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# The Role of Partnership in Agricultural Research and Development: Investigating Moral Obligation and Neoliberal Governmentalities

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**The Role of Partnership in Agricultural Research and Development:**

**Investigating Moral Obligation and Neoliberal Governmentalities**

by

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**Abstract**

Through this thesis, I question what international and national agricultural research organizations gain from working together, and how such international development partnerships shape governance and autonomy among the local farmers who are their target populations. I examine the partnership between the Kenya Agricultural Livestock Research Organization (KALRO), a semi-autonomous government institution, and the Maize and Wheat Improvement Center (CIMMYT), a private development organization with ties to the government of Mexico. Based on participation with KALRO and fieldwork in Kenya in 2016, I analyze how the partnership intertwines objective research with the political interests of Mexico and Kenya, moral intentions to "make an impact," and neoliberal market imperatives. Focusing on a case study of the partnership between CIMMYT and KALRO and their initiative with nixtamalization—a Mesoamerican maize processing method widely used in Mexico and promoted in Kenya for nutritional benefit—I demonstrate how partnerships within the field of development manifest the "afterlives of development" and exemplify the legacy of developmentalism in achieving humanitarian goals. This partnership is essential for CIMMYT to demonstrate its professional expertise through resource allocation, dissemination of knowledge, and achieving project outcomes. For KALRO, this partnership improves access to resources and technologies. However, the interorganizational relationship obscures the workings of cultural knowledge in technical solutions, reframes citizens as subjects of knowledge, and reinforces aspects of neoliberal responsibilization. Despite this, as a fundamental element of humanitarian and development aid, partnerships offer a critical locus to examine potential unintended consequences and more generally the afterlife and effects of transnational and interorganizational collaboration.

**Introduction**

Over a century ago, agriculture became the focus of technological advance and economic development (Bonte-Friedheim et al. 1997; Herdtz 2012; Nally and Taylor 2015). With the assistance of foundations such as the Rockefeller Foundation, agricultural organizations sought to address challenges faced by farmers in impoverished areas by setting goals to improve economic development, eradicate poverty, and reduce malnutrition. At the same time, within Kenya, colonial administrators promoted the production and cultivation of maize, coffee, and tea to generate economic growth and modernity (MacKenzie 1999). Following independence, the Republic of Kenya continued to install policies and acts that prioritized agriculture as integral to Kenya's development strategies. Today, international agricultural research organizations (IARO) continue to conduct research, produce international public goods, disseminate information, and create new technologies to achieve national and international development goals (Kamanda et al. 2017). These IAROs collaborate with local and national organizations to contact target populations through on-the-ground research, or pass responsibility to local organizations to fulfill projects. These partnerships and interorganizational relationships become sites of collaboration seen as essential to reaching development goals and achieving project outcomes.

As national and international agricultural organizations establish partnerships and interorganizational relationships, it is essential to understand how these organizations contribute to trends of moral obligation and neoliberal governmentalities that persist in the afterlives of development (Rudnyckyj and Schwittay 2014). Within Kenya, agricultural research partnerships are an integral component of Kenya's development strategies and goals (Hope 2012). Focusing on the partnership between an IARO based in Mexico called the

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International Maize and Wheat Improvement Center (CIMMYT) and a semi-autonomous government research institution called the Kenya Agricultural Livestock Research Organization (KALRO), I question what international and national agricultural research organizations gain from working together, and how such international development partnerships shape local farmers' citizenship and agency through technical rationality and neoliberal governmentalities. I situate the partnership in relation to Kenya's rich history of colonialism, ethnic tensions, and socioeconomic inequality. Intrigued by the complexity of partnerships and relations between international organizations, I seek to understand CIMMYT's role in promoting agricultural projects and research through its partnership with KALRO.

First, I examine how scholars (e.g., Abrahamsen 2004; Brown 2015; Unnithan and Heitmeyer 2014) interpret the existence of partnerships within other humanitarian relations. I use a theoretical framework of the afterlives of development established by Daromir Rudnyckyj and Anke Schwittay (2014) and a foundation of Foucauldian principles of governmentality. I discuss the background and political context of these research organizations in relation to my experience working on a nixtamalization initiative that sought to introduce the food preparation practice to Kalenjin-speaking people in western Kenya, a project encouraged by CIMMYT and implemented by KALRO. This initiative evaluated the acceptability for rural Kenya's use of nixtamalization, a Mesoamerican cooking method that increases calcium intake and decreases storage toxin risk. Based on the participation with KALRO and fieldwork in Kenya in 2016, I analyze how the partnership between CIMMYT and KALRO—one small example of normalized trends of partnership, empowerment, and on-the-ground initiatives in the development world—intertwines objective research with the

political interests of Mexico and Kenya, moral intentions to "make an impact," and neoliberal market imperatives. Furthermore, I seek to conceptualize my role as a CIMMYT research intern, in interacting intimately with KALRO to evaluate the acceptability of nixtamalization. I do not seek to evaluate whether this partnership is "good" or "bad" but rather to highlight common tendencies that occur through partnerships in relation to development work.

Ultimately, I argue that partnerships are intertwined in political, social, and economic contexts that shape the functionality of collaboration, reconfigure knowledge and actors of change, and embody neoliberal forms of governance. KALRO and CIMMYT's partnership, although often understood as an equitable exchange, is regulated through transnational governmentality. Consequently, this governmentality, or power that shapes people and institutions through knowledge dissemination, creates processes of exclusion and inclusion to configure individuals' citizenship and identity. Today, this partnership in Kenya interacts with prior forms of governance—both colonial and post-colonial—to increase the economic productivity of Kenyan citizens in the Rift Valley. Both KALRO and CIMMYT exemplify the "afterlives of development," the process through which current humanitarian initiatives reorganize and transform past development paradigms to fit today's political and economic agendas. The interorganizational relationship of KALRO and CIMMYT obscures the workings of cultural information in technical solutions and reframes citizens as subjects of knowledge. Additionally, the partnership reinforces aspects of neoliberal responsibilization, a process through which subjects acquire individual responsibility for tasks previously taken on by the state. As a fundamental element of humanitarian and development aid, partnerships

offer a critical locus to examine potential unintended consequences, or the afterlife and effects of transnational and interorganizational collaboration.

**(Re)defining Partnership**

Partnerships are an integral element of humanitarian aid. Often times, partnerships are defined by exchanges of equal reciprocity in which global partnerships rely on one organization to provide resources, while the other holds the right to deliver these resources to a target population (Brown 2015; Abrahamsen 2004). Although the term *partnership* suggests equal participation between organizations, differing managerial responsibilities and roles can generate inequality (Brown 2015). In the last decade, several authors have discussed the role of partnerships in humanitarian and development aid. Rita Abrahamsen (2004) examines the transformation of North-South relations and argues partnerships reinforce processes of exclusion and incorporation. Hannah Brown (2015) argues that partnerships enable governments to access resources transnationally and can empower a state to provide for its citizens. Maya Unnithan and Carolyn Heitmeyer (2014) ethnographically examine how partnerships between the state and civil society organizations (CSO) shape health in rural India. Additionally, Ayesha Khursid (2016) and Lamia Karim (2011) discuss how current development practices ignore the dimensionality of empowerment when working with local actors. These authors highlight how interorganizational relations have become integral to development initiatives, how partnerships are beneficial yet create asymmetries, and how empowerment techniques shape behavior.

In the late 1980s and 1990s, critics characterized development as an authoritarian practice dictated by Western nations. As a result, development initiatives attempted to shift their methods and rationalities away from practices known for being neo-colonial.

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Partnerships were an avenue for this change and an attempt to create mutually beneficial alliances. With attention to the paternalistic and imperialistic accusations, North-South relations used partnerships to enable governmental "ownership" of economic development (Abrahamsen 2004, 1455). Through forms of necessitated reciprocity and the movement of resources, partnerships helped governmental agencies expand their capacity to provide for citizens and regain sovereign responsibility in Kenya (Brown 2015, 341). Unnithan and Heitmeyer (2012) note partnerships between CSOs and the Indian government improved health programming at a local level when these NGO-state partnerships shared resources, policy dialogue and strategies. In various states, including India and countries in Africa, partnerships became a normalized and necessary component of humanitarian aid.

