered is shared with community members and that feedback is integrated into the final report
- Acknowledging internal community diversity in data analysis
- Approaching the research humbly, with the attitude of a learner who has been invited to understand more about the motivations and knowledges of seed savers
- Making sure that research protocols are respected by checking in with key community contacts
- Obtaining free, prior, and informed consent from research participants by ensuring the purpose of the research is explained and participant rights are clear
- Interpreting data within the cultural context by learning about the history of the community and verifying details with key contacts
- Translating final results into local languages so that the results can be used effectively for advocacy or further internal research purposes
- In a spirit of reciprocity, being open to preparing useful informational materials for local communities and organizations, promoting community ownership over data and data accessibility
- Co-authoring publications that arise out of this work with key research collaborators (LaVeaux and Christopher 2009)

Organization of the thesis

This thesis is organized into 5 chapters. This first chapter introduces the thesis and outlines the context of the research, the guiding research questions, and an overview of the methodology used.

Chapter 2 was written in response to the second research question (see page 6) regarding how people exercise seed sovereignty in relation to self-determination and community autonomy. It builds on the literature drawing attention to state- versus community-centric food sovereignty (Clark 2016; Cockburn 2014; Felicien et al. 2020) to draw attention to how Bolivian agricultural policy has systematically undermined seed sovereignty at the community level through a lens of three ethnographic vignettes. It also brings in the literature from modernity, coloniality, and decoloniality to understand how racial logics impact perceptions of what constitutes a seed, and how this continues to shape seed policy despite important shifts to the country's constitution. It also explores alternative ways of being in relationship that persist in campesino communities in Tarija and outlines what a community-centred, decolonial agricultural agenda could look like. This paper draws on data collected in phases 2.1 and 2.2 (see Table 1.1).

Chapter 3 was written in response to the first research question regarding locating seeds within their community and regional contexts (see page 6). Situated within activism and literature related to seed sovereignty, it explores the ways in which the community of Laderas Norte continues to cultivate seed sovereignty by way of everyday acts of resistance in response to dynamic environmental, economic and political changes that affect their control over their relationship with seed. Drawing on Anna L. Tsing's work on the friction produced in global encounter, it explores how the actions of farmers to construct access to ancestral and local varieties, and increase their autonomy amidst environmental and social upheaval, can inform and deepen our understanding of seed and food sovereignty. This chapter draws on data collected during phase 2.1 and 2.2 (see Table 1.1).

Chapter 4 was written in response to the third research question exploring how design and seed sovereignty can build on one another (see page 6). This last paper draws on the literature and context from previous papers to articulate how inter-epistemic collaboration in a design context can be carried out in support of community autonomy. I present a case study of a mobile museum to explore how place-based collective action can support community autonomy and produce new opportunities for resistance and solidarity. It again draws on the literature on colonial modernity and puts it in conversation with the emergent field of critical design studies. It uses biocultural design (Davidson-Hunt et al. 2012) as an organizing framework that can be used to spur decolonial action. This paper draws on data collected as part of phase 2.3 (see Table 1.1).

Finally, chapter 5 concludes the thesis by putting these diverse chapters in conversation with one another, drawing connections among them and outlining the theoretical and practical contributions this work aims to make, as well as opportunities for further research.

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Preamble to Chapter 2

Chapter 2 addresses the research question:

- (a) What are the opportunities and barriers people experience in exercising seed sovereignty?
- (b) How does seed sovereignty, or a lack thereof, impact one's ability to exercise self-determination and cultivate community autonomy?

I explore the history of Bolivia's approach to seed policy and outline how the coloniality of past agricultural policy approaches inform the present. I outline how the MAS's decolonial approach to cultivating food and seed sovereignty is undermined by their ongoing commitment to upholding capitalist land holding structures. I argue that cultivating seed sovereignty requires intentional and active support for small scale farmers, especially Indigenous and campesino farmers, and that a commitment to community food sovereignty is not compatible with the industrial agriculture model.

This chapter provides the background needed to understand the political context in which Chapters 3 and 4 take place. In order to understand the ways in which people assert seed sovereignty under precarious environmental and socio-political circumstances (Chapter 3) and exercise creativity in cultivating seed sovereignty as an intentional process (Chapter 4), it is important to understand how colonial modernity continues to underpin the political structures in which those responses are embedded.

Chapter 2 – Contested seeds: The persistence of coloniality in Bolivian agricultural policy

Introduction

In August 2017, the Bolivian Ministry of Rural and Territorial Development (MDRyT in Spanish) held its third annual National Seed Congress in the Santa Cruz de la Sierra, the agroindustrial capital of the country. The congress slogan, plastered all over the promotional material for the gathering, read “Sowing a better future with quality seeds”². Directed at government actors, farmers, input manufacturers, distributors, and other industrial food system actors in the country, the conference focused on seed “improvement” and the political and economic climate necessary to make use of technical innovation in the agribusiness sector in Bolivia.

As I walked up to the registration desk, sitting on the table was a little paper policeman figure blowing a whistle and holding a sign. The sign read: “Denounce those who sell common grain as seed”. I was struck by the visual and the implication the sign was making. A seed, for 10,000+ years, has been commonly understood to refer to any embryonic plant, housed in a protective casing, that when sown in rich soil and given sufficient access to sufficient sunlight



Figure 2.1 Pamphlet produced by the MDRyT and INIAF calling on farmers to denounce those who sell "common grain" as seed

² All translations by the author.

and water, can develop into a plant, capable of producing nourishing or beautiful fruit and then reproducing again, creating more and more seeds in an endless cycle that exists wholly outside of the market. Here at this Seed Congress and elsewhere in the increasingly powerful and ubiquitous world of agribusiness, one can witness a discursive shift at play.

The narrative that only a seed that has been registered and certified can be distributed “as seed” has crept into official government and industry parlance, particularly for countries that hold membership in the International Union for the Protection of New Plant Varieties (known by its French acronym, UPOV). But the idea that encouraging farmers to denounce their fellow growers for selling or trading seed in the way that farmers have for generations is an especially striking narrative for a country like Bolivia that enshrined food sovereignty in its constitution as recently as 2009. Bolivia, since the election of the Movimiento al Socialismo (MAS) party in 2005, has become renowned globally for its explicit support for food sovereignty, its vocal rejection of the globalization of agriculture, and centering the leadership of campesino and Indigenous people at all levels of governance. But despite these discursive commitments, the contradictions within Bolivia’s agricultural policy broadly, and its approach to seed specifically, are indicative of the persistence of coloniality within an administration with purportedly decolonial aims. It is evident from gatherings like the Seed Congress, and the seed policy framework it reflects, that the interests of agrarian capital are limiting the work that can be done in pursuit of meaningful food sovereignty at the community level. Instead of a dialogue among different ways of knowing, or a *diálogo de saberes* (Martínez-Torres and Rosset 2014), two knowledge systems — one that asserts that answers to food production concerns lie in a modernist orientation and one that advocates for supporting community food sovereignty and locally embedded knowledge — are competing for their share of resources.

This examines the tensions involved in enacting seed sovereignty in Bolivia. Building on the critical literature drawing attention to state- versus community-centric food sovereignty (Clark 2016; Cockburn 2014; Felicien et al. 2020), I draw attention to the ways in which Bolivian agricultural policy is systematically undermining seed sovereignty at the community level through three ethnographic vignettes. I begin by returning to the Seed Congress to explore how coloniality persists in agricultural policy legislated at national and departmental levels, building on Bolivia’s long history of shaping markets to support agro-industrial actors. Then I shift to the community level, exploring how racial logics impact perceptions of what constitutes

a seed and how that has shaped seed policy at national and international scales. Finally, I explore alternative ways of being in relationship with seed as demonstrated by small-scale farmers in the campesino community of Laderas Norte in the department of Tarija, Bolivia. I conclude with a discussion around what meaningful supports for community-level seed sovereignty could look like, countering the racial logics of coloniality in seed policy and uplifting the work of campesino and Indigenous communities to assert a decolonial agenda.

Methods

Between 2017 and 2018, I spent about 11 months in Bolivia, mostly in the Central Valley region of the department of Tarija. Using critical ethnography as a method of inquiry, I split my time between the small campesino community of Laderas Norte located about 40 minutes outside the city of Tarija and the city of Tarija. In Laderas Norte, in addition to participant observation under a framework of critical ethnography (Lassiter 2005; Madison 2005), I conducted household surveys to understand what people were growing and from where they were presently sourcing their seed (n=29). I also conducted life history interviews (n=13) with participants who were willing to share a bit more about how life had changed for them over the course of their lifetimes, including personal histories around the kinds of crops and varieties their families cultivated when they were younger and their perceptions of why those had shifted.

When not present with the community, I interviewed several policy figures (n=8), including officials associated with the seed certifying authority in Bolivia, academics, campesino union leadership, and NGOs to understand more about policy approaches to seed governance taken at different levels of government and perspectives on how these affect small scale campesino farmers in the department. I also conducted a thorough document review of relevant policies and the political economy of agricultural development in Bolivia.

This research and its methodological approach were collaboratively conceived by myself, members of a local NGO with decades of experience and relationship working with Laderas Norte, and members of the community itself. In a spirit of collaboration and *convivencia*, I became involved in the office of the local NGO and supported their various ongoing initiatives when time and resources allowed.

Now we turn to a series of short vignettes from fieldwork in Bolivia that illustrate how conflicting understandings of seeds between policy makers, industry, and small-scale producers are leading to seed policies that support certain production methods at the expense of others.

Vignette 1: “Diálogo de Saberes” at Seed Congress 2017?

The 2017 Seed Congress gathered mostly medium and large-scale industrial farmers from the lowland regions of Bolivia, as well as technical experts, policy officials, and students from agricultural colleges. Jointly organized by the INIAF – the national authority governing technological innovation, genetic resource management, and seed certification in Bolivia – and the Ministry of Rural and Territorial Development (MDRyT in Spanish), the congress purports to be a space where people working in the Bolivian agricultural sector can learn about and participate in establishing the country’s policy trajectory for governing seed work in the years to come. The event, inviting national and international presenters, centred around three principal themes: public policy and food security, quality management and commercial control of seed, and biotechnology and intellectual property (see Table 2.1).

Table 2.1 Selected session titles and presenters at Seed Congress 2017

Session title³	Presenter	Notes
INIAF’s Institutional Sustainability Proposal 2017-2020	INIAF representative	Significant focus on augmenting the volume of certified seed produced nationally
Seed Quality Control	SeedNews	A Brazilian agribusiness publication promoting the use of certified seed
Plant Breeders’ Rights according to UPOV Convention : Benefits for Farmers	UPOV representative	UPOV is a private organization that advocates for the global harmonization of seed regulations (see Vignette #2)
Biodiversity, Biotechnology and Intellectual Property in Agricultural Research for the Development of Bolivia	MDRyT	Discussion on the benefits of biotechnology for increasing biodiversity in Bolivia and decreasing pesticide use in soy
Advances in Agricultural Insurance in Bolivia	Erik Murillo Fernandez, director of INSA (Institute for Agricultural Insurance, under the MDRyT)	

³ Translated from Spanish by the author.

The congress has been held biannually since 2013, always in Santa Cruz. Santa Cruz is the epicenter of agribusiness in Bolivia, whose department is home to 81% of certified seed grown in the country (Dirección Nacional de Semillas 2015). Some of the congress' co-sponsors included big national and international names in agribusiness with a major market hold in the department of Santa Cruz, including Syngenta, Agripac, and Agricomseeds.

Walking into the venue for the seed congress contrasts starkly against walking into a campesino or Indigenous-run *feria*, or market fair. The latter gatherings have a very celebratory vibe, often taking place outdoors with lots of unique crop varieties on display, children running around, and the tantalizing smell of local delicacies ready for serving while the congress' ambience is significantly more business-oriented. The event is catered by the hotel staff, so any food is hidden away. There are outreach tables being staffed by congress sponsors, but no one has any actual seeds or crop varieties on display. Participants can get promotional material for pesticide vendors and seed treatment options, or pick up their own copy of the little seed police stand-up pamphlet pictured in the introduction. At one of the promotional tables, a representative from SEDAG – the department that does technical training and capacity building within the agricultural sector – agreed to an interview with me. I asked him a bit about their work and how he felt their approach aligned with the food sovereignty goals of the national government. His response is indicative of the attitude within government departments working with campesino farmers broadly:

Within the project that we're executing, I think the majority of species that we're working with are within the list of cultivars prioritized for food sovereignty, like potato, maize, wheat...we're working within that food sovereignty frame. Our contribution is important here because we need to increase yields on these crops, and the only way to do that is by sowing quality seed. That's the first step – sowing a quality seed will bring us better production and the only thing that can really assure a quality seed is the certification process managed by the INIAF.⁴

The clinical environment created by the congress paired with this shallow, productivity-focused understanding of food sovereignty feels like an apt reflection of the trend in seed policy advanced by the MDRyT towards seed sector “innovation” that is entirely divorced from the needs and realities of small scale campesino and Indigenous farmers in Bolivia. It is interesting

⁴ Kaitlyn Duthie-Kannikkatt, Interview with SEDAG engineer, August 27th, 2017.

to reflect on this reality in light of the commitment to fostering a *diálogo de saberes* explicitly identified in the founding literature of the INIAF as a core pillar of their approach to innovation (INIAF 2010).

A *diálogo de saberes* – in English, a dialogue among knowledges or ways of knowing – is “a process whereby different visions and cosmovisions are shared on a horizontal, equal-footing basis” (Martínez-Torres and Rosset 2014, 980). According to Martínez-Torres and Rosset (2014), this kind of dialogue transcends a mere discussion or attempt to come to a compromise and requires a meaningful and respectful engagement without a set end goal in mind. The term stems from a commitment in social movement spaces to resisting the “monocultures of knowledge” (de Sousa Santos 2009) that have been imposed on Indigenous and campesino communities globally through the spread of “modern” agriculture, including the push for Green Revolution technologies that characterized the latter half of the 20th century (Patel 2013; Grey and Patel 2015). As a concept, it is not intended to imply that there is a strictly enforceable binary between Western and non-Western knowledge systems; indeed, such a binary would only further entrench Western ways of perceiving the world that pit ways of knowing against one another and rank them. But it does draw attention to the ways in which the pluriverse of Indigenous cosmovisions need to continue to struggle to flourish under the seemingly unconditional state support for a destructive and extractivist industrial agricultural model. People pursue unique ecological and economic practices influenced by a variety of factors including their traditions, the constraints and opportunities provided by the landscape, new information and technology available to them, support programs, training, advice from neighbours and technical experts, and more. But community capacity for innovation is impeded when alternative models of building sustainable food systems that nurture rural families and communities are actively threatened by industrial expansion and policy redirection. When the state allows for the resourcing and support of those who conform to a modernist paradigm at the expense of all other ways of farming, it makes it difficult for these smaller scale and more sustainable forms of farming to remain economically and culturally viable (Bebbington 2008, Turner 2016).

The use of the term *diálogo de saberes* within the INIAF’s founding literature implies that the institution aims to provide a medium for multiple ways of knowing to be put on equal footing and allow producers from diverse backgrounds to hear from one another and find the space for solidarity. Yet, both at the national seed congress and within the broader trajectory of

INIAF-directed programming, it is apparent that ways of knowing rooted in western modernity and coloniality remain the central organizing frameworks, to the neglect of Indigenous cosmovisions and community food sovereignty. At the seed congress, despite this being an event purportedly aiming to consider how seed can be used to help advance food security and sovereignty, there were no campesino or Indigenous presenters, and seemingly no campesino or Indigenous participants either. The aim of the event was to provide a space for dialogue around specific technical questions and means of supporting agricultural models that reflect explicitly colonial patterns. It is striking that the very people responsible for producing 85% of food consumed in the country (Rapsomanikis 2015) were not invited to participate in a congress whose theme concerns them so deeply. Based on attendance and location choices for the Seed Congress alone, it becomes evident that the state is investing in a very particular vision for food security and food sovereignty – a vision that uplifts and embraces monocultural production methods, western scientific knowledge, and profit-oriented plant breeders rights to the exclusion of Indigenous producers, a consideration of ecological farming methods, gender justice, and the communitarian economy.

In contrast with the intent of a meaningful *diálogo de saberes*, here we can witness the same problematic dynamic of coloniality that has been ongoing since the initial colonization of the Americas. Entrenched within Bolivia's national seed policy framework is the idea that a seed can only be called a seed if it complies with a set of administrative requirements that privilege order, documentation, technological advancement, strict phytosanitary requirements, and yield-based standards of productivity; that is, requirements rooted in the logic of modernity. Indigenous ways of conceptualizing seed that might privilege alternative priorities such as ancestral connection, taste and appearance, how well it had adapted to local environmental conditions, or how important it is for traditional culinary dishes. In this statement it is clear that, despite its stated decolonial aims under Indigenous leadership, the MAS government is perpetuating a hierarchization of knowledge rooted in the racial social classification of the world population under Eurocentred world power" (Quijano 2010, 171).

Coloniality refers to system of power used to drive the universal implementation of modernity as a model of political and social organization (Quijano 2010; Mignolo 2010; Escobar 2007). Some Latin American postcolonial scholars have used this framing to speak about the imposition of modernity as a global design on Indigenous and other non-Western communities

and their respective diverse worldviews (Mignolo 2000). Whereas modernity constitutes a particular set of beliefs, rooted in western values, about how society should be structured, coloniality is the force that enables modernity to subordinate other ways of knowing and being. While race is the key element upon which social classification is based, the coloniality of power has implications for social formations and processes that might appear unrelated to race, such as class and knowledge system. In the government's approach to food sovereignty, as evidenced in its seed policy framework, a hierarchy of knowledge that devalues Indigenous and campesino seed knowledge systems in favour of systems rooted in Eurocentric, modernist ways of knowing is evident.

Since coming to power, the MAS party has been explicit in its support for a new economic model that could subvert the global design of capitalism by making space for public, private, and social-communitarian forms of property (Webber 2017). Former vice-president and intellectual leader within the MAS, Álvaro García-Linera, called the space for productive disagreement between these models and the societal actors that advocate for them a “creative tension” (García Linera 2011) that can build supportive solidarity for advancing the revolutionary project. The idea that diverse economic models can and do co-exist in Bolivian society has been called the plural economy (Lizárraga Aranibar 2014) and is supported by other work such as that by Gibson-Graham (2008; 2006) drawing attention to the ways in which diverse economic models of organization undermine the dominance of capitalism in everyday ways. In Bolivia, the idea of the plural economy emerges directly out of the revolutionary process of becoming a plurinational state that is explicit in its support for diverse ways of being and knowing co-existing under a unified state banner.

The plural economy within the plurinational state represents, in many ways, a forceful rejection of modernity as a totalizing model of sociopolitical organization and names the colonial dynamics that have made its implementation so ubiquitous. Bolivia has worked to nationalize its resources as part of a broader aim to disentangle itself from the web of dependence on international finance capital (Zimmerer 2015; Merino 2020). But the state's approach to implementing food sovereignty suggests that its promised rejection of modernity remains elusive; ways of being in relationship with seed that challenge the superiority of stability, uniformity, distinctiveness, and proprietary ownership continue to be politically deprioritized. Indeed, the modernity/coloniality complex underpinning the pattern of agrarian extractivism

(McKay and Colque 2015; McKay 2017) that characterizes large scale production in Bolivia appears alive and well and is gaining ground.

Bolivia's model has been described as 'neo-extractivist'. When the MAS came to power in 2005, it was lauded by supporters for prioritizing the nationalization of major extractive industries that had hitherto depended on foreign investment. Nationalization allowed money from these industries to benefit the Bolivian economy, rather than lining the pockets of shareholders for foreign companies (Perreault 2015; Hinojosa et al. 2015; McKay and Colque 2021). But nationalization did not deal with the ecological implications of an economy dependent on large-scale resource extraction (Webber 2010). Initial successes were outshone by criticism and large-scale mobilization from Indigenous communities forced to bear the brunt of these impacts without gaining their share of the potential economic benefits (Fabricant and Postero 2015). While this dynamic has been relatively widely explored within the literature for these sectors, Bolivia's relatively new entry into agrarian extractivism means that the ways in which agricultural policy in Bolivia has failed to meaningfully undermine the dynamic of coloniality remain underexplored (McKay 2017).

The long-standing alliance between the capital-owning and political classes has led to a decades-long (and ongoing) struggle over land rights and title in Bolivia. Campesino and Indigenous peoples fought hard to right the wrongs that had resulted in a very skewed land concentration in the hands of the elite. Initial legislative change in the 1950s broke up large-scale plantations and returned land to the small scale growers who farmed it (Webber 2011). But the mechanisms for land redistribution had a lot of problems and, especially in the lowlands, served to reproduce consolidation in the hands of those with capital while dislocating those who could not afford to farm on their newly acquired lands without competitive access to inputs (McKay and Colque 2015; Deere 2017).

In the 1970s and 80s, state-led capitalism in the form of fiscal incentives, agricultural credits, transport infrastructure and foreign aid supported the development of export-oriented crops and the social and financial systems that catered to their needs, including an increase in inter-department migration for farm labour (Valdivia 2010). As a certain class of lowland farmers accumulated more capital and were able to consolidate land and devote more and more arable farmland area to crops like soy, cotton, and sugar, the country also opened itself up to foreign investment from countries like Argentina, Brazil, and the US, primarily. With the inflow

of foreign investors, agrarian capitalists in the lowlands no longer needed fiscal incentives from the state to flourish. Money was pouring in to fuel the expansion into Guaraní territory and reduce the need for labour with major technological investments and eventually a dependence on herbicide and pesticide use, followed by GM soy. Fairly quickly, Santa Cruz's reputation as an "engine of production" (Valdivia 2010) skyrocketed.

This expansion of agro-industry in the lowlands coincided with the rise of the green revolution globally. The aim of the Green Revolution was to "modernize" agriculture by pushing farmers to focus their production on higher-input and high-yielding varieties dependent on those inputs (Eddens 2019; Patel 2013; Shiva 1991). Local and regional diversity used to come from farmers saving their own regionally and environmentally adapted varieties (Stone and Glover 2017; Cockburn 2014; Kothari, Demaria, and Acosta 2014). Many farmers, if they weren't pushed out of the sector altogether by increasing costs associated with farming, depend increasingly on single varieties to meet their production needs, all of which is destined for commercial markets (Soper 2016; Eakin et al. 2014).

In response to these threats to their livelihood and land security, lowland Indigenous groups in Bolivia, facing down quickening land dispossession large-scale industrial producers expanded their landholdings, rallied against the expansion of agro-industry. Their struggles resulted in the approval of the INRA law in 1996 which sought to offer more land security, particularly for Indigenous peoples and improve transparency in land management (International Land Coalition 2015). The law intended to ensure that property held by different kinds of landholders is being used for productive purpose for which it was intended. If not being used as intended, it would be subject to expropriation by the state. For example, if a landowner is not actively cultivating their land or using it for grazing, that parcel could be expropriated and redistributed to Indigenous communities under a collective title. The "best uses" for the land would be determined by a land use plan devised by the Ministry of Sustainable Development and the Environment, taking into account various 'limiting factors' – mainly ecological – including soil structure, topographical considerations, etc. The law was considered a major win for social movements fighting for land reform.

By the time Morales was elected president, many social movement groups were concerned that the INRA law of 1996 had been poorly implemented and that capitalist-fueled land dispossession continued to threaten Indigenous and campesino land bases in the lowland

regions. Only 10.7% of land slated for titling had been titled (Valdivia 2010; International Land Coalition 2015). The MAS set out to reform the law to reduce the abuse of titled property in the lowlands. Once a medium or large property is titled under the reformed INRA law, the state can monitor its use and expropriate it if deemed ‘unproductive’, regardless of whether or not the land is titled. It also allowed social movements, including Indigenous federations, campesino unions, and other groups more control in the process of use verification, expropriation, and land granting. These changes fueled unrest among lowland agro-elites who feared that foreign investment would be impossible to attract if land title was no longer guaranteed. They also took issue with aspects of the food security agenda that sought to guarantee a ‘fair price’ for food, claiming that this would limit the export of certain agricultural products in order to counter rising food prices in the domestic market (Valdivia 2010). These kinds of policies, according to the agro-industrial elite, constituted unfair handouts, conveniently forgetting that their own success was built on labour exploitation and land dispossession.

Valdivia (2010) argues that resistance to state support from agro-industrial elites conveys a refusal to acknowledge the myriad of ways in which their financial success in agribusiness has largely been a product of state-support going back decades. This is especially true for those whose families benefitted from capital injections that made the expansion of their productive systems easier, suggesting a collective amnesia about state support in agro-industrial expansion. Tracing back to 1952, initiatives rolled out by the state under the agricultural policy banner have largely served to bolster industrialized production (Córdoba, Jansen, and González 2014).

The interests of agribusiness elites in Bolivia have long been supported by federal agricultural policy. This continued support is evidenced in national events like the Seed Congress and its emphasis on certified seed (see Figures 2.2 and 2.3). Despite the shift in leadership upon the election of the MAS, these interests continue to be prioritized within the current national policy trajectory. This choice serves to belittle the food systems of campesino and Indigenous farmers that deprioritize market production in favour of mixed systems that provide household and community nourishment along with enough funds to meet a family's basic needs. The producers who do not integrate their systems fully into the market are seen as dependent on handouts, insufficiently professional, in contrast with capitalist farmers who are 'self-made men' that managed to rise to the top without supports. But of course, this is a false characterization,



Figure 2.2 Posters from Brazilian agribusiness presentation at Seed Congress 2017

and the state has always played a role in facilitating the expansion of agroindustry.

