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Agrobiodiversity's caring material practices as a symbolic frame for environmental governance in Colombia's southern Tolima

Abstract

248 words.

Agrobiodiversity scholarship broadly examines plant-human interactions in agricultural landscapes and often concerns the governance of seed resources. This article pivots attention away from agrobiodiversity as a set of governable genetic resources to examine how the relational aspects of agrobiodiversity come to symbolize a future vision of environmental governance. Tolima residents are between two significant socio-environmental events: the 2016 Peace Accord ending decades of violent conflict and the development of an irrigation megaproject. This context creates space in which to imagine future governance relations. Drawing insights from political ecology-informed environmental governance and feminist care ethics, I show how caring material practices around native seeds translate into a vision for governance. The symbolic frame of agrobiodiversity promotes an alternative ordering of human-environment relations than that of export-oriented production, which has recently increased in southern Tolima. Methods included 42 interviews, 60 household surveys, and participant observation throughout 12 months. Findings illustrate that the caring material practices of agrobiodiversity particularly in seed exchanges, home gardens, and kitchens become a symbolic frame for environmental governance in which access to land, food, and community cohesion are ensured and protected. This research makes two contributions to the literature of agrobiodiversity. First, drawing on feminist care ethics, I argue that the caring material practices of agrobiodiversity create 'care-full' human-environment connections, especially important in the post-conflict context. Second, findings suggest that agrobiodiversity is not simply a set of plant materials to be governed, but also can have a strong symbolic function as a frame for environmental governance.

Keywords: *agrobiodiversity, environmental governance, feminist care ethics, post-conflict, development, Colombia*

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1.0 Introduction

Agrobiodiversity, or the biodiversity of agricultural ecosystems, includes not only biological aspects of human and plant interactions, but also consists of social and biocultural factors (Leclerc & d'Eeckenbrugge, 2012; Nemogá, 2016; Zimmerer et al., 2019). The relational aspects of agrobiodiversity include acts such as seed exchanges, culinary or artisan production tied to specific varieties, or communal cultivation practice, among other examples (Abizaid et al., 2016; Chambers and Momsen, 2007; Delêtre et al., 2011). Relational practices centered on agrobiodiversity contribute to the shaping of community dynamics including ontology, identity, gender roles, and economies (Aistara, 2011; Kerr, 2014; Schöley and Padmanabhan, 2017). More than a count of plant varieties to be governed, agrobiodiversity as a set of relational practices often centers on native varieties of seed and plant material (Zimmerer et al., 2019b). The material practices around seeds create 'landscapes of care' (Graddy-Lovelace, 2020) in which cultural practices, traditions, and local environmental knowledge imbue seeds with meaning (Aistara, 2019; Moreno, 2016; Reyes-García et al., 2009). Additionally, recent scholarship highlights how emergent qualities of human and plant interactions may spark positive relational changes in human-environment interactions. For example, agricultural practices based in diverse systems may inspire agroecology networks (Sherwood et al., 2017), mobilize activist movements resisting state regulations (Silva Garzón and Gutiérrez Escobar, 2020), or form the basis for food system transformations in response to abrupt shifts or crises (Abizaid, Panduro, & Egusquiza, 2020; Zimmerer et al., 2020). Responding to the need for more attention to the relational functions of agrobiodiversity (Visser et al., 2019), I leverage insights from feminist care ethics and environmental governance to analyze how the caring practices of agrobiodiversity produce a symbolic frame for the governance of human-environment relations. I do so by examining in tandem relational practices of agrobiodiversity and competing visions for environmental governance in a post-conflict region of Tolima, Colombia.

The findings presented integrate qualitative data from interviews and participant observation with quantitative household survey data from research conducted over twelve months in two municipalities in southern Tolima. During Colombia's almost 80-year internal conflict, southern Tolima residents experienced waves of violence and occupation by armed groups, displacing them from their land and disconnecting them from neighbors and family. Following the 2016 Peace Accord between the Colombian government and the Revolutionary Armed Forces of Colombia—People's Army (FARC-EP), the post-conflict communities are in the process of repairing and reconnecting relations with each other and the land. As the region heals from the past, it also negotiates future human-environment relationships. A suspended irrigation megaproject in the region has been without state regulation or financing since 2015, creating low-level social conflict over the future of land and water access. Importantly, claims to water and land resources ignite memories of past violence and displacement, thereby interweaving the processes of post-conflict recovery with current and future environmental governance of water and land. By thinking across the frameworks of feminist care ethics and environmental governance, I suggest that the material practices of agrobiodiversity among southern Tolima communities do reconnective work to heal past human-environment relationships and, in response to present development changes, become a symbolic frame for future resource governance. I use the word frame to indicate a roadmap or framework for visions for the administration and social ordering of human-environment relationships, visions both ideological and materially practical.

I engage scholarship of agrobiodiversity to better understand how Tolima residents' values and practices centered on diverse seed varieties and diversified agricultural systems translate into a symbolic vision for governance of resource use. Scholars have illustrated how interactions with seeds can create strong relational ties between humans and between humans and the environment (Aistara, 2019; Carney, 2009). In stark contrast to these connective relations, violent conflict severs and displaces human-environment relationships (Ingalls and Mansfield,

2017; Suarez et al., 2018; Tamariz, 2020; Wrathall et al., 2020). Although scholars have hinted at the potential reparative work of seeds in post-conflict areas (Zimmerer, 2017), there have been few studies of how agrobiodiversity practices might function to (re)connect human-environment relationships (for exceptions see Hernández et al., 2020; Moreno, 2016). I draw on feminist care ethics scholarship to understand how everyday caring labors lead to a reimagining of broader social-environmental relations, and agricultural systems more specifically, that prioritize equitable resource access and human-environment interdependence (Lawson, 2007; Whyte and Cuomo, 2019). Findings from this research suggest that agrobiodiversity's caring material practices both re-establish and create social cohesion and livelihood opportunities amidst shifting land use and community dynamics. Moreover, such caring practices centered in seed exchanges, gardens, and kitchens together manifest as a symbolic frame of a more caring environmental governance that promotes equitable resource use, food access, and the maintenance of cultural traditions and social identities.

This research makes two principal contributions to studies of relational agrobiodiversity. First, by bringing insights from feminist care ethics to bear on agrobiodiversity, I argue that the material practices and labors of agrobiodiversity create 'care-full' connections (Bauhardt et al., 2019) both among humans and between humans and the environment. The theoretical approach of feminist care ethics provides an analytical bridge through which to understand how caring practices become a vision for environmental governance, thereby constituting an alternative to the neoliberal, Green Revolution style of rural development often accompanying large-scale irrigation development. Therefore, my research makes a second contribution by suggesting that agrobiodiversity is not simply a set of relations and plant materials to be governed, but also has a strong symbolic function that influences broader socio-environmental governance.

2.0 Theoretical framing: Integrating agrobiodiversity, environmental governance, and feminist care ethics

2.1 Agrobiodiversity

Agrobiodiversity is understood to be a broad set of relations and interactions between humans and plants across scales, and centers the active role of humans in conserving, fomenting, and interacting with species diversity in agricultural settings (Zimmerer et al., 2019). Studies of agrobiodiversity engage biotic aspects of plant species, landscapes, and genes in addition to questions of history, culture, and identity (Leclerc and d'Eeckenbrugge, 2012; Schöley and Padmanabhan, 2017). A significant body of agrobiodiversity research emphasizes *in situ* conservation and geographic exchanges of seed and plant material (Coomes, 2010; Van Etten & De Bruin, 2007; Zimmerer, 2003). In this paper I use "seeds" to refer to and include both seeds and other planting material (tubers, rootstock, seedlings, and plant cuttings). A parallel body of research and policy examines and critiques *ex situ* agrobiodiversity, or the conservation of seed material in seed banks for future modification or emergencies (Pautasso et al., 2013; Sperling and McGuire, 2012). In literature concerned with *ex situ* agrobiodiversity conservation, governance structures play prominent roles as seeds are understood to be "instrumental" (Visser et al., 2019: 284) to landscapes, food systems, and agribusiness. Both in *ex* and *in situ* studies, agrobiodiversity becomes an object or a set of relations to be governed, evidenced by both national and international regulation of interactions between humans and plant material (Graddy-Lovelace, 2017; Montenegro de Wit, 2016, 2018). In these literatures, the term agrobiodiversity refers generally to agronomic concepts of diversified agricultural systems and to the conservation of genetic seed material.