However, while partnerships can be beneficial to development initiatives, differential practices and the nature of partnerships dictate degrees of asymmetry. Abrahamsen (2004) argues the production and regulation of performance technologies can influence the continuation of partnerships. For instance, in examining relationships between Africa and the donor community, Abrahamsen (2004, 300) observes the World Bank and International Monetary Fund has full power to veto a government's poverty reduction strategy. While in India, the state favors CSOs that privilege public health agendas and biomedical knowledge over CSOs embedded in grassroots initiatives that promote health as a human right (Unnithan and Heitmeyer 2012, 305). In Kenya, different visions of managerial responsibility between U.S. clinical researchers and the District Health Management Team created tension between partners and challenged vertical governance (Brown 2015, 346). Partnerships cannot be defined by only symbiotic exchange but are influenced by perceived hierarchies and power

dynamics. Although partnerships are less visibly dictated by authoritarian practices, asymmetries persist through new interorganizational relationships.

By prioritizing techniques intended to empower local populations and state governments, developmental partnerships shape the behavior of states and local actors. Through a Poverty Reduction Strategies Learning Group, the UN Economic Commission for Africa seeks "to support the fit and help make the unfit fit" (Abrahamsen 2004, 304). In Bangladesh and Pakistan, empowerment approaches attempt to depoliticize tensions but reinforce individual responsibility (Karim 2011; Khurshid 2016). Microfinance organizations in Bangladesh interact transnationally and reinvent local individuals as agents of development through credit loans (Karim 2011). In India, partnerships used in the area of rural health reconfigure the government as an "activist state" and CSOs as "mediators in development" (Unnithan and Heitmeyer 2012). These types of techniques ignore how power hierarchies affect empowerment, both on the local and global levels (Khurshid 2016). Through empowerment approaches, partnerships reconfigure the responsibilities of the state and the citizen and influence the relationship between governments and its population. While these techniques intend to empower local individuals to improve their livelihoods, these approaches make citizens more accountable for their own economic mobility.

As discussed by each of these authors, partnerships are essential to the functionality of development and humanitarian work. Although scholars debate whether these interorganizational relations are created through equitable avenues of exchange, partnerships offer a critical locus to analyze current development initiatives. These scholars (Abrahamsen 2004; Brown 2015; Unnithan and Heitmeyer 2014; Karim 2011; and Khurshid 2016) examine partnerships at varying levels, and connect their discussions of partnership to

fundamental theories of governance, power and autonomy. These authors highlight the complexities within presumed conditions of partnerships and provide a foundation to understand the anthropological discourse of partnership and development work. However, this literature fails to address how partnerships exist outside the frame of NGOs and CSOs. My research attempts to fill this gap by discussing how institutions such as IAROs also use partnerships to achieve project goals. Subsequently, I investigate how these partnerships indirectly contribute to the decentralization of government responsibility and popularize the empowerment paradigm.

**Reconfiguring Processes, Rationalities, and Knowledge**

The afterlives of development, according to Daromir Rudnyckyj and Anke Schwittay (2014), refers to how transitions in contemporary development work reflect the legacy of the developmentalism paradigm. These afterlives demonstrate that "developmentalism is understood as a mode of thought and a set of concrete practices, which reduce poverty, promote economic growth, and enhance living conditions and standards" (Rudnyckyj and Schwittay 2014, 3). Using this analytical framework, I argue partnerships—among other development approaches—contribute to the normalization of practices that conceal agents and governmentalities within the humanitarian and development world. This framework is comprised of three interconnected dynamics. First, this framework highlights a shift in state responsibility. Because of transnational governmentality, states have gained managerial responsibility and decentered their contribution to economic growth. This has allowed humanitarian workers to gain ownership of resources and expertise within the field. Second, current empowerment approaches create the expectation that citizens should utilize individual responsibility and expertise to improve development in their communities. Third,

with a shift towards neoliberal governmentalities that prioritize particular knowledge, development approaches reconfigure rationalities to reflect reason and technical decisions. An analysis of these three interconnected dynamics reveals how partnerships incorporate new actors, techniques, and rationalities to remain dedicated to the improvement of human life.

The first trend in the afterlives of development is a shift in managerial responsibility and development design. Within a globalized world, territorial borders or state boundaries no longer confine governing power. Rather, to govern requires imposing actions to achieve a favorable outcome for those governed (Foucault 2006). This power, as defined in terms of governmentality, is a productive force that creates and shapes people through knowledge dissemination (Foucault 2006). As organizations such as NGOs mobilize knowledge to promote development, these organizations work through international networks and transnational governmentalities. Through partnerships, these international organizations work both above and below states through encompassment (Ferguson and Gupta 2002). Subsequently, governmentality's "productive dimension" is now controlled by non-government players who gain recognition as humanitarian designers (Ferguson and Gupta 2002, 989; Rudnyckyj and Schwittay 2014). With this shift, states assume managerial positions within development and reduce top-down approaches.

Although development organizations, including IAROs, deviate their practices away from vertical authoritarian governmentalities, partnerships enable new forms of power to emerge and dictate actors' responsibility. As humanitarian organizations take the reins in development implementation and evaluation, they must work to establish themselves as experts within the field. Development organizations participate in an audit culture, a process which maintains a system of accountability and to exemplify expertise. These "ritual

verification" practices reinforce self-checking and transparent practices constructed within

neoliberal governance (Strathern 2000, 3; Shore and Wright 2015). The presence of an audit

culture institutionalizes the use of development paradigms and practices that achieve

successful outcomes, monetarily or materially. Through an audit culture, organizations and

institutions are compared and ranked, creating "external representations of their quality,

efficiency and accountability to the wider public" (Shore and Wright 2015, 421). This culture,

while thought to improve the quality of development initiatives, can also reshape programs

and initiatives to mirror priorities of audit technologies (Shore and Wright 2015).

Contributing to another dynamic of the afterlives, humanitarian designers encourage

citizens to become active agents of change within their communities. Empowerment

paradigms characterize the ideal citizen or community member as both active and deliberate

in improving their economic mobility. This emphasis on individual responsibility redefines

these local agents as solely responsible for their economic growth (Karim 2011; Khurshid

2016). At the same time, these initiatives encourage community members to use their lived

experiences to influence project design and become "expert innovators" or subjects of

knowledge (Schwittay 2014, 39). Nonetheless, when input is spatially separated from the

local communities, the intellectual knowledge of development organizations is prioritized

and local sources of knowledge is dismissed (Schwittay 2014, 39). Although these techniques

are an attempt to improve development initiatives, the empowerment paradigm often results

in a political project that redefines individuals and collectivities within a neoliberal

framework.

The afterlives of development transforms rationality to reflect technical and

calculated solutions. Many development and humanitarian organizations, such as KALRO

and CIMMYT, claim their intentions are based on moral sentiments of assistance such as "making an impact" (Fassin 2012). These claims "inextricably link values and affects, and serves both to define and justify discourses and practices" (Fassin 2012, 2). However, commitment to progress and reason obscures affective intentions in technical solutions (Rudnyckyj and Schwittay 2014). Subsequently, development organizations make calculated decisions to successfully make an impact. This technical rationality naturalizes development interventions and prioritizes the expertise of humanitarian programs. Overall, this process towards development becomes routine (Li 2007, 6). Additionally, moral obligation to assist in development becomes objective through technomoral politics—when recommendations are reconfigured as law or policy towards administrative reform (Bornstein and Sharma 2016, 77; Fassin 2012). However, particular political, socioeconomic, and historical contexts influence individual or organizations' understanding of what is rational. Subsequently, these dynamics create hybrid forms of rationality and knowledge to justify development initiatives or programs.

Within these three trends, the legacy of developmentalism persists as both an ideology and set of practices that seeks to improve wellbeing, increase economic mobility, and create social equity. The analytical framework of the afterlives of development frames partnerships as historically representative of an attempt to shift from neocolonial and paternalist relations. However, partnerships still enforce political and cultural ideologies, and contribute to the naturalization of transnational governmentality, empowerment approaches, and the hybridization of knowledge. Partnerships, such as between KALRO and CIMMYT, are illustrative of a dynamic process that is defined by perceived reciprocity between international organizations, governments, and populations.

