ABSTRACT

Title of Dissertation: FAUCETS AND FERTILIZERS: INTERPRETING TECHNOLOGICAL CHANGE IN RURAL OAXACA, MEXICO, 1946-1988

Joshua Charles Walker, Doctor of Philosophy, 2015

Dissertation directed by: Professor Mary Kay Vaughan
Department of History

Faucets and Fertilizers: Interpreting Technological Change in Rural Oaxaca, Mexico, 1946-1988 argues that peasant farmers in Oaxaca were key actors who helped to oversee the technological modernization of their villages in the twentieth century. From the 1940s to the 1980s, federal and state development programs sought to introduce new tools like chemical fertilizers, water faucets, roads, and mechanical corn grinders to villages in the countryside. These programs were often unevenly distributed and poorly designed, forcing peasants to rely on old skills and customs in order to acquire and use the technologies they wanted. As peasants learned about the benefits of the technologies, they also learned to use them to challenge the power of family patriarchs, village elders, and federal leaders. Far from being the passive victims of modernization described in the historiography of rural Mexico, Oaxacan peasants participated in technological change and used new tools in an attempt to overcome problems with low crop production and restricted mobility.

FAUCETS AND FERTILIZERS: INTERPRETING TECHNOLOGICAL CHANGE IN RURAL OAXACA, MEXICO, 1946-1988

by

Joshua Charles Walker

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Advisory Committee:

Professor Mary Kay Vaughan, Chair
Professor Karin Rosemblatt
Professor Daryle Williams
Professor Thomas Zeller
Professor Bruce James

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Abbreviations

AGN: Archivo General de la Nación, Mexico City
AGPEEO: Archivo General del Poder Executivo del Estado de Oaxaca, Oaxaca City
AHA: Archivo Histórico del Agua, Mexico City
AHSS: Archivo Histórico de la Secretaría de Salud, Mexico City
CDIMEX: Comisión Nacional para el Desarrollo de los Pueblos Indígenas, Mexico City Archives
CDIOAX: Comisión Nacional para el Desarrollo de los Pueblos Indígenas, Oaxaca City Archives
CDITLAC: Comisión Nacional para el Desarrollo de los Pueblos Indígenas, Centro Coordinador para el Desarrollo Indígena Tlacolula-Zapoteco del Valle Archives
GN: General Notes, used to classify the combined field notes of Ronald Waterbury and Carole Judith Turkenik. I read the notes in their home in Oaxaca.
INI: National Indigenist Institute
INEGIOAX: Instituto Nacional de Estadística y Geografía, Centro de Información Oaxaca
NARA: National Archives and Records Administration, College Park, MD
NLM: National Library of Medicine, Bethesda, MD

Chapter 1: Introduction and Argument

Rusty reminders of bygone technological regimes punctuate the streets of Oaxaca's rural villages. Abandoned hydrants, wells, pumping stations, and water holding tanks hark back to water management systems that were part of federal efforts to modernize and sanitize the countryside in the 1960s and 1970s.[1] Federal development programs after World War II sought to make rural residents healthier, more economically solvent, and more active consumers of manufactured goods. Giving peasants access to clean water was one important step towards achieving this goal.[2] To do this, officials designed water management systems that moved water from riverbanks or springs through asbestos tubes to hydrants located on street corners and communal meeting spaces. There, residents could get fresh water by simply turning a faucet valve.

Villagers had a central role in building and operating these systems. They formed committees and petitioned officials to come to their village.[3] They provided labor and funding using traditional institutions like *tequio* (mandatory community service) and *cooperación* (a tax to fund communal projects and celebrations). They fought over the best ways to operate and maintain the new systems. The arrival of the first potable water networks depended as much on peasants as it did on federal officials.

Today, disused hydrants and pumps remind us of the problems of these first water management systems. Little funds or expertise were available for the maintenance and

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[1] See Figures 1-2. Photograph for Figure 1 by Joshua Walker, 2012; Figure 2: "Oaxaca: Obras de Agua Potable, 1965-6," AHA, Fondo: CdP, Caja: 284, Exp.: 4431, Legajo: 1.

[2] Wolf, *Peasant Wars,* xiv-xv. Following Eric Wolf, I define peasants as cultivators who make decisions about their crops, participate in "traditional arrangements" that protect their land and their access to labor, and sell products in markets only when necessary.

[3] I define village as a community of people, usually between 200 and 3,000 residents, who share a common language, history, and geography.

repair of pumps.[4] Some villages outgrew the coverage areas of their first potable water networks.[5] Public hydrants were annoying for their tendency to break or to be misused by children playing in the streets.[6] The asbestos pipes broke down after less than twenty years, and the springs that fed them could go dry.[7] They also made water taste like rust.[8]

In the 1980s and 1990s, villagers began searching for ways to replace technologies that were not getting the job done. In San Bartolomé Quialana, a village in the arid valley of Tlacolula, they looked for high-elevation springs that could provide water via gravity instead of relying on repair-prone pumps.[9] In Santa Marta Latuvi, a community in Oaxaca's *Sierra Juárez*, they replaced the corroding network of asbestos tubes with a series of hoses fed by untapped springs.[10] In both villages, public hydrants gave way to home water faucets. Villagers fought over the design of these replacement technologies and over ways to pay for them.[11] In the end, both communities settled on a

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[4] Manuel Hernández Hernández to Gorge Aristaín Figueroa, 10 Feb. 1981, San Bartolomé Quialana Archives, Binder: Documentos Antiguos; Gonzalo Sánchez Sánchez to Jorge Atristaín Figueroa, 29 Jan. 1981, San Bartolomé Quialana Archives, Binder: Documentos Antiguos; Lázaro Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 4 June, 2012.

[5] This happened in San Bartolomé Quialana. Conversation with peasant, San Bartolomé Quialana, field notes 21 Aug. 2014; Ricardo Rey Morales Hdz., and others, to Miguel de la Madrid Hurtado, 23 Jan. 1984, San Bartolomé Quialana Archives, Binder: Documentos Antiguos.

[6] Conversation with peasant, Santa Marta Latuvi, field notes 5 Oct. 2012.

[7] Conversation with peasant, Santa Marta Latuvi, field notes 5 Oct. 2012; Anonymous former resident of Latuvi, interview by Joshua Walker, at his home in Oaxaca de Juárez, 22 May 2012.

[8] Angelita Herrera, interview by Joshua Walker, in her home in Santa Marta Latuvi, 2 May 2012; Conversation with peasants, Field Notes 14 Oct. 2012. Angelita Herrera told me that the metal pipes made water taste like rust. Angelita Herrera is a pseudonym for the interviewee, who requested that her identity be concealed.

[9] "Acta de Asemblea," 4 Mayo 1992, San Bartolomé Quialana Archvies, Binder: Documentos Antiguos; Lázaro Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 4 June 2012.

[10] Conversation with peasant, Santa Marta Latuvi, field notes 5 Oct. 2012.

[11] I have more evidence of conflict from San Bartolomé Quialana than I do from Latuvi, although I believe that conflicts over the shape and form that technologies would take were a feature of village life throughout the state. "Acta de Asemblea," 4 Mayo 1992, San Bartolomé Quialana Archvies, Binder: Documentos Antiguos; Lázaro Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 4 June 2012.

technological regime that uses hoses, holding tanks, and gravity to transport water past the disused technologies of yesteryear and into the homes of thirsty peasants.

The story of water management technologies in Oaxaca is instructive for understanding the general process of technological change and modernization in the second half of the twentieth century. In this dissertation, I investigate the ways that peasants acquired and used new technologies like water faucets, chemical fertilizers, grafted fruit trees, paved roads, tractors, automobiles, and mechanical corn grinders.[12] I also ask about the consequences of their decisions. Federal programs and development funding from the 1940s to the late 1980s helped to expose many peasants to these technologies. Officials offered suggestions, tools, and money to make new projects come to life.

Figure 1: An abandoned hydrant in Santa Marta Latuvi, 2012. Photograph by Joshua Walker.

[12] I define technology as a diverse network of humans, non-humans, materials, and equipment working together in order to achieve something that a single human (or non-human animal) could not. The creation of these networks and the definition of their success is a highly contentious process that is influenced by the politics, economics, environment, and culture of a given place. See, Sismondo, "Science and Technology Studies," 14-7.