An associated body of literature examines agrobiodiversity through more relational frameworks, often examining the informal seed sector (Almekinders and Louwaars, 2002; Coomes et al., 2015) in which seeds are imbued with meaning and circulated through every day practices, what Turnhout, Waterton, Neves, and Buizer (2013) call "living with" agrobiodiversity (158). Seeds assume different meanings depending on the users, meanings often tied to traditional or Indigenous ontologies (Graddy, 2013; Nemogá, 2018; Nemogá, 2016). Social relations may center around practices of agrobiodiversity, creating "networks of relatedness" (Aistara 2011: 492) that bring

communities together to collaborate in cultural cultivation practices (Meinzen-Dick and Eyzaguirre, 2009). For example, Isakson (2009) and Schmook, van Vliet, Radel, Manzón-Che, & McCandless, (2013) show how the *milpa* growing tradition (a polyculture based on maize and other domesticated and semi-domesticated species for family subsistence) was so central to cultural identity for Guatemalan and Mexican peasant farmers (*campesinos*), respectively, that producers ensured the farm space and financial assets to sustain the practice of *milpa*, even as the households cultivated other crops for the market or engaged in labor migration. In this paper, my use of the term agrobiodiversity references the human-environment relations realized through material practices, many of which hold important meanings for users.

It is through practices like *milpa* or seed exchanges that agrobiodiversity contributes to placemaking, fundamentally a relational, cultural, and political project often undertaken in reaction to threats to identity and communal trust (Aistara, 2019). The act of placemaking, through which humans connect to and find meaning in interactions with plants and the environment, builds on affective elements including memory (Nazarea, 2006). Culinary traditions are a critical part of agrobiodiversity practices, as the sense of taste especially triggers vivid memories, making seeds, their fruits, and prepared recipes especially important to the connective act of placemaking (Aistara, 2014; Jordan, 2015). Kitchens and home gardens, then, are important spaces in which agrobiodiversity relations are formed (Abizaid et al., 2016; Camacho, 2013; Chambers and Momsen, 2007; Galluzzi et al., 2010). Notably, kitchens, gardens, and certain crop fields are traditionally gendered spaces that reveal women's particularly important roles as consumers, conservationists, and promoters of agrobiodiversity (Carney, 2008; Padmanabhan, 2007; Sachs, 1996). Through material practices such as cooking, seed exchanges, and culturally important cultivation systems, agrobiodiversity becomes a set of connective human-environment interactions that works toward household and community social, economic, and nutritive wellbeing (Jones et al., 2018; Kerr, 2014).

The relational meanings instilled in seeds and realized through material practices, may also be mobilized into social actions in more public spheres. I also draw insights from recent research on the emergent qualities of agrobiodiversity realized through affective relationships as well as through linkages between practices of seed diversity and related global changes (Zimmerer et al., 2020). The “potentialities” of agrobiodiversity, for example, may be defined by the users’ worldviews and signify more sustainable or interconnected forms of agriculture (Visser et al. 2019: 286). The contributors to Sherwood, Arce, and Paredes' (2017) edited volume *Everyday Vitality* illustrate how interactions between plants and people may spark social movements, political awareness, or community organizing. Similarly, Mullaney (2014) draws attention to Mexican producers’ intentional political act of sowing native or ‘*criollo’* maize varieties to resist the government’s promotion of genetically-modified maize monocrops. Silva Garzón and Gutiérrez Escobar (2020) demonstrate that seed practices in Colombian regions inform protests against national seed laws and regulations that privilege agroindustry. In many communities, both in Colombia and globally, worldviews value the more-than-human elements of plants and soils, and such perspectives guide the governance of human-environment relations (Graddy, 2013; Lyons, 2020; Toro Pérez, 2009). The linkages between agrobiodiversity’s material practices and their discursive political manifestations merit more scholarly attention. I bridge these spaces by examining how the material, relational practices of agrobiodiversity in more intimate, often gendered settings are translated into a symbolic framing for environmental governance that is mobilized in the public sphere.

2.2 Feminist care ethics

In order to understand the (re)connections made through relational practices around agrobiodiverse seeds and their mobilization into a framing for governance, I leverage insights from feminist care ethics (henceforth, care ethics). Underpinned by a “social ontology of connection” (Lawson 2007: 3), care ethics foregrounds the interdependence and mutuality of human relations across scales (Held, 2006; Williams, 2018). Care ethics’ emphasis on the relational view of self, and the importance of interpersonal difference shifts understandings of justice away from autonomy, rights, and impartiality (Noddings, 1986; Young, 2008). Essential to the framing of this paper, scholars theorize care ethics through the material practices of care labor (Hekman, 1995; Kittay, 2020; Noddings, 1986). While care ethics attends to caring labors often performed in roles and spaces traditionally

symbolically gendered as women's, research also emphasizes that caring practices are both performed by and benefit people of all genders (Elliott, 2016; Jordan, 2020). Feminist scholars have shown that an ethic of care fosters a sense of responsibility not only to familial or intimate relationships, but also toward justice and equity for strangers in the broader society (Cash et al., 2006; Massey, 2004; Miller, 2011).

Through empirical attention to what material practices offer in the way of meaning, care ethics opens analytical space in which to theorize alternative ways of structuring human-environment relations (Dowler and Ranjbar, 2018; Lawson, 2007). Scholars of feminist political ecology and political economy in particular have shown how material practices of care enable a reimagining of economies and ecologies that are more "care-full" (Bauhardt et al., 2019; Gibson-Graham, 2005). Specifically for human-environment relationships, scholarly engagements with relational and more-than-human frameworks have linked care ethics to matters of ecological concern (Puig de la Bellacasa, 2017, 2010). Here, Fisher and Tronto's broad definition of care work has been foundational: "[Care work is] a *species activity that includes everything that we do to maintain, continue, and repair our 'world' so that we can live in it as well as possible*. That world includes our bodies, our selves, and our environment" (1990: 40, emphasis in original). I point to Fisher and Tronto's emphasis on "maintain, continue, and repair" to emphasize the historic, ongoing, and future-oriented activities of care work that may heal, aspire to, or already realize alternative ways of relating. Also extending Fisher and Tronto's scholarship, Jarosz (2011) argues that care work includes both "relational engagement and action" (319) that extends beyond intimate interpersonal relationships or one's garden to create alternative economies or more sustainable ways of interacting with the environment. Similarly, Graddy-Lovelace's (2020) 'landscapes of care' framework uses care ethics to critique the devaluation of gendered expertise in 'agrarian care skills' by neoliberal plant breeding technologies, and starts to think through opportunities for re-valuing the care inherent in practices of agrobiodiversity. Important for this paper, feminist care ethics permits the theorizing of material practices in more intimate relational settings such as community seed exchanges, home gardens, and kitchens, which may also then promote alternative visions for socioecological relationships. My research specifically builds on the scholarship of geographers who have brought care ethics together with agricultural practices and labor (Graddy-Lovelace, 2020; Jarosz, 2011), and furthers their work by considering how caring practices of agrobiodiversity may function as a symbol around which to organize socio-environmental relations.

2.3 Environmental governance

Political ecologists have shown how the material practices of environmental resource use may function as a form of governance. Environmental governance serves in my analysis as a theoretical lens through which to understand agrobiodiversity as a symbolic frame for the desired future ordering of human-environment relations in the case study region. Often a "co-emergent element" (Zimmerer, 2010: 1079) among other socio-environmental issues, environmental governance is broadly defined as the ordering of human-environment relations through the administration of natural resources. In producing a socio-environmental order, environmental governance is shaped by political and economic forces (Bridge & Perreault, 2011) as well as relational meanings, practices, and knowledge, or the "subjective relationships of people with each other and with the environment" (Lemos and Agrawal, 2006: 304; Carse, 2015). Importantly, political ecologists extend governance to also refer to practices and rules of resource use within communities or households that are not formally mandated by a body like a government, irrigation user group, or other structure (Bridge & Perreault, 2011; Ribot & Peluso, 2009). A political ecology-informed approach to environmental governance is concerned with relations of power, and attends to the role of relational ontologies and social identities in formulations of resource governance (Perreault, 2008; Zimmerer, 2015), currents often undervalued in research of institutional governance. Environmental governance scholarship informed by political ecology is especially useful in its attention to how everyday material practices inform and are co-produced with and through discursive framings of governance (Ribot and Peluso, 2009; Robbins, 2012). For example, Hausermann (2012) shows how cropping and land use practices create an alternative structure of governance to the Mexican government's stipulations for land tenure and use. Hausermann importantly argues that "transformative moments" (1002) of environmental governance often exist beyond institutional arrangements in the material, everyday practices of farmers.