**Situating Myself within the Nixtamalization Initiative**

In order to reconstruct the partnership between CIMMYT and KALRO, I focus on one

particular research agenda, the acceptability and introduction of nixtamalization, a

Mesoamerican method of cooking maize in a water and calcium hydroxide solution that is

being promoted in rural Kenya. During May 2016 to August 2016, I participated in the first

research initiative that sought to assess the acceptability of nixtamalization in Kenya through

on-the-ground research. I worked intimately with KALRO nutritionists, KALRO researchers,

and an extension officer from the Kenyan Ministry of Agriculture (MOA) in Nakuru and

Njoro, Kenya. Although I worked consistently with KALRO employees, my official title was

as a CIMMYT research intern.

I found myself working as a research intern for CIMMYT almost by chance.

Floundering to find an internship position to fulfill a requirement for my bachelor's degree, I

was encouraged by my grandfather, a social anthropologist, to reach out to an employee of

CIMMYT, who used to be one of his PhD students. Through correspondence, I shared my

career interests and desire to gain research experience with an organization like CIMMYT.

After numerous email conversations and a few skype conversations, CIMMYT informed me

that the organization wanted to proceed with an initiative in Kenya and could use my

assistance at KALRO. Within a month, I boarded a plane to Nairobi and began my work as a

research intern for CIMMYT.

Upon arriving in Nairobi, I met with the Africa Regional Representative of CIMMYT.

I was informed of the details of the nixtamalization initiative and the anticipated outcomes of

the research I was to help conduct. Within the a few days, I traveled to Njoro, Kenya and

started work at KALRO. During my first week, I participated in a weeklong agricultural

show at the Nakuru Showgrounds that demonstrated the role of KALRO in disseminating nutritional knowledge and teaching the general public about nutritional and agricultural practices. This agricultural show was one of several national events organized by the Agricultural Society of Kenya to promote agriculture and agricultural practices within Kenya. I shadowed the nutritionists I would eventually work with on the nixtamalization initiative. By the end of the week, I assisted in explaining displays and presenting KALRO's work to show attendees. Following the agricultural show, I began working full-time at KALRO, Njoro. I received an orientation through which I met with the head of each KALRO department and learned about the tasks of each department. Through these activities, I developed a basic understanding of KALRO's current projects, technical approaches, and department structure.

Before I even began to work on the nixtamalization initiative, I recognized differences between the CIMMYT headquarters and KALRO's center in Njoro. With a private car service, highly manicured lawns, and strict security gates, CIMMYT's facilities and resources appeared plentiful and modern. Comparatively, KALRO faced multiple power and internet shortages, and struggled to keep the organization's service vehicles functioning to full capacity. Additionally, many KALRO researchers assumed I held a level of expertise and authority higher than their own position at KALRO. I often reminded KALRO employees that I was a student and did not possess any agricultural proficiency. These incidents suggest that CIMMYT and CIMMYT employees were generally regarded as holding higher expertise. Intrigued by these differences, I began to take extensive field notes. Over the next two months, I documented conversations and daily interactions with my supervisors, conversations with other employees of KALRO, informal interviews with the

head of each department at KALRO, and my communication with CIMMYT representatives located in both Mexico and Kenya. Gradually, I pieced together a snapshot of the relationship between CIMMYT and KALRO, and the significance of the nixtamalization project.

As part of the nixtamalization initiative, I worked alongside KALRO nutritionists to evaluate whether local farmers and families would use this cooking method if resources were made available. Prior to my arrival, CIMMYT trained various KALRO agricultural experts in the process and the benefits of nixtamalization. CIMMYT also donated resources including a wet-mill grinder, food-grade calcium hydroxide and a tortilla press. After various training and workshops, the nixtamalization process could only continue with on-the-ground assessment through KALRO. This field assessment began by using local Kenyan maize to create nixtamalized products. We adapted local recipes of *githeri*, a maize and bean dish; *mukimo*, a mashed potato dish served with maize and green vegetables; *ugali*, a dish made from grain flour; *uji*, a porridge made from maize flour; *chapatti*, a type of flatbread; and maize crisps to incorporate the nixtamal maize. A hundred and nine people sampled these new recipes and were asked to rank the samples on a 5-point hedonic scale to determine their like or dislike of the samples. Based on the preference of this initial test, we led three demonstrations outside of Nakuru to introduce local farmers to nixtamalization and the processes to use nixtamal maize to create githeri, mukimo, ugali and maize crisps.

Organized by a MOA extension officer, we participated in three demonstrations in Ngata Division, bordered by Njoro and Nakuru West sub-counties. These demonstrations took place in Kamungai village in Menengai, and two villages in Sumek: Mimwaita and Ex-Margaret. In this area, almost all households participate in mixed farming, ranging from small- to large-scale farms. The most common farming enterprises include olericulture,

farming vegetables; pomology, growing fruit for commercial purposes; floriculture, the cultivation of flowers; food crops, production of crops intended for household consumption; and livestock. Sixty-one people attended the community demonstrations and learned the process of nixtamalization. Thirty-four percent of these individuals were female. The mean age of the participants was 50 years with a distribution between 30 and 86 years old. Ninety-six percent of the people identified as Kalenjin while one individual was Luo, and another Kikuyu. The demographics and political landscape of these demonstrations became fundamental to connecting the nixtamalization initiative to broader trends of agricultural advancement in Kenya.

Demonstrations occurred in open fields with a few tables, and equipment brought from KALRO. At each demonstration, I introduced and demonstrated the nixtamalization process while the nutritionists translated in Swahili. Then individuals were encouraged to assist the KALRO representatives to cook traditional food dishes using the nixtamal maize. Following the demonstration, 46 farmers, including 26 males and 16 females, completed a food validation questionnaire. These questionnaires asked people to rank the samples based on their sensory experience but also asked questions regarding their likelihood to use this process in specific situations i.e., for a meal, to sell, or to share with the community. As the questionnaires were in English, the nutritionists translated the instructions and questions into Swahili. In one instance, one of the nutritionists explained the survey in the Nilo-Saharan language Kalenjin. Several farmers did not complete the questionnaires due to illiteracy or leaving the demonstration early. When literacy was the barrier, verbal comments were encouraged. Following the completion of this written survey, we held an open discussion for the farmers to express their thoughts on the process and food products. These demonstrations

introduced nixtamalization to the farmers, and allowed researchers to access the probability of whether the local community would adopt that nixtamalization into their daily routines.

Following the demonstrations, I continued my work at KALRO, Njoro mainly compiling survey data and writing a publishable report on our quantitative and qualitative findings. According to my contractual agreement, CIMMYT owned the data from this research, in partnership with KALRO. The draft was to be approved by both the KALRO, Njoro Center Director at KALRO and my supervisors at CIMMYT. Prior to returning to the United States, CIMMYT asked me to meet with the Mexican Ambassador at the Mexican Embassy in Nairobi, as a representative of CIMMYT, to discuss the findings of the research conducted at KALRO, Njoro. The report was evidence to progress or halt the broader integration of nixtamalization in rural Kenya. By working as an intern for CIMMYT and participating in the nixtamalization initiative at KALRO, I gathered observational experience on the partnership between KALRO and CIMMYT.

Returning to the United States, I was plagued by questions regarding the relationship between CIMMYT and KALRO, the significance of the nixtamalization initiative, and its relation to larger trends in development. After an initial analysis of my field notes, I decided to collect additional insight with CIMMYT representatives, because I did not have as much direct interaction with these individuals as I did with KALRO employees. I conducted additional interviews with several people involved in nixtamalization: a senior researcher at CIMMYT, Mexico who leads training and promotes nixtamalization; a businessman seeking to create a company based on nixtamalization in Kenya; and the Africa Regional Representative for CIMMYT who is most knowledgeable about CIMMYT's relationships within Kenya and other African countries. Through these interviews and my participant

observation as a research intern, I gained sufficient data to analyze the intricacies of the nixtamalization initiative, the partnerships' relation to broader development trends, and the significance of these practices in the lives of local Kenyans.