To transcend the power of modernity as a global system, there is a need to consider it from a lens of coloniality, thus “unfreezing the radical potential for thinking from difference” (Mignolo 2000) and allowing alternatives to

modernity to take their rightful place in the plurality of global consciousness (Escobar 2018). Despite the lack of meaningful state support for these alternatives in the realm of seeds, campesino and Indigenous communities and organizations continue to assert their alternative visions for farmer-led seed and food sovereignty. This involves detaching from the colonial matrix of power and disentangle from the forces of colonial modernity by supporting these efforts. In the case of the seed system in Bolivia, that detachment has yet to take place.

Now we move to further evidence of the persistence of coloniality in the kinds of opportunities for small-scale campesino and Indigenous farmers that the state appears willing to fund.

Vignette #2: Seed potatoes – contested notions of “quality seed”

On a rainy Saturday in January, I was invited to accompany an INIAF engineer to a festival celebration at a community called San Juan about an hour and a half’s drive from the city. San Juan was celebrating 5 years of participation in the seed potato program, a business venture supported by the INIAF and SEDAG (a technical capacity building institution falling under the authority of the departmental government) that aims to encourage farmers to grow seed potatoes for a guaranteed market through the Empresa Estrategica de Apoya a la Producción de Semillas (EEAPS), or the Strategic Business for Supporting Seed Production.

The celebration was relatively small, with more officials present than community members. More people arrive later once the food came out, the speeches were over, and the *fútbol* game began. Listening in on the speeches, I was struck by one in particular – the head of the local *syndicato* expressing his gratitude to the institutions that had supported this community’s transition to becoming major seed producers. He claimed that thanks to their support and the seed potato program, San Juan had now become ‘professionalized’ as a community. That before, the people in his community had not been seen as professionals, but now that program uptake had increased substantially, they were now “real business people”.

Campesino food systems in the department of Tarija have always found innovative ways to combine subsistence needs with market vending (Lizárraga Aranibar 2014; Vacaflores Rivero 2009). Producing diverse foods for home consumption and selling the surplus at market is common for many of the families I spoke with during my field work. But the pursuit of growth and owning a successful farm market business is not necessarily the goal for most families. Food is understood to be something that nourishes one’s family and can provide enough funds to meet basic needs like shelter, extra food, and further investment in the quality and efficiency of your food system (Vacaflores Rivero 2017). But the seed potato program offers something different – a chance for farmers to grow a product, not for their families or communities, but for large-scale industrial producers supplying major domestic and export markets. Most grow one variety – the Desiree potato – a relatively short-season potato with high marketability for consumers and

major foodstuffs manufacturers like French fry and potato chip companies. In many ways, participation in the program makes sense. You are guaranteed a certain price for your potato seed, provided you continue to meet the requirements to maintain your status as a certified seed potato producer. Certified seed can be sold at a much higher price per bag than potato sold as food (or, under the table, as uncertified seed).

Many farmers over the last 5 years have found a lot of success through this program and have chosen to convert much of their arable land area to production of the Desiree potato. But not all have chosen (or are able) to shift their modality towards seed potato production. There is a growing economic disparity between those with sufficient land approved for certified potato seed and those who either cannot or have chosen not to participate in the program. As a support program, it is only accessible to those whose plots of land can be certified for seed potato production. There are also a number of things one necessarily deprioritizes when devoting more and more of the available land to a single seed crop destined for market. Many of the more prolific producers in the community have stopped growing for consumption altogether, instead opting to purchase food consumed in the home. And shifting to a mostly monocultural system may impact the resilience of their agricultural system.

The seed potato program serves as yet another example of how the state encourages small-scale farmers to de-diversify their food systems in favour of integrating wholly into the chain of value production for agro-industrial elites. And all under a narrative of supporting national food sovereignty by increasing domestic production of necessarily inputs like seeds.

Again, we see evidence of coloniality infusing the food sovereignty discourse, praising farmers that have risen above their ‘lower’ station in life to become professional seed growers, with ‘clean’ and ‘pure’ fields, ready to serve the needs of the agro-industrial elites to the neglect of traditional foodways.

Launched in 2012 (SEDEM 2021), the Bolivian Strategic Venture for Seed Production (EEPS) was designed to support the production of ‘quality’ seed in Bolivia. Initial crop focuses for the program included soy, sorghum, corn, and some fruit plants. In the last few years, it has also begun supporting growers in growing certified seed potatoes, particularly in the mountainous regions of the lowlands due to the ecological desirability of seed from these regions.¹ The program works by providing technical assistance to farmers interested in focusing a portion of their productive capacity on producing seed potato destined for larger industrial markets both in Bolivia (mostly in Santa Cruz) and abroad, mainly in Argentina and Brazil. Participants in the program receive technical assistance to meet the standards required of the INIAF in order to become certified potato seed producers. There are multiple levels of potato seed certification quality, and different farmers get different prices for their seed depending on which generation of distinct and uniform potato seed they are able to grow in a stable way.

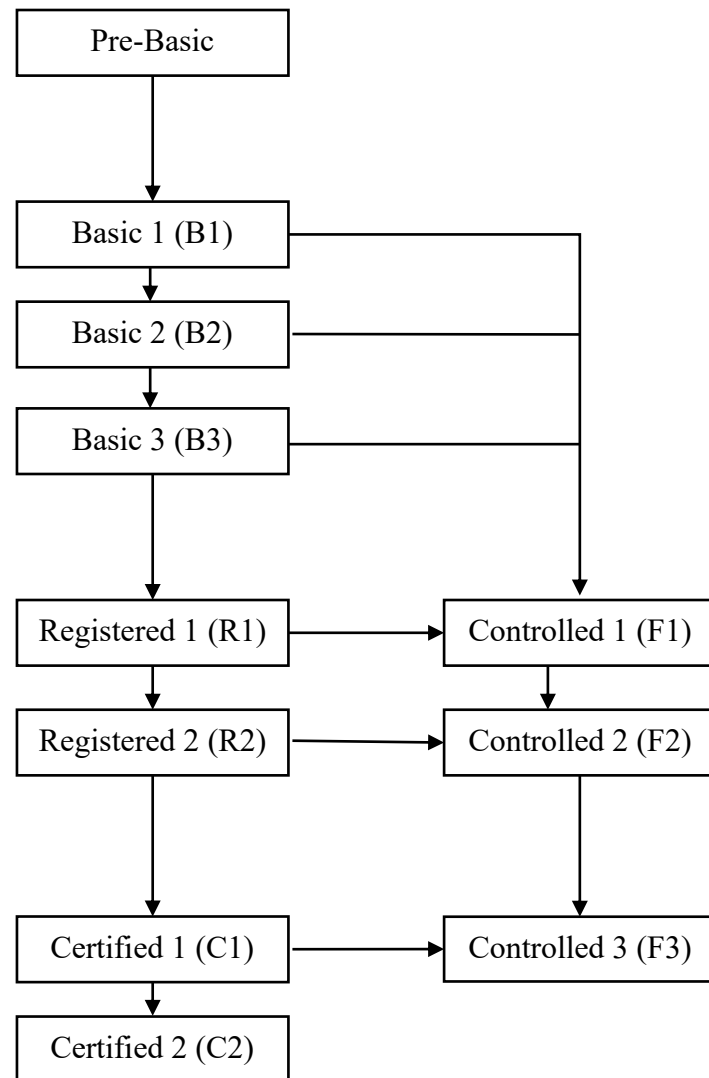


Figure 2.3 Seed potato certification process. Participating farmers receive pre-basic tubers grown in-vitro by INIAF labs, then grow successive generations of tubers progressing from Basic (3 generations) to Registered (2 gen) and then Certified (2 gen)

In 2008, the national government, under Decreto Supremo 29611, created the National Institute for Agricultural and Forestry Innovation (INIAF in Spanish). The INIAF replaced the National Seed Program (PNS), which had been implemented in 1982 in collaboration with USAID (CENDA 2018), the international development agency of the United States government (Balcazar 2018; INIAF 2010). The PNS took a public-private partnership approach to seed with the state providing the infrastructure for seed certification and land-use fiscalization while producers remained responsible for producing and commercializing. The work of the INIAF builds on that history within the framework of operations for the MAS government, tasked with “generating technologies, establishing directions, and managing public policies for agricultural and forest innovation, with the aim of contributing to food security and sovereignty within the framework of *diálogo de saberes*, social participation, and management of genetic agrobiodiversity resources as the heritage of the State” (Osinaga 2017). It holds responsibilities for all agricultural research, technical assistance, and seed registration and certification programs in the country, with regional offices in each of the departments.

Seed certification under the authority of the INIAF is structured around the 1979 UPOV Convention, which Bolivia became party to in 1999 as part of a wave of ‘developing’ countries acceding to the international convention on plant variety protection. Some were encouraged to join to meet the requirements for membership in the World Trade Organization, which included having a national system in place for managing plant variety protection (PVP). While joining UPOV is not actually *required* for WTO membership (Peschard 2017; Peschard and Randeria 2020), UPOV advocates made a big push in the 1990s to encourage countries to join the convention in order to fulfill their national PVP system obligations. Most countries around the world agreed, or were forced into UPOV through bilateral free trade agreements (Wattne 2016; Silva Garzón and Gutiérrez Escobar 2020). The only major agricultural power that has so far resisted joining UPOV in favour of establishing its own *sui generis* seed system is India (Peschard 2014). While the UPOV convention was updated in 1991, Bolivia has remained a party to the less restrictive 1978 UPOV Convention which, among other important distinctions, requires signatory countries to maintain the right for farmers to save seeds for on-farm use.

The UPOV system is largely responsible for the proliferation of patent-like protection for plants on a global scale. Granting exclusive distribution rights to applicants who can prove their varieties are sufficiently new, distinct, uniform, and stable, plant breeder’s rights (PBRs) under

the UPOV has been criticized for enabling the widespread dispossession and privatization of genetic material from the communities who have stewarded it for generations (Otero 2008). PBRs are designed to restrict farmers' ability to freely save and share or sell seeds through informal systems. A company or breeder, when successfully granted rights, has exclusive power to decide how a variety for which they hold the PBR for can be distributed, even when that variety arguably builds upon genetic material created over generations by farmers (Louwaars 2005). Intellectual property laws like the PBR system under UPOV have played a significant role in the commodification and corporatization of seed (Kuyek 2007), as well as the resulting loss in agrobiodiversity on a global scale (IPBES 2019).

In addition to the threats posed by intellectual property rights, laws governing the certification of seeds also contribute to the criminalization of informal seed systems through cumbersome, expensive, and inaccessible certification processes (Wattne 2016). While IPR laws have been very damaging in their theft of Indigenous seed knowledge and their conversion of open-source plant germplasm into saleable commodities, their impact remains isolated in the formal seed sector where people regularly rely on purchased seed. Clauses like farmers' privilege have protected farmers' rights to save their own seed (Mooney 2011), even if it restricts them from sharing or selling it. But the informal seed sector – that is, the trading, saving, and even sale of seed outside of regulated market spaces (Schöley and Padmanabhan 2017; Wynberg et al. 2015) – represents an untapped market for large seed companies looking to expand their reach into countries where the informal seed system still dominates the majority of seed activity. In order to tap into that new market, it becomes necessary to erode informal seed systems by lobbying for laws and regulations that make informal seed practices illegal (Wattne 2016). Though these laws may seem purely technical, the introduction of mandatory certification regimes, and the push to standardize seeds for quality assurance, are power moves that require farmers to shift their practices as they must adapt to externally-set standards of practice and align their work with the expectations developed for industrial agriculture.

In 2009, the Bolivian government passed the Norma General sobre Semillas de Especies Agrícolas (Regulations on Seeds from Agricultural Species) which outlined the country's certification and fiscalization procedures aligned with global trade norms. The Norma emphasizes that key to Bolivia's food security is ensuring that farmers avoid the introduction or distribution of diseases on their plots. According to the regulations, which provide directives for

the INIAF, unregistered varieties cannot be trusted due to the fact that they have not been inspected by the institution tasked with phytosanitary regulation. Therefore, according to the regulations, they pose a threat to food security. Technically, the Norma imposes obligatory certification on all seed species distributed in the country, though this is poorly enforced (Balcazar 2018). Anyone who produces, imports, transports, stores, sells, gifts, or distributes seeds in any way must submit their practices to certification and fiscalization procedures. These procedures include years of field inspections and lab analysis to ensure seeds are being grown in a “suitable” environment for seed production. Also under the Norma, and in accordance with UPOV 1978, unregistered seed can only be saved for *uso propio*, or on-farm use – no sharing, trading, or selling is permitted. Returning to the seed police pamphlet from the Seed Congress registration table (see Figure 2.1), anyone who is caught selling unregistered seed that should, under the regulations, be sold as grain for food only, could face legal consequences. Furthermore, anyone seeking to replant their seed under the terms of *uso propio* is supposed to seek prior authorization from the INIAF, signing a document that indicates their seed will not be shared with anyone else.⁵ In 2014, regulations stipulating the consequences of failing to comply with the Norma were released that institute sanctions and establish fines for anyone who commercializes seeds that haven’t been certified under the terms of the INIAF. Failure to comply can result in fines of up to 3000 bolivianos (over 400 USD) plus 10% of the value of the product. The seed in question can also be destroyed at the discretion of the authorities.

The Norma and the UPOV convention on which it is based could easily be interpreted as a simple set of phytosanitary regulations designed to protect farmers from sowing poor quality seed and ensuring the integrity of the seed market in Bolivia. However, in reality, it imposes a set of rules on farmers that are impossible for smallholders to comply with and threatens their inherent right to continue to steward their own collective-managed seed systems on their own terms, protected under the United Nations Declaration on the Rights of Peasants. But more than that, it imposes a hierarchy on seeds. The ‘uncleanliness’ of peasant-stewarded seed, which is all anyone grew for generations before intellectual property concerns became widespread, is no longer deemed acceptable. Under the terms of the law, farmer-bred and stewarded seed is understood to be a threat to national food security, despite the fact that only 3% of potatoes

⁵ This regulation seems to be widely ignored, but it remains on the books.

grown in Bolivia currently come from certified seed (Escobar 2014; Zeballos et al. 2009). In this way, a hierarchized system of seed classification reflecting the same racialized models of classification and hierarchization made possible under colonial modernity is made law. These kinds of systems make the pursuit of a plural economy where many models of seed can fit impossible to legally pursue. They make a *diálogo de saberes* nothing but empty words because peasant seed systems are necessarily subsumed under the dominant model.

In an interview with a departmental director of the INIAF who was familiar with the local context where I was working, I was struck by his reaction at the end of our interview when we were chatting about my next steps for the research. I mentioned the small community I was collaborating with to document values and practices around seed saving and seed diversity and he said, “Ah yes, Laderas. But people who live there don’t know much about seeds”. Curious to clarify what he was implying, I asked him what he meant and he replied:

The only material that can be called seed according to the national law of Bolivia is material that has passed through the process of certification. Our Norma states that you can’t call it a seed if it doesn’t comply with the requirements established under this norm.⁶

This idea of what constitutes a quality seed, or even a seed at all, represents a major conflict of worldviews. The idea that the only trustworthy seed is one that has gone through a certification process full of administrative and biophysical barriers to entry, especially for campesino and Indigenous farmers, is fundamentally at odds with the idea of a genuine *diálogo de saberes*. The Norma’s definition of a seed leaves no room for multiple ways of knowing to co-exist, making it impossible for community-directed food systems that lie at the heart of food sovereignty to flourish. The next vignette offers insights into community priorities around seed.

Vignette #3: The erosion of campesino autonomy

On an afternoon in December, just as the rainy season was starting to rear its head, I was planting potatoes with Doña Mariela. Her grandson skillfully directed the oxen to plow deep trenches in the soil while she filled her bucket with potatoes and followed after the oxen, dropping tubers along the trench to be buried again as the oxen returned down the field. Doña Mariela is an older

⁶ Kaitlyn Duthie-Kannikkatt, Interview with INIAF director, January 11th, 2018. Ciudad de Tarija, Tarija, Bolivia. Translated by the author.

woman who was born and raised in Laderas. In the decades she has lived there, she has seen a lot of changes in the community over time: a new school has been built, roads that make it easier to get to town have been constructed, there is relatively reliable bus service, and most homes have electricity and easy access to water. It's a different world in many ways than when she was a child. But despite easier access to markets, the technical training programs that have been made available to her, and other factors that might encourage her to change the way her seed system is managed, Doña Mariela maintains that there are certain things she doesn't want to compromise on. As we take a water break after sowing, we talk a bit about what is important to her in how she manages her relationship with seeds:

Ideally, I would always choose to select seeds and try to take care of our own seed – see that it doesn't get too diseased, really look at it. If ever we bring seed here from elsewhere, we often end up losing a lot of it—it doesn't germinate— or the harvest doesn't taste good to us. We lost our *trigo* (wheat) seed after a bad harvest a couple years ago, and the new seed we got from the market didn't make a very good tasting wheat – the flour came out coffee-coloured. You have to really ask “where did this come from” to trust it. That's what we've had to do here as we've lost our varieties – be really careful about asking where it comes from and then taking care of it for as long as possible. I still have my grandparents' maize, but other things like potato and wheat, we have lost that and need to source it carefully. We need to *really know* our dear seeds.⁷

This relationship that Doña Mariela speaks of with her seeds is something that does not seem to surface in the state's discourse on food sovereignty. But it is fundamental to how people in Laderas talk about what they grow and why. Despite the threats people face due to environmental changes, the arrival of pests that are difficult to manage, and changes in rainfall patterns, there is still a lot of seed diversity in the community.

Threats to on-farm agrobiodiversity have been examined thoroughly in the literature (Zimmerer 2014; Brush 2013; Montenegro de Wit 2016; Baker et al. 2013; Shiva 2007; Nazarea 2006). There are many pressures on farmers in both the North and South to change their production systems in order to focus on fewer crops and fewer varieties of crops, including the drive towards export-oriented agriculture, the promotion of green revolution technologies, policy shaped around promoting 'improved' cultivars and engendering of distrust in traditional varieties

⁷ Kaitlyn Duthie-Kannikkatt, interview with Doña Mariela, December 3rd, 2017. Translated by the author.

upon which farmers have long depended (Patel 2013). These pressures also exist in Bolivia, despite its rhetorical support for food sovereignty. But in Laderas, prioritizing diversity and local seed adapted to local growing conditions are still central values by which people manage their agricultural systems.

What do those diverse systems look like? What could they look like with more support? As part of this research, I conducted a preliminary survey of 28 families in the campesino community of Laderas Norte in the province of Cercado in Tarija, Bolivia, exploring their on-farm agrobiodiversity and sources of seed. Laderas Norte is located on the hillsides that border the Central Valley of Tarija, in the subcentral of San Agustín. A particularly dry part of the range, water is a limiting factor for many families in the community. While a limited number of families have access to irrigation all year round thanks to their proximity to springs, the majority – especially those who primarily cultivate at lower altitudes – depend on temporal rainfall to meet their production needs.

Table 2.2 Crop varieties and access to water

	Average number of crop varieties grown in 2017
Families with year-round access to water	49
Families who extend the rainy season with water storage	36
Families dependent on rain-fed agriculture	22

The results of the survey indicated that those with more access to water are able to plant a wider diversity of crops. After discussing their level of access to irrigation, participants were asked to identify from a series of photos which crops they had planted over the course of the last growing year, as well as various perennials such as fruit trees

and herbs. We then identified the number of varieties of each plant that had been sown, and the source of the seed for each variety (see Table 1). Among those surveyed with access to plentiful water all year round, an average of 49 crop varieties were identified by participants (ranging between 35 and 68). Among those with access to limited water for most of the year, an average of 36 crops were sown over the course of the last growing year (between 28 and 59). Among those who were able to sow only during the rainy season, we identified an average of 22 crop varieties (between 4 and 45).

In addition to the diversity of crops, there is also an overlap in access to good irrigation and ability to save traditional seeds. While most participants identified saving some varieties as important to them, many who grow under conditions of temporality have been unable to see enough production to justify regular seed saving. Insufficient water often means that crops will fail to produce well enough to save seed for sowing the following year. Many varieties of traditional seeds that were long saved in the community have disappeared because of a particularly poor rainfall year, or a particularly prolific pest infestation. For many families in the community, traditional varieties of quinoa, amaranth, tomatoes, potatoes, and corn have all suffered such a fate, and have had to be replaced by varieties from other communities, or varieties from the market.

When farmers are unable to save seed themselves, they have two options. The first is to seek out seed from family members and neighbours, in their community or in neighbouring communities. Many in Laderas Norte opt for this route wherever possible, recognizing that seed that has been saved from their zone is often well adapted to the region and more likely to produce a quality product. But there are barriers to being able to access community-saved seed. Many families only save enough to replant themselves, especially if their harvests shrunk due to increasingly common drought conditions. The second option, then, is to purchase seed from the market in the city, from *agroquimicos* selling certified seed, or from small scale seed vendors. Being able to purchase seed from the market is often important to campesino farmers as it allows people to innovate and try new crops that they can then choose to save themselves, or to purchase more. But buying seed at the market can have its drawbacks as well. For example, many participants identified issues with having purchased poor quality potato seed, and that it can be difficult to verify the quality of a seed until it comes time to plant. Even purchasing certified seed can present problems, particularly when the seed is not well adapted to the challenging climatic conditions of the community. It is usually very costly and may require expensive chemical inputs in order for it to grow well. None of the research participants were very enthusiastic about their use of chemicals to grow food, seeing it as a necessary evil due to the increasingly difficult growing conditions facing the community. One woman remarked:

Now, the pests are so bad, I have to use pesticides from the city. But the more chemicals arrived in the community, the worse the *plagas* have gotten...Before, we only knew organic fertilizers – it was all natural, from the goats, chickens, cows. And then there was the fertilizers from the mountains – made of vegetation and herbs from the mountains,

that's what we knew before. Not like now. The natural fertilizers are best, of course, and some people grow their crops using more than I do – but with the *plagas* – they're just everywhere. You can't avoid the stuff.⁸

Participants often identified certain older varieties as being tastier, better adapted to the growing conditions of the community, and requiring fewer chemical inputs for a bountiful harvest. But in cases where these traditional varieties have been lost, there has been no effort on the part of agricultural authorities in the department to support farmers in recuperating them, or in identifying characteristics that they valued so as to develop new varieties that might suit their changing needs. All seed programs take a training and capacity-building approach, bringing seeds developed in far-away breeding stations into the community, 'teaching' people how best to cultivate these new seeds, and then leaving. The result has been that many participants see these new varieties and the colonial knowledge systems needed to grow them as superior to their own. Overtime, such a dynamic will undoubtedly result in a reduction of varietal diversity, at local and regional levels, putting campesino and Indigenous agricultural systems at further risk and wasting a valuable opportunity to support farmers in cultivating the biodiverse systems that will help them be more resilient in the face of ever-changing climates and unstable markets.

This issue of on-farm seed diversity is important because part of the narrative of food sovereignty at the state-level has included an enthusiastic recognition that biodiversity is one of Bolivia's greatest assets. But thinking about how diversity is measured and valued is critical and reveals important contradictions influencing policy choices about conservation approaches. When biodiversity is only seen as an economic asset, then the most important reason for conserving it is for future scientific innovation in a lab, divorced from the reality of smallholder farmers who have different priorities for their seeds (Dempsey 2018). Conversely, if diversity is understood to be a tool that supports farm resilience, that is critical to the *tejido* woven as sociocultural and ecological communities co-create each other (Paredes and Guzmán 2017), then storing genetic resources away in a bank becomes significantly less important than supporting farmers in recovering and adapting the varieties that are meaningful to them, for their nutritional, cultural, or ecological qualities.

⁸ Kaitlyn Duthie-Kannikkatt, Interview with participant, October 28th, 2017. Translated by the author.

Failing to support small-scale farmers in cultivating on-farm diversity obscures valid critiques of the narrative of biodiversity loss (Montenegro de Wit 2017). When we impose a biodiversity loss narrative as a blanket characterization of ecosystems worldwide, we fail to acknowledge how the cultivation of diversity is dynamic and forever ongoing. Loss is not permanent, especially at the local level, and farmers have agency in creating new diversity as well as stewarding existing diversity (Frison and Coolsaet 2019; Fowler 2013; Mooney 2011; Montenegro de Wit 2019; Didur 2003).

Montenegro de Wit (2017) explores the discourses of diversity loss and the kind of conservation systems that have emerged to address the crisis narrative. She is concerned that market-based interests advancing a narrative of loss conveniently legitimize the extraction of seeds from traditional farmers and Indigenous communities:

“On the basis of farmers being unable—or unwilling—to maintain diversity in living landscapes, the obvious solution is to rescue seed by shepherding it away, to the safety of centralized gene banks. Intentionally or not, accounts of alarming genetic erosion may then undercut efforts to foster living (‘in vivo’) farming systems in which people make their livelihoods and landraces continually to adapt to changing socio-ecological conditions.” (Montenegro de Wit 2016, 631)

Unfortunately, programs like the seed potato program establish a dynamic in which farmers are the recipients of expert technical knowledge, rather than knowledge co-producers with generations of experience behind them. This further entrenches the problematic crisis narrative that diversity needs saving and farmers are ill-equipped to handle the problem.

There are programs that have been really successful in supporting farmers to meet their own goals and work towards cultivating resilience on their own terms. One example is *Programa Solidario Comunal* or PROSOL, a redistribution mechanism fought for and won by campesino organizers in Tarija that redirects profits from the nationalized natural gas industry in Tarija to campesino communities for direct distribution to their members (Vacaflores Rivero 2016)⁹.