Figure 2: Children using a public hydrant, Santa María Temaxcalapa, Oaxaca. Estimated date 1965.

However, government programs were frequently ill-conceived, poorly executed, or not extensive in their coverage. Abandoned water faucets are partial evidence of this. As a result, I argue that technological development in rural Oaxaca largely depended on the initiative, creativity, and leadership of peasants themselves. Peasants made new tools work to enhance existing economic activities and political organizations in their villages. They used their repair skills, animals, and knowledge of local and regional markets to transform seemingly inappropriate technologies into valuable assets. Peasants' culture helped them to manage technologies and make them fit their needs.

At the same time, new tools also inspired changes in local customs. Women and young men used the mobility and convenience provided by faucets, corn grinders, and roads to challenge the entrenched authority of fathers and husbands. Political aspirants used the prestige associated with service on technology introduction committees to

challenge the power of village elders. Village leaders turned access to technologies into a political issue with nationwide implications, demanding that officials provide access to new tools as a precondition for their village's participation in a united Mexico. Problems involving new technologies could be intense, but by working through them, peasants created an economic and cultural environment that they describe as "progress" over the past.

Historiography

Many studies of rural development after 1940 follow what historians call a revisionist perspective. After the federal government massacred student protestors in 1968, revisionist scholars tried to criticize officials by revising historical understandings of the Mexican Revolution (1910-1920). Revisionist rejected an earlier description of a revolution that was liberating for peasants. Instead, they depicted it as an event that merely reinforced the power of capitalists and made state clients out of peasants and workers.[13] Along with these arguments came the idea of the Mexican federal state as Leviathan, a monster eager to destroy local traditions in the name of political and economic domination.[14]

Revisionism dominates understandings of rural Mexico, development, and technological change in the period after 1940. Many scholars understand rural development programs in this period to be "dualistic," serving wealthy agribusinesses at the expense of small farmers. Cynthia Hewitt de Alcántara was one of the first to advance this claim in her widely-cited monograph, *Modernizing Mexican Agriculture:*

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[13] Womack, "The Mexican Revolution," 200; Aguilar Camín and Meyer, *In the Shadow of the Mexican Revolution*, 75-6, 158-9.

[14] Bantjes, "Saints, Sinners, and State Formation" 140, 145-6, 150; Becker, *Setting the Virgin on Fire*, 72, 88-90, 157; Meyer, "An Idea of Mexico," 289; Brading, "Introduction: National Politics and the Populist Tradition," 8, 16; Fowler-Salimini, "Revolutionary Caudillos," 192.

Socioeconomic Implications of Technological Change, 1940-1970. Hewitt de Alcántara claims that the capitalists controlling Mexico's government after 1940 sponsored technological development programs that were only appropriate for large and middle-scale farmers. These farmers were able to produce huge amounts of food using new tools like fertilizers, hybrid wheat seeds, tractors, and irrigation, but small farmers were left out.[15]

Many scholars seem convinced by this argument. Historian Jeffrey Pilcher writes, "Mexican agriculture developed into an essentially dual system divided between a handful of commercially oriented and highly productive enterprises and large numbers of precariously situated and technically backwards cultivators."[16] Angus Wright opines that the Green Revolution was "compatible with the desires and plans of relatively wealthy landowners and urban elites," and "incompatible with the demands and cultures of traditional peoples focused on security and long-term ecological stability."[17] Sergio Reyes Osorio, Rodolfo Stavenhagen, and the other editors of *Estructura agraria y desarrollo agrícola en México* argue that from 1941-1958, "Agricultural development principally benefitted medium and large-sized private properties."[18] David Barkin and

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[15] Hewitt de Alcántara, *Modernizing Mexican Agriculture,* 37-42, 90, 101, 308.

[16] Pilcher, *Que Vivan,* 112.

[17] Wright, *The Death of Ramón González*, 186. Olsson, "Agrarian Crossings," Chapter 5; Cotter, *Troubled Harvest,* 234, 252. The Green Revolution refers to the spread of agricultural technologies like hybrid corn seeds, chemical fertilizers, tractors, and modern irrigation systems throughout much of the so-called third world. It began with experiments by the Rockefeller Foundation in Mexico in 1943 and helped to increase Mexican food production. See the citations in this note for Olsson and Cotter.

[18] Reyes Osorio and others, eds., *Estructura agraria y desarrollo agrícola en México*, 43-4. Original reads: "…el desarrollo agrícola benefició principalmente a las medianas y grandes propiedades privadas."

Blanca Suárez, Merilee S. Grindle, Gustavo Esteva, and Patrick H. Cosby have advanced similar ideas.[19]

There is a geographic component to this argument. In the revisionist imagination, northwestern Mexico received development support, while states in the central and southern sections of the country, sections dominated by peasants, did not.[20] Northwestern states, especially Sonora, were home of the generals-turned-politicians who dominated Mexican politics in the decades after the revolution, and the implication is that these leaders enriched themselves by directing development funding back to their home states instead of to peasants in places like Oaxaca.[21] Others employ an economic argument, claiming that development policies, specifically the construction of rural roads, put peasants at a disadvantage in national and international markets. Commodities that were once produced and sold in villages and regions now had to compete with mass-produced items from other parts of the nation and the world.[22]

Scholars often claim that skewed development policies created ugly consequences for peasants, their tools, and their traditions. In these formulations, peasants were "attacked" by government policy and suffered the results. Angus Wright, in *The Death of Ramon González,* claims that the after 1940, "the attack on peasant land rights, the *ejido,* and peasant communities went hand in hand with an attack on traditional agricultural technology."[23] Salomón Nahmad Sittón, Alvaro González, and Martha Rees argue that

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[19] Barkin, "SAM and Seeds," 113; Esteva, *La batalla rural*, 17; Barkin and Suárez, "El impacto de la biotecnología," 116; Cosby, "Leviathan in the Tropics," 165-6.

[20] Zazueta, "Agricultural Policy in Mexico," 123; Esteva, *La batalla rural*, 47-8; Eakin, *Weathering Risk*, 40; Foley, "Privatizing the Countryside," 61-2; Cosby, "Leviathan in the Tropics," 165-6.

[21] Foley, "Privatizing the Countryside," 61; Hewitt de Alcántara, *Modernizing Mexican Agriculture,* 141, 147-8.

[22] de la Peña, "Commodity Production," 90-3; de la Peña, *A Legacy of Promises,* 108; de la Peña, "Civil Society," 311; Kyle, *Feeding Chilapa*, 18-19; García Zamora, *Crisis y modernización,* 23.

[23] Wright, *Death of Ramon González*, 153.

communities (*los pueblos)* in national development schemes are subjected to "subhuman living conditions, unjust work regimes, the deterioration of their systems of production, cultural erosion, and the destruction of their territories."[24] For Nahmad Sittón, González, and Rees, the substitution of new technologies in place of old ones, "[breaks] the adaptive equilibrium between the environment and traditional technologies; and [imposes] a neocolonial capitalist economy in which relations with the environment consist of raping and pillaging natural resources."[25] Historian John Tutino claims that the Mexican "regime" viewed the Green Revolution as a way to end the ecological autonomy of rural communities.[26] Jonathan Fox argues that the government's promotion of hybrid seeds under the Mexican Food System resulted in "the loss of locally adapted seed varieties developed over generations…one more step erosion of peasant producer autonomy in the face of integration into the market…"[27] Gustavo Esteva points to the "stagnation" and "deterioration" of the peasant economy, and claims that it became "subordinated" to commercial agriculture.[28] Robert Wasserman claims "technological modernization, rather than addressing the basic problems of food production, has driven many peasants off the land entirely or augmented the flow of illegal migrants to the United States."[29] These views depict peasants as victims of an attacking, powerful state that used agricultural technologies as bludgeons.

My work takes issue with this scholarship on a number of fronts. First, I focus on small-scale peasant farmers, a demographic supposedly ignored by technological

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[24] Nahmad Sittón, González, and Rees, *Tecnologías indígenas*, 14.
[25] Ibid., 15.
[26] Tutino, "The Revolutionary Capacities," 214, 250-1. Tutino defines ecological autonomy as "the ability of rural communities to sustain themselves and insurgent fighters independently of the structures of power and production they seek to transform."
[27] Fox, The *Politics of Food*, 106.
[28] Esteva, *La batalla rural*, 71.
[29] Wasserman, "Rural Labor and Income Distribution," 103.

development programs. I show that government-sponsored, ecologically-appropriate technology programs arrived to peasants in select communities as early as 1946, and most communities received government support by the 1970s. My work also argues that we need to extend our view of technological development outside of Mexico's northwestern states. Officials paid attention to Oaxaca and to the other peasant-dominated states of the south, even if that attention was meager compared to the resources and time they spent in the north.