**Not So Humble Beginnings**

CIMMYT's founding principles are based on the philanthropy of the Rockefeller Foundation and Mexico's development goals. With an emphasis on building research capacity rather than extending known technologies, the Rockefeller Foundation worked towards assisting countries to increase their agricultural productivity (Bonte-Friedheim 1997). In 1943, the Rockefeller Foundation collaborated with the Mexican government to raise Mexico's agricultural capacity (CIMMYT 2017). The Mexican Secretariat of Agriculture and the Rockefeller Foundation established the International Maize and Improvement Center (CIMMYT) to combat food insecurity both within Mexico and internationally. While the institutionalization of philanthropy sought to improve the quality of life for local farmers, efforts to encourage capitalist market participation and eliminate the threat of communism fueled the birth of the Rockefeller Foundation and subsequently IAROS.

Philanthropy organizations such as the Rockefeller Foundation fostered the conviction that world progress and reformation required teaching the poor to uplift themselves out of squalor. Philanthropy's "greatest gift" was to provide the means to instill "a sense of usefulness and habits of self-reliance" (Nally and Taylor 2015, 52). However, these techniques towards agricultural development were tied to counter-insurgency efforts. By decreasing poverty, establishing market driven ideologies and stabilizing communities, Western power would defeat communism (Nally and Taylor 2015). These organizations interpreted development as a means to enact governance within a "nested social enterprise,"

specifically within farming (Nally and Taylor 2015). This agricultural assistance became a means to remodel agrarian practices on a wider scale, creating a self-regulating system of the free-market capitalism.

Within the United States, the Rockefeller Foundation established the General Education Board (GEB) to assist poor American farmers to rise above poverty (Nally and Taylor 2015, 53). The GEB argued that nutrition and agriculture were the foundation for social reform. The Rockefeller Foundation expanded on an "education by farm demonstration" model, originally utilized by Seaman Asahel Knapp, which sought to simplify scientific agricultural knowledge to instrumental forms used by farmers. Knapp's theory of agricultural change also rested on the belief that reform required indirect adjustments to social constructions within the home (Nally and Taylor 2015, 53-4). These reform efforts use governance to promote cultural change within farming communities. With funding and resources of the GEB, the Rockefeller Foundation employed these techniques to first, exemplify the value of these improvements, and then, give the farmers the technology to self-improve.

As the GEB's initiatives proved to be successful, the Foundation shifted its focus internationally: "Throughout the world, traditional or subsistence agriculture can and must be replaced with a highly productive, market-oriented system" (Rockefeller Foundation 1968, 5). At this time, the Director General of the Mexican Ministry of Agriculture applauded the work of the Rockefeller Foundation and echoed the importance of collaboration between agricultural research and farmers (Nally and Taylor 2015, 57). Rockefeller's blueprint for food sufficiency became an internationally accepted strategy for agricultural development.

Subsequently, the establishment of formal programs and IAROs forged an international path for agricultural modernization.

Within the movement of international agricultural modernization, CIMMYT grew into an IARO to ensure food security for global populations. Directly reflected in their agenda, techniques, and dissemination of knowledge to target farm populations, CIMMYT remains connected to the Rockefeller Foundation. The use of agricultural demonstrations, popularized through the Rockefeller Foundation in the early 20th century, remains instrumental to CIMMYT's work and objectives. However, these initiatives are deeply rooted in forms of political governance that reinforce neoliberal market ideologies and mainstream capitalism. This governance dissolves the boundaries of Western influence and demonstrates the reach of transnational governmentalities.

Moral Obligations

CIMMYT seeks to address issues within the developing world including food insecurity, improving livelihoods, and promoting sustainable maize and wheat farming (CIMMYT 2016). Their motto "turning research into impact" reinforces this type of research agenda and draws in particular types of employees. One employee stated that she was motivated to work for CIMMYT because of the organization's ability to translate science into practical things for people. Another stated how CIMMYT committed to "help the most needy." CIMMYT seeks to use intellectual inquiry for the betterment of other individuals. These "moral sentiments" to aid other people is a reoccurring theme within development and humanitarian aid that seeks to improve other people's livelihoods (Fassin 2012, 1; Li 2007). While CIMMYT strives to improve quality of life for farmers, CIMMYT describes their aims

through philanthropic motives, which reflects their beginnings within the Rockefeller Foundation.

While CIMMYT's grounds its intentions in moral and altruistic purposes, the organization transforms affective goals into scientific technical programs. Subsequently, CIMMYT transfers aid from above to below, creating an asymmetry (Fassin 2012, 4). To make an impact, CIMMYT makes rational and calculated decisions. (Li 2007, 6). For instance with nixtamalization, CIMMYT argues the initiative is nutritionally beneficial but its cultural significance is epiphenomenal to the nixtamalization technique. These rationalities and calculations determine the correct way to pursue improvement and reinforce particular forms of governmentality. The design of the interventions, the position of humanitarian and development workers, and the techniques used to carry out these improvement programs become routine in nature (Li 2007, 6). Bornstein and Sharma describe this tendency as technomoral politics: "how various social actors translate moral projects into technical, implementable terms as laws or policies as well as justify technocractic acts—as development and legislation regarding administrative reform—as moral imperatives" (2016, 77). These interactions become objective in nature leaving behind the moral intentions while hiding political meaning (Bornstein and Sharma 2016; Fassin 2012; Li 2007). Within the nixtamalization initiative, technomoral politics rationalize the partnership between CIMMYT and KALRO, the focus on maize, and development tactics such the empowerment paradigm.

**Entangled in Kenya's Development**

KALRO's existence is interlaced with Kenya's political history and their current development goals, including Kenya Vision 2030. After gaining independence in 1963, the

Republic of Kenya sought to increase its economic and developmental growth through several policies and acts that favored capitalist trajectories. The motto "Harambee," meaning "Let's pull together," promoted the utilization of cooperative participation towards growth and development (Orora and Spiegel 1980, 244). However, the lack of transparency and accountability for the new administration prevented the space to create a unified nation post-independence (Wa Gĩthĩnji and Holmquist 2012). Political party organizations were ethnically divided based on the district divisions created by the colonial government. While gaining independence rid the country of colonialism, a divided society—socioeconomically and politically—stunted and continues to prohibit Kenya's growth as a nation (Wa Gĩthĩnji and Holmquist 2012, 58).

Kenya continues to face economic and political instability as a result of unsuitable policies, poor terms of trade, and weak governance. Structural adjustment programs (SAPS), which intended to increase growth, promoted privatization and decentralization of the government and inflated socioeconomic inequality (Hope 2012, 3). Following violent ethnic and political clashes in 2007, new constitutional reforms took place in an effort to create stability and a unified nation. However, rushed legislation and "retreat into technical legal responses," excluded citizen's participation and prioritized rule of law and neoliberal growth (Manji 2014, 122). Current policy privileges national economic progress, and reconfigures boundaries between citizens and political elites.

Furthermore, Kenya's progress is encapsulated within an international neoliberal context that situates agriculture as central to development. In 2007, President Mwai Kibaki established Kenya Vision 2030 to improve social equity, to increase economic growth, and to institute a responsible and sustainable democratic system that actively responds to current

issues and the peoples' needs by 2030 (Republic of Kenya 2007). Under Kenya Vision 2030,

the *Agricultural Sector Development Strategy* situated improvements in the agricultural

sector as essential in achieving "'a food-secure and prosperous nation' and Kenya's mission

of 'an innovative, commercially oriented and competitive agriculture' " (Republic of Kenya

2010, xi). Agricultural progress becomes connected to global market participation and

subsequently, agricultural institutions acquire the responsibility to ensure participants in the

sector (i.e., farmers, producers, and marketers) are using the most contemporary

technologies. Once again, Kenyan policy stipulates agriculture as the backbone of Kenya's

economy and central to increased productivity and growth. Additionally, Kenya's economic

development strategies and political economy undermine citizens who do not participate in

these advanced agricultural technologies.

Within the *Agricultural Sector Development Strategy,* The Kenyan Agricultural and

Agricultural Research Act institutionalizes KALRO as a corporate body central to promoting

agriculture as an avenue for development. As an institution, KALRO promotes and provides

efficient and equitable access to resources, information, and technologies in the field of

agriculture (Republic of Kenya 2015, 6). Consequentially, KALRO becomes central to

achieving Kenya's goals of increasing economic growth, and social equity. As KALRO

works towards these development goals, the institution embodies Kenya's historical and

political context.