⁹ PROSOL is a program funded through the department of Tarija that has made varying amounts of funds available to campesino and Indigenous farming families to improve their agricultural production using autonomously-defined methods. Some have used the funds to rent machinery to habilitate new lands. Others have invested in irrigation systems over the course of several years. PROSOL continues in 2017 after much debate, though with drastically reduced levels of funds. See Vacaflores 2016 for more information about PROSOL.

Exact funds differ from year to year, but in 2021, 543 communities were slated to receive 41 million bolivianos (just under 6 million USD in October 2021) (El País 2021). With those funds some have been able to construct irrigation systems, bringing water down from the hillsides into the lower zones through a system of tubes to their newly habilitated plots. Doña Mariela and her husband constructed a pump to access more reliable access to water even when the rains slowed. It allowed them to become more resilient in the face of changing weather patterns that continue to affect Laderas Norte in major ways. PROSOL represents an innovative natural resource rent redistribution mechanism that centers Indigenous sovereignty, recognizing that those best positioned to make decisions about their production systems are families themselves. The program is the only one of its kind in the country. While it has been criticized for poor implementation¹⁰, campesino communities continue to advocate for an expansion of the program and support the idea of redistributing profits from a nationalized resource to support meaningful community food sovereignty initiatives.

Campesino political organizations in Tarija are no strangers to advancing alternative conceptions for dominant rural development models. They have long advocated for the redirection of public investment into campesino autonomy. They are self-organized and have proven to be the most effective means of achieving and sustaining genuine, farmer-led rural development (Lizárraga Aranibar 2014; Vacaflores Rivero 2009). But dominant rural development models in Bolivia, as we have seen with the seed potato program, are aimed at investing in specialized production of agricultural products with a high market value. Campesino farmers have always linked to local markets and feeding one's family and broader community is part of most people's way of life. But when the only form of state support available to help campesino communities thrive and meet their food sovereignty goals is opportunities for specialization and market integration, therein lies a persistent colonial development model that has contributed to the dispossession of campesino and Indigenous communities in Bolivia since before the 1952 revolution.

¹⁰ In October 2021, campesino unions staged a blockade in the city to protest the slow transfer of PROSOL funds to beneficiary families – these kinds of hold ups are common every year and put communities in a position of having to fight for what is rightfully theirs year after year (El País 2021).

Discussion

Bolivia is, of course, far from alone in its capitalist orientation towards seed and seed conservation. But it makes for an interesting case for analysing the tensions at play in this discourse, and how advocates for capitalist agriculture have aligned to manipulate conservation discourse to suit their interests. The nature of the food sovereignty movement is that it is highly diverse (Wittman, Desmarais, and Wiebe 2010), but can totalizing visions of food sovereignty that centre national self-sufficiency and economic prosperity co-exist alongside visions that centre community autonomy? How does capitalist agriculture deploy narratives around food sovereignty to advance their quest to dominate the sector and push out smallholders in favour of further accumulation of land and wealth? What collection of regional, national, and international forces have conspired to produce a systematic seed policy that devalues the work of campesino and Indigenous farmers who feed 80% of the country in favour of an export oriented agricultural model and an agrobiodiversity conservation strategy that aligns with it? What could community visions for conservation as well as food and seed sovereignty look like?

The evolution of the legal ecosystem for seed in Bolivia demonstrates a systemic effort to undermine seed stewarded within the campesino and Indigenous farming systems. Under the guise of protecting farmers from potential plant ailments, the government has facilitated the entry of corporate seed oligarchies into the market while criminalizing farmer seed systems. While it may be true that these systems are very poorly enforced, if at all, it is not inconceivable that a day might come where enforcement would be a priority. If and when that day comes, the legal foundation will already exist for the extinguishment of farmer seed systems. This hierarchization of seed at play in Bolivia represents a stark example of the persistent structures of coloniality that still bear power in Bolivia's political system, even after the emergence of the hard-won plurinational state. It is evident that while the notion of a *diálogo de saberes* might be a discursive priority within the department of the INIAF and within the country's approach to agricultural policy more broadly, a true and meaningful *diálogo*, where different ways of knowing and relating to seeds are valued equally, is not possible given the intentional efforts to criminalize farmer-saved seed and promote the falsity that it is inferior.

The tensions in enacting food and seed sovereignty in Bolivia are rooted in a persistent framework of coloniality within agricultural policy. The same drivers of agrarian capitalism and the green revolution that have exerted sizeable influence over the government's strategic

approach to agriculture since before the 1952 agrarian revolution continue to influence the discourse over what constitutes a worthwhile investment for food sovereignty, even after the election of the MAS. While some meaningful changes occurred under land reform in the 50s and again in the 90s, they failed to coincide with a shift towards resource redistribution and community sovereignty. It has proven difficult to break from the logic of colonial modernity in which western science is seen as superior to Indigenous ways of knowing and being.

Eddens (2019) explores how Indigenous maize from Mexico is having its genomes mined to develop a disease-resistant maize for Africa using gene-editing techniques. This same maize was collected by American scientists who travelled to Mexico upwards of 75 years ago to collect seed samples and distribute them to American seed companies for further plant development. This experimentation would eventually form the genetic backbone for the Green Revolution. It is no coincidence that the same scientific and economic forces that sought to transform global agricultural systems by scaling up a vision for monocultural, large-scale, technologically-driven, and environmentally problematic food production also appropriated the genetic material that would inform their pursuits from the very Indigenous communities whose agricultural systems they seek to devalue. Eddens (2019) refers to this phenomenon as “white science”, drawing attention to the racial logics that underpin colonial modernity in agricultural systems. Using such a logic, Indigenous knowledge systems and the seeds they nurture only become valuable once they are integrated into a capitalist chain of production rooted in a Eurocentric ontology that demands uniformity and scalability.

Programs purportedly designed to support small-scale producers and contribute to the national food sovereignty agenda insist upon a market-centred approach that integrates campesino producers into capitalist value chains associated with export-oriented industries like large-scale monocultural potato seed production. Agricultural elites, who amassed capital and power through unfair or failed land redistribution efforts in the mid 20th century, continue to exert influence over the trajectory of agricultural policy in the country. That policy trajectory uncritically adopts the rules and regulations outlined by UPOV, consequently imposing a seed regulatory system that devalues the immense contributions of small-scale farmers and makes it more difficult for them to feed their communities and steward diversity as they have for generations. Without challenging the power of agricultural elites and the global hegemony of the

UPOV system, the logic of “white science” will continue to inform seed policy in Bolivia in the same way it did prior to the Green Revolution.

Building a world where many worlds fit (borrowed from the Zapatista movement) is possible (Escobar 2018). Now that Bolivia has declared that food sovereignty is a major pillar of the constitution, it is clear that there is appetite for meaningful change that centres the self-determination of Indigenous and campesino communities. But a policy framework that continues to frame certified seed as the only ‘quality seed’ while pushing for an administratively burdensome variety registration program as the path to sustainable and secure seed systems is incompatible with food sovereignty. Framing agrobiodiversity conservation as worthwhile only as a means of stockpiling genetic resources for future lab-based innovation is incompatible with seed sovereignty. Analyzing the development of the seed policy trajectory in Bolivia makes it increasingly obvious that state and community approaches to food and seed sovereignty are fundamentally at odds with one another, rather than in dialogue as is suggested by state discourse.

Initiatives like the seed potato program purport to support producers but, in practice, do little to contribute to community food sovereignty. While they may provide limited income support for those who meet the exacting standards for certification within the formal seed system, the reality is that many will continue to be neglected by this form of “support”. As people in Laderas Norte and other campesino leaders in the region have made clear, their main barriers to building the kinds of food and seed systems they want are not insufficient opportunities to expand their access to markets but rather improving access to water so they can continue to grow the varieties that matter to them; the varieties that they depend on to carry on their cultural food traditions and to remain adaptive to a changing climate. Meaningful supports could include investing in the kinds of infrastructure supports that communities are demanding and further redistributing economic resources so that campesino and Indigenous communities can meet their own goals on their own terms. It could involve ensuring that the next generation has access to land and water to continue to farm if they so choose. It could involve expanding programs like PROSOL that recognize resource rents from industries like the natural gas sector belong to the people, and that families and communities are best positioned to know their own needs and invest those kinds of resources appropriately. Instead, the state is funnelling small-scale farmers into production channels that centre the service of industrial agriculture instead of community

seed and food sovereignty. Through a combination of internal pressure from capitalist agriculture interests in the *media luna* region and international pressures from private governance entities like UPOV aligned with major global trade actors, Bolivia is neglecting understandings of food sovereignty and conservation that centre community visions in favour of a nationalist vision that serves only the elite.

Conclusion

To overcome colonial domination, there is a need to support the thriving of alternative ways of being rooted in campesino and Indigenous lifeways. These kinds of visions should reflect the articulated needs of marginalized groups rather than the needs of the globalized market. A true *diálogo de saberes* in Bolivia is possible. Social movement actors continue to draw on frameworks like the plural economy to express hope that many ways of being can co-exist. Many ways of cultivating food and seed systems can co-exist. But the dominance of colonial modern thinking within the agricultural system, as evidenced by the state's support for the formal seed system at the expense of community seed systems, makes the dream of a multiplicity of worlds impossible to realize. If the definition of a seed under the Norma General includes only those seeds that have successfully navigated a burdensome certification process, then the multiplicity of traits those seeds hold for people who steward them are drowned out by their commodity value. The challenge of decoloniality is to find ways to hold space for those multiple ways of knowing and being and to build societal structures that can encourage the flourishing of plurinationalism rather than conformity to a singular, limited system of governance.

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Preamble to Chapter 3

Chapter 3 responds to the research question:

(a) How are seeds and plant genetic material situated in the value system of local and indigenous communities in the region of Tarija? (b) How are political, economic, and cultural values shaping and shaped by people's seeds and plant genetic material? (c) How are these values articulated across gender and generational differences?

Given the ongoing persistence of the neoliberal project in Bolivia as outlined in Chapter 2, Chapter 3 explores how people construct bricolages of seed sovereignty by making do with the tools available to them. It highlights the importance of drawing attention to those actions as critical expressions of seed sovereignty, particularly in times of environmental change and socio-political difficulty. The friction generated through the encounter of multiple ways of knowing and being empowers communities to respond to precarity and change with persistence and creativity.

Chapter 3 sets the stage for a deeper exploration in Chapter 4 around the role biocultural design can play in providing a process that allows for creative inter-epistemic collaboration across cultures in pursuance of community goals. Design can be one of the tools communities may utilize in order to enhance their autonomy, in addition to practices explored in the following chapter such as revitalizing their trading networks, organizing for traditional foods in a school setting, and advocating for increased campesino autonomy in the political sphere.

Chapter 3 - Sowing resistance in Tarija, Bolivia: Exploring practices of seed sovereignty in peri-capitalist spaces

Introduction

Seeds play a critical role in the agrarian landscape. For the global movement of peasant farmers, La Via Campesina, “seeds are a vessel that carries the past, the accumulated vision, and knowledge and practices of peasant and farming communities worldwide”(La Via Campesina 2013). Through seed saving, exchange networks, and land-based experimentation with new varietal development, Indigenous and campesino communities are stewards and cultivators of agrobiodiversity. At the same time, they face increasing threats to their work as providers of food for their communities and as stewards of agrobiodiversity. Climate change has altered rainfall patterns, resulting in shorter seasons and the emergence of new crop pests (Fabricant 2013; IPCC 2001; Masson-Delmotte et al. 2019). Urbanization and the diminishing availability of arable land in rural areas has increased pressure on young people to seek work outside of their communities (Andrews-Swann 2013; Zimmerer 2014). Dietary shifts have decreased demand for certain native varieties of some crops, encouraging farmers to switch to varieties that will sell well, even if they are less resilient. Corporate domination of the seed world has made it difficult for some farmers to access seed at affordable prices, even in the ancestral homelands of that seed (Kuyek 2007; Roy 2015; Silva Garzón and Gutiérrez Escobar 2020).

In a small campesino community near the city of Tarija, Bolivia, people continue to work their families’ acreages as a source of sustenance and income. People’s relationships with the land are strong; the challenges that come with environmental and economic change have not changed that, and in some cases have even strengthened these relationships. For generations, community members have used ancestral seed passed down to them by their parents and grandparents before them. Corn and potato especially fundamental to their way of life, providing the basis for human and animal diets. But in the last few decades, the ways in which people source and manage their seeds have changed substantially. Many varieties that were once common in the community have been lost due to the arrival of unfamiliar pests and diseases. A lack of rainfall has also impacted people’s ability to seed save as crops do not produce the way they once did when the rains were plentiful and reliable. Campesino farmers often told me that “*la semilla se cansa*”. The seed gets tired more easily.

Losing access to ancestral seed means that many have shifted their principal sources of seed to accommodate new realities. But even as ancestral varieties become less common and more difficult to steward, people continue to assert autonomy in the management of their seed systems in ways that are profound and innovative. These practices remain undertheorized as a form of seed sovereignty. As travel and transportation have become easier, networks for sourcing seeds from trusted friends and business partners have expanded. As youth leave the community in search of alternatives to the agrarian lifestyle, or more productive land, they return for family visits with new seeds or plants in hand to try. Farmers find new ways of looking for quality assurance when they source seed at local markets. Community residents invest time in passing on culinary traditions that depend on traditional seed varieties so that the youth will be able to steward these traditions into the future. As small-scale farmers in the Global South are challenged by climate change, capitalist enclosure, and other shifts in the political landscape to which they must adapt their practices, it is important to make visible the ways in which seed sovereignty persists in the context of stark environmental and social change.

Much of the literature on seed and food sovereignty to emerge in the past 30 years has (rightly) centred the narratives of seed activists working tirelessly to defend their ancestral varieties against corporate genetic theft and contamination (Peschard and Randeria 2020; Mooney 2011). Some discussion of ‘quieter’ forms of seed activism are emerging that understand embodied practice as crucial to enacting seed sovereignty (Pottinger 2017; Visser et al. 2015; Nizam and Yenal 2020). But seed sovereignty practices enacted out of necessity and compelled by environmental and social change can also constitute a form of creative and innovative resistance.

This chapter considers how seed sovereignty is practiced in the context of environmental and social upheaval and argues that discourses of seed sovereignty can and should become more inclusive of practices emerging on the margins of change. I explore expressions of seed sovereignty in a campesino community outside of the City of Tarija in southern Bolivia to understand the mechanisms by which local communities continue to cultivate resilience and autonomy even when ties to ancestral seed have been harmed or severed through colonialism, capitalism, and climate change. I begin with an overview of seed sovereignty as a discourse within food sovereignty. I then draw upon Tsing’s (2004; 2015) work to centre the actions of farmers to access seeds and increase their autonomy in response to the changing environmental

and economic context, exploring how this work generates friction and cultivates seed sovereignty in ways that are important to make visible. I then return to describe our case study in Tarija, highlighting how the resistance work of campesino farmers in the community of Laderas Norte can inform and deepen our understanding of seed and food sovereignty.

Seed sovereignty: resisting enclosure and protecting agrobiodiversity

The food sovereignty movement unites highly diverse peoples, ideas, localities, and contexts in a common struggle for more just food systems. Emerging from local struggles, and articulated by La Via Campesina (2007), food sovereignty interrogates power relations within the food system while advancing more democratic and participatory control over those systems (Wittman, Desmarais, and Wiebe 2010). It has also acted as a frame of analysis for understanding the increasing influence of neoliberal capitalism in the food system and for making visible resistance to those dynamics (McMichael 2014).

Seed sovereignty has emerged in parallel to articulate the unique conditions under which seeds have been subjected to capitalist enclosure within the contemporary food system and bring to light the efforts of producers and their allies committed to resisting that enclosure. Farmers and gardeners have saved seed for as long as domesticated food production has been with us. Small-scale and Indigenous farmers in particular have led the charge in protecting heritage seed varieties and conserving agrobiodiversity (Nazarea, Rhoades, and Andrews-Swann 2013; Grey and Patel 2015).

Seeds, themselves, also resist enclosure by their very nature as biophysical entities with the innate capacity to reproduce using only inputs that are naturally available (Silva Garzón and Gutiérrez Escobar 2020; Montenegro de Wit 2017a). But biological advances in plant genetics and breeding (Montenegro de Wit 2019; Otero 2008), coupled with an overhaul of the legal infrastructure governing the use and movement of seeds (Wattmeh 2016), represent concerted efforts to enclose seeds. Once enclosed, seeds are transformed into scientifically produced private market commodities, severing their relationship with the growers who steward them and becoming alienated from the commons with which they were previously interwoven (Lyon, Friedmann, and Wittman 2021; Silva Garzón and Gutiérrez Escobar 2020). This process, which has intensified over the last fifty years due to advances in genetic engineering, dispossesses local communities of the seeds they adapted over millennia through their labour, creativity, and

relationship with the land (Kloppenburger 2010; Lyon, Friedmann, and Wittman 2021; Shiva 2007). The enclosure of seed, and more generally the processes of colonization that have worked to separate people from their lands, has resulted in staggering losses in global agrobiodiversity. While farmers and farm communities the world over continue to resist the monocultural logic of capitalism (Montenegro de Wit 2016; Shiva 2014), most empirical accounts point to a dire situation as we are losing crop diversity conserved *in situ* at alarming rates (FAO 2010; IPBES 2019; Pautasso et al. 2013; Pimbert 2018; Zimmerer 2014). Since the 1900s, the FAO estimates that we have lost nearly 75 percent of plant genetic diversity as farmers worldwide have shifted from growing primarily local varieties and landraces to more genetically uniform crops designed to be higher yielding (FAO 1999; 1997).

The concept of seed sovereignty has been articulated by communities who believe that continuing to define, control, and assert their own seed systems is critical to their survival, despite the contemporary challenges of industrial agriculture. Whereas state-centric narratives of seed sovereignty might emphasize sufficient national supply, building seed export capacity for key crops, germplasm banking and scientific development, community seed sovereignty calls attention to the role of farmers in conserving and creating diversity through relationships with place (i.e., *in situ* seed conservation). Living in relationships with growers embedded in cultural landscapes frees the seed to adapt to the changing environments of which they are a part (Graddy 2014; Montenegro de Wit 2017b; Nazarea 2006). While we should be wary of narratives that deploy biodiversity as a collection of resources for future extraction (Dempsey 2016; Montenegro de Wit 2019), the conservation of biodiversity *in situ* is critical for planetary resilience in the face of climate change and represents an important piece of asserting diverse community visions for seed sovereignty.

Resistance to the enclosure of seeds and plant genetic material for corporate profit has been ongoing since these threats were first posed. Pat Mooney (2011) explores how civil society activists drew attention to the increasing restrictions on the saving, sharing, and trading of seed several years before there was a broad-based global movement for seed sovereignty. These efforts coalesced around the idea of Farmers' Rights in the early 1980s. Farmers' Rights were proposed as an alternative legal framework for protecting the right of producers to continue to freely save, use, and exchange seed uninhibited by intellectual property claims (Peschard and Randeria 2020). These initial successes laid the groundwork for more wins in the international

legal sphere as NGOs and other social movement actors, including La Via Campesina and its network of regional organizations, gained a seat at the international policy-making table (Claeys 2015a; 2015b; Desmarais 2007; Peschard and Randeria 2020; Wittman, Desmarais, and Wiebe 2010). Alongside this work anti-GMO activists deploy advocacy strategies around labelling on the consumer end, which reduces the threat GMO crops pose to local varieties and farmer autonomy on the producer end (Eaton 2009; Gupta 2015; Peschard and Randeria 2020; Roy 2015). Seed sovereignty has become a concern for a diverse set of actors involved in grassroots action and political advocacy in both regional and international policy forums.

At the grassroots, diverse initiatives are saving, trading and selecting seeds and in doing so conserving and creating agrobiodiversity at local and regional scales. Seed exchange fairs and community events like Seedy Sundays (Pottinger 2017) engage mostly urban gardeners in the practice of seed sovereignty. Traditional recipe contests provide an avenue for communities wishing to keep traditional seed varieties alive and relevant (Shukla and Sinclair 2010). Regional networks find innovative ways of facilitating inter-community seed exchange through the use of locally-controlled seed banks (Duthie-Kannikkatt et al. 2019; Vernooij et al. 2020). Farmers subversively appropriate “improved” varieties designed to work well with synthetic fertilizers and adapt them to local conditions, creating new *criollo* varieties (Gutiérrez Escobar 2017; Müller 2020). These kinds of initiatives form the foundational practice of seed sovereignty as something lived and ever evolving.

Practicing resistance amidst persistent threats

In the global sphere, advocacy around seed sovereignty emphasizes the need to protect producer autonomy to save, store, breed, exchange, and sell seeds outside of the control of corporate actors. This work is critically important and has been instrumental in safeguarding producer rights and farmer seed systems amidst the rising threat of monopolistic corporate control. At times, however, this framing of seed sovereignty can neglect the reality of many small-scale producers whose systems reflect more of a bricolage, or, a strategy for innovating by ‘making do’ with the constrained resources to which one has access (Phillimore et al. 2016). Whereas some seed sovereignty literature has highlighted cases where farmers and their allies rise up to defend their own well-articulated visions for food systems autonomy, actions undertaken by

farmers can be more diverse and are shaped by numerous everyday factors (Figueroa 2015; Mullaney 2014).

Farmers tend to be resourceful and will undertake a diversity of actions to continue farming despite constrained resources and uncertainty due to environmental and socio-political changes that they don't control. These actions are co-created through the friction (Tsing 2004) created as community visions of seed sovereignty, the reality of environmental change, policy priorities, market opportunities, embedded traditional knowledge, individual agency, and countless other factors interact within a particular socio-cultural context. If local seed diversity has diminished, or fast changing environmental conditions challenge local varieties' aptitude for adaptation, farmers make choices about what to do given the unique set of constraints and opportunities they face. As small farmers make choices about how to best manage their seed systems within what Tsing (2015) refers to as the "ruins of capitalism", it is important to situate these choices and remain attentive to how everyday forms of seed sovereignty remain possible and present even amidst challenging political and environmental contexts.

One way of framing this is by thinking about seeds and the farmers that steward them as part of peri-capitalist food system assemblages (Tsing 2015, 23). Seed management systems emerge as small farmers negotiate relationships within their own farming system and with the broader networks of which they are a part. These everyday acts of negotiation and resistance to external pressures that are outside of their control lead to emergent assemblages that constitute a kind of seed sovereignty bricolage rather than a pre-articulated political strategy. These dynamic assemblages allow them to grow crops, adapt to their environment, trade with their neighbours, and move crops between their own farming system and external markets. They live simultaneously within and outside of the larger capitalist food system.

When small scale farmers produce crops, those crops are not necessarily part of the capitalist value chain once the seed goes in the ground. Seeds may be saved or gifted or traded within farmer networks. Once the seed is planted, it may go on to produce crops destined for household use, whose use value is prioritized over its exchange value. Or if a crop becomes surplus, a farmer may decide to take it to market and sell it, either to a distributor or directly to a consumer (van der Ploeg 2014; 2018). But if the crop enters a capitalist value chain, its value is being salvaged from processes that exist outside of capitalism, including a farmer's connection with the land, soil, and seed. Tsing (2015) refers to this process as salvage accumulation. Peasant

farming is a peri-capitalist site that exists both within capitalism and outside of it. While not quite post-capitalist (Gibson-Graham 2006), centering these relationships and experiences demonstrates that capitalism does not have authority over all aspects of life and that multiple ways of being co-exist in economic space. Capitalist and non-capitalist forms of economic activity interact in peri-capitalist spaces.

One emerging lens for understanding how people pursue self-determination while coping with systemic oppression and environmental upheaval is the notion of *buen sobrevivir*, or good survival (Fash, Vásquez Rivera, and Sojob 2022). *Buen vivir*, meaning ‘to live well’, emerged in as a paradigm for articulating alternatives to development rooted in Indigenous cosmologies of the South (Villalba 2013; Kothari, Demaria, and Acosta 2014; González and Vázquez 2015; Acosta 2015). Its use in Bolivia signaled a will to move beyond ‘development’ – a ‘Western hegemonic discourse rooted in ideologies of growth, capital accumulation, and exploitation of nature’ (Ranta 2016, 427) – and towards locally rooted alternatives that reflects Indigenous ontologies and epistemologies. Fash et al. (2022) contend that while *buen vivir* has been useful as a unifying lens for social movements resisting colonialism from their own unique vantage points, it overemphasizes a utopian vision for decoloniality while failing to acknowledge the ways in which communities are constrained by real and difficult circumstances related to climate change and oppression. It has also been co-opted by leftist governments unwilling or unable to disrupt colonial extractivist paradigms of economic and political organization (Caria and Domínguez 2016; Webber 2017; Gudynas 2016). Shifting the goal post towards the idea of *buen sobrevivir* may be a more realistic encompassing of the product of local communities’ creativity, dreams, and ontologies that does not neglect the realities of living under capitalism.

This dimension of how seed systems operate rings true for many peasant farmers in the Global South who must contend with socio-economic upheaval and environmental change. But a farmer’s decision to integrate seed derived from a capitalist value chain into their agricultural system does not mean they cannot continue to practice seed sovereignty in ways that are more hidden or underexplored. In the midst of environmental and economic change, farmers find ways to continue to live out their values and steward their relationships with seeds. It is critical that we understand these everyday practices and integrate them into our theorization of seed sovereignty.

Case Study: Laderas Norte

We now turn to present the everyday practices that small farmers in one community in the Tarija valley of southern Bolivia employ as they navigate this in-between space to create their own version of seed sovereignty and persist in a rapidly changing economic and environmental context. We begin by providing an overview of our case study and the methods utilized in this research. This is followed by a discussion of our findings, exploring how farmers work to build a seed system that reflects their aspirations while navigating a changing context and ‘making do’ (Phillimore et al. 2016). We then draw upon these results to consider what seed sovereignty is for farmers in Laderas Norte and the implications of this work for our understanding of food and seed sovereignty more broadly.