Finally, I reject the thesis of peasant victimization. Peasants worked with government agronomists, teachers, promoters, and other officials, who often depended on peasant labor to put technology transfer projects into action. When officials were not available, peasants used their connections in markets to learn about new tools and to supply themselves with the ones that they wanted. They appropriated new technologies in quantities they could afford and in ways that fit with their existing behaviors, rejecting tools that did not fit with local landscapes and economies.[30] Over time, new tools helped to engender conflict and change in communities. However, these were conflicts in which peasants participated, and they often reflected pre-existing divisions within communities. The story of government officials using tractors and fertilizers to destroy peasant villages

[30] The idea that peasants rejected some technologies while accepting others is echoed in various publications, although in-depth analysis that explains why peasants made these decisions is still largely lacking. The most comprehensive work is Ronald Waterbury's article, " 'Lo Que Dice el Mercado': Development without Developers in a Oaxacan Peasant Community." For others, see: Pilcher, *Que Vivan*, 100; Barkin and Suarez, "El impacto de la biotecnología," 118; Redclift, "Production Programs for Small Farmers," 556-8; Cotter, *Troubled Harvest,* 237; Viniegra González, "Generating and Disseminating Technology," 137; Fox, *The Politics of Food*, 105; Cotter, *Troubled Harvest*, 235-7; Redclift, "Production Programs for Small Farmers," 559; DeWalt, "Appropriate Technology in Rural Mexico," 43; Kyle, *Feeding Chilapa*, 40-1. Eakin, *Weathering Risk* 43. Viniegra González discusses advantages of *criolla* seeds for peasants. Eakin discusses cutbacks on official support for technology as a reason for the declining usage of fertilizers, improved seeds, pesticides and herbicides in the early 1990s. He also discusses small-scale farmers' efforts to build relationships with private market suppliers.

is simply not accurate for the regions I studied in Oaxaca. In these places, peasants were decision-makers and the principal actors in their own technological development.

To be fair, some scholars have complicated the gloom-and-doom thesis concerning peasants and technological change. They have acknowledged that peasants could selectively adopt new technologies.[31] They have discussed reasons for peasants rejecting new agricultural tools.[32] A handful of authors investigate positive consequences of modernization in rural villages.[33] Others have begun to examine peasants' complex responses to development programs and technological change.[34]

However, there is much more work to be done when it comes to examining why peasants made the decisions that they made. David Carey argues that the viewpoints and experiences of indigenous farmers regarding the Green Revolution still have not received sufficient attention.[35] Few have asked how local politics, history, ethnicity, and gender relate to technology change and development.[36] A deeper understanding of the relationship between peasants' technologies and their culture, one informed by the rhythms and memories of peasants' daily lives, is missing.

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[31] Pilcher, *Que Vivan*, 100; Barkin and Suarez, "El impacto de la biotecnología," 118; Redclift, "Production Programs for Small Farmers," 556-8; Cotter, *Troubled Harvest,* 237; Gladwin. "Cognitive Strategies," 156-7.

[32] Viniegra González, "Generating and Disseminating Technology," 137. Viniegra González discusses advantages of *criolla* seeds for peasants; Eakin, *Weathering Risk* 43. Eakin discusses cutbacks on official support for technology as a reason for the declining usage of fertilizers, improved seeds, pesticides and herbicides in the early 1990s. He also discusses small-scale farmers' efforts to build relationships with private market suppliers; Fox, *The Politics of Food*, 105; Cotter, *Troubled Harvest*, 235-7; Redclift, "Production Programs for Small Farmers," 559; DeWalt, "Appropriate Technology in Rural Mexico," 43; Kyle, *Feeding Chilapa*, 40-1.

[33] Kyle, *Feeding Chilapa*, 40, 174; González, *Zapotec Science*, 128, 145; Grindle, "The Response to Austerity," 140-1. Appendini, "La transformación de la vida rural en tres ejidos del centro de México," 29, 44; Torres-Mazuera, "Los productores maiceros de Emilio Portes Gil," 76-7.

[34] Redclift, "Production Programs for Small Farmers," 561; Fox, *The Politics of Food*, 5-8; Waters, "Re-Mapping the Nation," 207-224; Waterbury, "'Lo Que Dice el Mercado' " 69-75, 85, 87-8.

[35] Carey, "Guatemala's Green Revolution," 284.

[36] Some exceptions are: Carey, "Guatemala's Green Revolution"; González, *Zapotec Science*; Mathews, "Suppressing Fire and Memory"; Clawson and Hoy, "Nealitcan, Mexico," Waters, "Re-Mapping the Nation," 219-224, and Fowler Salamini and Vaughan, eds., *Women of the Mexican Countryside.*

My study begins to correct this. It asks how the categories of meaning and the expectations held by rural men and women affected their response to the availability of new tools. My work is also one of the first to examine technological change in an integrated way. Rural women and men operate in both farm fields and in homes, municipal buildings, churches, and streets, so scholarship must consider how the addition of new technologies in one or more of these spaces affected daily life in the others.

Theory: Postrevisionism and SCOT

Postrevisionist perspectives on the Mexican Revolution and its aftermath inspire my questions and my conclusions. Postrevisionism began with Alan Knight's 1985 essay in the *Bulletin of Latin American Research* and Gilbert M. Joseph and Daniel Nugent's *Everyday Forms of State Formation* in 1994. These works argued that the Mexican federal government was very weak and unable to dominate centuries-old peasant communities in the decades following the revolution. Keeping this weakness in mind, they encouraged historians to re-imagine the application of state power as a negotiation between diverse actors at the federal, state, regional, and local levels.[37]

A new generation of scholars heeded this call. Mary Kay Vaughan and Jeffrey Rubin investigated how *caciques* (political bosses), politicians, entrepreneurs, and schoolteachers mediated between the federal government and local communities.[38] Others studied culture, material conditions, and language to understand the ways that communities and local actors bargained for power with federal officials.[39]

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[37] Knight, "The Mexican Revolution: Bourgeoisie? Nationalist? Or Just a Great Rebellion?" 5; Joseph and Nugent, "Popular Culture and State Formation," 12.

[38] Rubin, "Decentering the Regime"; Vaughan, *Cultural Politics in Revolution*.

[39] Nugent and Alonso, "Multiple Selective Traditions"; Rus, "The Comunidad Revolucionaria Institucional"; Boyer, *Becoming Campesinos*.

Postrevisionism is the most appropriate paradigm for my study. Peasant communities in Oaxaca had a tradition of jealously guarding their autonomy from federal and state officials, and even after 1940, the federal government still did not have the resources or regional clout to impose change from above. Instead, as I will show, technological development was a dialogue between peasants and officials, with peasants often taking the lead and making final decisions.

My work is also inspired by insights from scholars of the history of technology. *The Social Shaping of Technology*, edited by Donald A. MacKenzie and Judy Wajcman (1985), and *The Social Construction of Technological Systems*, edited by Wiebe E. Bijker, Thomas P. Hughes, and Trevor Pinch (1987), argue that the meanings and uses of technologies shift according to the political, economic, social, gender, and environmental contexts of the people who use them.[40] This "social construction of technology" (SCOT) approach dominated the field in the 1990s and 2000s. It inspired works that pay attention to how human categories of meaning influence the design and operation of technologies.[41] Later, the SCOT approach inspired studies that focus on individual users and the ways they modify and respond to their tools.[42]

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[40] MacKenzie and Wajcman, eds., *The Social Shaping of Technology;* Bijker, Hughes, and Pinch, eds., *The Social Construction of Technological Systems*; Bijker, Hughes, and Pinch, "General Introduction," 4; Pinch and Bijker, "Introduction: Common Themes," 10; Pinch and Bijker, "The Social Construction of Artifacts," 24, 28-44.