Assuming Managerial Responsibility

The structure of KALRO's board of trustees simultaneously resituates the state into a

managerial position, while non-state actors and external players assume integral roles in the

agricultural sector's development. The first half of KALRO's board consists of five

individuals associated with state responsibility, including "a Chairperson appointed by the President"; three Principle Secretaries in the Ministry including one responsible for agriculture, one responsible for finances, and one responsible for livestock; and the Secretary to the Science Council (Republic of Kenya 2015). These state members perform managerial responsibilities such as ensuring proper financial management, determining the research agenda, and overseeing the functioning of the organization and its institutions. While not being directly involved in the agricultural projects that occur at each KALRO center, these governmental actors ensure that KALRO participates in promoting agricultural technologies in alignment with Kenya's development goals.

By allocating board membership to non-state actors, the Kenyan government "creates a zone for non-state and transnational actors to facilitate economic growth programs" (Rudnyckyj and Schwittay 2014, 5). In addition to the state members of the board, the KALRO board of trustees includes three representatives to give voice to the interests of the farmers, the general public, and institutions of higher education, respectively. Through the allocation of these positions, the state can claim inclusivity of public opinion. However, since the Cabinet appoints these individuals and a Director General, it is likely these board members are politically aligned with the state. Additionally, two non-citizens with agricultural expertise and "who possess such knowledge and experience as may be necessary for the better carrying out of the Board" (Republic of Kenya 2015, 8) are also appointed to the board, along with a Director-General. The stipulation that two non-Kenyans may influence the management of KALRO suggests Kenya seeks to learn from international, and inherently external, experts. More importantly, these individuals may provide a link to external organizations willing to collaborate with KALRO and Kenya's initiatives both

intellectually and materially. Consequently, KALRO becomes connected to a transnational network of agricultural research organizations.

**Demonstrating Expertise**

To position themselves as agricultural experts, both CIMMYT and KALRO demonstrate their ability to be objective and demonstrate technical rationality. CIMMYT establishes their expertise through "CIMMYT Academy," an initiative to increase training and capacity building to "maximize learning and build an international cadre of top agricultural scientists and development practitioners" (CIMMYT 2016, 35). KALRO demonstrates their expertise by participating in various agricultural shows. By establishing their expertise, both CIMMYT and KALRO interact with systems of audit culture and accountability.

One way that CIMMYT authenticates and brands its expertise is through their capacity to train agricultural experts within the field. Through CIMMYT Academy, CIMMYT prides itself in having trained over 10,000 agricultural experts (CIMMYT 2016). This IARO trains individuals globally, including employees from KALRO. By training agricultural experts within the field, CIMMYT demonstrates accountability in transnationally improving agricultural efficiency, but also simultaneously creates its own "auditable structure" (Shore and Wright 2015 72). CIMMYT interacts directly with an audit culture, a system of self-checking practices that demonstrates efficiency and quality. Through the Academy, the number of individuals CIMMYT trains becomes a quantifiable marker of CIMMYT's ability to transform the agricultural system. Furthermore, through the process of trainings, CIMMYT can set standards of efficiency and quality of agricultural technology, or "produce auditable records" (Strathern 2000, 72). CIMMYT attempts to reconfigure its initiatives to fit within audit culture and technology. Through the Academy, CIMMYT

continues to be a transnational organization that can assist in designing initiatives that sustainably improve the livelihoods of individuals in developing nations but also an institution that works congruent with audit culture.

Like CIMMYT, KALRO must validate its high ranking in agricultural knowledge and innovation. KALRO demonstrates their expertise in the field of agriculture by participating in agricultural shows and field demonstrations. Organized by the Agricultural Society of Kenya (ASK), an institution created to promote agricultural development, agricultural shows take place in almost every district in Kenya. Universities, seed companies, farm equipment companies, and research organizations display their work to the general public and present their research, products, and technologies. Alongside other contributors in the agricultural sector, KALRO is subjectively graded based a range of criteria: number of people that attend demonstrations, yield of new genetic seeds, ability to align new technologies with Kenya Vision 2030, among other measures. Each stand is judged by the ASK committee to receive awards on their accomplishments. In 2016, KALRO won three awards: first position for "Best Stand in Development Research Institute," second place for "Best Agriculture Based Statutory Board Stand," and third position for "The Best Stand in Embracing Information and Communication Systems." The agricultural show becomes a site where organizations must demonstrate their expertise and ability to generate new information in the field of agriculture.

These agricultural shows demonstrate KALRO's abilities not just to the state and ASK but also to the public. The agricultural show is a local event attended by families and school groups. Displaying work and engaging with other agricultural experts and the public, KALRO and the other institutes are compelled to prove their reliability and trustworthiness. The nutritionists at the KALRO 'food value addition stand' adapt their information to suit the

needs of each individual that visits. School groups have the opportunity interact with a 3-D

model of the food pyramid. Women learn and ask about the diversity of ways one could cook

various food crop while simultaneously producing a more balanced diet for their families.

Men inquire about how food value addition could improve their economic opportunities. The

nutritionists at KALRO disseminate information, but also build rapport and trust with visitors.

Many of the nutritionists gave personal anecdotes about the benefit of value addition and

proper nutrition. Their personable interactions establish KALRO as a trustworthy

organization in which their own employees use the agricultural technologies advertised.

The agricultural show regulates organizations' respectability and expertise within

agricultural development. This system of accountability and way of maintaining expectations

is defined as an audit culture (Shore and Wright 2015; Strathern 2000). While this

accountability reinforces maintaining responsibility, sharing information and broadening

public access, the process generates a competitive culture. The research awards given at the

end of the week further exemplify this. However, the participation at the ASK show is

fundamental to KALRO's ability to prove themselves as a competitive research organization

that holds itself accountable for producing relevant and significant research. The organization

actively demonstrates its own commitment to "demand driven research for food security and

income generation" (KALRO 2017). Their mission aligns with the Kenya Vision 2030 but

also CIMMYT's own impact driven research. Furthermore, KALRO exhibits their ability in

disseminating information and community engagement, a fundamental part of KALRO's

work with CIMMYT.

Through audit culture, practices and interactions are naturalized in association with

improvement and development. CIMMYT is accepted as an organization with high

agricultural expertise in introducing effective technologies and innovation. This expertise

enables CIMMYT to work transnationally. KALRO also works congruent with this audit

culture. Through the agricultural show KALRO and its researchers become recognized as

trustworthy agricultural experts both through recognition of the ASK committee and personal

interactions. These audit culture practices become essential to demonstrating quality,

efficiency and accountability to both the wider public and internal management (Shore and

Wright 2015, 421).  Furthermore, as KALRO demonstrates their credibility in the field of

agricultural research, they prove themselves to be a reliable organization for CIMMYT to

partner with.

**Guided by Rationality and Development**

Both KALRO and CIMMYT rely on the use of partnerships to achieve the goals and

missions of their respective organizations. The nixtamalization is just one example of the

various projects these organizations collaboration on. Collaborating with each other,

CIMMYT and KALRO create a partnership guided by "a common agenda, shared

measurement and learning, mutually reinforcing activities and effective communication"

(CIMMYT, 2016). This interorganizational relationship is interpreted as "co-dependent" and

mutually beneficial (CIMMYT Africa Regional Representative 10 March 2017; KALRO

employee, 14 July 2016). Together, these organizations maintain connection with local

farmers, conduct outreach with farmers, and disseminate information and agricultural

technology. In order to achieve organizational mandates, these organizations situated their

partnership through necessitated processes of exchange and motives.

While both organizations benefit from the partnership, CIMMYT relies on KALRO

to reach target populations. With centers all over Kenya, KALRO is a link to local

populations. KALRO has the "'know-how' to take [the technologies] to every village in Kenya" (CIMMYT's Africa Regional Representative, 10 March 17). By working with local farmers, KALRO adapts CIMMYT's seed technologies to each community's specific needs. Additionally, CIMMYT gains access to land to build facilities and complete short-term projects. Through this interorganizational relationship, CIMMYT works transnationally to assist agricultural communities.