Community overview

Laderas Norte is a small campesino community on the outskirts of the city of Tarija, located in the central valley of the department of Tarija, one of the Bolivia’s southern-most provinces bordering Argentina. Some 90 households are registered in the community, though many residents spend the majority of their time in the city, working in other areas of the country, or in Argentina. All residents of the community are smallholder farmers, with most cultivating between 1 and 5 hectares of land, often scattered across multiple communities within the *subcentral*.¹¹ A small number of families cultivate up to 10 hectares. While a few families have access to irrigated water throughout the year (n=3), most people practice rain-fed agriculture with varying access to rain-dependent irrigation¹² to supplement natural rainfall. Corn is a key crop for the community, representing a source of sustenance for families and for their animal flocks (cattle, goats, and sheep). Potatoes are also an important part of the traditional diet for the community, though most people have lost access to ancestral potato seed due to pests and diseases (see below). Some families cultivate small gardens of vegetables and fruits, but this usually represents a much smaller portion of their cultivated space. All families in the

¹¹ The *subcentral* refers to the collection of campesino communities that share a regional governance council. Laderas Norte falls within the Subcentral Campesina de San Agustín, which includes 5 communities total (Cristalinas, Alto Potreros, Laderas Central, San Agustín Sur, and Laderas Norte) (Vacaflores 2011).

¹² Rain-dependent irrigation can include dug pools (with or without liners to prevent ground-seepage), gas-powered pumps, canals, etc.

community cultivate their crops for sustenance, for themselves and their animals. Most also bring surplus produce to the city of Tarija to sell at the Campesino Market.

Laderas Norte is also home to a small school going up to grade 8 and a community hall. Until about 30 years ago, there were few working roads in the community, making it fairly isolated. But in late 1980s and into the early 90s, rural roads were constructed that made getting in and out of the community to access goods, services, and markets in the city much easier. Now, there is a public transportation route that passes through the community twice a week, allowing those residents without their own transportation to take produce to market or visit loved ones in town. In addition to the public bus, the school van driver supplements transportation options by taking people into town on weekdays. Residents' access to the city is better than ever. While people mostly regard these as positive developments, some attribute the increase in problems with pests and diseases to increased access to the city; more people were able to easily obtain chemical pesticides and fertilizers, and the increased presence of these in the community has made the pest problem much worse.

Methods

Between 2017 and 2018, I spent about 11 months in the Central Valley region, splitting time between Laderas Norte and the city of Tarija. Using critical ethnography (Lassiter 2005; Madison 2005; Venkatesh 2013) as a method of inquiry, I spent time with residents of the community and relied on a combination of household surveys about seed use and seed sourcing (n=29), life history interviews (n=13), and participant observation. Life history interviews were conducted over 1 to 3 sessions, each lasting between 45 minutes and 1.5 hours with participants who were willing to share a bit more about how life had changed for them over the course of their lifetimes, including personal histories around the kinds of crops and varieties their families cultivated when they were younger and their perceptions of why those had shifted. I also interviewed several policy figures (n=8), including officials associated with the seed certifying authority in Bolivia, academics, campesino union leadership, and NGOs to understand more about policy approaches to seed governance taken at different levels of government and perspectives on how these affect small scale campesino farmers in the department. This research project and its methodological approach were collaboratively conceived by myself, members of a local NGO with decades of experience and relationship working with Laderas Norte, and

members of the community itself. In a spirit of collaboration and *convivencia*, I became involved in the office of the local NGO and supported their various ongoing initiatives when time and resources allowed.

Friction produced in global encounter

Expanded opportunities for global encounter have impacted Laderas Norte in specific ways, producing new conditions of life in the community and new expressions of autonomy.

Improvements to transportation routes have made accessing markets and marketed goods much simpler, allowing many to earn extra income from surplus agricultural products. Ease of access to city markets has also had an impact on the kinds of foods people consume. Many dishes now include noodles, flours, broths, and non-local produce options which have become more accessible since getting to the city became a 45-minute trip on a dependable bus route, rather than several hours of walking and/or an expensive cab ride. Young people have better access to education opportunities once they age out of the local school at age 14 – with many family members having migrated to urban areas, it is not uncommon for teenage youth to stay with an aunt or an older sibling while completing their high school education in the city of Tarija.

With these improvements to access, transportation, and education have also come some hardships. The impacts of climate change are becoming more and more evident with every passing growing season. Often, the only solutions on offer to the difficulties faced by campesino farmers are market-based, prioritizing entry into capitalist value chains over local values and environmental relationships. This is not to say that people are helpless in the face of these external pressures, but rather to demonstrate how environmental and economic change impact people's relationships with the land. It is important to consider these changes in order to understand how they produce particular forms of resistance.

We know that the bulk of emissions leading to severe and irreversible climate change come from the industrialization and consumption patterns of the Global North (IPCC 2018). Yet the Global South, including countries like Bolivia, will be dealing with the brunt of the burden of climate change impacts. Some of these impacts have already begun to show themselves, including in Tarija, where the rainy season has gotten shorter and shorter, starting later and later every year. When asked about the challenges they face in continuing to pursue a land-based agrarian lifestyle, almost everyone cites the lack of water in the community. Most families have

always depended on seasonal rains for most of their crop production. But in recent years, seasonal rains have started later and later into the season and sometimes fail to arrive at all, greatly impacting what people are able to grow and harvest. For instance, one woman talked about losing an ancestral wheat variety she used to grow:

There used to be a little wheat variety I would grow – it was delicious, it was never hairy – just beautiful. You could put it in soup – just boil it a little bit and it would thicken up. [...] But I lost that one too, now I have to buy it if I want to grow it. So we haven't sown wheat in at least three years. It's not worth it if the rainfall is lacking.

In addition to repeated drought, agricultural pest problems have become more severe. Even those who dislike chemical pesticides find themselves turning to them, with fewer organic options that can control the spread of new or more severe pests and diseases. One participant voiced the disconnect she feels between the way her family used to farm and the practices she has had to resort to using in order to ensure her crops can be harvested:

When my grandparents were farming, they really knew what they were doing. They knew to cover the corn harvest with cow hides [to keep the pests from eating the corn]. Same with the potato – and it would always come out clean, free of pests and disease. Then around 1980, the pests started to appear, but even then it wasn't as bad as it is now – now it is way too much. Now, everyone uses pesticides from the city, but the more we use, the worse the problem gets.

If a crop does well enough to harvest, residents often reported difficulties with storing any seed they are able to glean from the harvest. Pests get into storage bins and make the seed nearly unusable by the time the next planting cycle begins, unless you are able to afford highly specialized storage equipment. One community member notes:

Before, if you took the leaves off the corn, it would stay nice and clean. Now, it's not like that. You harvest the corn, store it, and then a month later it's full of gorgojos (weevils).

These climate change impacts and their effect on seed sovereignty is not politically neutral. In fact, analysis in the community points to the ways in which development and consumption can be linked to reducing the reliability of water flow to the community:

After 1990, there was a big drought. The small springs and creeks had been drying up for a while, but that one really affected us. Then, some of the projects were just starting – in my experience, and as elders have told me, some of those projects affected the water. Cement does not like water, so that’s why the water got depleted. That’s what I was told – I don’t know how, and I don’t know if you will believe me, but that’s what they have said and that’s what I’ve experienced. That’s the history of those years – everything changed. The rules changed.

In the late 1970s, the San Jacinto dam was constructed in a township neighbouring Laderas Norte. The dam was built in part to secure water access to industrial agricultural producers in the municipality, as well as to allow for commercial and residential urban expansion. In recent decades, this has included large-scale vineyards, which have exploded as the department of Tarija began to invest in its image as a centre for wine production (Turner and Davidson-Hunt 2016). Expanding vineyard production has been identified as a priority under the department’s regional development plan as it generates substantial income for the region and supports the cultivation of the Central Valley’s image as a travel destination for Bolivians (and increasingly international travellers) interested in gastronomic tourism. But while the dam secured water access for industry and urbanites, small-scale producers who practice seasonal rain-fed agriculture are struggling with drastic reductions in rainfall. Growing enough to support your family, let alone taking any produce to market, is difficult without access to water. And for young people who would otherwise want to stay in the community and continue to work as producers, it often forces them to make the difficult decision to leave. One community member who sits on the local council said:

Here in Laderas, we still need water, and I don’t know when the day will come that we can have a good flow of water. Until then, we won’t solve the problem of out-migration. I have six children but none of them have been able to stay here because of the lack of water. If there was more water like down there with the San Jacinto area, you’d have water to generate work every day and harvest every day, which generates more and more resources. But water is the barrier. If we had a good flow of water, I believe no one would want to leave – in fact, I think our work force would grow.

When farmers lack reliable access to water and must rely on the market for seeds, a new set of difficulties comes with that reliance. One participant noted the difficulties involved in making certified seed purchased at market financially feasible:

Some prefer to buy certified seed. But because you have to purchase it at a high cost, you have to put more into making sure it produces so your investment pays off. That means buying chemicals, etc. This year alone, certified potato seed was at 300 bolivianos per quintal, which will get you maybe two 80m rows. So if you want to plant a quarter hectare, you have to invest a lot of money. On the other hand, I use the “discard” potatoes, those that aren’t good enough for consumption – for peas, for potatoes – and with a quintal of that seed, I can put in a half a hectare. So for me, certified seed just isn’t worth the cost.

Lower levels of rainfall and increases in agricultural pests are making it more and more difficult to succeed as a small-scale farmer without adequate resources for inputs and infrastructure. Some have been able to supplement rainfall with investments in water pumps, water storage ponds, or more efficient irrigation systems. But even those require the benefit of proximity to relatively reliable streams and supplemental income. Until resources are put into supporting the community in accessing an alternative water source, as has been done for the more industrialized farming areas of the region, it will be difficult for young people who want to continue farming to make it work, let alone having a strong enough harvest every year to make saving one’s own seed tenable.

Campesino farmers must also contend with shifting public policy priorities that increasingly place a strong emphasis on market integration and commercialization. Despite its progressive rhetoric at the national level, the MAS government has had difficulty breaking from the country’s dependence on extractivist industries, including agrarian extractivism (Cockburn 2014; Francescone 2012; Gudynas 2013; McKay 2017; Villalba 2013). This extractivist orientation pervades the regional level as well, with departments like Tarija focusing their rural development strategies on increasing opportunities for campesino farmers to participate in gourmet food markets and, increasingly, export-oriented production (Turner and Davidson-Hunt 2016). Since the mid-2000s, the department of Tarija, together with capital-endowed private enterprise coalitions, has been promoting a rural territorial development strategy designed to

integrate small and medium-size producers into larger competitive value chains, with the aim of enhancing the competitiveness of the region in tourism and gourmet food markets (Turner, Davidson-Hunt, and Hudson 2018). Building on this strategy, agricultural extension agencies are shifting their program priorities to initiatives that build farmer capacity to grow seed and crops for larger national and international markets.

One of the programs that recently became available to residents of Laderas Norte is a seed potato program. The seed potato program was established as part of a national effort to increase the amount of seed produced nationally to meet national food sovereignty objectives.¹³ It equips farmers living in desirable climate zones with training to grow seed potato destined for large scale industrial farmers in other parts of the country (mainly in Santa Cruz) and for export. Registering as a producer with the program involves having a technical engineer come and test your soil and eventually, if all goes well, registering and certifying your seed for sale in the formal sector if the seed is sufficiently uniform, distinct, and stable.

Thus far in Laderas Norte there has been little uptake - only a couple of households have participated and see it as more of an experiment at this time. One of the participants in the program told me:

You can get a lot more money for selling certified seed – that’s what the engineer told us. He said if it comes out stable enough to certify, we can get up to 700 bolivianos per quintal. If it isn’t very stable but it’s still clean, we can get 300-400 bolivianos for one quintal. But if the pest problem my neighbour has, for instance, gets in there, we have to totally reject the production. So for now, we’re just planting this small plot as a test to see how it goes.

But in other communities, including their neighbour Laderas Central, uptake has been growing steadily and many families have converted substantial swaths of their arable land to potato seed production.

Farmers make choices about what to grow based on a variety of factors and integrating potato seed production into one’s system could be a great option for many. But the fact that government support programs available to small-scale farmers now are focused on integrating them into value chains designed to support large-scale industrial farming elsewhere in the

¹³ See Chapter X for more information on the seed potato program and on seed potato classification schemes for the formal seed sector in Bolivia.

country is a substantial shift away from a policy ethic focused on cultivating community food and seed sovereignty. A national orientation towards food sovereignty should work to design programs that support farmer autonomy in designing a productive system that works best for their needs; instead, the seed potato program offers incentives only to farmers willing to commodify their production and enter into a chain that supports a vision for state-led and state-focused food sovereignty (Cockburn 2014). It discounts the ways in which small-scale campesino farmers have, for generations, cultivated self-sustaining integrated food systems to feed their households, communities, and neighbouring urban centres and downplays the importance of supporting those systems for community food sovereignty.

These environmental and economic changes are the result of dynamics that are outside of the control of small-scale farmers in the region. But in responding to change, farmers become part of new kinds of assemblages where everyday acts of resistance allow them to cultivate seed sovereignty in unexpected ways. Being attentive to these bricolages creates space for finding ways to support campesino farmers when they are constrained by environmental and economic shifts.

Resistance

Climate change is not going to abate any time soon, and support for accessing water seems like a distant dream. While the national government continues to promote a vision for food sovereignty that focuses on supporting large-scale industry and export-oriented seed markets, small-scale food systems are struggling. But through everyday acts of resistance, community members of Laderas Norte are cultivating their own seed sovereignty bricolage.

Trading networks

One way people have begun to adapt to the changing production conditions in the community is through strengthening their trade networks and creatively sourcing new seeds and plants. Trading has always played an important role in campesino life and livelihoods (Ellen and Platten 2011; Levidow, Pimbert, and Vanloqueren 2014; Pautasso et al. 2013). These networks sustain informal seed systems while providing opportunities for people to try out new varieties, find new markets for their seed, integrate new kinds of plants into their systems, and adapt seed varieties to changing growing conditions (Almekinders and Louwaars 1999; Schöley and Padmanabhan

2017; Song, Zhang, and Vernoooy 2006). In Laderas Norte, while young people are out-migrating from the community at faster rates due to the lack of available water for cultivating alongside their families, many participants spoke of how many new kinds of seeds or plants arrive in the community from young people coming back to visit from wherever they have moved and bringing with them plants and seeds from that area to try.

I was offered strawberry plants by some project many years ago, but I didn't take it then. But last year my daughter brought me a cutting from her strawberry plant in Santa Ana, so I thought I would try it out. They taste nice and if you can protect them from birds they're easy to grow.

In addition to new seeds and plants from returning youth, people talked about how they have worked to cultivate relationships with seed vendors from other regions whose quality they can trust. In the absence of being able to save your own seed due to difficult growing conditions, sustaining relationships built on trust can also help enhance the resilience of your system. People feel safer knowing that the seed they are planting was treated with care and that the vendor from whom they purchase can be relied upon to keep delivering a quality product year after year. Another participant spoke about her process for determining whether she will purchase seed from a vendor:

When we bring seed from outside, we're more likely to lose the harvest. You go to the market, you see a bag of seed and it's cheap, you bring it here, and then suddenly you've brought in a disease. You have to really check – where is it coming from? Does that place have healthy seed? Sometimes it is hard to tell...I now go back to the same person from Villazón every year because my seed has been producing better since I connected with her.

These kinds of relationships existed before this period of environmental change. Cabero (2004) writes about the role of *agarradoras*, or women who facilitate market interactions between seed buyers and sellers, in the neighbouring municipality of Yesera. These relationships have taken on a different quality in a time of precarity, with producers in Laderas Norte relying on seed vendors for more of their crop production every year. Many spoke about seasons during which they experienced major crop failures because the seed they obtained was not well adapted,

or was full of pests. When you have less of your own reliable seed to form the basis of your productive system, you need to rely on your networks instead. In this way, relationships form a key part of seed sovereignty in a context of precarity and change.

Campesino food systems have always been innovative, with farmers constantly experimenting to see what kinds of crops will work best with their system, how to adapt to changing tastes and climate conditions, or how to improve their infrastructure to meet their needs. Trading networks play a role in helping people continue to innovate and exercise creativity in shaping their food systems.

Traditional foods

In addition to cultivating strong, trusting trade relationships, people assert seed sovereignty through small, everyday acts like maintaining traditional recipes. As Shukla et al. (2010) discuss, when people find ways to keep traditional dishes alive, they often feel a sense of cultural pride and ancestral connection. Teaching traditional recipes to youth and maintaining that cultural connection also holds an important connection to seed sovereignty. For many people in Laderas Norte, traditional dishes are not the same without particular crop varieties that hold a special place in the heart of the community. For example, one participant discussed the importance of selecting the right corn varieties to make *chicha* – a traditional fermented corn beverage often made for celebrations:

I know that for most people in the region, sustaining that tradition of saving local seed is important. Because for us, many of our traditional dishes depend on that traditional seed. Changing the seed changes the taste. For example, we have maíz rojizo here in Tarija which people use to make chicha. With this variety, the chicha comes out tasting really good. With improved seed, we've seen that they try to make a better final product – bigger in size, maybe better quality – but the taste really isn't the same.

Without ancestral corn varieties, these dishes don't taste quite right to those who grew up eating them. Under conditions where people are losing access to the seed their grandparents saved, ensuring that knowledge about traditional recipes is passed on to the youth becomes even more pressing – otherwise the drive to reclaim those varieties might be lost forever.

One example of this dynamic playing out in Laderas Norte is through the lunch program at the local school. In 2015, the parent council came together and decided that the kinds of foods that were being served as part of the school lunch program were not sustaining their children in the ways they felt most appropriate. With little time for cooking and few resources afforded to them, the teachers prepared quick foods like *milanesa*, hamburgers, french fries, and similar dishes that require little prep time and little cooking skill. The parents in the community decided to come together to address what they felt was a gap in the program through collective action. Volunteers signed up to prepare traditional dishes for the students on a daily basis. Usually, two mothers arrive at the school in the morning and get to work preparing food for the 40-50 students enrolled at the school. There are enough volunteers that the mothers are generally responsible for cooking once every few weeks. The teachers are enthusiastic about the program and the parents are thrilled that the students can be well nourished every day they attend school.

Since the program began, they have since expanded to including traditional dishes in the curriculum so that students not only get to eat the meals but also learn to prepare them. For example, in October of 2017, the school hosted a festival of traditional foods where the three different classes were paired up with three sets of volunteer parents to learn different dishes. Older students took on more complicated recipes while younger ones focused on simpler dishes. Each group documented the ingredients required, including specific vegetable varieties like which corn was best with which soup. Then they invited the whole community to come and try the dishes they had made, offering up plates free of charge as a celebration that everyone had contributed to. Students were so enthusiastic about the festival that they did another version a couple months later during which the students took even more of a leading role selecting dishes and directing each other in the best cooking methods for each.

Efforts like this represent an everyday act of resistance when your autonomy is under threat. It builds an interest among the youth in the community's way of life that cannot be erased. Many expressed hope that programs like this would encourage the youth to take an interest in the community and its traditions so that when they are older, they will still be invested in growing that specific kind of corn you need to make the best *chicha* or the best *chirriada*. While it is difficult to know what the outcome of these kinds of efforts will be, there is value in continuing to pass down knowledge and attempts to generate interest among the youth, seeing what

emerges. By working with these foods and sharing knowledge about the seeds that produce them, the community can sit with the uncertainty inherent in such a project and see what emerges.

Campesino municipality: the struggle for political autonomy

Another dimension of seed sovereignty that seems under analyzed is the way in which people need to build autonomy in other aspects of their lives in order to build the kind of seed systems that reflect their own worldviews. In Laderas Norte, one of the ways this is happening is through the struggle for a campesino municipality.

Laderas Norte and other campesino communities that encircle the perimeter of the city of Tarija fall under the jurisdiction of the urban municipality. This means that resources allocated to rural households are controlled by a municipal council for which the majority of representatives reside in urban areas. This has resulted in a disproportionate funding arrangement that favours the urban populace over the rural. While rural producers struggle with a lack of access to water and resulting outmigration, the urban populace benefit from an unequal allocation of resources.

In an effort to address this dynamic, campesino communities began advocating for a separate campesino municipality starting in 2015. One campesino union leader noted:

[With the campesino municipality], we're working towards direct representation for our concerns while also planting big ideas like the creation of a new territorial unit to address the discrimination we live with the capital city of Tarija every day. [...] Different projects that are priorities for campesino communities have been frozen at the departmental level for years – particularly water and other infrastructure pieces. We think this is the best way to invest in solutions that work for us so we can address problems holistically.

Campesino communities have existing governance structures that allow for robust and direct democracy on this issue. Local councils consult with households directly and then vote on whether to support a proposed initiative. Communities in the region voted overwhelmingly in favour of a motion to campaign for a separate campesino municipality through the regional campesino union.

Since the vote, people have been mobilizing to make this municipality a reality. In August of 2017, the campesino union held a huge and very well attended rally in support of a

separate campesino municipality at the junction of highways heading into the city. Speakers from every community spoke to why the initiative was important to them and how more autonomy over land and resources would positively impact their community. They'd have more money per capita to invest in additional production infrastructure. They could team up with other campesino communities to split costs on major infrastructure projects like roads or extensive water pipe networks. For now, this initiative remains held up in political limbo, as current municipal authorities are fighting the fissure of their land base that such a split would represent.

A campesino municipality in Tarija represents a key aspect of fighting for food and seed sovereignty because without autonomy over resources, building the kind of food and seed systems that work best for your community will be a constant struggle against those with power. These kinds of advocacy efforts, while not directly related to seed systems, represent a critical step in the struggle for seed sovereignty. Communities playing this long game are not often talked about as actors in the seed sovereignty literature, but especially as we head into a time of increased precarity and the dissolution of rural producer rights, we need to pay attention to and support these kinds of struggles that attend to long-term planning.

Discussion

The friction created as community members of Laderas Norte resist environmental, economic and political change that affects their control over their seed systems produces bricolages that support community efforts to cultivate seed sovereignty. As a result of climate change, coupled with the push for large-scale, industry driven agriculture in the *media luna* region of Bolivia and a lack of support for small scale peasant farmers, people's relationships with seeds have undergone a substantial transformation. For a community that used to grow exclusively its own seeds that had been stewarded for generations in healthy soil by well-practiced hands, this transformation has produced challenges that are difficult to overcome. In an environmental and economic climate where access to water is increasingly in jeopardy, and where the only incentive programs one can access are the programs designed to match demand for varieties that work best on an industrial scale, sometimes one needs to shift one's methods of production to accommodate a new reality. One's relationship with ancestral seed varieties is not static.

But just as one makes changes to adapt their growing system to new realities of global encounter, people continue to engage in resistance to dynamics that clash with their community

values. Campesino farmers in Laderas Norte, by and large, recognize the strength in stewarding their own seed and reducing their reliance on commercial markets to sustain their way of life. So, they take steps to work towards building autonomy under a system attempting to undermine it. They form new assemblages that might make space for new opportunities to cultivate seed sovereignty. In Laderas Norte, that has entailed rekindling or strengthening seed exchange networks rooted in trusting relationships with other producers rather than in the invisible hand of the market. It has meant continuing to pass down to future generations the knowledge of and appreciation for your culinary cultural traditions and the crop varieties they depend on. And it has meant fighting for increased access to resources and increased autonomy over how those resources are utilized by mobilizing for a campesino municipality.

In this way, the community of Laderas Norte and their relationships with seed exist in a peri-capitalist space where life exists outside of capitalist processes while simultaneously being exploited by them. Seed sovereignty represents an assertion of strength, drawing upon the accumulated knowledge of generations of campesino farmers continuing to centre the importance of healthy relationships with land, soil, and seeds. But the value of this strength is extracted under salvage accumulation, whereby the accumulation and reinvestment of capital depends on salvaging exchangeable value from non-capitalist ways of being. When a farmer grows an ear of corn, it is grown as an act of faith that that corn will sustain their family through another season, will feed their animals when pasture is no longer lush in the winter months, and produce enough to supply the farmer with a crop of seed for the coming season. All of this takes place outside of the capitalist space and the exchange value of that corn is meaningless relative to its use value to the farmer. If seed is obtained from the market because one's ancestral corn has been unable to thrive in new environmental conditions, or if a farmer integrates certified seed production into their system as a means of supplementing income, then their farming system exists in a kind of peri-capitalist space. In this space, one's pursuit of seed sovereignty does not disappear, but it may change shape as new adaptations are integrated into their system. As it changes shape, new assemblages and opportunities emerge out of these processes leading to what I have referred to as a seed sovereignty bricolage. These bricolages represent opportunities to experiment with *buen sobrevivir*, or surviving well, by actively building worlds that reflect one's values while recognizing that this world-building does not take place in a utopian vacuum untouched by environmental and political oppression. Especially as the world heads into an era

of increasing uncertainty around climate change and how it will impact agricultural systems across the globe, it is critical that these kinds of everyday actions undertaken by communities to prepare for the challenges that lie ahead be integrated into the discourse of seed and food sovereignty.

Tsing (2015) asserts that we need to be attentive to the places where life emerges in the ruins of capitalism. Indigenous and campesino peoples continue to fight in defence of territory and dignity (Concheiro 2020). These struggles are critical and are part of the construction of new worlds that reflect the visions and dreams of people on the margins. In the midst of ongoing struggle, people find ways to navigate change and assert their autonomy. Sometimes the results of that process are unexpected. As climate change worsens and capitalism continues to promote conditions of exploitation in rural areas, we need to find ways to talk about how seed sovereignty can continue to be cultivated under the immense pressure of social and environmental change.