[41] For relationships between technology and gender, see Wajcman, *Feminism Confronts;* Cowan, *More Work for Mother;* van Oost, "Materialized Gender" ; Horowitz and Mohun, eds., *His and Hers: Gender Consumption, and Technology*. For relationships between citizenship, politics, and technology, see Rose and Blume, "Citizens as Users of Technologies" and Josephson, *Resources Under Regimes*; For intersections of technology and race, see Winner, "Do Artifacts Have Politics?" and Mohl, "Stop the Road" ; For intersections of technology and environment, see Reuss and Cutcliff, eds. *The Illusory Boundary* and Opie, *Ogallala*.

[42] Oudshoorn and Pinch, eds., *How Users Matter*; Kline and Pinch, "Users as Agents of Technological Change"; Greene, *Horses at Work*; McShane and Tarr, *The Horse in the City;* Steven Lubar, "Men/Women/Production/Consumption."

This user-centric approach, inspired by SCOT, is the right one for investigating the effects of the Green Revolution and technological change in Oaxaca. Peasants' relationships with new technologies were profoundly influenced by the unique circumstances of their everyday lives. These relationships should be explored according to the categories of understanding that were meaningful for peasants, including community membership and gender. This is exactly what my study does.

Theories about how technologies develop and fail also enrich our understanding of rural Mexico. Trevor Pinch, Wiebe E. Bijker, and Thomas P. Hughes argue that technologies evolve over time to meet specific social criteria.[43] New problems constantly emerge to require new tools and new designs.[44] The development of technology is a process that requires experimentation, "negotiation and renegotiation among and between groups shaping the technology."[45] It also requires the alteration of designs that do not meet social requirements,[46] a situation that arises frequently when technologies are transferred across borders.[47]

I find this understanding of technological development to be appropriate for Mexico. Finding the right tools required peasants to experiment with different technological combinations, to mix new tools with the old, to alter designs that failed to solve specific problems, and to repair artifacts when they broke. As I will show, they tried different combinations of fertilizer mixtures in order to find a mixture to fit their lands and their budget. Pump-powered faucet systems needed constant maintenance and,

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[43] Bijker, Hughes, and Pinch, "Introduction," 12.
[44] Ibid., 12-13.
[45] Ibid., 13.
[46] Hughes, "The Evolution of Large Technological Systems, 39, 43-4.
[47] Ibid., 67.

eventually, replacement with more efficient designs. I argue that peasants helped to design and change the very technologies that supposedly attacked them.[48]

I draw further theoretical inspiration from the work of Samuel L. Popkin and his "rational peasant" approach to agrarian studies. Popkin argues that the opening of Vietnamese peasant villages to national markets helped poor peasants by increasing the mobility of their labor and by severing their dependence on coercive landlords and rich neighbors.[49] He argues directly against James Scott and Eric Wolf, who see the opening of villages to national markets and state intervention as intrusive disruptions to village-based systems of mutual cooperation that ensured a minimal level of economic security.[50]

I follow Popkin because his findings best describe my data. Villagers in both communities that I studied had long traditions of participating in markets, and local cooperation rarely, if ever, prevented the development of extreme poverty. Villagers worked with officials to build roads to give them access to new markets, and peasants mostly view the opportunities and technologies that came down these roads to be positive. As I show in chapter five, and as Popkin argues for Vietnam, "peasant struggles are frequently battles to tame markets and bureaucracies, not movements to restore 'traditional' systems."[51] When peasants did complain about the post-1940 economic system in Mexico, it was usually because they had too little, not too much, access to markets, technologies, and the world outside of their village.

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[48] This conclusion is one that too few scholars consider. An exception is DeWalt, "Appropriate Technology in Rural Mexico." For exceptions outside of Mexico, see: Shepherd, "From in Vitro to In Situ," 406, 411-14 and Bardini, "A Translation Analysis," 161.

[49] Ibid.

[50] Scott, *The Moral Economy,* 5-10, 57; Wolf, *Peasant Wars,* 279-80.

[51] Popkin, *The Rational Peasant,* 35.

Sources and Location

Taking peasants' perspectives seriously requires the investigator to speak with peasants and to treat their stories as evidence.[52] In 2012, I conducted over forty hours of interviews with peasants, agronomists, and one non-peasant politician. These interviews came mostly from two Oaxacan communities whose historical background I detail below. I dedicate an entire chapter (chapter nine) to exploring the tropes and patterns that emerge from interviewees' responses to my questions.

I use archival evidence to expand the geographic scope of my argument to other communities around Oaxaca and, in a few cases, to other states in Mexico. This evidence comes from government archives in Oaxaca City, Mexico City, and Washington, D.C. I also rely heavily on the field notes and publications of anthropologists who visited Oaxaca and observed technological changes during the period in question. I follow Alessandro Portelli's prescription for not privileging oral histories over written sources or vice-versa. I treat both as inherently subjective pieces of evidence and try to explain the context and background that inform them.[53]

As a state in Mexico, Oaxaca is appropriate for a number of reasons. First, indigenous peasants and small farmers dominate Oaxaca. This makes it a perfect place to test the revisionist assumption that new technologies and development programs in the period after 1940 only helped agribusinesses. Second, scholars have largely concluded that Oaxaca is exceptionally impoverished and exceptionally left out of the Green

[52] This is something that surprisingly few scholars of rural Mexico have done. For three exceptions, see: Appendini and de Luca, "¿Empoderamiento o apoderamiento?"; Marroni Velázquez, "Changes in Rural Society"; Friedlander, "Doña Zeferina Barreto."

[53] Portelli, *The Death of Luigi Trastulli*, 2-5, 63-6.

Revolution and its "miracles."[54] For example, Gonzalo Piñón Jiménez writes, "La tecnología de la Revolución Verde no se podía aplicar a la realidad oaxaqueña, por lo que en el estado no tuvo una incidencia directa."[55] By studying Oaxaca, I can test the claim that the state was left out of technological modernization, and I can also draw conclusions regarding the effects of technological change in especially impoverished areas.

My oral interviews come primarily from two Oaxacan communities: San Bartolomé Quialana and Santa Marta Latuvi. San Bartolomé Quialana (San Bartolo) is a Zapotec-speaking village in the arid Valley of Tlacolula, east of Oaxaca City. Its origins date to pre-Hispanic times. In the center of the village, not far from the colonial-era Catholic Church, sits a prominent hilltop named "El Calvario." El Calvario features the ruined remains of stone walls that resemble the Zapotec ruins at Monte Albán and Yagul. This suggests that San Bartolomé was similar to the Zapotec "hilltop towns" that archeologist Gary M. Feinman claims existed in the eastern part of the valley of Tlacolula in the classic and postclassic periods (roughly 200 C.E. to 1520 C.E.).[56]

San Bartolo is situated south of the town of Tlacolula at the base of a mountain peak named El Picacho. Communal forests abut base of the mountain, and two deep, dry riverbeds extend from the mountain through the residential district and then out to the farm fields near the village's northern border with Tlacolula. Residents told me that

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[54] Fox, *The Politics of Food,* 188; Rivera, "Multinational Agribusiness and Small Corn Producers," 100; Appendini and Almeida Salles, *Agricultura capitalista*, 29; Stavenhagen, "Aspectos Sociales de la Estructura Agraria," 41-2; Piñón Jiménez, "Crisis agraria y movimiento campesino," 294. Fox and Rivera describe Oaxaca as poor, Appendini and Almeida Salles, Stavenhagen, and Piñón Jiménez describe it as untouched by the benefits of mechanized agriculture, infrastructure and technical support, and the Green Revolution.

[55] Piñón Jiménez, "Crisis agraria y movimiento campesino,"294. "The technology of the Green Revolution could not be applied to the reality of Oaxaca, and for this reason, it did not have much presence in the state."