Through the partnership, KALRO benefits materially. This interorganizational relationship allows KALRO to hold sovereign responsibility, or provide for its citizens (Brown 2015). Through the partnership, CIMMYT gives KALRO access to new agricultural technologies such as new crop varieties developed by CIMMYT, crop management information, and opportunities for training. KALRO transfers these resources to Kenyan citizens with the assistance of outside organizations, such as CIMMYT. KALRO gains credibility, locally and internationally, as it shares success in productive outcomes with CIMMYT.

At the macro level, KALRO and CIMMYT establish their partnership on equity exchange and a shared agenda to improve agricultural technologies within rural populations. However, evaluating the partnership on a micro level through the nixtamalization initiative, the partnership becomes engulfed in ambiguities and complexities. Through a critical lens, the partnership between CIMMYT and KALRO sits within the global development landscape that persists to hierarchically value particular types of expertise, emphasize neoliberal responsibilization, and reconfigure knowledge assemblages.

Technical Rationality

Technomoral politics persist through CIMMYT's introduction of nixtamalization to Kenya

and through their partnership with KALRO. Nixtamalization is a Mesoamerican method of

cooking maize in a calcium hydroxide solution, more commonly known as lime. Originally,

the process was used to soften maize kernels and remove the husk. Contemporary research

has shown that nixtamalization has many nutritional benefits including increasing the

bioavailability of various vitamins, increasing calcium intake, and potentially reducing the

risk of storage toxins (Pappa 2010). To CIMMYT, these nutritional benefits could solve

various issues within Kenya's agricultural sector. However, by framing nixtamalization as a

technical solution to issues of malnutrition and toxin risk, humanitarian designers of the

nixtamalization initiative obscure other rationalities to introducing the technology.

Additionally, they prioritize income generating agricultural practices, and ignore the diversity

and existing knowledge of local Kenyan farmers.

CIMMYT representatives use technical rationality to justify the use of

nixtamalization in Kenya. When asked how and why nixtamalization was an important

method to introduce in Kenya, a senior researcher at CIMMYT explained it this way:

> Well, the beginning of this was very incidental . . .. The Mexican ambassador was
>
> actually interested in the maize institute in Kenya and did not understand the role of
>
> CIMMYT and why CIMMYT was also in Kenya. He had the opportunity to talk to
>
> one of our researchers . . .. The ambassador was always very keen to process maize
>
> the way they process it in Mexico. He was missing the food and was wondering why
>
> Kenya did not have that. It was also around the time, 2013 or so, that they had an
>
> outbreak of aflatoxin contamination in Kenya.[1] He was thinking about how Mexico

could help and how nixtamalization could be important. Slowly, slowly we start

talking with not only the Mexican embassy in Kenya but also the Mexican Agency

for International Support (AMIS). And they were really interested to hear about the

nixtamalization and to see if through the processing if they could get rid of the

aflatoxins, to avoid people being exposed to the consumption of these toxins. So, we

started a small project. (CIMMYT senior researcher, 10 March 2017)

This explanation reveals several discontinuities and complicates the notion that

nixtamalization was a rational decision to address malnutrition and storage toxins in rural

Kenya. First, nixtamalization was introduced to assist Mexicans residing in Kenya, who were

missing a cultural element of their diet. This rationality of nixtamalization appears cultural.

However, when the outbreak of aflatoxin exposure, a toxin produced by fungi, led to several

hundred deaths, nixtamalization was a possible solution to the health problem. Aligning with

goals of the Kenyan government, nixtamalization research began to exhibit whether

nixtamalization could reduce the risk of aflatoxins. While not addressed in this statement,

nixtamalization also became recognized for its nutritional benefits including its ability to

increase the bioavailability of niacin and calcium intake.  The rationality behind

nixtamalization transformed from a cultural desire to a technical solution for a reoccurring

problem. CIMMYT's claim to expertise (as demonstrated through CIMMYT Academy)

enables nixtamalization to fall into technical terms. Their claim to expertise enables

CIMMYT to "diagnose problems in ways that match the kind of solution that falls within

their repertoire" (Li 2007, 7). Subsequently, CIMMYT excludes the political-economic

contexts from their prescription of nixtamalization.

At the nixtamalization demonstrations, over ninety-six percent of the farmers identified as Kalenjin. As explained by one of the KALRO nutritionists, who identifies as Kalenjin, within many Kalenjin communities it is more common to eat ugali made from finger millet or sorghum rather than from maize. However, in Kenya finger millet production vastly decreased in recent decades as maize production increased (Handschuch and Wollni 2016, 345). This seems counterintuitive since "finger millet is better adapted to poor agro-ecological conditions and could therefore make an important contribution towards more resilient agro-ecological systems, especially against the background of climate change and ongoing soil degradation" (Handschuch and Wollni 2016, 345). Additionally, finger millet is more nutritiously dense in both calcium and protein (MacKenzie 1999, 69). Despite finger millet's high nutritional value, high market price, adaptability and good storability, few researchers or policy makers have given finger millet consideration (Handschuch and Wollni 2016, 344). Introducing nixtamalization, like these other policies, ignores the nutritional benefits, preference, and cultural significance for traditional food grains such as finger millet.

Historically and politically, maize is favored and advertised as an essential crop to improving the development of rural Kenya. Dating back to colonial rule, maize and the distribution of seeds was a priority of the Department of Agriculture in Kenya in the interest of market participation (MacKenzie 1999, 65).  In the 1920s, the Department of Agriculture and the Colonial Office interpreted European products, including new varieties of maize, as the solution to improving agriculture in Kenya. Subsequently, crops such as "millets, referred to as 'bird seed' crops, were considered inferior not just in terms of yield, but also in terms of nutrition and were replaced by crops more 'calculated to develop energy and replace waste' " (MacKenzie 1999, 74). Today, the state and development organizations continue to promote

the consumption and capitalism of maize, while rejecting the marketability and preference for other cereals such as finger millet. Within Ngata, the MOA hopes for the use of 2,000 hectares for maize during the long rains and 800 hectares during the short rains (MOA 2016). The promotion of maize production redefines maize as the advanced, modern agricultural technology, but defines finger millet and ethnicities that consume this traditional grain as backwards.

Today, maize and maize products continue to reflect socioeconomic status and the colonial framing of agricultural modernity. More indigenous food crops are associated with poverty. As a student researcher discussed it, "Growing up in the village and very poor areas, people rely on sweet potatoes and cassava. When the youth grow up and attend universities or do well for themselves, they continue to view these foods as association with poor, and social status" (KALRO student researcher, 14 July 2016). As the nixtamalization initiative focuses on methods to improve the nutritional content of maize, they solidify maize as the center of agricultural modernity. However, there is also hierarchical differences between varieties of maize. Several farmers expressed concern with the coloration of the nixtamal maize and its similarity to "yellow maize," or maize often distributed during times of famine. A KALRO employee agreed with this sentiment, saying, "we like our ugali white. If the lime solution or the nixtamalization process changes the color of the maize, I am not sure everyone is going to want it" (14 July 2016). The nixtamalization initiative failed to account for the historical and cultural significance of different varieties maize and other food crops within Kenya, and continues to promote maize as essential to development. These initiatives promote maize as the advanced agricultural technology, and reframe finger millet as

backwards. Subsequently, the individuals who continue to cultivate these traditional

technologies become backwards citizens.

As we continued with the nixtamalization project, especially the demonstrations, I

noticed the presence of multiple other development initiatives in Ngata. Signage of various

international and national organizations advertising their projects and initiatives littered the

junction leading from the highway to the village. When I inquired for more information

about Ngata and the involvement of other stakeholders, the MOA extension officer informed

me that several different stakeholders conduct research and projects in this sub-county. I was

subsequently presented a document summarizing who these stakeholders were and describing

their current projects. The stakeholders include Egerton University, KALRO-Njoro, Self

Help Africa (SHA), Horticultural Crops Development Authority (HCDA), Sustainable

Community Development (SCODE), Kenya Productivity and Agribusiness Project (KAPAP),

East Africa Agricultural Productivity Project (EAAPP), Heifer International, and Kenya

Cooperative Creameries (KCC). About two-thirds of the farmers at the demonstrations

participated in various collectives established through these development initiatives. While

the nixtamalization project and the MOA incentivize the production of maize, the presence of

these other initiatives exemplifies the inundation of approaches that seek to provide

opportunities for development. These humanitarian and development projects reinforce

neoliberal principles. These farmers must uphold individual responsibility in their economic

mobility, and encourage their community members to engage in similar processes. While the

location of these initiatives may be incidental, the presence of so many projects suggests the

people at this location need to "modernize" and subsequently rid themselves of backwards

technologies. The nixtamalization initiative is structured within a political landscape that attempts to revolutionize Ngata—and Kalenjin people specifically.