I draw insights from the environmental governance and care ethics literatures to intervene in the scholarship on relational agrobiodiversity. Both the care ethics and environmental governance frameworks provide analytical bridges to link every day human-human and human-environment relational interactions to broader scales of social and political organization. Building on the literature, in the following sections I examine how the material practices of agrobiodiversity (re)connect communities to one another and to the land, and in doing so create a symbolic frame for future human-environment relationships.

3.0 Case Study and Background

I conducted research in the municipalities of Coyaima and Natagaima in Tolima, a department in Colombia's Andean foothills. At an altitude of 300-400m, the agriculture-based communities experience severe dry seasons (June – September) characteristic of the bimodal rainy seasons in the tropical dry forest ecosystem. Communities in Natagaima and Coyaima are known for high levels of crop diversity, especially of maize seed varieties, which *campesino* and Indigenous smallholders cultivate both for home consumption and for markets. In addition to crop diversity, three additional characteristics mark the region: (1) persistent high rates of poverty and malnutrition, 2) a long history of violence, and (3) the suspended irrigation megaproject, the Tolima Triangle Irrigation District (henceforth the Tolima Triangle). Since the early 2000s, the Colombian government has invested development money in the region in the form of health, climate change adaptation, and victims' recovery programs to address vulnerabilities borne from decades of violence, drought, and persistent poverty. Food access and health are central issues of concern, with childhood malnutrition rates of 23% and poverty rates in rural and urban areas of 39% and 58%, respectively (*El Concejo Municipal de Coyaima*, 2016). Yet the most notable development project is the Tolima Triangle (Figure 1). The irrigation megaproject promises water to over 19,000 individuals across more than 20,000 hectares (ha) of semiarid land to promote agricultural development (Acevedo-Osorio, 2013) (Table 1).

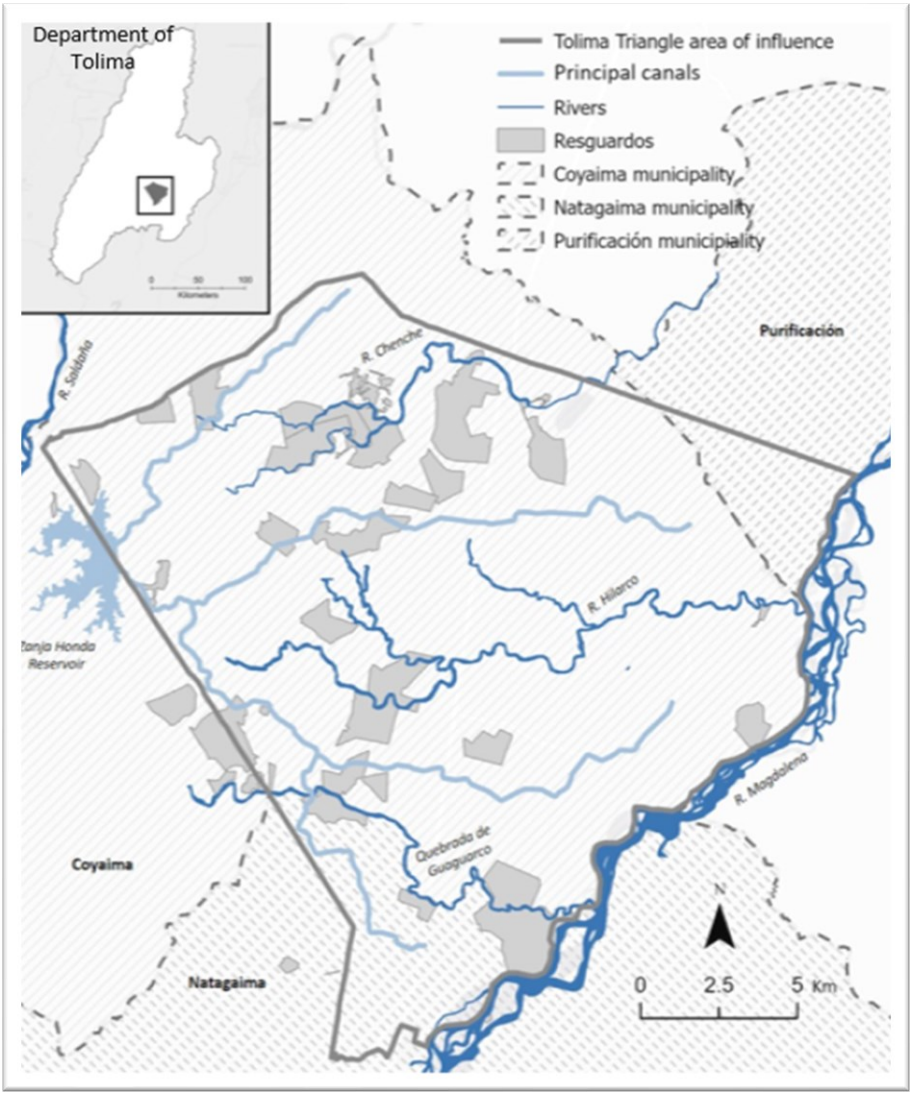

Figure 1. Map of Tolima Triangle Irrigation District area of influence. Reservoir, four principal canals, and surrounding rivers. Located in the department of Tolima, Colombia. (two-column figure)
Map by author.

Details of Colombian government's plan for the Tolima Triangle Irrigation District megaproject.
34,143 ha incorporated into district plan.
20,402 ha of the 34,143 ha (i.e., 60%) are apt for irrigation.
19,995 people will receive water. 17,502 of the beneficiaries (i.e., 88%) identify as Indigenous Pijao.
Percent area of megaproject in each of the three municipalities: Coyaima: 85.8% Natagaima: 9.6% Purificación: 4.6%
Population totals in each municipality as of 2019: Coyaima: 18,999 Natagaima: 14,292 Purificación: 22,682

Table 1. Details of Colombian government's plan for the Tolima Triangle Irrigation District megaproject.

Information for Table 1 from Corpoica, 2012. *Diseño e implementación de la fase demostrativa del plan agroproductivo del Distrito de Riego del Triángulo del Tolima*. [Powerpoint slides]. Retrieved from: https://es.slideshare.net/AlvaroPuentesMolina/iica-fonadefase-demostrativa-plan-agroproductivo.

Poverty and climatic stress intermesh with social and ethnic diversity and long histories of violence to create a complex cultural landscape. Approximately 88% of the Tolima Triangle's beneficiaries identify as Indigenous Pijao descendants. More than 100 Pijao organizations and *resguardos* (i.e., land adjudicated to Indigenous peoples by the government) are within Natagaima (47) and Coyaima (61) municipalities (Colombia Ministry of the Interior, 2015, p. 23). The remaining beneficiaries are *campesinos* and a small number of agroindustrial producers. During conversations, residents often referred to the most intense periods of violence in the region: The Violence (*La Violencia*) of the 1940s, FARC occupations in the 1960s and again in the 1990s, and finally, occupation by the paramilitary group the United Self-Defense Forces of Colombia (*Autodefensas Unidas de Colombia*, or AUC) in the early 2000s.[1]

Southern Tolima's most prominent land uses include pasture for cattle and the production of row crops including maize and beans. Production of *hoja de cachacho*, or plantain leaves harvested for Colombian tamales, as well as citrus production, are found in concentrated areas throughout the region (Acevedo Osorio 2016). For many *campesino* and Indigenous families, subsistence (*pancoger*) crops occupy fields closer to homes and form the basis of family food sovereignty. In Colombia, *pancoger* is the word used to describe traditional growing systems of staple subsistence crops. *Pancoger* crops are region- and climate-dependent. In Tolima, *pancoger* often includes plantains, yuca, beans, and maize. Frequently fruits are also part of *pancoger*, especially limes, papaya, and mangos (Table 3). Larger landholdings are used to graze cattle or to produce row crops, and more recently, for the production of paddy rice.