[56] Feinman, "The Economic Underpinnings," 262-3.

these riverbeds were once dammed and used for crop irrigation, but this water has since been appropriated for potable water faucets in the village.[57]

San Bartolo has approximately 2,470 residents.[58] Despite low annual rainfall, villagers plant corn and truck crops, sometimes using wells and plastic hoses to irrigate them. Villagers, mostly women, sell this produce in the nearby communities of Tlacolula and Mitla. Growing crops is an uncertain endeavor in such an arid place, and many families rely on non-farm work and migrant remittances for large portions of their income. Nearly 100% of the families from San Bartolo with whom I spoke had at least one family member who had migrated to California.[59]

Residents in assemblies decide major decisions in San Bartolo. A council (*cabildo*) of elected leaders caries out the day-to-day governance of the village. The council includes a municipal president, an advisor, five council members (*regidores)* in charge of issues like ecology and education, and assistants (*suplentes*) to the council members. There is also a local judge (*alcalde)*. Standing committees of residents focus on ongoing maintenance of public buildings and utilities. For instance, there are committees for managing the public water system, the church, the school, the power grid, garbage collection, and for planning the annual feast of San Bartolomé on August 23 and

[57] Lázaro Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 4 June, 2012; Conversation with resident of San Bartolomé Quialana, field notes 13 Aug. 2012; Conversation with family, San Bartolomé Quialana, field notes 23 Aug 2012.

[58] "Mexico en Cifras: Información por Entidad Federativa y Municipios," 2010. Instituto Nacional de Estadística y Geografía (Accessed July 10, 2014) http://www3.inegi.org.mx/sistemas/mexicocifras/default.aspx?e=20

[59] One informant said that 80% of households in the village depend on migrant remittances in some way. Conversation with resident of San Bartolomé Quialana, field notes 19 Oct. 2012.

24. Other positions in local government include director of the village cultural center (*casa de cultura*), secretary, treasurer, and policemen.[60]

Starting in 2008, people who served in selected positions began to receive a stipend.[61] This led to the partial disappearance of mandatory, unpaid community service (*tequio*) in San Bartolomé. According to one villager, people were reluctant to donate their labor for free when the officials heading the project were collecting taxes to pay themselves.[62] Another person suggested that the government officials help to undermine *tequio* by bringing their own laborers and equipment to the village.[63] Many of the jobs once completed via *tequio* in San Bartolomé are now accomplished with paid wage labor.[64] Wage labor has also largely replaced traditional labor sharing agreements (*guelaguetza*) that required no exchange of cash between villagers.[65]

Municipalities like San Bartolomé were historically administered from head towns that controlled *distritos* (districts). *Distritos* were groups of municipalities. According to historian Benjamin T. Smith, the Mexican Constitution of 1917 was supposed to destroy the control of head towns over municipalities, but this rarely happened in Oaxaca. Former districts (*ex-distritos*), he argues, were the "key level at

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[60] Conversation with resident of San Bartolomé Quialana, field notes 13 July 2010; Conversation with peasant, San Bartolomé Quialana, field notes 13 July 2010; "Acta de Asemblea," 4 May 1992, San Bartolomé Quialana Archives, Binder: Documentos Antiguos. Most of this information comes from the informal conversations cited in this note. Confirmation of the existence of a local judge comes from the "acta de asemblea."

[61] Conversation with resident of San Bartolomé Quialana, field notes 13 July 2010;

[62] Ibid.

[63] Conversation with peasant, San Bartolomé Quialana, field notes 13 July 2010; Conversation with peasant, San Bartolomé Quialana, field notes 21 July 2010.

[64] Silvestre Mecinas Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 20 July 2012; Conversation with peasant, San Bartolomé Quialana, field notes 21 July 2010.

[65] Conversation with peasant, San Bartolomé Quialana, field notes 31 May 2012.

which the revolutionary practice and process was debated, appropriated, or dismissed" in the decades following the armed conflict of 1910-1920.[66]

The district head-town for San Bartolo was Tlacolula. Villagers had to go Tlacolula to get access to some federal authorities and development programs. For instance, villagers embroiled in a dispute over local elections and the installation of potable water went to a public works official in Tlacolula to help solve the dispute in 1966.[67] Another villager went there to petition federal officials to extend power lines to his house in the 1990s.[68] Excepting these examples, however, villagers in San Bartolomé rarely mentioned Tlacolula as an important center for village politics. An official from Tlacolula also downplayed the role of his town in the political affairs of San Bartolomé.[69] Barring future research, I believe that Tlacolula was more important economically to San Bartolomé than it was politically. For most villagers, it was the nearest market center, and it was a place where they could go to find wage labor.

Santa Marta Latuvi (Latuvi) is a smaller village consisting of around 686 people.[70] It is located high in the Juárez Mountains north of Oaxaca City on land covered by pine trees. Unlike San Bartolomé Quialana, which is a *municipio*, a head-town with administrative autonomy over its local affairs, Latuvi is an *agencia municipal*. An *agencia municipal* is an administrative jurisdiction that falls under the authority of a

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[66] All of this background about districts comes from Smith, *Pistoleros and Popular Movements,* 16-17.

[67] Manuel Hernández Hernández and Antonio Raymundo Sánchez to Rafael Moreno Valle, 12 Oct. 1968, AHSS, Fondo: SSA, Sección: Spr., Caja: 31, Exp.: 4.

[68] Fernándo Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 3 Aug. 2012.

[69] Conversation with official from Tlacolula, field notes 8 Feb. 2012.

[70] *Censo General de Población y Vivienda, 2000;* Instituto Nacional de Estadística y Geografía (INEGI), http://www.inegi.org.mx (Accessed 10 July 2014). I found this number by going to INEGI's website, entering "Latuvi" in the search bar, and following the links. Unfortunately, this strategy is no longer viable for finding this information online. INEGI has posted new links and new options when one searches for "Latuvi."

municipio. This means that officials from Latuvi need approval of officials from a village called Santa Catarina Lachatao when formulating petitions for federal projects and other outside aid.[71]

The first people to visit Latuvi were religious dissidents who were fleeing the imposition of Catholicism by Spanish priests in Lachatao during the colonial period.[72] Many years later, people came to Latuvi from Lachatao to find new farmlands. They would walk for hours to their lands, farm, and then walk back to Lachatao during the evening.[73] By the 1920s, the people who had been making the long journey from Lachatao to modern-day Latuvi were ready to live full-time near their farmlands. In 1928, they built a school and named their community "La-tuvi," which means "curled leaf" in the local dialect of Zapotec.[74] By 1936, Latuvi was officially recognized as an *agencia municipal,* an administrative entity distinct from Lachatao.[75]

Latuvi is a member of an eight-community forest alliance. In 1891, residents from the villages of Lachatao, Amatlán, and Yavesía agreed to share and protect their forestry resources, forming an alliance they named the "Pueblos Mancomunados," or "villages working together."[76] As people left these three municipal centers and formed new, subordinate jurisdictions, the alliance expanded to include villages like Latuvi. Eight villages in the Juárez Mountains maintain the alliance today, cooperating to sell

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[71] Mario Sebastian Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 6 May 2012; Conversation with peasant, Santa Marta Latuvi, 3 Oct. 2012.

[72] Jaime Wilfredo Cruz Santiago, "Latuvi: Una comunidad con historia" (Unpublished history of Latuvi, 2007) 4-5. Exactly when this happened is not clear.

[73] Jaime Wilfredo Cruz Santiago, "Latuvi: Una comunidad con historia" (Unpublished history of Latuvi, 2007) 5; Mario Sebastián Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 26 Apr. 2012.

[74] Jaime Wilfredo Cruz Santiago, "Latuvi: Una comunidad con historia" (Unpublished history of Latuvi, 2007), 24-5.

[75] Ibid., 28-9.

[76] Jesús D. Ortiz Himiaga to Presidente del Comisariado de Bienes Comunales de Lachatao, Yavesía y Amatlán, 20 Aug. 1958, AGPEEO, Fondo: Asuntos Agrarios, Serie: XIII Tierras Comunales, Legajo: 21, Exp.: 2.

wood products from their forests, to sell bottled water from springs, and to sell lodging and activities like horseback riding to tourists. Villagers from all eight communities make decisions about communal lands and about the operation of these industries at periodic meetings (*asembleas*).[77]

Assemblies of residents make major decisions about local affairs in Latuvi. Similar to San Bartolo, day-to-day operations are the province of elected officials. Unlike in San Bartolo, administrative positions in Latuvi are unpaid.[78] These positions are known as *cargos*. *Cargo* positions include police officer (*topíl*), secretary, councilman, *agente municipal* (ward boss, similar to municipal president), and staffers for the village's ecotourism operation.[79] *Cargo* service might also include work on committees in charge of coordinating with the local school, maintaining the church, and promoting public health. Villagers must pay local taxes (*cooperación*) to fund celebrations and new building expenses, and they donate unpaid labor (*tequio*) to complete communal projects like road repair.[80]

Latuvi's ecology is very different from that of San Bartolo. Peasants have plenty of water from springs, streams, and rainfall. As a result, agriculture and fruticulture are more reliable. Peasants also make money from non-farm labor around the village and

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[77] Conversation with peasant, Santa Marta Latuvi, field notes 23 Jan. 2012.