This in-between space represents an undertheorized space for seed sovereignty. Small-scale farmers work every day to maintain control over their seeds, navigating the spaces between capitalist and non-capitalist worlds. Necessarily, efforts to assert seed sovereignty look different according to how threats to seed sovereignty have manifested in their communities. Where access to traditional seed varieties has been compromised by a combination of pests, inadequate access to land and water, and a lack of support from governments and other institutions, these rapidly changing conditions produce new and creative assemblages. Networks that may have gone dormant are reactivated and expanded, utilizing the increasing ease of travel and transportation to carry new and adapted plant varieties across greater distances. Parents find new ways to pass down knowledge about traditional foods on to the next generation, advocating for menu changes at the local school and using their power to influence the school food curriculum. Struggles for seed sovereignty become intertwined with broader struggles for campesino autonomy, ensuring that productive resources will be accessible to and controlled by the communities that need them well into the future. Some of these actions represent more of a bricolage than a coordinated, strategically planned fight for a well-articulated vision for community seed sovereignty. But laying that ground work is critical work, even if the finish line is unknowable given the speed at which conditions are changing. As the case study of Laderas Norte demonstrates, people are resisting seed enclosures in a myriad of ways as local actors find ways to assert seed sovereignty according to their own ways of knowing and their own capacities

for resistance. People are seeding sovereignty in unique ways on the margins of capitalism, and it is important to understand these dynamics so that they can be supported.

Seed has always been a dynamic force in the lives of small-scale farmers. People cultivate relationships with their seeds over generations, knowing that an investment in seed is an investment in the health and well-being of one's community. Losing access to those varieties is devastating. Communities that have lost access to many of their ancestral seed varieties are, rightly, devastated and trying to find the best path forward with the tools and capacities that they have. But their seed stories are, despite these immense challenges, stories of resilience and dynamism. Other communities continue to steward similar varieties to those cultivated by people in Laderas Norte. The national seed bank in Bolivia is home to thousands of varieties, some of which are no longer grown in situ. With the right supports, those seeds could thrive in small peasant farming communities once again, adapting to thrive in new conditions in relationship with the farmers who know them intimately. Many communities have begun to advocate for seed re-matriation to begin a new era where communities that had lost access to their seeds through the violence of colonialism are growing them once again, asserting their seed sovereignty after years of those seed relationships lying dormant (White 2020). Understanding seed sovereignty from the lens of assemblages helps us begin to appreciate the hope that lies in being attentive to the ways in which the friction produced in global encounter produces new energy.

Conclusion

Struggles for seed and food sovereignty have existed for a long time, challenging the capitalist domination of our agricultural systems while asserting community visions for autonomous food production and consumption that is rooted in local values. Centering the stories and experiences of producers on the front lines of those struggles is imperative. In our effort to center those stories, we must not neglect the spaces where people have been forced to adapt their growing system under immense environmental, economic, and political pressures. The struggle for seed sovereignty can still exist in peri-capitalist spaces. It can exist anywhere people continue to value seeds as something more than an exchangeable good. In Laderas Norte, I have argued that everyday efforts to maintain and expand exchange networks rooted in trusting relationships, commitments to passing on culinary traditions to the next generations, and fights for more political autonomy are integral parts of a seed sovereignty bricolage that contributes to the

broader struggle of food sovereignty in the context of environmental and political change. Even as relationships with seeds shift amidst the friction produced in global encounter, emergent relationships still exist. An attentiveness to these efforts and their role in the broader, more global struggle for seed sovereignty is critical as we collectively enter this moment of great transformation.

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Preamble to Chapter 4

Chapter 4 explores the research question:

What can a design process contribute to building seed sovereignty in local and indigenous communities?

Building on the expression of everyday acts of resistance in response to environmental and socio-political change as explored in Chapter 3, Chapter 4 explores how people can use design practice as a tool to support them in exercising agency in the cultivation of seed sovereignty.

Biocultural design articulates a process whereby intentional action can be taken collectively to pursue community goals. Cultivating a design practice can constitute a collective process for articulating and realizing political goals. This case study explores how a collective group of people coming from different epistemic traditions came together to support the promotion of traditional foods in various urban and rural spaces, supporting the leadership of campesino women in carrying forward and continuing to innovate regional food traditions.

Design is highlighted here as a set of tools that can be used to overcome the limitations of quiet or non-explicit activism. Unlike forms of quiet / non-explicit activism that focus on individual action in resistance to hegemonic political forces, design necessarily involves collective organizing in pursuit of community goals. But that organizing takes shape around engagement with biocultural materials like plants and foods as an embodied process of collective world building.

This chapter draws on design theory to highlight some of the ways in which decolonial world building can and is taking place in the pursuit of more socially and environmentally just food systems at the local level. It presents a case study of a mobile museum to stir conversations around collective action towards decoloniality.

Chapter 4 - Making *chirriadas* together: Inter-epistemic collaboration for community autonomy

Introduction

Around the world, communities are rising up to question the colonial paradigm. They are asserting the value and validity of local and Indigenous ways of knowing and, in that process, positing a challenge to the notion of a Eurocentric epistemological default. This conversation is growing within the field of design studies as calls for inter-epistemic collaboration in pursuit of community autonomy get louder and louder. In this chapter we review the recent literature regarding autonomous design and illustrate how such demands are manifesting in a case from Tarija, Bolivia. First, let's set that scene.

On a sunny Saturday in the small historical city of Tarija, Bolivia, Doña Anamaria¹⁴, a campesina¹⁵ woman from the rural outskirts of town, is conducting a workshop at the Tambo fair – an annual celebration of local cuisine organized by the municipal government. In a structure designed to resemble a classic campesino kitchen, she models how to pour out the batter for the chirriada – a local corn-based snack comparable to a thick, sweet crêpe – on her stone cooking surface. She is surrounded by chefs and caterers that have travelled to the fair from across the country to show off their own talents, now gathered to watch and learn how this delicacy is made by a true expert. After watching the demonstration, one by one the professionals attempt to pour out the batter in the spiraling style of Doña Anamaria, to wait until the batter begins to bubble, and then to flip the chirriada with a skillful flick of a large knife, slid underneath the rapidly browning surface. She makes it look easy. But chef after chef see the chirriada crumble in their hands, break apart under the knife, flip inconsistently onto the raw side. Doña Anamaria giggles, as do the chefs, as their years of professional experience still have not quite prepared them to connect with the chirriada in the way that the Doña can.

¹⁴ Names have been changed to protect anonymity

¹⁵ The Spanish word for peasant farmer, understood to be an Original People in the Bolivian context

The interaction described here came about as part of a design prototype co-developed by Jaina, a local community research institute and advocacy organization, and people from the campesino community Laderas Norte. As part of Jaina's campesino gastronomic heritage program, together they developed a *museo en movimiento*, a sort of living museum that would provide a space for *campesina* women to teach traditional food preparation workshops while earning some extra income and asserting their power as keepers of ancestral foods. In this moment, albeit giggly, we¹⁶ see how a design collaboration has produced an opportunity for resistance. Doña Anamaria subverts the conventional culinary dynamic at play in Bolivia and, indeed, most of the world, in which the everyday cooking knowledge and skills of Indigenous and campesino women are undervalued in favour of those who have trained in the best schools and worked in the best restaurants. For all of the praise we heap upon celebrity chefs, they are not the ones generally responsible for the daily work of putting food on the dinner table. And yet, the flavours and techniques perfected by (mostly) women in order to meet the everyday needs of their families and themselves are at best reduced to a mere curiosity and at worst pillaged or appropriated as a result of this colonial power dynamic. Culinary appropriation is yet another example of how Indigenous knowledge is packaged and profited off of by the global elite. Through her interaction with these chefs, Doña Anamaria demonstrates that the foundational knowledge upon which the culinary elite have built their success exists because of her and her ancestors; her people continue to carry this cooking tradition into the contemporary world. She shows them and all observers present that her skills, her knowledge, her food, and her connection to the land that produced it will not be erased and that she demands to be recognized for what has always been her work.

Design scholars are becoming more attentive to the possibilities of decoupling design from ongoing processes of colonial modernity (Escobar 2018b). Bringing design practice into tension with this conceptual work is necessary to move from theory to action. Design studies, for a long time, has been understood as a technical practice to be carried out by trained “design professionals” (Fry 2018). It has been activated in the colonial effort to supplant local

¹⁶ I use the term ‘we’ throughout the chapter to convey that, while these reflections are my own, they are rooted in and informed by conversations and analysis co-developed by the team of design collaborators. I am grateful for the knowledge shared by all throughout this process and wish to ensure that the collective generation of learnings from this process is communicated clearly.

knowledges and histories with a singular, Eurocentric, global design for modernity (Mignolo 2000). Some design theorists and practitioners, as well as allied scholars from adjacent fields such as anthropology (Escobar 2018b; Fry 2017; Manzini 2015; Onafuwa 2018; Schultz et al. 2018), are working to de-centre design from the domain of colonial modernity and re-situate it within the process of making worlds in which all communities and peoples are engaged. Out of this work, a framework for autonomous design is emerging that springs out of community and societal struggles to defend land and lifeways from the destruction wrought by neoliberal globalization. It does not advocate for an autonomy in the liberal, individualist sense of the word, but rather for a radical communal *autonomía*¹⁷ that makes space for communities to practice the design of themselves.

This kind of design necessarily takes place in the borderlands (Kalantidou and Fry 2014; Mignolo 2000) where the encounter of multiple ways of knowing and being causes friction (Tsing 2004) and produces new energies, entanglements, and arrangements among diverse human and non-human actors, materials and places (Ingold 2011; Akama, Light, and Kamihiro 2020). Escobar (2018b) asserts that “at its best, *autonomía* is a theory and practice of inter-existence and inter-being, a design for the pluriverse” (p. 144). Situating this kind of encounter of diverse ontologies and epistemologies within a broader decolonial project requires that we understand how inter-epistemic collaboration in a design context can be carried out in support of community autonomy. In this chapter, we reflect upon the *museo en movimiento* as collective action emerging out of place-based, collaborative relationships amongst diverse actors and materials. In reflecting upon the practice of design we highlight how the goal of community autonomy was centred and in doing so produces new opportunities for resistance and solidarity. We begin with a discussion of some critiques from Latin America levelled against colonial modernity as a global design and examine how these inform the emergent field of critical design studies and its drive to create space for pluriversal openings. We then return to the case study from Tarija, exploring how a design practice weaves together biocultural relationships through inter-epistemic collaboration producing novel and transformative opportunities for community

¹⁷ The notion of *autonomía* comes out of Latin American Indigenous and campesino movements advocating for self-determination. Going beyond Western notions of autonomy that call to mind independence and self-sufficiency, *autonomia* approaches self-determination within a framework of interdependence (Nelson and Braun 2017; Escobar 2018b)

autonomy. Finally, we speculate about the implications for the urgent work of decolonizing design spurred by this experience, including the potential for biocultural design (Davidson-Hunt et al. 2012) to play a role in that work.

Towards a decolonial design

Critical design scholars are working to identify how design has played a role in the domination and subalternization of non-Western knowledges, lifeways, and territories throughout the Global South. Much of this work has been made possible through the dialogue emerging between design studies and fields like anthropology or critical development studies, led in particular by scholars ontologically positioned in the South (Blaser 2014; Escobar 2008; Mignolo 2000; Quijano 2010; Walsh 2010b). For this reason, it makes sense to begin our discussion by understanding the critiques of modernity that underpin this nascent but growing space (Akama, Hagen, and Whaanga-Schollum 2019) within design studies. Here we focus on one of the more radical of these critiques of modernity that emerged out of Latin America, then explore how it informs emergent critical design literatures.

Colonial modernity as a global design

During the rise of neoliberalism in the 1980s and 90s, many Latin American movements and scholars saw the need to interrogate the political and economic shifts of the day through a lens of colonial modernity. The Modernity/Coloniality/Decoloniality (MCD) project emerged as a frame for understanding and interpreting these dynamics with the aim of becoming better able to undermine them. Initiated by Aníbal Quijano and later expanded upon by Walter Mignolo, Arturo Escobar, Boaventura de Sousa Santos, and others, the MCD collective project seeks to understand how modernity has become ubiquitous as a global design through the power of coloniality. Included in this project is the articulation of alternative visions for societal restructuring rooted in the perspective of those who have been marginalized by this universalist vision.

Neoliberal austerity unfolds in particular ways across different settings but its roots can be traced back to the Enlightenment era when the core tenets of modernity arose as a new fabric for society structuring in Western Europe. Modernity is characterized by the hierarchization of knowledge, of bodies, of being (Quijano 2010). With the advancement of modernity, European

ways of being – that is, ways of interpreting the world, of relating to one another and to nature, of classifying gender roles, of structuring the economy – are deemed more righteous than non-European ways of being (Escobar 2008; Quijano 2010; Mignolo 2010). A commitment to material progress and growth at the expense of life underpinned the economy (Walsh 2010a). Western science became the only valid way of interpreting the world around us (Geniusz 2009). A separation between nature and humans emerged, enabling humans to feel entitled and able to dominate and manage nature to suit the goal of progress for progress’ sake (Escobar 2008).

While these beliefs of modernity have become structurally embedded as the organizing principles behind much of global society, they emerged out of European history. European colonialism gave them power as a set of universalizing forces that continue to inform how political, economic, socio-cultural, and ecological systems are structured today. The epistemological project of modernity requires coloniality in order to “rule out and rule over” (Mignolo 2000). As has been well documented elsewhere, colonizing groups, emboldened by their confidence in the superiority of their own culture, created racial, social, and cultural hierarchies that denigrated distinct and diverse ontologies and epistemologies of the societies they encountered. Categories of human existence were designed to entrench the power of European colonizers and justify their imperial conquest of global territories. The coloniality of power operates from this place. The creation and hierarchization of race as a social construct, the suppression of diverse ways of knowing, the establishment of cultural systems that enforce Eurocentric economic and knowledge production systems – these and other arms of coloniality are what has given modernity its power as a system.

Understanding how modernity and coloniality function together is crucial to undermining their power as a political, economic, cultural, and environmental project, especially in the context of design theory and practice. Indeed, the epistemic focus of the MCD project is not necessarily modernity or the coloniality of power, but rather the *decoloniality* of power, or, the dissolution of structures of domination and exploitation underpinning the coloniality of power (GESCO 2019). This dissolution is not possible without a clear analysis of Eurocentric modernity as a cultural project and how capitalism, patriarchy, racism, and imperialism operate together to produce and sustain relations of power as they interact with diverse local contexts.

In the MCD perspective, colonial modernity is not a monolithic imposition but an agent in the production of new sites of resistance. The decolonial arm of the MCD project focuses on

community projects for community autonomy through which people resist onto-epistemic erasure and assert their own designs and projects that reflect their values and lifeways. Undermining the ontological universalization of colonial modernity requires a shift towards a recognition that “every community practices the design of itself” (Escobar 2018a). The decolonial option calls us to consider how we might collectively create “pluriversal openings” (Escobar 2018b) where non-capitalist, feminist, Indigenous, and other diverse economic, political, and social structures can flourish.

Autonomous design

In Latin America, the notion of *autonomía*, or autonomy, has resonated with many communities and social movements on the continent. Escobar (2018b) asserts that autonomy “can be seen as laying the ground for a particular kind of design thought” (p. 166). In this configuration, autonomy is inseparable from relationality. While the Western world typically privileges understandings of “autonomy” as something akin to self-sufficiency of the individual,¹⁸ *autonomía* is fundamentally relational in nature, and is more about creating or reviving social systems that are oriented towards radical sharing rather than individual success. Escobar proposes autonomous design as a way for communities to reclaim those domains of social life that have been usurped by the state and reassert relationality as a driving force to move towards Sustainment¹⁹ (Fry 2017). “The goal of the design process,” he states, “should be the strengthening of the community’s autonomy and its continued realization” (Escobar 2018b, 189).

For design to contribute to this collective project, there is a need to grapple with how fundamentally tied design practice has been to the project of modernity (Escobar-Tello et al. 2021). MCD does not address directly, for example, how the construction of the artificial – the foundation of design practice – itself is a necessary condition of modernity (Schultz et al. 2018). However, for Escobar (Escobar 2018b, 6), “It is necessary to liberate design from this imagination in order to relocate it within the multiple onto-epistemic formations of the South.”

¹⁸ With important exceptions rooted in feminist studies (Özdemir 2020)

¹⁹ Fry (2017) uses the term Sustainment to move beyond the idea of ‘sustainability’ which has become coopted by forces in the Global North bent on “greening” capitalism and towards a meaningful reflection on what is required of us in the movement ‘to sustain’ our continued survival on this earthly planet. It calls not only for a reduction of damage to environments but also to connect environmental destruction to global inequity, peace, and social justice.

Decolonizing design will take many steps, what we offer in this paper is one such step to set decolonial theory into a tension with practice outside of the studio in creating the *museo en movimiento*. We reflect upon our experience as part of an inter-epistemic project of making and un/making worlds, collectively undermining the power of modernity with intention. MCD thinking influenced us in setting these guiding questions for the design project: How do we centre community autonomy? Embrace ancestrality? Reflect diverse economic formations? Foster openings for pluriversal thought? Support a life on earth reflective of a relationship of equals rather than one of domination and manipulation?

Beyond ideation: investing in material relationship

The autonomous design framework offers a meaningful challenge for design practice to move beyond a set of universal best practices rooted in colonial modernity and make way for pluriversal understandings of design. But without being rooted in the material reality of human and non-human beings engaged in design, there is a danger that its approach to decoloniality will remain in the realm of ideation. Discursively, there is a need to delink design theory and practice from colonial modernity. But we must also engage in the messiness of the material. We have to test the waters of new relationships and see what sticks. We have to work with materials and see how they speak to us and us to them. As Moran, Harrington, and Sheehan (2018, 77) put it: “If we learn to perceive our patterns of relationship to Country, then knowledge alive in Country resituates us”. The relationships among people, lands, foods, and other beings depend on a real and meaningful engagement. Decolonizing design requires that we transcend ideation as we centre relational autonomy. How then, might we begin to “give matter its due as an active participant in the world of becoming?” (Ingold 2012, 439).

Anthropologist Tim Ingold has considered how the ways in which we conceptualize material culture reflect a colonial modern perspective. In *The Life of Lines* (Ingold 2015), he begins with the notion that life is lived along lines, that is, our life path is a line imbued with movement, growing and twisting and becoming knotted with other lines as they maneuver through space over time without a clear beginning or end. Just as tying a knot or knitting a stitch leads to the creation of a new form, permanent or impermanent, so our line encounters other human and non-human beings who lead us down different paths of becoming. Just as a rope retains impressions of the knots it ties once they are released, so the lives of the beings we

encounter on our journeys are weaved into our own life histories. We need to resist the temptation to understand ourselves as agents leaving our mark on the rest of the world and instead understand ourselves as part of a broader meshwork of lines, moving alongside and *corresponding with* other beings in our midst.

Ingold's (2018) approach to correspondence has much to contribute to how we understand the kind of pluriversal openings by which decolonial design aspires to create space. In this moment of the ontological turn,²⁰ there is a tendency to shift from one extreme *universalist* understanding of the nature of the world towards another extreme: the *multiverse*. The damage caused by the domination of modernity pushes us to isolate ourselves from one another in our effort to recognize and make space for the co-existence of multiple ontologies. But multiple ontologies existing alongside but completely separate from one another is neither realistic nor optimal. The reality of our situation is that our systems have evolved out of complex entanglements without clear spatial or temporal boundaries. Haraway (2017) has characterized this phenomenon as *sympoeisis*, the idea that self-creation is not possible, nor is it desirable, in a world where globality and locality are in a constant push and pull. If the pluriverse is about relational autonomy and inter-dependence, we must push ourselves to reconcile the universal with the particular (Haraway 2017; Ingold 2018; Tsing 2015). Decolonial design necessarily depends on the correspondence among multiple ontologies and epistemologies, in pursuit of community autonomy. Becoming less focused on product development and modernist reformism requires greater investment instead in process and in the set of relationships that are forged to more effectively engage in collective resistance to ongoing colonial domination. We need tools that can help us enter intentionally and authentically into inter-epistemic collaborative space, that build trust among human and non-human beings involved in the design process, and that allow curiosity and creativity to drive how communities practice the design of themselves.

²⁰ The ontological turn refers to emergent thinking in anthropology, and increasingly other social science fields, that seeks to interrogate the place of modernity as the top of the ontological hierarchy, instead highlighting how diverse ways of knowing inform how diverse communities move through the world (Ingold 2018). Some scholars have criticized the thought trend for failing to actually centre Indigenous knowledges and the thinkers who have written about them within this interrogation (Todd 2016). But the act of de-centering of modernity/coloniality is critical work with urgent implications for Indigenous communities; it is in this spirit that I draw on this scholarship.

Biocultural design: a tool for enacting autonomous design

All communities practice design and have been practicing everyday design for generations in order to exercise creativity, innovate, and meet their needs and collective goals (Manzini 2015). For many rural and local communities that have long had the validity of their own design practice denied by colonial modernity, it is important to propose and construct alternatives to conventional resource development, often rooted in their distinct cultural identities and relationships with their places. The assertion of such alternatives challenges the variety of ways in which economies can be organized, thus undermining the performative dominance of capitalist systems (Gibson-Graham 2006) and challenging the power of colonial social orders of modernity.

Davidson-Hunt et al. (2012) propose biocultural design as an approach for re-engaging relationships amongst beings of a place as an ontological and epistemological shift in how we dream our futures. It draws upon previous work that has emphasized the importance of the relationships between people and place and how biological materials and cultural values shape the things and landscapes that become known as cultural heritage (Valencia 2021; Davidson-Hunt et al. 2016; Kuzivanova and Davidson-Hunt 2017; Turner, Davidson-Hunt, and Hudson 2018). It is a practice for imagining self-determined futures rooted in the strengths, skills and capabilities of everyday lives. Combining a diversity of human skills and experiences with the “creative potential of biocultural heritage” (Davidson-Hunt et al. 2012, 39), while drawing on the influences of design as a practice, biocultural design offers a set of tools that communities may find useful in pursuing their goals. It is an “intentional, collective, and collaborative process” (Davidson-Hunt et al. 2012, 39) in which a team of diverse individuals committed to a place can engage with each other in a creative process out of which products, services, or institutions emerge consistent with participants desires, values, and aspirations.

Biocultural design as a practice is necessarily process-oriented, and focuses on designing solutions that work in “the here and now”, recognizing that as conditions, contexts, needs, and opportunities shift, solutions can be redesigned. True to the improvisational nature of creativity, biocultural design emphasizes a relational, responsive, and intentional correspondence with the various lines with which we become entangled over time and with whom we co-exist. Co-existing as a design practice is a *process* of entangling ourselves with others be they human, or other-than-human, to create ourselves, our things, our places whose forms emerge, persist and

dissipate as a flow of life. Co-existence continues beyond any one product produced, or one service rendered, tying designers to the threads they weave in a way that leaves an imprint, long after the knot becomes untied. Focusing on process means that design as a practice can stay with people and “become part of their experience of the world through new ways of being and doing and ... enhanced capabilities” (Davidson-Hunt et al. 2012, 41). Biocultural design seeks to create an environment in which dwelling with materials and with each other might nurture creative strategies and the space and freedom to test them out. In its commitment to making space for improvisation and creativity, biocultural design has the potential to contribute to the development of an autonomous design practice. It challenges us to think about the deschooling of design so we can bring design into an everyday practice of convivial living that loosens diverse dreams of future worlds and heals the wounds colonial design has inflicted upon our bodies and worlds.

A “Museo en Movimiento” – Case study in decolonial design ²¹

Context

As a step toward decolonizing design the *museo en movimiento* provides an experience of bringing theory into a tension with practice and through reflection contribute to both. My intent is not to be prescriptive, but rather bring biocultural design into the on-going conversation of decolonizing design as a practice of everyday creativity, sympoeisis (Haraway 2017), and community autonomy.

The *museo en movimiento* initiative took place in the city of Tarija, located in the central valley of the department of Tarija, one of the Bolivia’s southern-most provinces bordering Argentina. It is a relatively wealthy city, compared with Bolivia’s other major urban centres, and the dynamics of urbanization and gentrification are very evident. Many surrounding rural communities depend on the city’s central markets to market their goods and make a living. As the municipality makes an effort to rebrand the area as a centre of gastronomic heritage (Turner and Davidson-Hunt 2016), many rural poor communities and their food traditions become

²¹ Information for this section came from a combination of interviews with members of Jaina, review of previous documentation regarding the local school’s food program, and Duthie-Kannakkatt’s observation of and participation in the development of the *museo* prototype.

background to central narratives of tourism and territorial development. Viticulture, which has existed on a small scale in the region for centuries, is rapidly expanding into a primary industry with a developmentalist bent, taking over campesino land used for small scale and ecologically diverse farming. While Tarija promotes itself as a producer of fine, high altitude wines and delectable dairy products (Turner et al. 2017), those rural producers that sustainably produce food to feed the urban centre, not to mention their own families and communities, also need recognition.

A local research centre and advocacy organization known as Comunidad de Estudios Jaina (heretofore referred to as Jaina) has been working with rural communities in the department of Tarija for more than 20 years. They openly pursue a political agenda that promotes campesino autonomy and self-determination, advocating for policies and programs that support those aims. They organize in solidarity with the elected campesino union authority and with individual communities with whom they have longstanding relationships.