The Tolima Triangle megaproject lies fewer than 20km south of two other irrigation megaprojects, which provide water to the heart of Colombia's rice production. Processed exclusively for national markets, rice cultivation drives the economies of regional towns. Large, medium, and small producers cultivate rice in northern districts, but expensive water tariffs, land rent prices, and agrochemical input costs exert economic pressure on producers. This is contextually important, as contentious transitions in land use and resource governance in the Tolima Triangle occur in the shadow of these northern districts.[2]

[1] Although the region is officially "post-conflict," as recently as 2018, the United Nations reported ongoing paramilitary activity. In July 2019, interviewees reported rumors of the nearby presence of the National Liberation Army (ELN) guerrilla group. Therefore, although officially southern Tolima is labelled "post-conflict," peace is tenuous as residents continue to experience threats of violence or disruption of life by armed groups.

[2] For more see Pachón-Gantiva, 2020.

Among Tolima residents, some use the more academic word of agrobiodiversity, while others simply reference diversified agricultural systems either for rotated market crops or *pancoger*. Agronomically, agrobiodiverse systems in southern Tolima refer to small intercropped plots, comprised of a field of interplanted fruit trees or a field through which families rotate *pancoger* crops. Grassroots and nongovernmental organizations' efforts since the early 2000s have fomented sustainable agricultural management practices through principles of agroecology and multifunctionality to strengthen food sovereignty in a region that has long suffered from socioeconomic and environmental stressors (Moreno, 2016). For the Tolima communities in this research, food sovereignty (*soberanía alimentaria*) signifies access to the resources and the capacity to sustainably nourish oneself, one's family, and one's community without economic dependence on conventional seed and synthetic agricultural inputs. In both municipalities, the local market halls are the principal sources for food. With limited options for food purchasing, and generally low household earnings, the production of *pancoger* and the saving of native seeds, key practices of agrobiodiversity, are of economic and nutritional significance for many families. Moreover, the conservation of native maize varieties especially is of high value in relation to both cultural identity and culinary traditions (more in Section 5.3). In this article, I use the concept and literature of agrobiodiversity to attend specifically to caring practices around the conservation and promotion of native seed diversity, with less attention to agronomic practices.

4.0 Methods

Mixed-methods research took place over 12 months, between 2018-2019, and was supplemented by preliminary research in December 2017. Methods included semi-structured and open-ended interviews, household surveys, textual analysis, and ongoing participant observation to interrogate livelihood systems, resource access patterns, and land tenure. Sixty households (n=60) participated in surveys designed to gather information on household agrobiodiversity and to access voices not always present in community meetings. Selected households were spatially stratified throughout the Triangle's four irrigation sectors in order to capture responses from households located at various distances from irrigation canals. In doing so, surveys were completed by participants with differing water access and cultivation systems. Additionally, survey participants were chosen to illustrate variations in age, gender, ethnicity, and primary land use. Identification of survey households and spatial stratification occurred through regular travel throughout the Tolima Triangle area, going door to door in rural households. For land users who did not live in rural areas, surveys were administered in the towns or population centers of Natagaima and Coyaima (*pueblos*). Surveys registered land tenure, land use, access to water both for domestic and agricultural purposes, participation in ecological and/or Indigenous organizations, and also included open-ended questions regarding environmental governance. Survey data, largely used descriptively in this article, was analyzed using Qualtrics, a survey data processing software.

Anecdotal evidence was drawn from interviews and fieldnotes of participant observation. I conducted a total of 42 interviews (n=42). Interviews with 23 local producers and four with current and previous governors of Indigenous *resguardos* offered insight into present and historical practices of land use, as well as various local meanings of agrobiodiversity. Fifteen additional interviews afforded additional rich context for the region; these were divided among government officials (4), local environmental activists (7), an employee of a local cotton mill (1), and scholars of agronomy and environmental planning (3) with longtime ties to the research area. All interviews were recorded and transcribed. Participant observation included farm visits; meetings of Indigenous *resguardos* and organizations; small, grassroots financial savings groups (*grupos de ahorro*) and local not-for-profit organizations promoting environmental sustainability; conversations with municipal residents; producer protests over irrigation water access; and government-sponsored climate change adaptation workshops. I participated in five informal seed exchange ceremonies, or *trueques*. Both interview transcripts and fieldnotes were analyzed by coding for cross-cutting themes in Atlas.ti, a software for qualitative data processing and analysis (Schreier, 2014).

5.0 Results and Discussion

5.1 Conflict and disconnection

Southern Tolima communities experienced repeated periods of violent conflict throughout the past 80 years, which led to disconnection from one another and the landscape. The internal conflict of *La Violencia* (1948-1965) triggered a massive rural-to-urban migration in southern Tolima. Thousands of Tolima families fled more rural areas, many of whom have since lived in the *pueblos* of Natagaima and Coyaima (Legrand, 1988). In the years following *La Violencia, t*he first FARC units mobilized in the mountainous areas surrounding the study site. FARC units (*frentes*) 21 and 25 occupied Natagaima and Coyaima in the late 1960s, again in the 1990s, and into 2001 (Centro Nacional de Memoria Histórica (CMNH), 2017). FARC units limited citizens' travel, occupied larger landowners' fields, enforced curfews and social rules, and demanded "*vacuna*" (literal translation: vacine) or regular tax-like payments from landowners. Two interviewees recounted that the FARC had sequestered and killed one's father and the other's grandfather, both large landowners at the time. Another had his land seized by FARC units. Many others reported violence during the AUC occupation between 2001 and 2005, during which many residents were displaced and many deaths reported (CNMH, 2017; "Tolima: 9.000 Familias Desplazadas," 2003). One interviewee's husband was murdered by paramilitaries during that era. While traveling through the rural areas, research participants often pointed to sites of violence in the landscape. In addition to more recent experiences of violence, Pijao individuals and communities also carried collective memories of displacement. Pijao communities were limited to grand *resguardos* in the first years of Spanish colonization. In the late 1800s, however, Colombian government dissolved the *resguardos* and converted them into large elite agricultural estates (*haciendas*). Fears of repeated dispossession or displacement remained an undercurrent in conversations of resource access among many Tolima residents.

In addition to severing interpersonal relationships, the conflict disrupted human-environment relationships. Interviews and participant observation revealed that conflict often impeded access to families' subsistence gardens, or *huertas*, an important component of family food sovereignty and places of significant cultural practices. I accompanied an Indigenous woman head-of-household in her late 60s from the pueblo to her 0.25-hectare *huerta*. To arrive, we took a 20-minute motorbike ride on rural roads, crossed the Magdalena River on a small motorized boat, and then walked 30 minutes. Her *huerta* supplied grains and vegetables for three generations of family members in her household, as well as for the meals she cooked and sold at the local market hall twice a week. On the walk to her field, we passed irrigation tubing marked with "AUC", the name of the paramilitary group that occupied the area in the early 2000s (Figure 2). She commented that citizens who had land on that side of the river were cut off from their fields during years of paramilitary occupation and were thus unable to produce as much food for their families.

Residents told stories of how eras of intense violence interfered with the communal effort to establish agrobiodiverse *huertas.* For example, in the early 2000s, a social leader facilitated gatherings of Indigenous and *campesina* women to promote home gardens, or *huertas,* naming the group *Manos de Mujer* (Women's Hands). Women taught each other to save seeds and cultivate agriculturally diverse gardens, working toward increased food sovereignty and nutrition for their families. The gatherings, which centered on seeds, also served to strengthen connections between women within an area marked by histories of domestic violence in addition to the ongoing armed conflict. A seed guardian active since the first meetings recalled the paramilitaries' arrival to her house during a larger gathering, threatening the group's facilitator and reminding those present that gatherings of more than a couple of people were strictly prohibited under their rule. The woman noted that meetings about *huertas* were less frequent and that attendance fell in the months following the threat, but she pointed to various women from that time who continue to cultivate highly agrobiodiverse gardens.