[78] Mario Ponciano García, interview by Joshua Walker, at his family's store in Santa Marta Latuvi, 24 Apr. 2012; Conversation with peasant, Santa Marta Latuvi, field notes 23 Jan. 2012; Mario Ponciano García discussed with me the difficulty of feeding a family while working a *cargo*.

[79] Mario Ponciano García, interview by Joshua Walker, at his family's store in Santa Marta Latuvi, 24 Apr. 2012; Carlos Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 3 Mar. 2012; Conversation with peasant, Santa Marta Latuvi, field notes 23 Jan. 2012. I complied this list of positions in part by reviewing the positions that these informants men held in their lifetimes. Mario Ponciano García also held a position called *mayor de vara*. I am not sure exactly how this translates, but I think it means "police captain."

[80] Conversation with resident, Santa Marta Latuvi, field notes 25 Jan. 2012.

from migrant remittances, although migration seems to be less important in Latuvi than it is in San Bartolo.

I chose these two villages in order to control for the availability of water. Many of the new technologies that arrived in Oaxaca after 1940 needed water to function properly. Water faucets are an obvious example, but chemical fertilizers and hybrid seeds also require large amounts of water. By choosing one community with lots of water (Latuvi) and one community without it (San Bartolo), I hoped to judge whether or not ecology played a role in the ways that peasants dealt with modernization. I explain my conclusions regarding this question in chapter two.

Background: Rural Life in Oaxaca After 1940

Peasants in San Bartolomé Quialana and Santa Marta Latuvi were open to experimenting with new technologies because many were searching for solutions to interrelated problems of population growth, poor land resources, and new requirements for cash. These problems became especially acute in the period after 1940. Below, I briefly describe these problems. Then, I review historical changes in both communities as peasants responded to these challenges.

From 1940 to 1970, Mexico's population increased by 157%.[81] This demographic explosion was enabled by public health campaigns in the 1920s, 1930s, and 1940s that fought tuberculosis, hookworm, dysentery, yellow fever, rabies, polio, smallpox, whooping cough, and meningitis. Penicillin and canned foods were important weapons in the fight against many diseases.[82] Between 1940 and 1980, the population of San Bartolomé increased from 1,061 people (1940) to 2,386 people (1980), with increases

[81] Alba and Potter, "Population and Development in Mexico since 1940," 49-50.

[82] Vaughan, "Rural Women's Literacy," 117; Birn, *Marriage of Convenience* 2, 26-7, 133, 251-2; Sanders, "Gender, Welfare, and the 'Mexican Miracle,'" 129-31; Sherman, "The Mexican 'Miracle,'" 589.

noted in every decennial census during this period. Latuvi's population spiked from 531 in 1940 to 844 in 1950, and then decreased slightly to 802 in 1960. For Santa Catarina Lachatao, Latuvi's *municipio*, populations increased from 1,892 people in 1940 to 2,200 in 1980, but the village experienced a major subtraction of 799 people between 1960 and 1970. Even with this decline, Lachatao's population grew dramatically for twenty years, growing by 52% between 1940 and 1960.[83]

More infants surviving into childhood meant more mouths to feed and more children to send to mandatory federal schooling. Mario Sebastián Contreras, a seventy-nine year-old peasant from Latuvi, explained to me some of the challenges faced by large families. "Back then," he said, "there were people who had up to eight children, six children, four children, and where to get water?"[84] Mario Ponciano García, age seventy-three, was one of twelve children in his family. His family's enormous daily requirements for food required him to do wage labor in Latuvi for three to six pesos a day starting at age sixteen. He told me he had to do this, "Out of necessity, because there wasn't anything to eat. My dad…because there were many of us, it wasn't enough, we didn't have enough to eat…"[85] This suggests that peasants considered and dealt with the consequences of population pressure on a daily basis.

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[83] *Sexto censo de población, 1940: Oaxaca,* Secretaría de Economía, Dirección General de Estadistica, 1948: 396, 697, 606; *Septimo censo de población, 6 de Junio de 1950: Oaxaca,* Secretaría de Economía, Dirección General de Estadistica, 1953: 27, 790; *Octavo Censo General de Población, 8 Junio de 1960: Oaxaca,* Secretaría de Industria y Comercio, Dirección General de Estadistica, 1963: 2, 49, 202; *IX Censo General de Población X 1970 28 de Enero: Estado de Oaxaca,* vol 2, 1971: 5, 10; *Censo General de Población y Vivienda, 1980: Estado de Oaxaca*, Instituto Nacional de Estadistica Geografia e Informatica, Vol. 1, Primera Parte, 1984: 91, 258.

[84] Mario Sebastián Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 26 Apr. 2012. Mario's exact age is unclear to me at the time of writing, but using context from the interview, I calculated that he was between seventy-nine and eighty years old in April of 2012.

[85] Mario Ponciano García, interview by Joshua Walker, at his family's store in Santa Marta Latuvi, 24 Apr. 2012. Translation by Joshua Walker.

Poor harvests and drought-like conditions in much of the state compounded this problem. Most peasants in the Valley of Oaxaca had only two and a half hectares of land to farm in the late 1960s. This amount allowed families to grow enough food for self-consumption in ideal weather conditions, but income for other necessities had to come from non-agricultural work, like women's work raising and selling animals.[86] Weather conditions, of course, were not always ideal. Nazario Hernández Sánchez, a farmer in the arid community of San Bartolomé Quialana, talked to me about economic difficulties during dry years:

> **Nazario Hernández Sánchez:** …yes, there was food, certainly, because people farmed. Well, when it rained well, there would be a good harvest. But when there is no water in the sky, you do not come away with anything. That's when one battles, [looking] for where we're going to get money to buy corn.[87]

An anonymous forty-two year old man from the same village told me that people might stockpile corn during good years, but this would run out if it did not rain for two or three straight years. People would then be forced to buy corn, which required cash.[88]

Nutrient deficiencies in soil and soil erosion were another problem that threatened agricultural incomes. This was the case for Santa Marta Latuvi, where years of intensive farming and slash-and-burn agriculture in the mountains yielded soils that did not produce much corn by the 1950s. Planting on steep hillsides also contributed to soil erosion.[89] Mario Ponciano García told me, "Yes, before fertilizers were used, the harvest did not come in. You planted, but the stalks would only come up to here [demonstrating

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[86] Kirkby, *The Use of Land and Water Resources*, 89-90. Kirkby completed her fieldwork between 1966 and 1970.

[87] Nazario Hernández Sánchez, interview by Joshua Walker, at his home in San Bartolomé Quialana, 5 June 2012.

[88] Anonymous man #32, interview by Joshua Walker, in his home in San Bartolomé Quialana, 20 Aug. 2012.

[89] Conversation with peasant, Santa Marta Latuvi, Field notes 14 Oct. 2012; Mario Sebastián Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 6 May 2012.

with hand], no more, with small kernels."[90] This was a consistent theme of my interviews in Latuvi. In San Bartolomé Quialana and other arid villages, nutrient deficiency was a problem, but one that was secondary to lack of water. Nazario Hernández Sánchez told me that corn in San Bartolomé Quialana would not grow on "sandy" lands without a bit of fertilizer.[91] At a time when expanding families needed more corn and beans than ever, farming in Oaxaca was becoming more and more difficult.

There were also growing needs for cash in rural villages after 1940.[92] Purchasing books, paper, and pencils to send children to public schools was a huge expense that many remember as burdensome.[93] Amador Pérez Sánchez, a fifty-nine year old peasant from San Bartolomé Quialana, remembers being forced to quit school at an early age due to lack of resources.[94] María Pérez Ramírez, age sixty-nine and from Latuvi, remembered filling up notebooks and then using saliva to erase their covers in order to create more space on which to write.[95] She had to do this because money for new notebooks was not always available for her family. Federal schoolteachers had first come to the countryside around 1923, and families needed new sources of cash to outfit their children for school.[96]

New, industrially-produced products moving south along the Pan-American Highway from manufacturing centers in Puebla, Mexico City, Monterrey, and the United States also tempted peasants to spend more cash. Angelita Herrera, age forty-four and

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[90] Mario Ponciano García, interview by Joshua Walker, at his family's store in Santa Marta Latuvi, 24 Apr. 2012.