Empowerment Paradigm

Working directly with local populations, IAROs such as KALRO and CIMMYT seek to produce research, knowledge, and technologies to assist local farmers in becoming self-advocates for their own livelihoods through agriculture. All KALRO's departments seek to enable farmers to act sustainably and self-sufficiently in their agricultural practices. The cereal breeding and oil crop breeding departments develop different varieties of crops that are more likely to withstand effects of climate change. Entomology, pathology, cereal chemistry, and soil and crop management participate in developing management practices and teaching farmers to assess, evaluate and solve various issues that may occur with their crops. The nixtamalization initiative employed these technologies of empowerment by simultaneously collecting advice from the local farmers while encouraging the use of nixtamalization during field demonstrations. As institutes such as KALRO and CIMMYT use such qualitative research to capture the needs and desires of populations, community members become "expert innovators" (Schwittay 2014, 36). However, by enabling institutions to dictate the root cause of the farmers' struggles, humanitarian design still prioritizes the institutions' authority in knowledge. In the case of nixtamalization, the initiative prioritizes the cooking process's ability to reduce malnutrition and storage toxin risk. As discussed above, these initiatives ignored food preferences and customary significance of particular food grains. Additionally, these empowerment approaches reaffirm particular forms of self-responsibility and liberation, which advances Western expertise and technological values.

KALRO and CIMMYT assume that the nutritional benefit and aflatoxin risk reduction would motivate the local farmers to adopt the technique. To these agricultural institutes, community members should feel empowered to use this cooking technique. However, based on the responses and commentary during the nixtamalization demonstrations, actors interpreted this empowerment differently. Some farmers framed the field demonstration in terms of improving their ability for innovation. Others discussed nixtamalization as widening their options to provide snacks for their children. Additionally, other farmers were interested in the economic benefits from the replication of nixtamalization equipment. These options enable the community members to act in varied ways to improve their livelihoods but also demonstrate that there is fluidity in the concept of empowerment (Khurshid, 2016, 641). Furthermore, unraveling this commentary reveals how empowerment can reinforce neoliberal conceptions of responsibility and capital market ideologies.

Neoliberal Citizens

Through these demonstrations, KALRO and CIMMYT become "gatekeepers of knowledge production which affirm neoliberal market principles of discipline, efficiency and competitiveness" (Karim 2011, xvii-iii). Although the demonstrations were innovations from KALRO and CIMMYT, an extension officer of the MOA attended each demonstration. This extension officer assisted KALRO in finding locations and organizing participants to attend demonstrations. While demonstrations were intended to give farmers the space to voice their opinions on nixtamalization, the demonstrations also served as an opportunity for KALRO and the MOA extension officer to encourage the farmers to take individual responsibility in improving their livelihood.

Through the demonstrations, the MOA extension officer and KALRO nutritionists introduced nixtamalization and assess its acceptability within a neoliberal context. At the close of the Mimwaita demonstration, the MOA extension officer stated, "Now after this demonstration, your first step is to show your families. Second, in either a group or individually think of ways to start a business, to fortify the maize to generate income. Even I am going to share with my neighbors tomorrow." Nixtamalization becomes a rational technique to empowerment. The extension officer also suggests personal responsibility and accountability characteristically define the ideal community member.

Individuals at the demonstrations also echo identities structured within neoliberal responsibilization. One woman stated, "We won't remain idle in the villages anymore. We now have more innovations." Other farmers discussed the importance of "acting as teachers," being good leaders by communicating what they learned about nixtamalization and putting their own teaching into action. One woman, who identified herself as a leader of the group, shared a list of important lessons the farmers learned from the nixtamalization demonstration. One lesson she described was "accountability: showing how something can start out so small and start initiatives at home." This commentary reaffirmed a neoliberal narrative the farmers were already internalizing from their interaction with other development projects, specifically Heifer International. This neoliberal narrative redefines the boundaries of the ideal community member in an individual's ability to remove themselves from poverty and become innovative. Furthermore, this community member must seek to educate others about their knowledge. These farmers become "subjects of knowledge" (Rudnyckyj and Schwittay 2014, 5) and become active agents in improving their lives.

In the Kamungai demonstration, farmers' envisioned nixtamalization as a method to increase individual economic mobility, framed within a capitalist market context. The Kamungai demonstration consisted of local farmers in the surrounding Kamungai village. This group was compromised of a majority of men and only two women. While these farmers did not express as many of the same exclamations of communal responsibility, these farmers showed interest in nixtamalization's ability to increase their economic opportunities and their ability to participate in the local market scene. Several men expressed the desire to replicate the tortilla press and wet mill grinder. One farmer stated, "These look easy to fabricate. I want to make this press and sell it"; he saw the nixtamalization equipment as a way to increase his economic opportunities. These economic opportunities could reinvent their individual mobility. The demonstrations reproduced knowledge that affirms the use of neoliberal governmentality in individual responsibility and the involvement within a capitalist market.

Neoliberalism hides within morally accepted initiatives that seek to empower local actors. Development and empowerment become valued in terms of economic upward mobility. The nixtamalization project reinforces ideals of personal responsibility and encourage local populations to invest in their own economic wellbeing. As organizations such as CIMMYT and KALRO mobilize their agricultural expertise, they remake individual and collective identities. All the while, the state maintains its managerial role through the board of KALRO and representatives such as the MOA extension officer. The state no longer assists in development by direct investment but rather by being "incubators in development" (Rudnyckyj and Schwittay 2014, 3) and by reinforcing neoliberal knowledge through these projects.

Hybridization of Knowledge

The demonstration process further transforms knowledge and rationality, creating hybrid forms of knowledge. As discussed, CIMMYT's Mexican origin and the cultural significance of nixtamalization influences CIMMYT's justification for introducing nthe cooking technique. However, at the demonstrations, nixtamalization's affiliation with Mesoamerica is all but ignored. KALRO publicizes nixtamalization as a technical and rational solution due to its nutritional benefits and aflatoxin reduction. When Kenyan researchers wearing white lab coast embroidered with the KALRO logo introduce and encourage the use of nixtamalization, CIMMYT's cultural connection and rationale of nixtamalization is removed and transformed. Nixtamalization is subsequently stripped of its Mesoamerican origin and is seen as a beneficial opportunity that all local farmers. It is backed by KALRO and the MOA, so it is presented as fit for every local farmer.

Furthermore, the process discredits other techniques that people used to soften and dehull the maize in this part of Kenya. While living in Kenya, I learned about how maize can be boiled with wood ash to soften the kernels. Many individuals contested how the nixtamalization process was any different to these other methods. Nutritionally, there are differences in the processed maize, mainly that nixtamalization increases calcium. However, very few studies have accessed whether these other boiling processes decrease aflatoxin risk. As the aflatoxin reduction is the main reason for introducing nixtamalization, CIMMYT and KALRO could have investigated whether these other processes could be expanded before introduction a culturally different technique. By introducing nixtamalization, CIMMYT and KALRO prioritize the expertise and knowledge from development designers rather than that of the local population. Their technical solution to aflatoxin risk is tied to notions of progress

within a neoliberal context. The intervention of various stakeholders and initiatives simultaneously promote neoliberal modernization while discrediting and rejecting traditional techniques as backward. These processes create hybrid knowledge assemblages that reconfigure day-to-day interactions with farmers to the political agenda of Kenya.

**Expanding beyond Ngata**

On a broader scale, the nixtamalization initiative and the partnership between KALRO and CIMMYT reinforces the privatization of development and the push towards participating in a neoliberal capital market on a larger scale. Outlined in their *Strategic Plan 2017 to 2022*, CIMMYT sees public-private cooperation as essential to progress. "Private sector is playing a stronger role in development work, helping to make markets work for the poor" (CIMMYT 2016, 9). During the 1940s, in a different context, Rockefeller used a similar framing to rationalize why involvement in the capitalist market was essential. Repeatedly, market participation is interpreted as integral to development.