Memories of violence and the threat of violence were written into the region's agricultural spaces and societal relationships. Occupations of land by armed actors, the closing of travel routes both by land and water, dispossessions, forced displacements, theft, and killings ruptured human-human and human-environment relationships. Yet even during some of the most violent years, practices around seeds and the maintenance of diverse gardens and fields were pathways for maintaining connections and cohesion. While food sovereignty was

certainly a central concern for families struggling to earn sufficient incomes or to access their land, practices of agrobiodiversity signified more than food access. Agrobiodiversity came to symbolize an ordering of society in which access to land, food, and community cohesion were protected.

Figure 2. Tagging on an irrigation pipe along the Magdalena River reads "AUC", *Autodefensas Unidas de Colombia*, the paramilitary group that occupied the area in the early 2000s. Photo by author, October 2018.

5.2 Contestations of and opportunities for environmental governance

Groundbreaking for the river diversion irrigation project occurred in 2006, just following the end of paramilitary occupation. In late 2014, water filled the four principal concrete-lined canals of the Tolima Triangle. Yet as of mid-2020, the megaproject remained incomplete, with construction suspended since 2014 due to insufficient government financing. A lack of government regulation of water use accompanies the suspension. At the level of the Colombian government, a 2019 investigation by the Tolima Comptroller (*Contraloría*), the government entity responsible for fiscal accounting of public expenditures, reported a lack of government responsibility for the megaproject following the 2015 restructuring of state agencies (*Cortolima, Autoridad Nacional de Licencias Ambientales, & Contraloría de Tolima, 2019)*. Locally, the potential water user group, Utritol, has no official authority to administrate the canals. Despite the lack of administrative governance, the unauthorized use of water along 56km of canals has been widespread.

The informal and uneven water access created contestations of environmental governance. Enabled by the arrival of water in 2014, agribusiness investors and local producers alike quickly rented fields alongside the principal canals for rice cultivation, drawing water from the canals through electric motor pumps (Figure 3). Residents report a doubling of land rent prices, from 500,000 to one million Colombian pesos per semester (approximately $166 to $333 USD).[i] Government data shows a 363% increase in rice production between 2015 and the end of 2017 (Table 2). Interview data corroborates the change, as landowners reported crop conversions in neighboring fields or their own investment in rice production in recent years. Two rice cultivators in northern neighboring rice districts had recently rented 20 ha and over 100 ha, respectively, for rice within the Tolima Triangle. Two members of a Pijao *resguardo* had fields of rice, one a woman that rented three hectares outside of the *resguardo* land and

the other a young, male producer that had more than 20 ha of rice divided into various fields. Interviews with three other *campesino* producers showed that many small- and medium-landholders had switched a percentage of their land into rice since 2015. All producers were encouraged by the lack of governance of land and water use, which translated into low production costs given cheap land rents and free irrigation water from the canals.

The boom in rice production incited heated, region-wide discussions about the governance of land and water resources. Among the various visions for how to administer the irrigation water and for what cropping systems it should be used, paddy rice production and diversified, agrobiodiverse systems of production emerged as the prominent proposals for organizing resource use. For some local Tolima producers, rice cultivation served as a proxy for agroindustrial systems of production that were mechanized, water intensive, dependent on synthetic inputs, and export oriented. In contrast, agrobiodiversity practices were promoted for their use of natural inputs like compost, their water efficiency given the sowing of drought-resistant crops, and for diversified harvests that contributed both to families' tables and local markets.

Public discussions of the competing visions were highly contentious. In late 2018, the local radio station interviewed a resident environmental activist who insisted, "*Este distrito* no *es para arroz. Es para cultivar pancoger para nuestras familias"* (This district is *not* for rice. It is for the cultivation of food for our families, emphasis original). Weeks later, the potential water user group Utritol, largely supportive of diversified land use systems, sent a memo to the government agency charged with maintaining the canal infrastructure. Utritol referenced and opposed a recently formed lobbying body of "*una proporción minoritaria de cultivadores de arroz, que… [no representa] legítimamente los intereses de los 7.542 potenciales beneficiarios del Distrito de Riego*" (a small minority of rice producers, that…do not legitimately represent the 7,542 potential beneficiates of the Irrigation District). This debate entered into daily conversations. A woman producer with a diversified system of livestock and fruit crops told me, "*Desde que empezaron a construir el Triangulo del Sur, siempre nos dijeron que eso no era para arroz, era para productos pancoger"* (Since they started to construct the Triangle, they have always told us that it was not for rice, it was for *pancoger,* or subsistence crops.) Like this woman, who drove a taxi to earn money as well as managed a small farm for home consumption and small sales of maize, many smallholder residents were dependent on their diversified production for supplementing market purchases. They feared being priced off their land, or being excluded from water access. In May 2019, in an effort to calm social tensions over rice, the Comptroller facilitated a meeting between rice producers and those opposed to rice. A land-renting, absentee rice producer new to the region stood up and declared the facts: "*Si es legal o ilegal, lo estamos disfrutando [del agua*]" (Whether its legal or illegal, we are using the water.) In the absence of formal administrative regulation of land and water use, rice production had made a strong imprint both on the landscape and in community relations.

Although not often explicitly stated, the communal resistance to rice production often implicitly referenced histories of conflict and disconnection, concerns exacerbated in the suspension of the megaproject. In the years of paramilitary occupation, some producers were alienated from their plots, as paramilitaries closed transportation routes. Fears of dispossession were especially present among conversations with individuals that held strongly to their Indigenous identity. Although Pijao communities have lived in the region for hundreds of years, only since the 1991 constitution have many achieved self-governance in adjudicated *resguardo* land. Other Pijao organizations are in the process of petitioning the government for land. One Indigenous environmental activist explained that the recent intensification of rice production and the related increasing land rents represented a threat to land tenure, and ultimately, to their way of life.

The practices of agrobiodiversity were central to Pijao and *campesino* identities, their systems of production, and their intercommunity relationships. In the wake of decades of conflict that disrupted human-environment connections and contributed to the economic hardship in the region, longtime Pijao and *campesino* residents were hopeful that the arrival of irrigation water would also provide opportunities for a renewed sense of place (Aistara, 2019) and support for a defense of cultural practices. Given the availability of irrigation water, many had envisioned strengthened food access through increased production of *pancoger* and new economic opportunities. In other words, they believed that the irrigation water would perhaps create a new social-environmental ordering. For many residents, monocrop production systems of paddy rice did not fit into that vision of place. Furthermore,

the suspension of the project's construction and administrative governance projected a space of opportunity in which to lobby for a regulation of land and water use that would align with the values of food provisioning, land use by local producers, and care-full human-environment connections.

Rice data in Coyaima, Tolima. 2014-2018.								
Year	**Semester**	**Area sown (ha)**	**Area harvested (ha)**	**Percent increase in area sown (ha) in relation to average 2006-2014 (304.79 ha)**	**Production total in municipality (t)**	**Percent increase in production (t) in relation to average 2006-2014 (1813.30 t)**	**Yield (t/ha)**	**Percent increase in yield (t/ha) in relation to average 2006-2014 (5.8 t/ha)**
2014	2014A	332	332	9%	2,386	32%	7.18	24%
2014	2014B	318	318	4%	2,111	16%	6.63	14%
2015	2015A	385	382	26%	2,615	44%	6.84	18%
2015	2015B	330	329	8%	2,116	17%	6.44	11%
2016	2016A	925	925	203%	7,009	287%	7.58	31%
2016	2016B	1,031	1,031	238%	7,499	314%	7.27	25%
2017	2017A	884	883	190%	6,620	265%	7.49	29%
2017	2017B	1,124	1,124	269%	8,390	363%	7.46	29%
2018	2018A	920	920	202%	6,889	280%	7.49	29%

Table 2. Changes in rice production in Coyaima, Tolima, since principal canals were filled towards the end of 2014. Semester 2017B shows a 269% increase in area sown (ha) in relation to pre-irrigation water average. That same semester shows a 363% increase in production of rice in relation to the production average before the canals were filled with water.
Data from Colombia's Ministry of Agriculture and Rural Development.

Figure 3. Motor pumps for paddy rice. Motor pumps drawing water from canal to irrigate rice fields. Photo by author, September 2018.

5.3 Material practices of care in agrobiodiversity relations

In southern Tolima, the caring practices of agrobiodiversity, mainly undertaken by women, were found in three important informal relational spaces: (1) the *trueque* (seed exchange), 2) the *huerta* (home garden) and (3) the *cocina* (the kitchen). Women regularly participated in and often facilitated *trueques*, while both the *huerta* and the *cocina* were traditionally women's spaces. Significantly, findings suggest that within these three spaces, the caring practices of agrobiodiversity did important governance work through (re)connecting social ties, improving family food access, and strengthening livelihoods.