[91] Nazario Hernández Sánchez, interview by Joshua Walker, at his home in San Bartolomé Quialana, 5 June 2012.

[92] Young, "The Creation of a Relative Surplus Population," 69; De la Peña, *A Legacy of Promises,* 128; Young discusses important changes brought about by the transition to a cash economy.

[93] Catarino Maximiliano Santiago Quero, interview by Joshua Walker, in his home in Arroyo Largo, Latuvi, 7 May 2012.

[94] Amador Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 21 Apr. 2012.

[95] María Pérez Ramírez (with Vicente Garíca Cruz), interview by Joshua Walker, at their home in Llano de Marta, Latuvi, 17 May 2012.

[96] Vaughan, *Cultural Politics,* 11-12

from Latuvi, stressed that people needed money for school, but she also told me, "…before, nobody had heard of [cooking] oil." Instead, she said, people used the fat from slaughtered pigs for cooking.[97] Cooking oil was an example of a relatively new expense in family budgets. Another example comes from a man named Ángel Rosales Domínguez. In 1964, he wrote to Mexican President Gustavo Díaz Ordaz asking for a Harley Davidson to help him with his work. He informed the President, "My source of work is insufficient to achieve my desires."[98] Industrially-produced products like Harleys and cooking oil created new desires and new needs for cash in rural areas.

How did villagers go about solving the problems I described above? In many cases, villagers in Latuvi and San Bartolomé relied on the same strategy: they sold wood and charcoal in Oaxaca's ancient system of rotating marketplaces.[99] Some raised and sold animals for cash, while others hunted wild animals to provide more food for the family.[100] Others looked for wage labor, often outside of the village.[101] Oaxacans were accustomed to trying creative solutions that required them to work as entrepreneurs in

[97] Angelita Herrera, interview by Joshua Walker, in her home in Santa Marta Latuvi, 2 May, 2012.

[98] Ángel Rosales Dominguez to Gustavo Díaz Ordaz, 20 Dec. 1964. AGN, Fondo: Gustavo Díaz, Caja: 67 (204), Exp.:727.2/4. I am not positive that Rosales Dominguez was from Loma Bonita. Loma Bonita was appears in the sending address, but my poor photograph concealed the name of what looks like an ejido written above it.

[99] Anonymous man #32, interview by Joshua Walker, in his home in San Bartolomé Quialana, 20 Aug. 2012; Mario Sebastián Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, May 6, 2012; Semehí Ramírez García, interview by Joshua Walker, in the ecotourism office in Santa Marta Latuvi, 1 Mar. 2012.

[100] Ofelia Quero Santiago, interview by Joshua Walker, in her home in Santa Marta Latuvi, March 29, 2012; Carlos Contreras, interview with Joshua Walker, in his home in Santa Marta Latuvi, 3 Mar. 2012; Lázaro Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 4 June, 2012.

[101] Anonymous peasant #30, interview by Joshua Walker, in his home in San Bartolomé Quialana, 10 Aug. 2012; Silvestre Mecinas Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 20 July 2012; Angelita Herrera, interview by Joshua Walker, in her home in Santa Marta Latuvi, 2 May 2012.

capitalist markets, and this was a tradition that dated to the colonial period and even before.[102]

Fertilizers, faucets, grafted trees, corn grinders, and automobiles provided a whole new set of opportunities to solve the economic riddle of peasant life. Fertilizers and fruit trees promised more abundant harvests, roads and automobiles promised more efficient marketing, and domestic technologies like faucets and grinders promised to free women for more participation in income-generating activities. How peasants acquired and manipulated these tools while simultaneously dealing with their consequences is the central question of this dissertation. As I will show below, their choices and opportunities differed according to the ecological, historical, economic, and political realities of their villages.

Timeline of Technologies for Latuvi and San Bartolo

The 1940s were also the beginning of major technological, economic, and political changes in Oaxaca and the rest of Mexico. Prior to the 1940s, merchants who used mules and human portage dominated trading and the exchange of goods between villages and markets.[103] Villagers in Santa Marta Latuvi used donkeys, mules, and humans to carry their products to market, while transportation options in relatively level San Bartolomé Quialana also included oxen pulled by wagons.[104] A train line arrived to Oaxaca City by 1892,[105] and villagers remember using it to travel between Tlacolula and

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[102] Feinman, "The Economic Underpinnings," 267-72; Baskes, "Coerced or Voluntary?," 4-5; Dillingham, "*Indigenismo* and its Discontents," 36.

[103] Beals, *The Peasant Marketing System,* 251.

[104] Anonymous man #22, interview by Joshua Walker, Outside of the Casa de la Cultura, San Bartolomé Quialana, 1 June 2012; Anonymous man #32, interview by Joshua Walker, in his home in San Bartolomé Quialana, 20 Aug, 2012; Carlos Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 3 Mar. 2012; Angelita Herrera, interview by Joshua Walker, in her home in Santa Marta Latuvi, 2 May 2012.

[105] Beals*, The Peasant Marketing System,* 11.

Oaxaca City, and between Oaxaca City and Mexico City.[106] However, anthropologist Ralph Beals describes the train as inefficient and expensive when it came to bringing in goods from outside of the region.[107]

Agriculture in Latuvi in the period before the 1940s relied on slash-and-burn techniques to provide soil fertility, while wooden plows and digging sticks (*coas*) were important tools for planting and weeding.[108] Villagers harvested potatoes, beans, corn, and timber.[109] Agriculture in San Bartolomé Quialana involved oxen, plows, digging sticks, dung, and dam irrigation.[110] Villagers concentrated on selling charcoal and timber and growing beans and corn.[111] Villagers in both places relied on natural sources of water and wood from the forest for drinking, washing, cooking, and heating homes, and women used *metates* (grinding stones) to grind boiled corn into corn meal.[112]

The year 1943 marked the beginning of major changes in the technological regime I described above. That year, the Pan-American Highway connected Puebla to Oaxaca City. When combined with the "rising industrialization of Mexico," Ralph Beals

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[106] Fernándo Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 3 Aug. 2012; Lázaro Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 4 June, 2012.

[107] Beals, *The Peasant Marketing System,* 11-12.

[108] Mario Sebastian Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 6 May 2012; Anonymous former resident of Latuvi, interview by Joshua Walker, at his home in Oaxaca de Juárez, 22 May 2012.

[109] Ofelia Quero Santiago, interview by Joshua Walker, in her home in Santa Marta Latuvi, 29 Mar. 2012; Mario Sebastián Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 26 Apr. 2012; Mario Sebastian Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 6 May 2012.

[110] Anonymous man #22, interview by Joshua Walker, outside of the Casa de la Cultura, San Bartolomé Quialana, 1 June 2012; Nazario Hernández Sánchez, interview by Joshua Walker, at his home in San Bartolomé Quialana, 5 June 2012. See footnote 57 in this chapter for citations on dam irrigation.

[111] Anonymous man #32, interview by Joshua Walker, in his home in San Bartolomé Quialana, 20 Aug. 2012; Anonymous man #26, interview by Joshua Walker, in his home in San Bartolomé Quialana, 19 July 2014.

[112] Lázaro Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 4 June, 2012; Ubalda Ceballos Santiago, interview by Joshua Walker, in her home in Santa Marta Latuvi, 24 Apr. 2012; Anonymous man #26, interview by Joshua Walker, in his home in San Bartolomé Quialana, 19 July 2014; Anonymous man #22, interview by Joshua Walker, outside of the Casa de la Cultura, San Bartolomé Quialana, 1 June 2012.

describes this as the beginning of the " 'watershed' era that divided a regional economy dominated by a traditional marketing system from the massive introduction of a modern economy of national dimensions."[113] For the first time, tools and consumer goods produced outside of the state could enter villages and towns in the back of pickup trucks.

The year 1943 was also important because it marked the official beginning of the Rockefeller Foundation's Mexican Agricultural Project. This was a program designed to increase crop yields on Mexican farms. With the help of the Mexican government, Foundation officials tested and promoted new technologies like improved varieties of corn and wheat, tractors, and chemical fertilizers.[114] Some of these technologies would not become available to farmers in Oaxaca until later decades, but the research and testing to introduce them to Mexico began in the 1940s.