The nixtamalization initiative has sparked interest in the private business sector. Following my internship, I was contacted by a man named Antonio, who is seeking ways to create a for-profit business around the concept of nixtamalization in Kenya.[2] Antonio is a Mexican businessman residing in Kenya. Dialogue with Antonio revealed similar framing of the nixtamalization project. Antonio wanted to make an impact: "I thought it made sense. It is a health problem. A nutritional problem. It aligns with what I want to do as far as contributing to something. And it is something that is urgent to be addressed. And that might benefit the community at large. That is why I focused on nixtamalization" (Antonio, 8 March 2017). Like the commentary from CIMMYT representatives, this businessman feels a moral obligation to help. His rationality to focus on nixtamalization is not connected to his cultural

heritage but rather to nixtamalization's potential health benefits for rural Kenyan farmers and families. His moral obligations are transformed into a technical solution.

Additionally, the way Antonio envisions his business model reproduces the empowerment paradigm. Ideally, as he explained, his model would include "start[ing] at the bottom of the pyramid . . . include [the local farmer] as the consumer but also as a part of the value chain . . . it is involving people at the bottom of the pyramid as consumers, producers, distributors." This focus those at the bottom also reflects the initiatives already in place for the nixtamalization initiative: empowering the farmers. It also implicitly suggests that the capitalist market works to regulate socioeconomic contexts. However, this "bottom of the pyramid" theory buries the political context and social infrastructure that promotes neoliberal responsibilization (Elyachar 2012).

As evident through this interaction, the afterlives and neoliberal development techniques seeps into larger contexts. Antonio exemplifies how social objectives and rationalities are combined with business objectives as technical solutions. This is seen as a more sustainable method to improving development and humanitarian initiatives. Values established by philanthropists like Rockefeller in the early 20th century persist to control the trajectory of development in capitalist means. Within the private sector, governments are further decentralized and politics become more obscure. As the private sector obtains more responsibility in development, employs empowerment approaches, and incorporates local discussion, researchers must continue to critically evaluate the effects of these initiatives of development in relation to the afterlives of development. Neoliberal responsibilization, the making of the neoliberal citizen, and the hybridization of knowledge assemblages continue

on a grander scale through the expansion of global capitalism. Developmentalism continues

to prove its resilience in both the practices and promotion of the new development initiatives.

South-South Cooperation

The partnership between CIMMYT and KALRO also reflects the increases in

collaboration among countries in the global South and their development efforts. Globalizing

capital market trends improved economic growth and development in the global South,

restoring the possibilities for South-South Cooperation, or SSC (Gray and Gills 2016, 589).

Historically, SSC was introduced in the Bandung Conference of 1955, but failed to fully

emerge as an alternative option to North-South dialogue until recently (Gray and Gills 2016).

However, with the continual expansion of development initiatives and ideologies, and the

rise of nations within the global South to middle income status, many nations have adopted

SSC. This cooperation is seen to eliminate the tensions which exist within North-South

development relationships, but SSC contributes to interorganizational relations which

obscures developmentalism into new development approaches.

Like partnership, South-to-South cooperation retains values of mutual benefit,

solidarity and equality. Structurally, SSC is "subsuming a broader sense of collaboration than

traditional forms of international cooperation" (Bry 2017, 163). These cooperation efforts are

about countries in the global South sharing their lived experiences and knowledge (Bry 2017).

At the macro-level, the partnership between CIMMYT and KALRO reflects a SSC. Through

CIMMYT, Mexico shares their learned expertise in agricultural advancement through

technology dissemination to Kenya by way of KALRO. Through this alliance, collaboration

can "take form of a more direct, more or less horizontal relationship between agricultural

research institutions from both sides; transfer technologies to farmers is considered a task to

be performed largely by African counterparts" (Cesarino 2012, 513). However, using expertise to assist others still creates hierarchical boundaries between those who diagnose, those would adapt the technologies to the target population and those who are supposed to use these new techniques, as seen explicitly in the nixtamalization initiative. Rendering technical still "recreates ontologic-epistemological hierarchy" (Cesarino 2012, 522). These entanglements within SSC can be as complicated, asymmetrical, and political as North-South relations.

The rise of SSC creates several new questions regarding development and a new world order that cannot be answered in this thesis: Is SSC a new emergence of unequal players, unequal resource distribution and neoliberal politics? Will this shift in global development trends lead to a larger shift in the world order in terms of economic globalization? In the long term, how will SSC effect on-the-ground practices of development and empowerment? Research on current partnerships between organizations such as CIMMYT and KALRO can inform researchers how SSC will play out in the coming years. It should be expected that even if SSC is an effort to move away from "standardizing package solution to problems" of North-South collaboration, famous for imperialistic and colonial tensions (Cesarino 2012, 515), asymmetries will arise. These collaborations are likely to embody the afterlives of development. As SSC reconfigures practices within developmentalism to suit contemporary needs and goals, these ideologies and practices will remain inherently connected to forms of neoliberal responsibilization, global capitalism, and global development.

**Conclusion**

The partnership between KALRO and CIMMYT and the nixtamalization initiative serve as an example of the present and future of development within agricultural progress. While inherently embedded in the Kenya's political economy, Kenya's current development strategies, and CIMMYT's foundational association with the Rockefeller Foundation, the partnership reveals the intricacies of contemporary development work. Through the analytical framework of the afterlives of development, the partnership between CIMMYT and KALRO, and the nixtamalization initiative reveal how the Kenyan state has become decentralized and assumed managerial responsibility of their development projects. The initiative works intimately with processes that construct Ngata and local farmers as inferior subjects that need to be modernized. CIMMYT and KALRO, as humanitarian actors, demonstrate themselves as experts in the field and gain authority to rationalize the introduction of nixtamalization in Kenya. Nixtamalization's cultural significance remains epiphenomenal. Through the progress of empowerment techniques, the local farmers redefine both collective and individual identities through neoliberal responsibilization and the neoliberal market context. Finally, knowledge assemblages are reconfigured to reflect the agricultural expertise of CIMMYT and KALRO, rather than the cultural knowledge of the target population. While partnership and agricultural research organizations remain central to the discussion of development work, such partnerships continue to be situated in political, social and historical contexts which shape initiative outcomes and effects.

More broadly, understanding the complexity of partnerships and initiatives that exist between interorganizational relations foreshadows future outcomes within development work. The increased influence of private sector further emphasizes neoliberal responsibilization,

capital market place, and neoliberal citizenship. As the UN and other international

organizations mainstream South-to-South cooperation into national development strategies to

enhance Africa's capacity, researchers must remain critical to how these collaborations

reflect past developmentalism. While these organizations such as KALRO and CIMMYT

hold the reputation of producing intellectual and objective work, their engagement in

development projects reveal how their work is framed in contextual way. I hope this

encourages readers who are involved in programs and policy within the development field to

be critical of the implications of their practices. While partnerships will remain an integral

part of humanitarian and development aid, practitioners must be mindful of the contextual

framing that reshapes policy and practice on the ground. Additionally, as other

anthropologists continue to engage in professions within the development field, we must

continue to be critical about the implications of development practices while also recognizing

development is intended to be about creating positive change.


**Notes**

[1] Outbreaks of illness due to aflatoxins occurred both in 2004 and 2010, affecting over 300

    hundred people in 2004 alone.

[2] Antonio is a pseudo name, to protect the identity of the participant.

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**Appendix**

Acronyms

AMIS: Mexican Agency for International Support

ASK: Society of Kenya

CGIAR: Consultative Group on International Agricultural Research

CIMMYT: International Maize and Wheat Improvement Center

CSO: Civil society organization

GEB: General Education Board in the United States

FAO: Food and Agriculture Organization of the United Nations

IARO: International agricultural research organization

KALRO: Kenya Agricultural Livestock Research Organization

KARI: Kenya Agricultural Research Institute, name of KALRO prior to 2013

MOA: Ministry of Agriculture

SSC: South-South Cooperation