5.3.1 *Trueques*: Agrobiodiversity (re)connects social relationships

In the context of this research, the word *trueque* (exchange) refers to the informal seed exchanges that constitute the foundation of the region's informal seed network.[3] At least 60% of survey respondents (40) in the region listed a *trueque* as their source for maize seeds for field production, while 87% of respondents (56) acquired seeds for their *huertas* from *trueques. Trueques* can be ritualized ceremonies involving the exchange of seeds and knowledge, gifts of seeds, or informal barters. Both men and women engaged in quotidian *trueques* as well as in more formalized seed exchange rituals. *Trueques* are especially prominent in the most rural areas of southern Tolima.

Trueques contribute to communities' inter- and intra-community trust and social cohesion. For example, due to untimely rains in early 2019, the former governor of an Indigenous *resguardo* lost his entire seed crop. One afternoon in June 2019, just before the time of sowing maize, he stopped by the home of a well-respected seed

[3] Generally, in Colombia a *trueque* is any exchange of goods that does not involve money.

guardian, and requested five kilos of native (*criollo*) maize seed. The woman and her family cultivated up to five native maize varieties, and the quality of her seed was reputable. The next morning, she, her family, and I harvested and processed the colorful seed (Figure 4), and tied it into a plastic bag for the man. When the governor arrived to pay for the seed, she refused the money. She asked instead that he draw an updated layout of her family's farm that they could then use for land use planning. It was a task she had long delayed and that she considered central to her family's practices of crop rotations and subsistence production**.** The *trueque* between the seed guardian and the *resguardo* governor, both community leaders, functioned to reinforce trust between two neighboring communities and to assure mutual food access.

Figure 4. Harvest of traditional maize varieties. Photo by author, June 2019.

More ritualized *trueques* often occurred when communities gathered from different *veredas* (administrative unit smaller than the municipality) or departments. In October 2018, Indigenous communities in semi-arid southern Tolima hosted *campesinos* from the department of Cauca, an area that had also endured intense periods of violent conflict. The visitors resided in a more forested, cooler region at a higher altitude where lack of rain was never a stressor. Each community arranged their seed mandala and took a moment before the *trueque* to introduce their offerings to the group (Figures 5 and 6). Hearing how the Tolima communities took pride in their drought-resistant maize varieties, the visiting *campesinos* commented that they could not imagine growing food in an area that received so little rain. The Indigenous communities equally marveled at the cool-weather crops brought by the visiting families, and started to chat about adapting the seeds to the Tolima heat. Building both inter- and intra-community trust and empathy was particularly important amidst the social tensions surrounding resource use brought upon by the irrigation megaproject. The Tolima producers were encouraged by families similarly committed to diversified production and agricultural practices that conserved water and soil resources. Moreover, the inter-community dialogue about values, environments, and seeds reconnected the Cauca and Tolima communities, alienated in past decades by the closing of transit routes by armed actors.

Figure 5. Seed mandala from southern Tolima residents. Seed mandala from tropical dry forest ecosystem: maize, hot peppers, melon, watermelon, squash, and plant cuttings. Photo by author, September 2018. (Two-column figure.)

Figure 6. Seed mandala from Cauca residents. Seed mandala and food offerings from cooler climate: marked seed packets, yuca, limes, avocados, carrots, pineapple, bananas, plantains, mandarins, and oranges. Photo by author, September 2018. (One column figure.)

Trueques were an important caring practice of agrobiodiversity. Not only were *trueques* the principal means of acquiring native seed varieties for many smallholders, but they also functioned as practices of care in their promotion of social cohesion and community interdependence. Seeds were the connective objects through which communities found common ground. Exchanges of knowledge or growing practices always accompanied the interchange of seeds, creating 'landscapes of care' (Graddy-Lovelace, 2020) in which producers collaborated to develop production skills specific to the place, including the particular climate, soils, and culture of their area. Moreover, as participants discussed precipitation patterns, compost recipes, or intercropping strategies, they learned new ways of adapting seeds or discovered previously unknown culinary techniques. Producers often knew which families grew certain varieties and shared planting material regularly, fomenting a more relational approach to agricultural production. In the sharing of seeds and cultivation techniques, human-environment relationships were strengthened.

5.3.2 *Huertas*: Agrobiodiversity connected to nourishment

Agrobiodiversity underpins many families' food sovereignty in the study region. Agrobiodiversity was most often reflected in small fields or *huertas* (home gardens) to produce *pancoger*. The *huerta* is traditionally gendered as a woman's space, located close to the home and the kitchen to allow her to perform the household, childcare, and production duties simultaneously, while men have traditionally (but not exclusively) managed field crops and cattle. Of the 60 households surveyed throughout the two communities, 85% of households had *huertas*. The crops most often listed in *huerta*s included *cachaco* (a plantain variety), maize, limes, yuca, beans, and fruit trees, specifically mangos and papayas (Table 3). Other crops commonly grown were tomatoes, squash, aloe, hot peppers, soursop, watermelon, and culinary and medicinal herbs. When referring to their *huertas*, survey respondents mentioned native tree species, illustrating the agrobiodiversity value of these systems beyond food crops. Trees frequently listed included *totumo* or Calabash (*Crescentia cujete*), igua (*Pseudosamanea guachapele*), matarratón (*Gliricidia sepium*), palma real (*Attalea colenda*), and the fique plant (*Furcraea andina*), all of which were processed for medicinal qualities or for livestock forage, or were transformed into artisanal pieces.

As other scholars have shown, home gardens provide important nutrition complements to purchased food (Powell et al., 2017). The seeds exchanged and then grown in *huertas* nourishes bodies in a region with some of Colombia's most severe rates of malnutrition. The community efforts of *Manos de Mujer* and all of the women who maintain gardens is care work, labors undertaken for the health of the family (Jarosz, 2011). The prevalence of *huertas* in rural homes promotes an agricultural landscape in which resident families have sufficient affordable food access and a rich diversity of nutrients.

Table 3. *Pancoger* (subsistence) crops most often grown by survey participants, and their culinary uses.

Crop name, locally.	Percentage of surveyed participants who grew the crop in their huerta. (Sample size 60 households).	Uses: culinary or other (livestock feed, etc.).
Cachaco (variety of plantain)	81%	Boiled in stews or eaten alone as boiled starch. Peel and pulp used as base for chicken feed.
Maíz (maize)	78%	Consumed fresh, dried and stored for boiling. Used as base for stews, for beverages *chicha* and *masato*, and for traditional dishes of *insulsos, envueltos, tamales, mazamorra, arepas* and *bizcochos*.
Limón (limes)	71%	Added as dressing to salads. Made into juices, limeade.
Yuca	70%	Foundational starch used in stews, boiled and eaten alone, fried. Yuca starch used for baking. Used as base for chicken feed.
Frijol (beans)	68%	Bean dishes. Consumed fresh or dried and saved for future consumption.
Papaya	60%	Consumed as fruit or juice.
Mango	51%	Consumed as fruit or juice.
Plátano (plantain, of another variety)	21%	Foundational starch. Either sweet or firm. Boiled alone or in stews, pan fried, or deep fried. Peels used for chicken feed.
Ahí (hot pepper)	21%	Made into salsa to add to meats, empanadas, stews, and other dishes.

Table 3. *Pancoger* (subsistence) crops most often grown by survey participants, and their culinary uses.

5.3.3 *Cocinas*: Agrobiodiversity strengthens livelihoods

Finally, findings show the importance of agrobiodiversity's material practices of care in *cocinas* (kitchens). Surveys and interviews demonstrated that maize agrobiodiversity and the resultant dishes made in kitchens are foundational to women's livelihoods. Eight surveyed households reported as a primary income source the making and selling of the fermented corn drink *chicha* and/or salty crackers of maize and cheese called *bizcochos*, all prepared by women. An additional six women interviewed regularly prepared and sold traditional foods. All relied exclusively on non-commercial varieties of maize, cultivated in their fields or purchased from neighbors (see Table 4). Three women prepared *chicha* for weekly sales (Figure 7) and the third, retired from running a full-time *chicha* bar, prepared it for special events. One woman made weekly batches of *bizcochos* (Figure 8), selling them in local markets and once per month at a market in Bogotá. The sixth woman relied on native varieties of maize for the foods sold in her catering business and at her weekly stand in the market hall. She was known for her *tamales, insulsos, masato,* and, when maize was freshly harvested, *envueltos*.