Part of Jaina's work includes conducting participatory research on issues that have emerged as community priorities over years of conversation with the local union authorities. Over the course of their solidarity and research work, Jaina has worked with communities to challenge the dispossession of their lands and knowledge, and to co-create spaces of resistance and rebellion to the dominant order. They have documented traditional knowledge, particularly around food and food preparation, to give visibility to campesino communities as agents in creative, contemporary and decolonial future-making. They have supported a democratic referendum among campesino communities looking to form their own municipality in order to exercise more autonomy over their financial and territorial resources. They have advocated for continued support of a funding scheme dedicated to helping campesino families improve their production on their own terms. The *museo en movimiento* arose out of the relationships Jaina holds with campesino communities and organizations in Tarija, as well as ongoing conversations about biocultural design between Jaina, myself, and the research team at the University of Manitoba.

Methods

I became involved in the project during an 11-month period of field work in Tarija for my doctoral thesis between 2016 and 2018. This was one component of a larger research project that

worked with members of the campesino community of Laderas Norte. Other aspects of the research considered the theme of seed sovereignty, exploring how the community's values around traditional seed use have shifted over time, and how a neoliberal policy trajectory have informed that shift. As Jaina was generously supporting my research work through the provision of their knowledge, connections, and office space, I wanted to also support their activities in the spirit of collaboration and *convivencia* (co-living), and so became involved in the life of their small office and supported their various ongoing initiatives when time and resources allowed. One of these initiatives was their participation in the Tambo fair, at which they had been requested to construct a demonstration stand detailing some of their work on local food systems. I supported the project by leading a small ethnographic exploration of the tools in a typical campesino kitchen with women I had come to know in Laderas Norte. I also helped prepare a few materials for distribution at the stand, including recipe cards and the transcription of recipes collected with the consent of a few campesino women in Laderas. Finally, I was present to support the stand the weekend of the fair, including securing necessary ingredients, advertising the workshop to fair attendees, preparing the demonstration space, and other general tasks as needed. After the demonstration, I took part in team reflection sessions related to the weekend, including debriefing with the campesino women who had been involved in the fair, either as workshop leaders or food preparers.

Escobar (2018b) engages with the literature around presencing versus absencing within theories of agency, and the imperative of cultivating complex relational networks among humans and non-humans to resist the disconnection from nature that the ontology of colonial modernity has produced. Drawing on Scharmer and Kaufer (2013), he explores how presencing – that is, allowing the self to embody the emergent future through collective creation – relies at least in part on “a significant personal transformation toward more relational modes of being” (Escobar 2018b, 126). Personal transformation, in this sense, is about letting go of the ego in order to make space for compassion and authentic caring; we must work to cultivate an attitude of openness that can foster (re)connections with other knots in the meshwork.

We draw on this literature to inform our methods because we believe that part of what makes design practice so powerful as a tool for enacting pluriversal transitions is its predisposition towards recognizing the role of individual agents in co-constructing a whole. As a doctoral student engaging in ethnographic research, I became embedded in the systems and

relationships that I was also studying. I do not mean to purport that spending 11 months in a community allows for the kind of depth of understanding of that place as those who have always lived there. But I do believe that it is important to recognize the personal transformation of all agents involved in an ontologically-oriented design process (including the researcher) is a critical outcome of said process. Only through engaging with one another in ways that make space for multiple ways of knowing and being can we begin to shift consciousness towards making other worlds possible. In this way, an ethic of being open to personal transformation, for me as a researcher involved in a design practice, cannot be ignored as a critical aspect of the strategy of inquiry.

It is also reflective of the kind of inter-epistemic collaboration that communities engaged in the design of themselves are working towards. Of course, such projects do not require “outsider” involvement to be successful. But in a world that is increasingly connected, encounters of multiple ontologies is inevitable and, indeed, positive. Bringing our diverse skill sets, knowledges, and experiences to the table has the potential to be very transformative. Learning to collaborate with one another across ontological difference is not something that can be done through ideation; it needs to be rooted in meaningful relationship among human and non-human beings and the territories that sustain us all.

The project

The *museo en movimiento* is a project of the Centre for Campesino Gastronomic Heritage developed by Jaina in collaboration with members of the campesino community of Laderas Norte and other communities in the region. In essence, it is a mobile educational and interpretive space designed to engage a variety of audiences around traditional food and food preparation. The space is designed to resemble a typical kitchen one might find in a home in the *campo*, with dried foods hanging from the rafters, a cane roof, woven baskets, wooden utensils, clay cooking pots, cooking and medicinal herbs, a replica of clay *horno*, a stone kernel grinder, and other traditional implements that continue to be used today (Figures 4.1-4.3). Various educational materials have been prepared to help set the scene, including banners detailing the creation of traditional foods like *tamales*, *chirriadas*, and *chicha*, and a photographic display of food and food preparation taken over years spent doing work and research in the *campo*. A critical part of the *museo* involves the participation of women from the community who have offered to host

workshops on the preparation of their foods. Thus far, these workshops have included *chirriada* making and *tamale* making.



Figure 4.2 Museo en Movimiento

The first incarnation of the *museo* was at the Tambo fair – an annual 3-day celebration of gastronomic culture that has taken place in Tarija for the past few years. In 2017, Jaina participated with the *museo en movimiento* as their principal educational space. The first day involved mainly school children passing by and learning from one of the women who had come to run the *chirriada* workshop about the importance of quality ingredients and try their hand at



Figure 4.3 Seeds and plants in museo display

pouring the *chirriada* batter on the hot stone. On the second day of the fair, locals and tourists, as well as culinary professionals that had come from other parts of Bolivia and Latin America to participate in the fair, engaged with the space, learning how to make *chirriadas* as well as *tamales* from two women from Laderas Norte. People of all ages and backgrounds were truly excited by the experience, with lots of laughter abounding, and many people asking good questions about how they could



Figure 4.1 Making chirriadas with youth

replicate the foods at home for their families. The space engaged all of the senses: the smell of fresh goodies wafted through the air, the taste of a warm and fresh *chirriada* and the feel of having worked to make it with your own clumsy hands, the sight of a beautiful campesina kitchen, and

the sound of people laughing and enjoying themselves, as people do when preparing food for those they love.

Since the initial presentation of the *museo*, for which I was present, there have been a few other sites at which they have set up, experimenting with the format of the museum each time. They did a simplified presentation of the *museo* in a public square in the centre of town, allowing people to walk up at will and hear presentations about the importance of the *chirriada* to Tarijeño cuisine while spending some time looking at the photo exhibit. They also have set it up in a school in the city, doing an interpretative presentation geared towards children. Perhaps most importantly, a version of the *museo* was also set up at the local school in Laderas Norte. In collaboration with the teachers and the parents' committee, they planned a day of celebration for traditional foods designed to teach the students how to prepare the dishes their parents and grandparents make. Many of the mothers came to volunteer their time helping to cook, showing the students how to make common *sopas y segundos*.²² Jaina set up the photo exhibit and banners for the youth and parents who had come to the celebration to admire, often smiling at the sight of themselves in the photos on display. The students made up recipe posters and stuck them to the walls of the school to share the ingredients of the dishes they were in charge of with their classmates. The day turned into a big community celebration, with families from all around venturing to the school to participate in the festivities. As demonstrated by these efforts, the *museo* is not solely a space to educate urbanites about food cultures in rural areas, but also an opportunity to shapeshift as a useful tool for different audiences.

Development of an idea

The birth of the *museo en movimiento* came about as a result of many collaborations. The relationship with the community of Laderas Norte, and in particular the school and parents' committee that guides aspects of school programming, was key. Learning how the women taught their food skills, finding out the kind of events that were appealing to the community, spending time in people's homes and learning from them, all contributed to the development of a design prototype that could provide a meaningful space to support existing campesino resistance and decolonization efforts while finding a way to engage new audiences and involve new actors.

²² Soups and main dishes

Other actors involved in the design of the project, even if indirectly, included funders. One of the foundations supporting Jaina's work on the Centre for Campesino Gastronomic Heritage provided a useful sounding board. The language of design was introduced by the research team at the University of Manitoba, working in collaboration with other design teams in other parts of the world, and has since been incorporated into Jaina's research program because it resonated with their existing work and gave them a way to articulate their process involving the inclusion of diverse ways of knowing. In addition, I as a visiting foreign student contributed to the development of the space by attending brainstorming sessions and supporting the creation of the museum space itself. Ongoing conversations with a sociologist colleague from Cochabamba about museum sciences, and how to radicalize and democratize them, also contributed to the development of the idea. Finally, the design of the museum was very much inspired by the materials themselves that make up campesino food production spaces, and becomes an effective learning space precisely because of the authenticity of the materials making it up, and the story they tell having developed over years of relationship with the humans that use them. Indeed, it could be said that the design team extends far beyond the immediate network of Jaina members and community members that sustain the initiative, including members of a global human and non-human community that have become part of the meshwork woven to create a solid support system for the initiative to succeed.

While the outcome of the design process may not have been altogether intentional, the process itself mirrors, in many ways, the kind of design practice that has existed in many parts of the world for generations but marginalized through the professionalization of design. To examine the development of the initiative is to trace a long story of humans and non-humans becoming entangled over time and making impressions on one another. That series of interactions, and of inter-epistemic collaboration, results here in the production of a space of resistance and will surely continue to produce new and novel outcomes as time goes on.

Motivations

Table 4.1 Motivations for the creation of a *museo en movimiento*

Motivations for the creation of a <i>museo en movimiento</i>	The motivations for the creation of the <i>museo</i> (Table 4.1) have deep roots in the history of anti-colonial struggle in the region. In an interview with the two main collaborators from Jaina, they note the potential for the space to challenge the ongoing dispossession of campesino knowledge within the realm of food systems:
Challenge for-profit motivations	“Tarija in particular is a territory where the dominant colonial ideology has a very strong influence. So it is very important to construct spaces of resistance in the face of this colonizing action: the dispossession of campesino knowledge. And the theme of food is crucial because it is through the food system that much of this colonial control is exercised”. ²³
Explore the complexity of the food system	
Demonstrate cultural dynamism	
Challenge knowledge and capital dispossession	
Space of resistance/new mechanisms of struggle	
Visibilize campesino actors as knowledgeable experts	
Visibilize food knowledge as part of the collective heritage	

They see part of their role as collaborators in supporting existing resistance efforts against dispossession. Housing an interpretive centre that might remain within the control of communities facing and resisting dispossession is an important support mechanism that can be offered by movements and organizations that are allied with campesino communities. The format of an interpretive centre challenges the idea that food knowledge and products must have profit as one of their driving motivations. It celebrates the idea that knowledge and food can be shared and celebrated without being mitigated through a monetary exchange. It also allows for an exploration of the complexity of local food systems that centres campesino experiences and knowledge using popular education pedagogies. The *museo* represents a means for campesina women in particular to demonstrate how their knowledge is dynamic and continues to evolve and adapt to new contexts while remaining rooted in tradition. For example, when suitable stones for cooking the *chirriada* are unavailable, many have shifted towards using iron grills that heat up in

²³ Carlos Vacaflores and Pilar Lizarraga. Private communication. February 13th, 2018. Translated by the author.

a similar way over a flame but require less labour to source and season. These factors make the space a critical site of resistance.

Challenging the dispossession of campesino food knowledge is linked to the challenging of capital dispossession. When food production knowledge, both on the land and in the kitchen, is relegated to marginal spaces in the collective cultural imaginary, access to lands that support the continued production of that knowledge can be eroded more easily. This dynamic is visible in the region of Tarija, particularly as the large-scale viticulture industry grows and changes campesino-managed landscapes into sites for commercial production, reducing opportunities for biodiversity and for continued small-scale (re)production (Turner and Davidson-Hunt 2016). Providing a space to host such conversations further enables Jaina and the communities they work with to explore complexity in the food system through practical, hands-on workshops. By visibilizing the work of those who have stewarded thriving local food cultures for generations, the workshops act as a novel mechanism of struggle against the dispossession of knowledge and capital, while making a clear point about the importance of continuing to steward food and food knowledge as part of the region's collective cultural heritage. Food carries meaning beyond its classification as a commodity. Opportunities to challenge the for-profit underpinnings of the capitalist food system are critical in order to showcase alternatives and help broad audiences envision alternatives. Part of the motivation for this *museo* comes from a commitment to challenging the commoditization of food and support small scale producers in meeting their goals. There must be a commitment to local producers and ensuring they have the opportunity to benefit from emerging economic development strategies that centre their cultural food heritage.

Discussion

While the *museo* remains in an early stage of programmatic development, it represents an important contribution to thinking through biocultural design as a process and practice, and helps us imagine how (re)establishing a relational correspondence across multiple ontologies and lifeways around us might help us imagine another world and bring it into being.

Campesino women have, and have had for many generations, an intimate relationship with the food that nourishes their communities (Deere 2017; Song, Zhang, and Vernooy 2006; Singh, Rallen, and Padung 2013; Fash, Vásquez Rivera, and Sojob 2022; Colque Fernández 2014; Vacaflores 2017; Lizárraga Aranibar 2014). The life of the community revolves around

food, in many ways. Important occasions are celebrated with community feasts where all gather together over the most delicious and complicated dishes. Most of the food that is cooked on a daily basis to feed one's family comes from that family's land. From seed to table, women know their foods intimately. From selecting the seed to plant in the ground, to stewarding a plant's growth, to harvesting, drying, and storing, to preparing for consumption – the knowledge that people have about the foods they grow and eat runs deep. This kind of deep knowledge is reflective of a different kind of ontology than one in which people are separated from the foods they eat and the environments that have produced them. Over the course of their lives, the women in Laderas Norte have cultivated relationships with their food that go beyond 'consumer' and 'consumed'. Their foods have transformed as their needs, preferences, and circumstances have changed. When a community gathering takes place, the quality of the *chancho* that's prepared, or the crispness of the *maíz* they serve is a part of the experience of being in community with their neighbours. When it comes time to bring their produce to market, the quality of the food plays a role in deciding a household's income. In turn, the care invested in cultivating one's crops, from the selection of seed to the long-term investment in maintaining soil health, is reflected in the quality of the food produced. In the mutual caring for each other, food and the women of Laderas Norte form part of a meshwork in which living and non-living things correspond and produce new arrangements that change and adapt as they in turn encounter new things.

The workshops are rooted in the relationships that the women who have taken on a leadership role in this project have with their foods. It centres the deep knowledge they have as a result of years of coming to know something in an intimate way and acknowledges their role as experts because of their connection with the land and what it has produced. This choice stands in stark contrast with conventional cooking workshops that assure participants they can succeed in mastering a particular dish by following a step by step recipe, rather than ensuring the integrity of their ingredients and developing a relationship with them from seed to plate. Campesino women presenting their knowledge as experts undermines the notion of a supremacy of humans over nature, demonstrating that the best kinds of dishes come from an ontology in which knowledge and skill focus on learning to work in relationship with materials rather than becoming the master of them.

The success of the workshops also relies on the trusting relationships that have been formed among all actors involved in executing this initiative, from workshop leaders to funders, from NGOs to student researchers like myself. It is through the application of diverse epistemologies that the *museo* can have the impact it has had. It exists in a place that is both rural and urban; tied to the land and also mobile; an independent project and an exercise in community autonomy. As critical design scholars push for a decolonization of design – not just another stream for people to pursue, but a fundamental reimagining of design as a theory and practice – these kinds of inter-epistemic relationships will form the basis of its praxis.

This workshop is only a beginning. But part of what makes biocultural design a powerful tool is its acknowledgement that working with materials, building trust, and developing structures that reflect the way we imagine the world should look is an iterative process, always in flux. Being part of a meshwork entails that new opportunities for encounter will continue to emerge as our relationships with each other and with the materials we work with continue to develop. The only imperative is that the work begins, guided by the ways of knowing in the community engaging in the design practice. Doing the work and making space for transformation within that work is key.

Actors that situate themselves within a meshwork of living and non-living things are coming from a different starting point than those that operate under the premise of a hierarchy between the two. This starting point represents an important premise for autonomous design. The market, supported by the capitalist state, has worked to take control of food as a dimension of social life by commoditizing the production and consumption of food. This commoditization represents a particular ontological worldview that understands food as a commodity fails to understand food as a thing that sustains communities, as a thing embedded in a set of relationships between people and the land that both sustains us and is sustained by us. Centering a worldview that understands food as something more than a commodity, and centering people who live that worldview in how they interact with food at all stages of its life cycle, is critical to undermining colonial modernity. While this space may be only a beginning, the transformative power of its creation and the process of correspondence that continues to take shape in its wake cannot be underestimated (Pierri 2019).

The centrality of relationality is apparent not only in the relationships between the women leading the workshop and the materials they work with, but also in the set of

relationships among people that have a hand in organizing the space and the people who are touched by it. Rather than a workshop setting where the leader is imparting a lesson on participants, the *museo* establishes a dynamic in which participants are guided into a renewal of their own relationship with the foods being showcased by the campesino women sharing their knowledge and lived experience of making food. Many of the participants commented on how their mothers or grandmothers had prepared foods like this, but after moving the family to the city, they often didn't have time to teach their children how to go about preparing traditional but often more labour-intensive foods. *Tamales* and *chirriadas* were replaced by rice-based dishes and store-bought bread. There is a nostalgia associated with these foods, and a blood memory that tells participants these are the foods that have nurtured them. And there is a visible joy when people are presented with the opportunity to rekindle a relationship with these culturally important heritage foods. The joy shared among the participants, workshop leaders, and volunteers is a reminder of the importance of sharing good food in community. It also breaks down barriers between people living in urban and rural areas, who come together in the *museo* united by a shared culinary past. The hope is that people leave with a sprouting seed of curiosity about the place of traditional foods in a shared culinary future. This space itself makes space for inter-epistemic encounters; we will have to wait and see what these sparks ignite.

Perhaps it is at a site like this that we can begin to understand what autonomous design as an intentional practice looks like. The *museo* emerges out of a place of ontological difference, recognizing that the ways of being and knowing lived by campesino women in Laderas Norte articulate the world in different terms than those espoused by the infrastructure of colonial modernity. This ontology has informed the community's "design of itself" (Escobar 2018b, 184), which includes the nature of community members' relationships with food. As recipes and agricultural production knowledge has been passed down from generation to generation, residents of Laderas Norte have had to innovate to keep their ideas alive in an environment that is constantly changing. Biocultural design provides a means for communities to continue innovating using materials that reflect their biocultural heritage by identifying the problems and possibilities before them as a community, in collaboration with trusted partners, and finding ways to meet their goals that reflect their values. It allows for a design process that revolves around the autonomy of the community, rooted in their ancestral knowledge, the lands they work, and their visions of the future. This example of biocultural design in practice reflects the

core tenets of an autonomous design framework, while reflecting a practical example of how people, in relationship with the biocultural materials that are important to them, can create concrete initiatives to meet their goals while countering the dominance of colonial modernity. It does the slow and steady work of reclaiming food production as a sphere of social life under the autonomous domain of communities, rather than the state and the market. The *museo* imagines that another world, in this particular time and space, is possible, and takes steps to bring that world into being collaboratively, centering meaningful relationships.

Conclusion

The short and jovial moment of resistance described at the outset of this paper, where Doña Anamaria shows all the gathered chefs how the *chirriada* is prepared to perfection, represents a small but meaningful example of how every day assertions of community autonomy weave a fabric of resistance that challenges the dominance of colonial modernity. Here, autonomous design has played a role in making space for that assertion to take place while demonstrating its potential as a tool for supporting communities in meeting their goals on their own terms, informed by their own values. The *museo en movimiento* is a small case study that illustrates how design practice that centres relationship can help people find innovative ways of relating to the materials that are important to them while deepening their relationships with people from diverse onto-epistemic locations. All design initiatives, led by communities, movements, or otherwise, are opportunities to bring new worlds into being, little by little. A case like this that expands our collective imagination, guiding us towards a future in which diverse ways of knowing and being in the world are able to co-exist and co-create, is making its contribution to that important work, one *chirriada* at a time.

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Chapter 5 - Conclusion

My goal with this research has been to demonstrate how campesino communities continue to be the leaders and shapers of local food systems in Tarija despite an agricultural policy framework that works against them and a climate that is becoming increasingly challenging to manage. In chapter 2, I documented the international and Bolivian political economy of agriculture and demonstrated how small-scale farmers continue to struggle for self-determination despite a constitutional framework that claims to value food sovereignty. I identified the contradictions within that framework and highlighted how national policy must shift away from pushing a seed system rooted in colonial modernity and towards one that centres community visions for food sovereignty. In chapter 3, I explored the case study of Laderas Norte and their community visions for food and seed sovereignty, demonstrating that despite overwhelming environmental and social upheaval, campesino communities continue to shape bricolages for seed sovereignty. I argue for an expanded understanding of seed sovereignty that might take these kinds of unexpected actions into account, incorporating everyday acts of resistance into the way we talk about self-determination. In chapter 4, I highlighted one way in which these acts of resistance play out in detail by documenting a biocultural design process in which a researcher (myself), a local NGO, and handful of committed women farmers from Laderas Norte collaborated to create a mobile museum to facilitate the sharing of campesino culinary knowledge. Together, these pieces aim to demonstrate that campesino food ways in Tarija, despite the challenges they face, are resilient and are the bedrock of the region. Their continued success and ability to innovate in the face of the environmental and social challenges that lie ahead require that their self-determination be prioritized.

Findings by research question

1. (a) How are seeds and plant genetic material situated in the value system of local and indigenous communities in the region of Tarija? (b) How are political, economic, and cultural values shaping and shaped by people's seeds and plant genetic material? (c) How are these values articulated across gender and generational differences?

In chapter 3, I explored the seed system in the campesino community of Laderas Norte, including the threats to seed sovereignty and the ways in which the community continues to



Figure 5.1 Older youth cooking a guiso de trigo with local wheat

practice resistance to those threats. I argued that the bricolage of actions taken by people as they confront the challenges of environmental and political change constitute a valuable articulation of seed sovereignty.

For the campesino communities in Tarija, seeds are fundamental to their way of life. As agricultural communities, everything starts with a seed. For generations, seeds were widely saved by the people who grew them, with unique and locally adapted varieties being passed down from parents to children and exchanged widely through family and community networks. They were kept alive through traditional recipes that depended upon particular seed varieties to taste the way the community expected it to taste.

But as the climate became less predictable and political priorities shifted, seed saving has become less common. Climate change has altered rainfall patterns, resulting in shorter seasons and the emergence of new crop pests (Fabricant 2013; IPCC 2001; Masson-

Delmotte et al. 2019). Urbanization and the diminishing availability of arable land in rural areas has increased pressure on young people to seek work outside of their communities (Andrews-Swann 2013; Zimmerer 2014). Dietary shifts have decreased demand for certain native varieties of some crops, encouraging farmers to switch to varieties that will sell well, even if they are less resilient. Corporate domination of the seed world has made it difficult for some farmers to access seed at affordable prices, even in the ancestral homelands of that seed (Kuyek 2007; Roy 2015; Silva Garzón and Gutiérrez Escobar 2020).

Those who continue to have enough reliable access to water can be more confident that they'll have enough of a harvest to save seed for the following year. But many who depend on rainfall for their crops can no longer depend on the rain to sufficiently nourish their crops. People

lament only being able to get the corn husk, or *chala*, for their animals out of what they harvest now. The need for more supports to secure access to irrigation infrastructure and make farming a viable way of life again has become more evident due to environmental changes and oppressive political systems that devalue local knowledge. So, in more recent decades, families have begun to source more of their seed commercially on an annual basis. Many try to limit how often they purchase seed from market by saving what they can and only purchasing from market when they need to top up their seed. But for many families, especially those with more limited access to water, saving all one's own seed or sourcing it from neighbours who might also be struggling with water access is insufficient to meet their seed supply needs.

But despite these changes to how seed is sourced, people continue to demonstrate how they value seed sovereignty and the ability to control their own seeds and plant genetic material in a variety of ways. They continue to pass on recipes to youth, at home and through local school food programs, that depend on the use of local crop varieties. Sharing traditional recipes and keeping culinary traditions alive is a way of ensuring that the next generations will continue to



Figure 5.2 Children shelling porotos (beans) for school lunch

value their local crops. They continue to agitate for more control over their resources and territories to improve access to critical irrigation and other agricultural infrastructure. And they continue to grow their trading networks, experimenting with new biodiversity in their food systems sourced from

trusted neighbours and friends and seeing what will work best for them.

These kinds of actions demonstrate that even the ‘disappearance’ of ancestral seed varieties is not the end of the story. People continue to assert autonomy in the management of their seed systems in ways that are profound and innovative. As small-scale farmers in the Global South are challenged by climate change, capitalist enclosure, and other shifts in the political landscape to which they must adapt their practices, seed sovereignty persists as people make do with what they have and weave a creative bricolage of resistance that supports the

resilience of their agricultural systems that are so intimately tied to their culture and livelihoods. Seed sovereignty practices enacted out of necessity and compelled by environmental and social change can also constitute a form of creative and innovative resistance.

This commitment to the stewarding of local seeds as well as the building of relationships and systems that allow people to continue growing local varieties into the future demonstrates that they continue to value the important role that local seeds play in their lives. While campesino communities are always innovating and experimenting with the integration of new plants in their agricultural systems, local varieties that can be saved from year to year and adapt to local growing conditions continue to play a critical role in the life of the community and the ability for campesino people to continue their way of life. People value seed diversity and the resilience that diversity in their seed system allows them to exhibit in the face of unpredictable climate and changing economic circumstances. Diversity is best stewarded when people have autonomy over their seed systems and over their food systems more broadly.