The production of cultural foods based on traditional crop varieties has historically been and continues to be essential to the socioeconomic security of women and families. The six women referenced above were either

single or widowed mothers. Earnings from the food they sold made up the primary income for their families. One woman recounted how her mother started selling *chicha* and had taught her to make it when her family was displaced from their rural farm to the *pueblo* decades ago during *La Violencia*. In another example, women comprised a majority of the participants in local community savings groups (*grupos de ahorro*). One of the most common interest-earning activities for the groups was the preparation and selling of traditional foods at municipal events, thereby adding value to their investments and bolstering their financial security.

Research has long tied women to the active conservation of agrobiodiversity through *huertas* and other livelihood activities (Chambers & Momsen 2007; Trinh et al. 2003). I extend this scholarship by suggesting that women's labor in kitchens and their cultivation of diverse varieties of maize in fields and *huertas* are caring practices of agrobiodiversity. Through agrobiodiverse practices, Tolima women have weathered stresses, some induced by conflict, including displacement, loss of partners, and being the sole head-of-household in a region with few employment opportunities overall, and fewer still for women. Significantly, stable incomes for women have positive ripple effects throughout the family (Bezner Kerr 2014). The agrobiodiversity-based livelihoods enhanced food access for families, reinforced cultural food practices, and provided important sources of income.

Notably, the caring practices of agrobiodiversity highlighted are led principally by women in kitchens and *huertas*, socially ascribed women's spaces. Scholars have pointed to women's unique roles in the conservation of agrobiodiversity (Carney and Elias, 2006). Community gender relations in the context of southern Tolima shape the participation in the aforementioned material practices of care, influencing the spaces, actors, and forms of participation. While women's networks like *Manos de Mujer* and other local women leaders are highly valued among parts of the community, their participation in agrobiodiverse practices of care does not necessarily uproot the patriarchal gender relations that shaped the formation of gendered caring labor. Despite this, I suggest that importantly, the caring work of agrobiodiversity emergent from women's spaces forms a basis not only for conserving seed diversity but also for the reimagining of resource governance for people of all genders.

Figure 7. Patio *chicha*. *Chicha* simmering in one woman's patio for weekly sales to neighbors. Photo by author, May 2019.

Figure 8. Woman makes *bizcochos* for weekly sales. Photo by author, June 2019.

Table 4. Maize varieties in southern Tolima: Characteristics and uses.			
Maize variety, local name	**Characteristics**	**Uses: Market/consumption**	**Uses: Culinary**
guacamayo	Kernel is white, smooth, large, firm. Drought resistant.	Home consumption and sold in markets.	Used for *chicha.*
clavo, blanco or bavario	Kernel is pale yellow or white, and smaller than *guacamayo*. Valued for its high yields and facility of kernel removal.	Home consumption and sold in markets.	Used for *masato*, *envueltos*, *insulsos*, *mazamorra* and *chicha*. Also consumed fresh.
bavario amarillo	Kernel is orange, round, large, firm. Drought resistant.	Typically for home consumption.	Used for *arepas,* stews and soups. Traditionally the variety processed to make the drink "*chucula*."
bavario colorado	Ear measures approximately 15cm. Kernel is yellow-orange, round, large, firm. Drought resistant.	Primarily sold in markets.	Traditionally the variety processed to make the drink "*chucula*."
chucula	Ear measures approximately 10cm. Kernel is yellow, smooth, large and soft. Often cultivated in association with other crops. Drought resistant.	Typically for home consumption. Husks used as fodder.	Consumed fresh and processed into *chúcula.*

Table 4. Maize varieties in southern Tolima: Characteristics and uses.

Information for Table 4 from *Grupo Política y Derecho Ambiental, Universidad Nacional de Colombia*, led by Dr. Catalina Toro Pérez. Translation by author.

5.4 Agrobiodiversity as a symbolic frame of governance: The promotion of a social order that prioritizes caring human-environment connections

Through the caring practices of agrobiodiversity seen in *trueques*, *huertas*, and *cocinas*, agrobiodiversity formed a symbolic frame for environmental governance of the newly irrigated land of southern Tolima. The caring practices of agrobiodiversity rendered an alternative vision for resource use from that of intensive commodity production, as exemplified by the rice boom. The daily, caring material practices agrobiodiversity symbolized connections to land, social cohesion, traditions and culture, and access to diversified foods. In the wake of the Tolima Triangle, agrobiodiversity as a symbolic frame for governance intensified. It became a symbol of human-environment connection set against the disconnect perceived by the expansion of intensified, monocrop rice production.

In one *resguardo*, values of relational agrobiodiversity organized actual governance rules for land and water use. Although its adjudicated land bordered one of the principal canals, *resguardo* members did not use any of the irrigation water, and instead grew drought-resistant crops. Of the 54 ha *resguardo*, the members dedicated six to grazing cattle, seven to reforestation, and divided among families the remaining 41 ha for *pancoger*, all harvested and shared communally. One *resguardo* member interspersed ten crops throughout his one allotted hectare. Strict crop rotations governed land use in an effort to maintain soil fertility, with community-coordinated rotations of beans, maize, papaya, and yuca. Plots of plantain varieties, especially the local *cachaco* plantain, were interplanted

with citrus crops, and mango fields were nearby. The *resguardo* prohibited the use of transgenic seeds on its land. Instead, the community shared the labor of seed cultivation and seed saving of native crop varieties. The richly diversified fields within the *resguardo* served as an example of how environmental governance, led by agrobiodiversity, might function within the landscape to create communities with more consistent access to food and less reliance on synthetic inputs and irrigation water.

As of 2016, in response to the newly arrived irrigation water and its undefined administrative governance, the *resguardo* voted to prohibit the cultivation of monoculture commodity crops, specifically rice and cotton, on its 41 ha of communal land. Given the suspension of canal construction and the lack of secondary and tertiary canals, the *resguardo* had no access to water-for-production. Moreover, it understood the intensification of rice production as threatening to both its commitment to communal diversified agriculture for family subsistence and the Indigenous movement to reclaim land from the government. As a result, the *resguardo* prohibited members from renting non-*resguardo* land for said commodity crops. Nonetheless, in 2017, a member rented his land to an agribusiness investor for rice production. The *resguardo* immediately revoked the member's voting and participation rights, sanctioning him for leasing the land. In an interview the *resguardo*'s governor remarked, "*Eso sirvió de ejemplo para que… es que ninguno ahorita se le pasa por la mente cultivar arroz, todos nos concentramos en lo ancestral, al cachaco, al maíz, al frijol*." (This set an example…so that now no one would even think of cultivating rice, we are all concentrated in what is ancestral: cachaco, maize, beans.) Due to the 2017 sanctions, the member ended the lease. Neither rice nor cotton has since been sown on communal lands or in members' fields. The governed sanctions and crop rotations contributed to cultural preservation, soil fertility, and more stable land tenure arrangements.

In more public spaces, agrobiodiversity was promoted as a discursive symbolic frame for the broader environmental governance of the Tolima Triangle area of influence. Groups of producers mobilized agrobiodiversity as a symbol of resource access, the maintenance of cultural traditions, and food access. Residents understood governance as an ideological ordering of human-environment relations and also as productive of regulatory power. They looked to irrigation governance in nearby districts for ideas about how to translate into rules their desire for more caring and sustainable human-environment relationships. For example, in the nearby irrigation district of Usocoello, the water user association regulated cropping decisions, limiting the number of hectares of rice cultivated in order to balance water supply. Community members in the Tolima Triangle wanted similar administrative structures that would protect soil and water resources from the nutrient- and water-intensive practices of rice cultivation.

Agronomists agreed with residents protesting rice production. In May 2019, a Coyaima meeting hosted by the Department of Tolima Comptroller and regional agricultural experts from *Agrosavía* had over 40 people in attendance, including 10 to 15 career rice producers, more than 20 local smallholder producers, and other interested parties. A lead agronomist from *Agrosavía* insisted, "Cultivating rice as we are doing is not a good idea for the soil." Smallholders in attendance reinforced the need for increased food access for local families. Another government scientist agreed, "We must keep *pancoger* (subsistence crops) at the heart of any land use plan for the Triangle." Despite the agreement between smallholders and scientists, the lack of enforceable governance regulations or a governing body to enforce rules meant continued social conflict over land use.

The absence of administrative governance over irrigation water and the project's suspension continued, as well as the low-level social conflicts between rice and agrobiodiverse systems of production. In May 2020, the regional Pijao Indigenous authorities, local environmental groups, and other interested parties organized a radio and audio message campaign to discourage local residents from renting their fields to rice producers:

> The Tolima Triangle project would be the dream we long for to build our productive projects and improve our living conditions, but multinational companies, political sectors, and landowners have set their eyes on it. The implementation of large monocultures, in addition to the impact they bring to a territory already hit by the climate crisis, could once again rob us of our land. … Do not rent your land. … If you rent out and thus permit a misuse of water, seeds, and streams, you are also hurting yourself and your family.

> When you rent out, the earned money is limited but the damage to the property is enormous. Let us recover *community work*, let us sow real food that nourishes our community (emphasis mine). [4]

These messages fuel what has been a years-long campaign against the agroindustrial system of production understood by many smallholder residents to damage resources, threaten land tenure, and displace *pancoger* production. The relational, caring practices of agrobiodiversity, the "community work", exemplified in spaces of *trueques*, *huertas,* and *cocinas* are important in the post-conflict context, and become symbolic frame for an alternative vision to the intensive agricultural practices that often follow large-scale irrigation development.

6.0 Conclusions

This research intervenes in the scholarship of agrobiodiversity to argue that instead of a set of relations to be governed, agrobiodiversity can be mobilized as a vision of governance. With the suspension of the irrigation megaproject in the Tolima Triangle and the absence of administrative governance, and in the face of increasing intensification of Green Revolution-style agriculture, agrobiodiversity as a symbolic framing for organizing social-environmental relations has intensified. Its symbolic function promotes human-environment connections, foiling the severing that occurred during conflict. As encouraged, and in some instances practiced, agrobiodiversity becomes a framing of a caring vision of governance, or a socio-environmental order that emphasizes access to land and irrigation water for small producers, social cohesion, the importance of traditional agricultural cropping systems, familial food access, and commitment to the long-term conservation of soil and water resources. This intervention expands work on agrobiodiversity as more than an instrument or measure of conservation. This research suggests that agrobiodiversity can play a significant symbolic role as a connecting vision in post-conflict landscapes and as an alternate vision to traditional development plans of export-oriented agricultural intensification that often accompany irrigation megaprojects. The caring practices of agrobiodiversity become a proposal for equitable access to land and water for agricultural production that nourishes and directly benefits local residents.

This research makes two primary contributions to studies of agrobiodiversity. First, aligning with scholarship on the biocultural aspects of agrobiodiversity and the importance of relational contexts, this research contributes to current thinking on the interactions between environmental governance and agrobiodiversity. Scholarship on agrobiodiversity and governance has focused almost exclusively on governance as the active management or conservation of agrobiodiversity, be it *in situ* by producers or *ex situ* in institutionalized seed or gene banks. Yet producers in the Tolima communities organize around agrobiodiversity not as a set of relations they must govern, but as the symbol for the governance they wish to implement and, in the case of the *resguardo* or on individual farms*,* are already realizing. Treating agrobiodiversity as a symbolic frame for environmental governance opens new research questions about the possibilities of a landscape organized, socialized, and governed by the socioenvironmental relations of agrobiodiversity.

Second, this research brings scholarship on relational agrobiodiversity into conversation with feminist care ethics. Drawing insights from care ethics on the potential of caring material practices of labor to inspire alternative futures, I suggest that practices of human-environment connection centered on agrobiodiversity work to re-establish once-disrupted human environment relationships. Caring practices of agrobiodiversity in *trueques*, *huertas*, and *cocinas* reinforce social cohesion in both inter- and intra-community relationships, strengthen food sovereignty, and support traditional livelihoods, particularly for women. Such caring practices inform a framing of resource governance that centers smallholder livelihoods; equitable land access, food access, and well-being for families; and sustainable resource use. By connecting relational, caring practices surrounding seeds and the meanings imbued in them intro framings to direct the development of environmental governance structures, this research further extends recent research on agrobiodiversity as a set of potentialities and emergent relationalities. I suggest that future cross-engagements between agrobiodiversity and feminist care ethics may be a productive

[4] Circulated via audios on WhatsApp.

space in which to further examine seeds' meanings, their role in place-making, and their importance in post-conflict areas.

The research presented has broader applicability to related research and policy. First, the symbolic function of agrobiodiversity generates energy and momentum around solidarity movements for more just human-environment relations and governance of the same. The empirics here show how a set of practices becomes a symbol around which residents imagine equitable futures. Other concepts have shown similar symbolic force in generating solidarity efforts for more equitable agricultural and food futures, including agroecology and food sovereignty. A deeper engagement with care ethics and material practices of environmental governance can offer novel insights both conceptually and in generating momentum for these and other movements advocating for social-political change. Food sovereignty scholarship in particular may find fruitful engagements with care ethics to open further spaces for reimagining the value of agricultural labor, the importance of nourishing as a caring act, and envisioning more caring human-environment futures.

Lastly, to put into operation agrobiodiversity as a set of relational and caring human-environment practices implies policy adjustments for local, national, and international laws. First, given the high rates of poverty, unemployment, malnutrition, and land consolidation in the study area, as well as the context of post-Peace Accord Colombia and shifts in environmental governance, continued political and societal support for agrobiodiversity interactions would be well advised. In Coyaima's 2016-2030 Development Plan, the first line of the vision statement reads, "By the year 2030, [the municipality] will be one…that has overcome conflict, poverty and malnutrition…" The values of relational agrobiodiversity may provide direction for local governance to prioritize the relational and nutritional wellbeing of a region whose human environment relationships have been disrupted by conflict and reconfigured by new water infrastructure.

These findings might also inform Colombian policy guiding rural development and seed use. This research challenges development initiatives to support community-directed caring practices including family food production, traditional cultivation systems, and culinary traditions, for a few examples. Additionally, this research highlights the essential role of caring social-environmental practices in the recovery of post-conflict communities, which might reframe post-conflict development to ensure the wellbeing of both residents and natural resources. Finally, at an international level, a relational understanding of agrobiodiversity and specifically its potential to inform equitable governance structures, might reframe understandings of seed conservation. The International Treaty on Plant Genetic Resources for Food and Agriculture prioritizes the "conservation" of genetic resources in situ. Agrobiodiversity as a set of practices that promotes care projects a more comprehensive understanding of the often-gendered labor, culture, environmental factors, and interpersonal connections productive of agricultural landscapes.

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Declaration of Interests

The author has no conflicting interests to declare.

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Figure Captions

	One- or two-column figure	**Caption**
Figure 1	2	Map of Tolima Triangle Irrigation District area of influence. Reservoir, four principal canals and surrounding rivers. Located in the department of Tolima, Colombia. Map by author.
Figure 2	1	Tagging on an irrigation pipe along the Magdalena River reads "AUC", *Autodefensas Unidas de Colombia*, the paramilitary group that occupied the area in the early 2000s. Photo by author, October 2018.
Figure 3	1	Motor pumps for paddy rice. Motor pumps drawing water from canal to irrigate rice fields. Photo by author, September 2018.
Figure 4	1	Harvest of traditional maize varieties. Photo by author, June 2019.
Figure 5	2	Seed mandala: Southern Tolima. Seed mandala from tropical dry forest ecosystem: maize, hot peppers, melon, watermelon, squash and plant cuttings. Photo by author, September 2018.
Figure 6	1	Seed mandala: Cauca. Seed mandala and food offerings from cooler climate: marked seed packets, yuca, limes, avocados, carrots, pineapple, bananas, plantains, mandarins and oranges. Photo by author, September 2018.
Figure 7	1	Patio *chicha. Chicha* simmering in one woman's patio for weekly sales to neighbors. Photo by author, May 2019.
Figure 8	1	Woman makes *bizcochos* for weekly sales. Photo by author, June 2019.

[i] Monetary conversions are based on a general 3 COP to 1 USD conversion, although it fluctuates often.