2. (a) *What are the opportunities and barriers people experience in exercising seed sovereignty?*
(b) *How does seed sovereignty, or a lack thereof, impact one's ability to exercise self-determination and cultivate community autonomy?*

In chapter 2 I explored the tensions involved in enacting seed sovereignty in Bolivia. There exists a conflict between state-centred and community-centred conceptualizations of seed sovereignty (Clark 2016; Cockburn 2014; Felicien et al. 2020). Bolivia has made strides in advancing a progressive political discourse. This discourse has made meaningful gains for many of the country's most marginalized groups and was hard-won by social movement actors fighting for their visions for the plurinational state. But the nation state's approach to seed policy continues to, by and large, centre the needs of large-scale and industrial farmers at the expense of small-scale Indigenous and campesino farmers. It continues to be plagued by a colonial discourse that values technological advancement and large-scale industrial production over stewarding diversity, nourishing community food systems, and the cultural importance of seeds.

This disconnect between state- and community-centred conceptualizations of seed sovereignty represents a major barrier for communities in exercising seed sovereignty. When resources are put into seed systems that do not adequately reflect community priorities, it

becomes difficult for communities to exercise autonomy in shaping their food system. One example I explored was the seed potato program managed through the national corporation for supporting seed production in Bolivia. The program offers incentives for small-scale producers in ecologically desirable regions to produce seed potato for large national and international markets. But a shift to cultivating seed potato for market, while a desirable and useful tool for some farmers, does not work for all and ends up leaving many behind from being able to continue practicing an agrarian lifestyle at all. When water and land access are the prevailing concerns of small-scale producers, those concerns need to be addressed, and market-based incentives are an inadequate solution.

Another barrier to seed sovereignty explored in this dissertation is the international political sphere designed to support seed markets for large-scale agricultural systems while neglecting the needs and perspectives of small-scale producers. Bolivia, as well as many countries in the Global South and North that are significant agricultural players, is part of the UPOV 78 agreement that, as discussed in chapter 2, puts significant limits on farmers' ability to trade, distribute, share, or sell their seed if it does not meet exacting standards for certification. While the laws that are on the books in Bolivia may be poorly enforced, normalizing seed certification within small-scale production systems and incentivizing small-farmers' entrance into those markets further commoditizes farmer-saved seed systems while disincentivizing campesino farmers from stewarding varietal diversity that is so critical to their food systems and to their way of life. Global intellectual property regimes that encourage countries to conform their seed and agricultural systems to a single standard established within a western governance paradigm represent a perpetuation of colonial dynamics that we must interrogate. Agrarian movements around the world have criticized the UPOV system for limiting what farmers can do with their seeds, imposing significant limits on community seed sovereignty. It is imperative that all countries, especially countries like Bolivia that have made good work of transforming their constitution around the needs of a diverse, plurinational state, reject these global systems of modernity in favour of community-rooted systems that centre community food and seed sovereignty.

Seed sovereignty is fundamental to a community's ability to exercise self-determination and cultivate community autonomy. However, the relationship between seed sovereignty and self-determination, and being able to live well, is not a linear relationship; one does not 'achieve' seed sovereignty and thus become empowered to pursue self-determination. Rather, seed

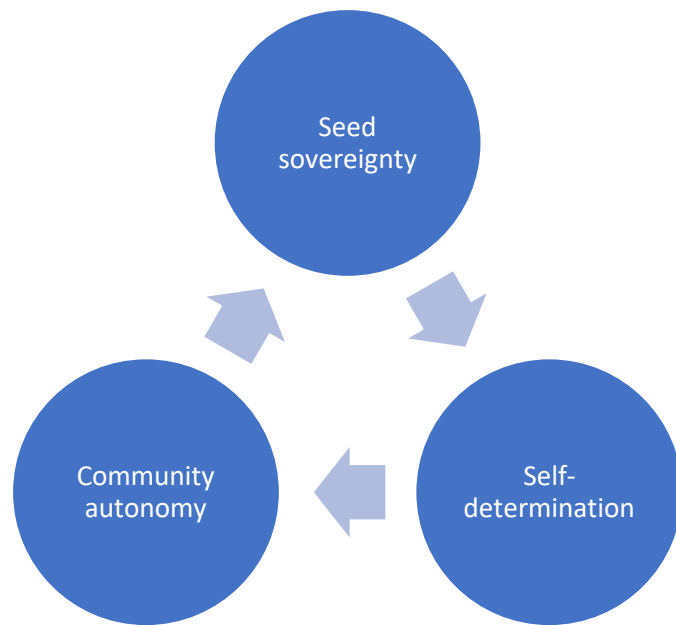


Figure 5.3 Cultivating seed sovereignty relies on self-determination and community autonomy while also contributing to these

self-determination. Having control over one's seeds or being able to access them in community is part of living well, because the kinds of everyday actions that help to nurture seed sovereignty as discussed in chapter 3 are the same kinds of actions that support community well-being. These include passing down cultural food traditions, engaging in mutual support with community members, and working together to advocate for resource and territorial autonomy. So, while seed sovereignty is fundamental, the challenges that communities experience in cultivating seed sovereignty do not make their ability to pursue *vivir bien* a lost cause. Nurturing

community, practicing self-determination, and continuing to grow food according to one's cultural values are all important aspects of practicing seed sovereignty, even if they don't appear on the surface to be directly related to the practice of saving or sharing seeds.

3. What can a design process contribute to building seed sovereignty in local and Indigenous communities?

Chapter 4 outlined the case study of the *museo en movimiento*, or mobile museum, and how initiatives like this, that emerge out of collaborative relationships amongst diverse actors and materials, can be used as tools for cultivating community autonomy through inter-epistemic

collaboration. I discuss how biocultural design as a process can be a tool for nurturing pluriversal openings and creating space for decolonial approaches to design.

The *museo* was developed by a local research and advocacy organization in collaboration with members of the campesino community of Laderas Norte and other communities in the region. It is a mobile educational and interpretive space designed to engage a variety of audiences around traditional food and food preparation. The space is designed to resemble a typical kitchen one might find in a home in the *campo*, with dried foods hanging from the rafters, a cane roof, woven baskets, wooden utensils, clay cooking pots, cooking and medicinal herbs, a replica of clay *horno*, a stone kernel grinder, and other traditional implements that continue to be used today. Various educational materials have been prepared to help set the scene, including banners detailing the creation of traditional foods like *tamales*, *chirriadas*, and *chicha*, and a photographic display of food and food preparation taken over years spent doing work and research in the *campo*. A critical part of the *museo* involves the participation of women from the community who have offered to host workshops on the preparation of their foods. Thus far, these workshops have included *chirriada* making and *tamale* making.

As discussed in chapter 3, part of the practice of seed sovereignty for communities coping with environmental and social change involves passing down the culinary traditions to which traditional seed varieties are attached so that the youth can keep their connections to their ancestral varieties alive. As communities navigate difficulties in water access and increased presence of pests and diseases as climate change continues unabated, saving traditional varieties on-farm is not always possible. But keeping relationships with seeds and traditional foods alive is something that community members in Laderas Norte prioritize. Chapter 3 discussed, for instance, the presence of the school food program where parents cook traditional dishes for the youth at the local school rather than have them be dependent on burgers or sandwiches that would otherwise be the only kinds of foods the school would have the capacity to prepare.

In light of this, the *museo* exemplifies one way in which culinary traditions can be celebrated and thus passed down from generation to generation, even amidst social and environmental upheaval. The process of designing the *museo* as a biocultural initiative demonstrates that intentional, collaborative design process that centres community values and priorities can have a meaningful impact on advancing community self-determination and building power towards community seed sovereignty.

Chapter 4 also outlines how biocultural design entails working together as diverse actors and materials to see what possibilities emerge when relationship and engagement are at the centre. There are parallels between this design process and the process of cultivating seed sovereignty. If we understand seed sovereignty as a practice, as a set of actions and decisions taken every day to advance community control over seeds, then we recognize that it requires everyday engagement with the materials and actors that enact seed sovereignty. The *museo* represents one kind of initiative to have emerged out of a practice of coming together and working with materials to yield something meaningful. As people continue to work with seeds and nurture the community relationships in which those seeds are embedded, more possibilities could emerge. As people continue to work with seeds in a meshwork of mutual care, actors and materials correspond and produce new arrangements that change and adapt as they in turn encounter new opportunities.

Part of what makes biocultural design a powerful tool is its acknowledgement that working with materials, building trust, and developing structures that reflect the way we imagine the world should look is an iterative process, always in flux. The only imperative is that the work begins, guided by the ways of knowing in the community engaging in the design practice. As emphasized in chapter 4, doing the work and making space for transformation within that work is key.

Theoretical contributions

Contributions to seed sovereignty

Kloppenborg identifies four constitutive pillars of seed sovereignty: the right to save and replant seed, the right to share seed, the right to use seed to breed new varieties, and the right to participate in shaping policies for seed (Kloppenborg 2014). These right has been undermined by a capitalist system that seeks to ‘disappear’ local knowledge systems, first by delegitimizing them and then by destroying the landscapes in which they are rooted (Shiva 2014). Local seed savers resist this attempted colonization by continuing to develop dynamic seed systems that adapt to changing political, social, economic, and ecological contexts while drawing on their cultural memory (Nazarea 2006). But as has been explored in this dissertation, the diversity of ways in which people cultivate seed sovereignty have not been fully captured by the literature. Seed sovereignty as a theoretical framework must include in its analysis the ways in which

communities continue to exercise seed sovereignty in contexts of ecological and social upheaval where many ancestral varieties have been lost.

Chapter 3 connects seed sovereignty with the notion of friction (Tsing 2004) and bricolage (Phillimore et al. 2016) to demonstrate how communities nurture their food and seed systems and work towards food sovereignty in ways that are informed by both their own values and the opportunities that are available to them. Even those practices that are less overtly political, or less explicitly tied to seeds, are necessary to building autonomy. Tending to community relationships, being attentive to farmer innovation, keeping culinary traditions alive, and advocating for self-determination and autonomy are all dimensions of cultivating seed sovereignty and must be understood as such. This is especially true for communities whose need for infrastructure upgrades (like water access) are being outpaced by environmental upheaval brought on by climate change.

The literature on alternative ontological frameworks in Latin America and beyond has emphasized the importance of community autonomy in realizing decolonial visions (Blaser et al. 2010; Fernandez Osco 2010; Botero, Del Gaudio, and Gutiérrez Borrero 2018; Cockburn 2015; Shiva 2007; Gonzales 2013; Nazarea 2006). Understanding the diversity of ways in which communities cultivate seed sovereignty, even in situations where environmental change and economic hardship constrain options, becomes especially important given the failure of the state to support community autonomy, as demonstrated in chapter 4. The 2005 election of the MAS, as well as that of other Latin American political parties considered part of the Pink Tide towards leftist leadership (Spronk 2008), signaled a possible about-face in the political trajectory of the country, from a discourse dominated by neoliberal developmentalism advanced by a series of conservative parties and backed by international financial institutions, to an explicitly anti-neoliberal agenda rooted in Indigenous wisdom around societal transformation (Ranta 2016). But in the decades since this political turn, the about-face appears to be shallow and short-lived, signaling that nurturing self-determination at the community level is still as important as ever.

As discussed in chapter 4, one of the movement's first acts upon seizing power was to institutionalize *vivir bien* in the nation's constitution as a framework that would guide the values and objectives of the state. *Vivir bien* represents "an-other" (de Sousa Santos, Arriscado Nunes, and Meneses 2007) ontological perspective, offering an opportunity to try seeing with different eyes, moving the world beyond narrow the project of modernity and towards a plural conception

of lifeways that are less destructive and more inclusive. But like so many radical visions for an alternative future that have been coopted by electoral politics, the policy trajectory of the MAS government in the years since their initial election has demonstrated that the integration of movement language is not enough to create a policy agenda that is truly movement-informed (Clark 2016; Cockburn 2014; Ranta 2016).

Given the continued failure of the state to meaningfully support food and seed sovereignty at the community level, the literature must continue to amplify how everyday community efforts to cultivate seed sovereignty posit a more meaningful challenge to colonial modernity. Conventional economic thought asserts that the only legitimate path towards economic development is in pursuance of endless growth (Gibson-Graham 2008; Quijano 2010; Kothari, Demaria, and Acosta 2014). But post-colonial thinkers across disciplines are challenging the constructed separation between economic and ecological realms, arguing that addressing global development challenges in an equitable way requires ecologically-centred strategies for change (Escobar 2010). Local community struggles for seed sovereignty, drawing on community values and knowledges, offer alternatives to the totalizing modernist paradigm that has been attempting to erase local ontologies through the force of coloniality. Communities are resisting colonial modernity through asserting their own ways of knowing and building arrangements for seed sovereignty that reflect their realities while drawing on Indigenous cosmologies, including but not limited to *vivir bien*.

Community efforts to increase their autonomy over their food systems look different everywhere. Locating food and seed sovereignty struggles within long histories of colonial land theft and ongoing displacement strengthens community capacity to respond to those dynamics in ways that are relevant to them. Schiavoni (2017) speaks to how applying a relational lens to food sovereignty struggles helps us consider how these struggles take shape in relation to other processes and circumstances taking place around them. There is no one way to fight for food sovereignty – all struggles are informed by local ontologies, local capacities, local visions, local resources, and local socio-economic realities. This research demonstrates that everyday actions to continue land-based education, nurture community trading networks, and advocate for more autonomy all contribute to cultivating seed sovereignty.

Contributions to design theory

Integrating design into conservation discourse within the social sciences is a process still in its early stages (Davidson-Hunt et al. 2012). Industrial design has gone from being primarily considered a narrow, technical trade (Krippendorff 1997) to one that professionals from fields as diverse as communication, graphic design, political theory, architecture, philosophy, and marketing began to embrace it (Buchanan, Doordan, and Margolin 1995; Buchanan and Margolin 1993). Today, everything can be and is designed, from tangible goods and services, to more immaterial products like interfaces, multi-user networks, social projects, and discourses (Krippendorff 2007).

But while the idea that “form follows function” has more or less been replaced with notions of design that are more complex, immaterial, social in nature (Krippendorff 1997), the fundamental ontology underlying industrial design has yet to bear any drastic shifts. The notion of artificiality as essential to the character of design remains commonplace (Cross 2001), and the human experience as designer or user remains central, even in contemporary progressive design circles (IDEO 2011). Centering “the designer” and that which they consider to be artificial has shaped the way we think about agency in design (Fry 2017; Schultz 2018; Onafuwa 2018). When we take design out of its social and cultural context, out of the environment that shapes the human and non-human agents involved in the design process, the complexity of the story told about an object, project, or system is flattened.

The extent to which Western design practice has shaped the way we interact with the world has gone largely unaccounted for until recently. Escobar (2018a) argues that much of what we have come to classify as design practice is tied up with colonial modernist notions of economic progress and unsustainability. As has been explored throughout this dissertation, throughout the initial expansion of the colonial Empire and later through development work that perpetuated the supremacy of Western ways of knowing, powerful actors from the Global North have long worked to perpetuate the supremacy of Western ways of knowing, reducing the depth and breadth of Southern ontologies to little more than expressions of ‘underdevelopment’ (Escobar 1995; 2010; Mignolo 2010; Mohanty 1988; Szaniecki, Ventura, and Costard 2018). This process has resulted in a totalizing design vision that separates and subverts the pluriversal in favour of the universal. “It is necessary, “ therefore, “to liberate design from this imagination

in order to relocate it within the multiple onto-epistemic formations of the South” (Escobar 2018a, 6).

Through the presentation of a case study in the use of biocultural design, I have sought to contribute to the emergent literature on decolonizing design practice that seeks to document the relocation of design within Southern ontologies. Biocultural design (Davidson-Hunt et al. 2012) as a practice requires case studies that implement its conceptual methodologies in order to advance its practical application. This research aims to demonstrate how design practice that combines diverse ways of knowing and acknowledges the agency of both humans and non-humans in the process can contribute to collective processes of liberation, including seed sovereignty.

In the Global South, diverse transition imaginaries have taken shape as decolonial responses to dominant western ontologies and as proactive assertions of Indigenous autonomy. One such imaginary that Latin American social movements have rallied behind is the notion of *vivir bien* - “an-other” (de Sousa Santos, Arriscado Nunes, and Meneses 2007) ontological perspective that offers an opportunity to try seeing with different eyes, moving the world beyond the narrow project of modernity and towards a plural conception of lifeways that are less destructive and more inclusive. While chapter 2 expands on why we should remain critical of the appropriation of *vivir bien* at the state level (Fabricant 2013; Gudynas 2016), transition imaginaries like *vivir bien* open up necessary space for imagining other worlds (González and Vázquez 2015). They create an ontological environment in which decolonial design tools like biocultural design can play a role in world-imagining and world-making.

In *Designs for the Pluriverse*, Escobar (2018a) asks whether a shift towards ontological design might be enough to foster spaces for autonomy and ‘radical interdependence’. This experience has demonstrated that working with materials imbued with eco-cultural meaning like seeds and traditional foods produces innovative applications that centre community values and knowledge while supporting self-determination and autonomy. This kind of work has always occurred and does not need to take place within an explicit design framework in order to produce outcomes that are meaningful to communities. But biocultural design is an important and useful tool that provides a framework for inter-epistemic collaboration, allowing designers with diverse ontological worldviews to come together to engage in an intentional creative process while cultivating an awareness of how their positionalities inform the relationships that underpin that

process. Biocultural design has the potential to stimulate a shift away from knowledge documentation and towards knowledge co-production, in which all ways of knowing that are brought to the table are understood as legitimate and integral to the design process.

Weaving together seed sovereignty and decolonial design

Akama et al (2020) explore the use of uncertainty as a kind of technology in future making.

While uncertainty can be scary, learning to embrace it in the practice of design can help us grow to understand that we do not have to know exactly what the future will hold, or be confident in what series of steps will lead to the particular outcome we desire, in order to begin. In fact, uncertainty is more than an inevitability to accept; it can be a tool in creating futures that reflect our values and the reality of the world in which we live. It allows people and materials coming together to engage in co-design without a being attached to a particular outcome or clinging to hope that their action will lead to a specific change in a predictable direction. Embracing uncertainty means we accept that the worlds we live in are “ongoingly emergent” and that all of us, human and non-human, are embedded in processes of creation, transformation, and change that we cannot control, but that we do have agency within. Understanding uncertainty as technology in future-making allows us to use the tools and relationships we have to become something together.

By integrating both seed sovereignty and design literatures into this dissertation, I am not making any claims that social movements fighting for seed sovereignty, or communities cultivating seed sovereignty amidst trying environmental and political circumstances, should shift towards articulating their community building work as rooted in design theory. Akama et al. (2020) are also clear that co-design transcends disciplinary boundaries, and that principles can apply to any number of change making approaches and processes. But I believe that these principles of emergence and uncertainty within design are of value to the way we think about food sovereignty, and indeed, are already being practiced by communities like Laderas Norte. Working with campesino farmers who maintain deeply held values about seeds and food, but whose relationships with their seeds have been challenged by oppressive political systems and environmental change, it is clear that the option to embrace uncertainty while working towards the kind of future they want is already something people are inclined to do. When a group of mothers decide to collaborate to integrate traditional foods into the school lunch program, they

cannot know whether this work will lead to more community autonomy, or a younger generation committed to maintaining their seed and food systems, or healthier relationships with the land and soil. But they can work with the materials they have and the values they hold to take the next best step and see what emerges. The same holds true for the *museo en movimiento*: the group of participants coming together to host a *chirriada* workshop cannot know whether this work will lead to an undermining of the colonial paradigm underlying the global agricultural system, or a more systemic acknowledgement of the role of Indigenous knowledge in nurturing culinary worlds in Bolivia and beyond. But together, in relationship with one another and with the biocultural materials at the centre of our value systems, we can immerse ourselves in the unknowability of the future and see what blooms. When faced with an uncertain future, it is easy to lose hope. Akama et al. (2020) quote activist and writer Rebecca Solnit (2016) in claiming that “hope is not blind optimism”, but rather something that requires us to be fully present and ready to take action even in the midst of uncertainty. We can take steps to build towards the kind of future we envision without knowing whether or not these steps will lead to change. That act of faith is generative, bold, and worthwhile.

Practical applications / contributions

In addition to theoretical contributions outlined above, this research process has yielded some practical applications locally and it is my hope that the results of the research will continue to bolster existing community efforts to cultivate seed sovereignty.

Firstly, the development of the *museo en movimiento* through the biocultural design process continues to act as a meaningful initiative for community members. Though the COVID-19 pandemic has slowed community gatherings, the workshop model and infrastructure developed through this process continue to be employed by Jaina and by the women who took part in organizing the original *museo* event. By setting the *museo* up in different kinds of spaces, it is proving to be a useful outcome of a design process that will continue to offer a mechanism for community members to pass on their culinary knowledge and challenge the dispossession of campesino foodways.

Several research products have been created that will continue to feed into supporting community efforts to enhance seed sovereignty and advance self-determination. At the request of the local school, I created a poster detailing the diversity of crop varieties that had been found

in the community complete with selected photos. This poster is being used for educational events as well as for general classroom use. Also, as part of the biocultural design process, I developed two postcards detailing how *chirriadas* and *tamales* are made according to recipes shared with me by the women in the community of Laderas Norte during a short kitchen ethnography project conducted as part of the development of the *museo*. These cards continue to be used at public events and are available to the school to use as resources for classroom teaching.

In 2019, I recorded a video lecture to be shared as part of a course on agrobiodiversity that Jaina, the local NGO partner with whom I collaborated in this work, was organizing. That lecture reviewed the biocultural design process and also gave some background around threats to agrobiodiversity in Laderas Norte and how community members are working to combat those threats. This video lecture is now part of the curriculum for this course, and local students who take part in Jaina's ongoing education work will continue to utilize the content.

Due to the COVID-19 pandemic, I was unable to return to Bolivia to share a full picture of the results of this study. I hope to be able to return and share a couple of seminars with local authorities as well as with the community of Laderas Norte once it is safer to do so. My intent is to ensure that this research can be used as a tool to support the struggle for campesino autonomy and provide documentation of fact that campesino and Indigenous communities in Bolivia have the knowledge and skills to nurture their own food systems and meet the food security needs of their families and communities. But meaningful food sovereignty requires a redirection of resources from market-based solutions that are not accessible or desirable to all. In the interim, I will be translating the publications that come out of this thesis to share with Jaina, who will be able to draw on this work to continue their support of campesino union advocacy in Tarija, especially around the fight for a campesino municipality that is ongoing.

Directions for future research

This work builds on extensive academic and community labour that has gone into documenting agrobiodiversity in small-scale agricultural communities. Documenting diversity and knowledge has been very important for building academic understanding of community food systems and for providing evidence that investing in small-scale agriculture has benefits for conservation as well as food security. However, I believe that knowledge documentation has its limits.

Particularly in dealing with campesino and Indigenous seed varieties, closely documenting

varieties to justify the validity of their knowledge systems can sometimes have unintended consequences including real or perceived knowledge theft via the perpetuation of extractive research dynamics. It will be important for future work addressing seeds in this region to move beyond a documentation paradigm into one that centres community voices and amplifies community demands.

Campesino communities have been working for generations to nurture their community food systems. They have not only been successful in this, but also in stewarding immense agricultural biodiversity that is at the heart of climate resilient agriculture. At a time where climate change is having a substantial impact on small-scale farmers' ability to continue providing food for their families and communities, future research needs to play an activist role in working with communities to advocate for more resources to support the continued survival of their communities. My research revealed that communities have a desire to continue growing their ancestral varieties but that environmental upheaval is making this difficult to achieve in situations where there is a lack of access to reliable water. Community councils are ready to support local infrastructure projects, but resources need to be dedicated to ensuring they have the financial capacity to take on projects like this. Public plant breeding and community-directed variety revitalization could play a role in supporting communities in bringing back the varieties that are important to them, but these also require public investment. Future research will be required to understand how these kinds of programs and initiatives could be facilitated to support community goals.

Finally, this research revealed that local communities are struggling to continue to shape the food system according to their values and goals. But it also revealed that people are creative and resilient when it comes to finding ways to ensure that their knowledge gets passed down to future generations, giving young people the cultural tools they will need to continue to shape the food systems according to their values and goals. Understanding how people continue to practice seed sovereignty in a variety of contexts will be critical to informing our understanding of seed sovereignty in the context of unpredictable climate change. We need to continue to make visible the practices that people prioritize when confronted with change, informed by their traditional knowledge, and how those can continue to shape a seed sovereign future.

Concluding thoughts

The COVID-19 pandemic, while outside the scope of this paper, demonstrated that people are willing to come together and contribute what they can to creating resilient community food systems when the need presents itself. In Tarija, campesino farmers at the beginning of the pandemic banded together to assemble food boxes that could be distributed to families in urban areas when the markets that people depend on for fresh fruits and vegetables had to virtually shut down. These kinds of actions prove yet again that farmers have the solutions and the drive to confront crises. But they need support and resources to continue to do that critical work. They need to be supported in cultivating seed sovereignty and controlling the genetic resources that will allow them to usher in the future of community food systems, according to their own values and priorities. The crises we are facing require diverse, community-based solutions, rooted in local worldviews and knowledge systems, to be effective. There is no one-size-fits all way of managing food systems that will offer us collective salvation. A decolonial approach to seed requires ensuring that campesino and Indigenous farmers who feed the world can practice self-determination in shaping their food system.

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Appendix 1: Household Seed Use Survey

Household code:

Irrigation available? Y / N

Use crop photos as identification prompt

[illegible]

Notes:

Appendix 2: Life History Interview Guide

Personal Background

Age (approximately)

Who lives in this household? Do you have children? Where do they live? What do they do?

Where were you born?

(if elsewhere) – What brought you to LN? How long have you lived here?

(if LN) – Have you always lived here?

What is your current primary occupation?

Have you done other kinds of work? What do other people in your family do for work?

Personal History

What was it like here when you were a child?

What work did your parents do?

How much land did they have? Did they raise animals?

What kinds of crops do you remember them growing?

Do you remember where they got their seed? Did they have most of it, get from neighbours or market? Purchase from somewhere? Did you learn anything about saving seed when you were a child?

What kinds of food did you eat?

Where did it come from? (Garden? Fruit trees? Animals? Foraging? Purchase? Trade?)

How much did you grow/raise yourself?

If you purchased food, where did it come from?

Did you share/trade any food with neighbours?

What kinds of services were available in the community? School? Health centre? Electricity? Water? Irrigation?

What kinds of things did you do as a child? School? Helping your parents? What were your responsibilities?

What was it like when you were first beginning your household?

Did you live where you live now? If not, where?

How much land did you have? Did you raise animals?

What was your primary occupation when you began your first household?

What kinds of food did you grow? How did you choose them? Where did they come from?

When did you have children? Were they involved with growing/raising/cooking food?

What was it like once your children had grown?

Did your children leave the house? When/why?

What is their primary occupation now? How often do you see them? Do they have children of their own? Do they continue to grow food/raise animals? In the same way?

Regional history

How has life changed here since you were a child?

What were most people growing when you were young? Now?

Do people have more or less land than they used to?

What about services, like irrigation, or schools, or health centres, or markets?

Do more people sell food at markets now than before? Why?

What other changes have you seen?

Current context

What kinds of crops do you grow/produce now? *(more or less detail, depending on if biodiversity assessment has taken place)*

What is new or different from when you were a child? Why did you change?

What does the food you grow get used for? (market, household consumption, seed saving, sharing with neighbours...?)

What are your sources of seed?

Saved? Neighbours? Market? Government?

Which kinds of crops come from which sources?

Why do you use that source? When did you start using that source?

What do you like about that source? What do you dislike?

Are there any seed sources you would like to obtain seed from that you currently do not? Why or why not?

For saved seed:

How do you clean and store your seed?

How do you choose which seed is best to save? Where did you learn from?

What kinds of qualities do you appreciate about the seed you save? Is there anything you wish could be improved?

For market seed:

How do you select seed to purchase? Do you do it yourself, or does a friend or colleague go to the market for you?

How do you know which seed will be good?

For market & saved seed:

Have you had any bad experiences using market seed? Why/what happened?

Do you use any other inputs to grow this seed? (fertilizers, pesticides, etc.?)

Do you have any infrastructure to help you grow this crop (e.g. nets, irrigation..)

Values / Aspirations

(If still saving seed) Why is it important to you to continue saving seed?

Have you/do you want to teach your children about saving seed?

What kinds of challenges do you face in making choices about what kinds of seed to use?

Does the term seed sovereignty resonate with you? What does that mean to you?

If you could change something about how you obtain, produce, save, or store seed, what would it be?

Have you ever spoken with your neighbours about how they obtain seed? Is it different from your own ways? How do you feel about how other people obtain, produce, save, store seed?

Appendix 3: Interview Guide – Knowledgeable Person (Seed Policy)

***To be tailored slightly depending on interviewee*

Can you introduce yourself and your organization/your role within it? How long have you been in your current role? What motivates you to engage in your current work?

What changes have you seen over time in how campesino farmers access seed?

- Do many still practice seed saving?
- Do many access seed from market?
- Are there government programs that provide seed? More now than before?
- What kinds of factors go into a choice to save or purchase seed for a particular crop? Are some crops more often saved/purchased than others?

What changes in seed policy have you witnessed over your time in your current role?

- more/less/equal attention to FPIC?
- more/less/equal attention to in situ conservation strategies?
- more/less/equal attention to supporting campesino knowledge systems?
- more/less/equal attention to supporting SPS campesino?
- changes to national seed program?

How would you characterize the current trajectory of seed-related policy in Bolivia? (e.g. UPOV, free trade agreements, PBR laws, seed certification, support (or lack of) for campesino seed systems) What would an ideal seed system look like from your perspective?

What are the barriers and opportunities for campesino farmers in accessing formal seed systems (e.g. certified seed)?

What are the barriers and opportunities for campesino farmers using campesino seed systems?

How would you characterize the relationship between formal and campesino seed systems? What kind of relationship would be ideal, from your perspective?

Is seed sovereignty a concept that resonates with you? What does that mean to you?

Appendix 4 – Informed Consent Form (Laderas Norte Community Members)



Natural Resources Institute
Clayton H. Riddell Faculty of Environment, Earth, and Resources
70 Dysart Road Winnipeg, MB
Canada, R3T 2N2
General Office 204-474-8373

Research project title: Cultivating Seed Sovereignty in Tarija, Bolivia

Researcher: Kaitlyn Duthie-Kannikkatt

Research Partner: Comunidad de Estudios JAINA

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read and/or understand this carefully and to understand any accompanying information.

Research purpose and objectives: The present research is part of my Ph.D. studies in Natural Resources and Environmental Management in the University of Manitoba, Canada. The main purpose of this research is to explore what campesino farmers in Laderas Norte think about seed sovereignty, and what kinds of institutions or services could be created to help support the cultivation of seed sovereignty for individuals and in the community. It will also explore if there is a link between seed sovereignty and living well in Laderas Norte. This field work will take place from April 2017 to November 2017, and data analysis and thesis writing will continue until approximately December 2020. This form is designed to provide you information on the objectives, methods, possible risks and benefits, as well as the expected outcomes of this research.

Nature of participation: Your participation in this study is voluntary. If you decide to participate, you may withdraw from the study at anytime. If you withdraw from this research, your contributions to the research will be removed and destroyed. You also have the right to omit any question(s)/procedure(s) you choose. If you agree to participate, you will be asked to be involved over a maximum period of 12 months. Your participation will involve allowing myself (and at times another researcher) to participate in your daily farming activities. You will be invited to participate in research exercises at your discretion and at your convenience. On average, research activities will last one hour and will not exceed two hours in one session.

Information gathering procedures: If you decide to join this research, I will ask you to participate in the following exercises, either in the field or in some other mutually agreed upon setting.

Participation: This method involves myself and perhaps my research assistants taking part in daily activities related to farming and/or seed saving. My hope is that participation in research activities will not take away from your time spent doing every day activities. This method will also allow you to provide ongoing feedback to research findings throughout the research process.

Interviews/Surveys: During my stay in Tarija and Laderas Norte, I will ask for your participation in one or more of the following research exercises. You can choose whether your contributions will be recorded digitally, or in field notes only. I will always inform you if I am collecting information that I plan to use in research, and you may choose to not participate in any activity at any time. To ensure you are fully aware of what information will be used, I will go over all data gathered from interviews/surveys with you to make sure I have understood everything correctly.

1. **Life histories:** The aim of a life history interview is to understand how people's lived experiences have informed their relationship to a given subject (in this case, seed sovereignty). I will ask some questions to prompt you to reflect on how your interactions with various seed systems have changed over time, but you can also feel free to communicate what is meaningful to you. These narratives will help me to construct a timeline of your relationships with seeds, in response to various processes of change. These sessions will mainly take place over the course of your regular daily activities, such as food preparation or farming. They will take no longer than 1 hour per session, for a maximum of 3 sessions.
2. **Biodiversity assessment:** I have devised a brief survey to understand what you are growing in your farm and from where you source your seed. This is to understand the distribution of agrobiodiversity in your farm and in Laderas Norte generally. This survey will be administered by either myself or one of my field assistants. The results will be recorded on paper, and I will translate the data into an electronic database afterwards. This data will be kept confidential and secure. The biodiversity assessment is designed to take no more than 2 hours.
3. **Group workshops:** You will be invited to participate in group workshops as part of the research process. These workshops are designed to provide an opportunity for you to talk about what you think of seed sovereignty in a shared space with other members of the community. Other group workshops may also take place when we begin to think about what kinds of products, services, or institutions might support you in cultivating seed sovereignty in Laderas Norte, if that is something you are interested in. The group workshops will take no more than 3 hours, and will be scheduled at a convenient time to allow for maximum participation. There will be a maximum of 3 groups workshops.

Anonymity and Confidentiality: All data will be collected anonymously, and you will be identified only by pseudonym in the products of this research. At a later date, you will be given an opportunity to consent to having your contribution to this research be attributable to you by name, if you so desire. All personally-identifiable information will be removed from transcripts, recordings, photographs, and research products; only I will have access to your real name. All information will remain confidential and access will be limited to me and my advisory professor. Raw data, including field notes, audio recordings and/or photographs, will be stored and protected either on my person (when I am in Laderas Norte) or in a locked cabinet or password-protected computer during the data collection, analysis and writing stages of my research.

Upon completion of my research, I will create, in collaboration with project partner JAINA, a secure digital and physical archive for data that may be useful to them and to Laderas Norte for future projects undertaken as part of their signed agreement with the San Agustin subcentral, ensuring that confidential data remains confidential and that your identifying information is removed. This archive is being created in order to ensure that you and your community can continue to benefit from this work. You can choose whether or not you want your contributions included in this archive. I will analyse this data and synthesize it into a useful format for the purposes of my project, but I am

committed to ensuring that the data itself belongs to the community, and will support the creation of resources to ensure this data is stored properly, following ethical guidelines. The archive will include photos, survey data, and completed life histories that you consent to being made public, and will be housed at the offices of Comunidad de Estudios JAINA in the city of Tarija. If you consent to the inclusion of your contribution, your information will be confidential and anonymous. This archive can be accessed by the JAINA team for future work conducted in collaboration with Laderas Norte, by the San Agustin Subcentral, or by members of the community of Laderas Norte.

You will be asked to provide consent to the use of any information published in a written thesis, academic publications, reports, research related websites, arts based research and conference presentations. In the consent section of this document, you will be asked to provide your informed consent regarding whether all or part of your contributions to this research can be used publicly and anonymously. You may withdraw any/all contributions you have made to the research upon request until the submission of my thesis and publication of my results (estimated December 2020). In the event that you withdraw from the research, your contribution will be deleted from audio recordings, erased from field notes, and/or deleted from computer files; any personal photographs will be destroyed.

Risks and Benefits: This research is not expected to create physical or economic risks for participants. However, there is some risk of emotional distress during the process of constructing life history narratives, if there are harmful memories associated with socioeconomic or environmental shocks that may have impacted you. To mitigate this risk, I remind you of your right to pause/stop the conversation at any time, or to skip questions, or to withdraw from the study entirely. The process of conducting the biodiversity assessment is designed to protect your rights and your knowledge about the plants you grow. For this reason, I do not intend to collect any plant material, and instead just wish to document plant varieties and their general uses for the purpose of supporting community initiatives. If you feel uncomfortable with any information I have asked for, you can always feel free to skip a question or withdraw from the activity.

Benefits associated with the project will be numerous. Firstly, it provides an opportunity for you and others in your community to move through a process whereby your views and visions for seed sovereignty can be expressed in a constructive way. This research provides an opportunity for that conversation to take place in a way that you can exercise ownership over. This project also has concrete objectives attached to it in terms of taking your dialogue around visions for seed sovereignty in your community and designing a product/service/institution that can support the realization of those visions. If you are interested, you can join in a process of creating something that will be of value to Laderas Norte moving forward. Finally, equipped with the findings of the research (which will be provided in an accessible format – see dissemination section), you will have will have good data to back you up when you communicate with decision-makers about your interests.

Compensation: I will not provide monetary compensation for participation in this study. However, I will cover all costs of the project, including travel associated with attending events and including the materials given to the community that result from this research.

Feedback and publications: You will have ongoing opportunities to express your interests, concerns, and aspirations regarding the research findings and seed sovereignty in Laderas Norte more generally, in group workshops and through individual interactions with me and my research assistants. There will be one group workshop in which all community members will be invited to provide feedback on the general results. I will also provide you with a copy of your interview

transcript for you to review and make changes to; this transcript can be read aloud to you at your request. In addition, all non-confidential project results and materials will be accessible to participants approximately three months after the research project finishes. They will also be archived at the offices of Comunidad de Estudios JAINA. Print copies of your photographs and your interview transcripts, as well as a print summary of the results of the research, will be prepared for you to keep once the research has been completed.

You will be asked to provide your informed consent to the following potential uses of this research: a written thesis, academic publications, public reports, research related websites, and conference presentations. Raw data will remain anonymous and the identifiable information will be removed from transcripts, recordings and photographs. This information will be destroyed after all publications are completed or three years after submitting my thesis. All data that you do not consent to making public will be destroyed by December 2023.

Contact information:

Kaitlyn Duthie-Kannikkatt Graduate Student Researcher University of Manitoba, Canada +591 xxx-xxxx Email: xxxxxxxx	Dr. Iain Davidson-Hunt Research Advisor University of Manitoba, Canada +1 xxx xxx xxxx Email: xxxxxxxx	Carlos Vacaflores Researcher – Comunidad de Estudios JAINA Tarija, Bolivia +591 xxx xxxx Email: xxxxxxxx
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The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way. This research has been approved by the Joint-Faculty Research Ethics Board (JFREB). If you have any concerns or complaints about the project, you may contact any of the above-named persons or the Human Ethics Coordinator (HEC) at humanethics@umanitoba.ca. A copy of this consent form will be given to you for you to keep for your records and reference.

Consent: You will be asked to provide informed consent to multiple aspects of this research either in writing or on an audio recording. Consent is ongoing, and can also be withdrawn at any time.

Yes	No	I have read or had read to me the details of this consent form and understand its content. My questions have been addressed.
Yes	No	I agree to participate in the research activities outlined above, and understand that I can choose to withdraw from any activity at any time
Yes	No	I agree to have my interviews audio recorded
Yes	No	I agree to the inclusion of my confidential and anonymous contributions in an archive that will be securely stored in the JAINA office in Tarija and can be accessed by JAINA, the sub-central, or Laderas Norte community members.
Yes	No	I agree that anonymous photographs or depictions I create during this research (such as maps) may be used in research products
		I agree to the anonymous use of statements I make during interviews and group workshops in research products
Yes	No	I agree to be contacted for future research on seed systems conducted by Kaitlyn Duthie-Kannikkatt or Comunidad de Estudios JAINA

Your signature on this form (and/or audio recorded consent) indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

Participant name: _____

Participant signature **Date**

Researcher signature **Date**

For oral recorded consent, please state : “On this date, _____ (state the present date), I, _____ (state your full name) have had read to me the details of this consent form. I (do/do not) understand its content. I (agree/do not agree) to participate in the research activities outlined above and understand that I can choose to withdraw from any activity at any time. I (agree/do not agree) to have my interviews audio recorded. I (agree/do not agree) to have my anonymous contributions included in an archive at JAINA. I (agree/do not agree) to have my anonymous contributions used in research products, including photos, statements, and depictions I create. I (agree/do not agree) to be contacted for future research about seed systems by Kaitlyn or JAINA.”

Appendix 5 – Informed Consent Form (Knowledgeable persons – seed policy)



Natural Resources Institute
Clayton H. Riddell Faculty of Environment, Earth, and Resources

70 Dysart Road Winnipeg, MB
Canada, R3T 2N2
General Office 204-474-8373

Research project title: Cultivating Seed Sovereignty in Tarija, Bolivia
Researcher: Kaitlyn Duthie-Kannikkatt
Research Partner: Comunidad de Estudios JAINA

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read and/or understand this carefully and to understand any accompanying information.

Research purpose and objectives: The present research is part of my Ph.D. studies in Natural Resources and Environmental Management in the University of Manitoba, Canada. The main purpose of this research is to explore what campesino farmers in Laderas Norte think about seed sovereignty, and what kinds of institutions or services could be created to help support the cultivation of seed sovereignty for individuals and in the community. It will also explore if there is a link between seed sovereignty and living well in Laderas Norte. This research will take place from March 2017 to October 2017. This form is designed to provide you information on the objectives, methods, possible risks and benefits, as well as the expected outcomes of this research.

Nature of participation: Your participation in this study is voluntary. If you decide to participate, you may withdraw from the study at anytime. If you withdraw from this research, every attempt will be made to remove your contributions and have them destroyed. This interview is designed to take approximately 30-45 minutes. The purpose of these interviews is for me to gain a better understanding of the political and policy context around seed systems in the area. They involve interviewing people like yourself who are not necessarily community members in Laderas Norte but who have high-level system factors knowledge about processes affecting local seed sovereignty. You can choose whether your contributions will be recorded digitally, or in note form only. To ensure you are fully aware of what information will be used, I can go over all data gathered from this interview, at your request, to make sure I have understood everything correctly. I will also provide a print summary of the research results to you.

Anonymity and Confidentiality: You will decide whether you wish to use your real name or remain anonymous. If you request anonymity, you will be given a pseudonym in this project and all personally identifiable-information will be removed from research products; only myself will have access to the real names of anonymous participants. All information will remain confidential and access will be limited to my advisory professor. Information including field notes, audio recordings and/or photographs, will be stored and protected either on my person (in the field) or in a locked cabinet during the data collection, analysis and writing stages of my research. Raw data will

remain anonymous and the identifiable information will be removed from transcripts, recordings and photographs.

This information will be destroyed after all publications are completed or three years after submitting my thesis. Any information you do not consent to being made public will be destroyed by December 2023. You will be asked to provide consent to the use of any information published in a written thesis, academic publications, reports, research related websites, arts based research and conference presentations. In the consent section of this document, you will be asked to provide your informed consent regarding: 1) whether you wish to participate in this research, 2) whether you consent to having your contribution published in research products, 3) whether you wish to remain anonymous or be named in the research products, and 4) whether you consent to having your information included in a community research archive to be housed at JAINA and accessible by JAINA, the Subcentral, and Laderas Norte community members. You may request any of your research contributions or any other non-confidential data at any point during the research. You may withdraw any information you have provided upon request until the submission of my thesis and publication of my results (estimated December 2020). In the case you withdraw any or all information, it will be deleted from audio recordings, erased from field notes, and/or deleted from computer files; any personal photographs will be destroyed.

Risks and Benefits: This research is not expected to create physical or economic risks for participants. Benefits associated participating in the project include supporting the aspirations of Laderas Norte and the San Agustin Subcentral.

Feedback and publications: All non-confidential project results and materials will be accessible to participants approximately three months after the research project finishes. Print copies of your interview transcripts will be prepared for you as requested (as indicated in the consent section).

In addition, you will be asked to provide your informed consent to the following potential uses of this research: a written thesis, academic publications, public reports, research related websites, and conference presentations. Raw data will remain anonymous and the identifiable information will be removed from transcripts, recordings and photographs, if you so desire. This information will be destroyed after all publications are completed or three years after submitting my thesis. All data that you do not consent to have included in the archive or to have published will be destroyed by December 2025.

Contact information:

Kaitlyn Duthie-Kannikkatt Graduate Student Researcher University of Manitoba, Canada +591 xxx-xxxx Email: xxxxxxxx	Dr. Iain Davidson-Hunt Research Advisor University of Manitoba, Canada +1 xxx xxx xxxx Email: xxxxxxxx	Carlos Vacaflores Researcher – Comunidad de Estudios JAINA Tarija, Bolivia +591 xxx xxxx Email: xxxxxxxx
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This research has been approved by the Joint-Faculty Research Ethics Board (JFREB). If you have any concerns or complaints about the project, you may contact any of the above-named persons or the Human Ethics Coordinator (HEC) at +1 204 474 7122, or email humanethics@umanitoba.ca. A copy of this consent form will be given to you for you to keep for your records and reference.

Consent: You will be asked to provide informed consent to multiple aspects of this research either in writing or on an audio recording. Consent is ongoing, and can also be withdrawn at any time, until the publication of my thesis (estimated December 2020).

Yes	No	I have read or had read to me the details of this consent form and understand its content. My questions have been addressed.
Yes	No	I agree to participate in the research activities outlined above, and understand that I can choose to withdraw from any activity at any time
Yes	No	I agree to have my interviews audio recorded
Yes	No	I wish to have a copy of my interview transcript prepared and shared with me.
Yes	No	I agree to the inclusion of my contributions in an archive that will be securely stored in the JAINA office in Tarija and can be accessed by JAINA, the sub-central, or Laderas Norte community members.
Yes	No	I agree to the use of statements I make during interviews in research products
Yes	No	I agree to be contacted for future research on seed systems conducted by Kaitlyn Duthie-Kannikkatt or Comunidad de Estudios JAINA

Choose one:

	I wish to remain anonymous in all research products, including the data archive. (Pseudonym: _____)
	I wish to have my contributions attributable to me by name.

Your signature on this form (and/or audio recorded consent) indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

Participant name: _____

Participant signature **Date**

Researcher signature **Date**

For oral recorded consent, please state: “On this date, _____ (state the present date), I, _____ (state your full name) have had read to me the details of this consent form. I (do/do not) understand its content. I (agree/do not agree) to participate in the research activities outlined above and understand that I can choose to withdraw from any activity at any time. I (agree/do not agree) to have my interviews audio recorded. I (agree/do not agree) to have my contributions included in an archive at JAINA. I (agree/do not agree) to have my contributions used in research products. I (agree/do not agree) to be contacted for future research about seed systems by Kaitlyn or JAINA

Appendix 6 – List of cultivated varieties encountered in Laderas Norte

List of common names for varieties, synthesized from data collected during Household Survey

Trees (n=25)	Variety (if applicable)
Higuerra (Fig)	
Albarillo (Apricot)	
Manzana (Apple)	
Palta (Avocado)	
Limon (Lemon)	
Naranja (Orange)	
Eucalypto (Eucalyptus)	
Granada (Pomegranate)	
Mandarina (Mandarin)	
Pino (Pine)	
Carnavalita	
Membrillo (quince)	
Tipa (Tipuana)	
Arcan	
Nogal (Walnut)	
Mango	
Pomelo (Grapefruit)	
Durazno (Peach)	Blanco
	Amarillo
	Rosada
	Risco
	Olingat
	Risco amarillo

Durazno (Peach)	Risco blanco
	Blanco olingato
Vegetables (n=32)	Variety (if applicable)
Acelga (Chard)	Verde
	Blanca/Pisancalla
	Criollito
	Chiquita
Aji (Chili pepper)	Putita (Coloradita)
	Picante
	Amarillito
Apio (Celery)	Huerta
	Antiguo
Remolacha (Beet)	
Rábano (Radish)	
Tomate (Tomato)	Rio grande
	Petajuego
	Santadelia
	Perra
	Criollita
	Manzanita
	Morron
	Hibrida
	Grande

Lechuga (Lettuce)	Blanca
	Verde
	Morada
Achocha (Cucumber)	
Morron (Bell pepper)	Grandes (4 punto)
Zanahoria (Carrot)	
Cebolla (Onion)	Cabeza (Morada)
	Cebollin (cebolla verde)
	Misquerita
	Grande
Ajo (Garlic)	Comun
Repollo (Cabbage)	Verde
Herbs, Teas, and Flowers (n=21)	Variety (if applicable)
Oregano	
Albajaca (Basil)	
Perejil (Parsley)	Criollita / Comun
	Hoja grande
	Americano (hoja grande)
Cilantro	
Manzanilla (Camomile)	
Borraja (Borage)	
Rosas de pascua (Easter roses)	
Rosas (Roses)	Oscuras
Claveles (Carnations)	Normal
	Clavelines
Gladiolas	

Boca conejo	
Inojo (Dill)	
Siempre vives	
Eluciones	
Chispa	
Nardo	
Girasol (Sunflower)	Grande
	Chiquita
Legumes (n=19)	Variety (if applicable)
Porotos (Beans)	Overito
	Trijolo
	Blanquito (vacquitos)
	Negro
	Cumandita
	Coloradito
	Moraditos
	Vaquitas
	Rojitos
	Chiquita (vainita)
	Rayadito
Arbejas (Peas)	Chiquita
	Media arbeja
	Arbejon
Mani (Peanut)	Vallo de cheche
Haba (Fava)	Chiquita
	Grande vaina
Garbonzos (Chickpeas)	Criollo (chiquito)

Garbonzos (Chickpeas)	Grande
Grains (n=24)	Variety (if applicable)
Maiz (Corn)	Pisancalla
	Pisancalla (Romanito chiquito)
	Pisancalla (Cochabambino)
	Pisancalla (Vaca)
	Pisancalla chiquita
	Pisancalla grande
	Morocho
	Morocho (Romanito)
	Morocho (Antiguo/criollo)
	Morocho (Sauciño)
	Morocho (chiquito)
	Morocho (grande)
	Garapatita
	Amarillo
	Chapare (chaparita)
	Blanco tostado
	Dura
	Sauceño
Trigo (Wheat)	Mochito
	Agualuz
	Lavilluro
	Gabillo
Coime (Amaranth)	

Quinoa (Quinoa)	
Squash (n=14)	Variety (if applicable)
Lacayote (Local sweet melon)	Blanca
	Verde
	Overito / Chesche
	Unidentified
Sandia (Watermelon)	Rosada / Rojo
	Amarilla
	Verde
	Blanca
Melón (Melon)	
Zapallo (Squash)	Grande (quintalero)
	Chiquito
	Tronquito
	Guineo
	Rovero
Fruit (n=16)	Variety (if applicable)
Frutilla (Strawberry)	Chiquita
	Grande
	Aroma
	San Andrea
Uva (Grape)	Moscatel (blanca)
	Puro blanca / Blanquita
	Blanca de mesa
	Negra de mesa
	Negra comun

	Tribera
	Trempanera
	Italia
	Paral
Tuna (Cactus fruit)	Colorada
	Blanca
	Amarilla
Tubers (n=13)	Variety (if applicable)
Papa (Potato)	Desiree (Rosada)
	Colorada

	Cardenal
	Runa Cron
	Carteja
	Rojitos
	Revolucion
Camote (Sweet potato)	Amarillo
	Morado
Yacón	
Mandioca (Cassava)	Blanca
	Morada
Oca	