High-level politics also fostered technological changes in the 1940s and beyond. After World War II, the U.S. government approved funding for technical assistance and infrastructure projects for the so-called Third World.[115] In Mexico, President Manuel Ávila Camacho (1940-1946) ended the government's focus on land reform and redistribution, a hallmark of the previous administration.[116] Instead, he and his successor, Miguel Alemán Valdés (1946-1952), sought to improve agricultural production and to integrate peasants into the nation-state via the introduction of new technologies, infrastructure projects, and experts to rural areas. Two agencies charged with carrying out this vision were founded during these years, the Papaloapan Commission and the National Indigenist Institute (1947 and 1948, respectively). Their work was especially

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[113] Beals, *The Peasant Marketing System,* 11-12.

[114] Olsson, "Agrarian Crossings," Chapter 5; Matchett, "At Odds with Inbreeding," 360-5; Cotter, *Troubled Harvest,* 188.

[115] Escobar, *Encountering Development,* 31, 36; Bess, "Routes of Conflict," 79.

[116] Cypher, *State and Capital in Mexico,* 43.

relevant in Oaxaca. Projects to connect villages to cities and highways via *caminos vecinales,* "neighborhood roads" paved with asphalt or concrete, were also prominent features of government development efforts in the 1940s.[117]

These changes helped to make a host of new technologies produced outside of Oaxaca available to peasants for the first time. Villagers tried the new technologies as they looked for solutions to the problems of overpopulation, food production, and cash expenditures I detailed above. In Santa Marta Latuvi, peasants turned to grafted fruit trees, chemical fertilizers, wage labor, and increased participation of females in income-generating activities to solve the problems outlined above. A schoolteacher named Florencio Cruz introduced apple trees to the village in 1946.[118] The first car to enter Latuvi arrived in 1950, traveling a road that had taken workers from various villages, donating their labor via *tequio,* twenty-five years to carve into the mountainside.[119] Cars and roads allowed for more efficient marketing of fruit,[120] and fruit became a staple of the local economy.

Fertilizers arrived to Latuvi sometime around the late 1960s. This was a momentous event, because the village had been ravaged by poor harvests and declining soil fertility in the 1950s.[121] Villagers who had once been forced to seek lands far away from the village or migrate could now return to formerly-exhausted parcels replenished

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[117] Bess, "Routes of Conflict," 78-9, 86. Bess estimates that an average of 1,250 kilometers of roads was built each year between 1940 and 1945 in Mexico, while an average of 2,250 kilometers of new roads was built from 1946 to 1952.

[118] Anonymous former resident of Latuvi, interview by Joshua Walker, at his home in Oaxaca de Juárez, 22 May 2012.

[119] Anonymous former resident of Latuvi, interview by Joshua Walker, at his home in Oaxaca de Juárez, 22 May 2012.

[120] Mario Sebastian Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 26 Apr. 2012; Ignacio García Hernández, interview by Joshua Walker, in his home in Santa Marta Latuvi, 14 May 2012.

[121] Ignacio García Hernández, interview by Joshua Walker, in his home in Santa Marta Latuvi, 14 May 2012; Mario Sebastian Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 6 May 2012. Both of these men remembered the 1950s as a difficult period.

with fertilizers.[122] Villagers paid for fertilizers by working for logging contractors on land leased out by the Pueblos Mancomunados forest alliance.[123]

The late 1960s and early 1970s were also the first time that villagers in Latuvi had access to technologies that transformed life in the home and in public spaces, including water faucets (1965), corn grinders (1960), and electricity (around 1975). These innovations freed women for labor in agricultural fields. This was especially true for women who were single or whose husbands had migrated away from the village. Women also used the time that these devices saved in order to become more involved in marketing. They used trucks and roads to supply village stores and to sell produce in the valley of Oaxaca.

New technologies helped to build a village that is very different from how residents remember it in the 1950s and 1960s. As I explain in chapter three, the physical layout of the village has changed dramatically. Houses have been rebuilt with new materials like cinder blocks that came to the village in the beds of trucks.[124] Houses are also more closely grouped together in the center of the community in order to take advantage of utilities like water and electricity.

There is also a feeling of optimism in the village. The sense of doom that pervades peasants' memories and stories from the 1950s and 1960s is gone. People continue to leave the village looking for alternatives to agriculture, but there is a general

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[122] Anonymous former resident of Latuvi, interview by Joshua Walker, at his home in Oaxaca de Juárez, 22 May 2012.

[123] Rosa Ochoa, interview by Joshua Walker, in her home in Santa Marta Latuvi, 15 May 2012.

[124] Ignacio García Hernández, interview by Joshua Walker, in his home in Santa Marta Latuvi, 14 May 2012

consensus that one can make a subsistence living by farming in Latuvi.[125] Fertilizers, fruit trees, faucets, mills, and roads helped to make this possible.

The story and timeline of technological change were different in San Bartolomé Quialana. Fertilizers required water, and not many villagers had it.[126] Fruit trees, mostly grown near the mountainous portion of the community's territory, were not enough to keep villagers out of extreme poverty.[127] Instead, roads, automobiles, and time-saving devices for women were key here. They allowed peasants more mobility and time to participate in activities outside of local agriculture.

Private owners installed the first mechanical corn grinders in the village around 1960. The first public water faucets arrived to the village in 1967 as part of a project sponsored by the federal Secretaría de Salud Pública. Thirty villagers also received government assistance to dig open-air irrigation wells in the 1960s.[128] Villagers from Tlacolula and San Bartolomé worked together to build a concrete and metal bridge over the Rio Salado in 1970. This gave villagers from San Bartolomé much faster access to the market center in Tlacolula. The first road arrived to the village around the late 1970s, and automobiles and tractors followed shortly thereafter.[129] Electricity, also available

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[125] Ignacio García Hernández, interview by Joshua Walker, in his home in Santa Marta Latuvi, 14 May 2012; Mario Sebastián Contreras, interview by Joshua Walker, in his home in San Bartolomé Quialana, 6 May 2012; Conversation with peasant, Santa Marta Latuvi, field notes 4 Oct. 2012; Field notes, Santa Marta Latuvi, 18 Sept. 2012.

[126] Fernando Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 3 Aug. 2012; Conversation with family, San Bartolomé Quialana, field notes 23 Aug. 2012; Conversation with peasant, 1 Oct. 2012. Fernando Martínez told me about relative scarcity of irrigation in the village. Conversations on August 23 and Oct. 1 discussed the importance of water for chemical fertilizers.

[127] Conversation with peasant, San Bartolomé Quialana, field notes 22 July 2010; Conversation with peasant, San Bartolomé Quialana, field notes 15 June 2012; Conversation with village official, San Bartolomé Quialana, field notes 1 Oct. 2012. These informants told me that fruit used to grow near San Bartolomé's mountain.

[128] Conversation with peasant, field notes 1 Oct. 2012.

[129] Anonymous peasant #30, interview by Joshua Walker, in his home in San Bartolomé Quialana, 10 Aug. 2012; Anonymous man #22, interview by Joshua Walker, outside of the Casa de la Cultura, San

starting in the 1970s, allowed for the installation of corn grinders in the home. This saved women time they would have spent waiting in line for their turn at the mill.

The increased mobility that these technologies provided helped people to find work in other villages. Tlacolula, San Bartolomé's district seat, became important as a place where farmers could supplement their meager harvests by working as sharecroppers.[130] Villagers in Tlacolula began to abandon agriculture over time in favor of work as teachers, electricians, engineers, and architects,[131] and this gave men from San Bartolomé the opportunity to work lands in Tlacolula for half-shares (*a medidas*).

Some people went even further away than Tlacolula. Many used roads and automobiles to travel southward to work in Chiapas during the cotton boom of the 1970s.[132] Many also went to the United States, usually to the city of Santa Monica, California. Women whose husbands were gone used time saved by mills and water faucets to become more actively involved in agriculture and more aggressive traders in regional vegetable markets.

Whereas Latuvi benefitted from locally-appropriate support shortly after World War II (1946), villagers in San Bartolomé Quialana waited over twenty years for similar attention from the government. This attention arrived as state spending to modernize the countryside expanded in the 1970s. The administration of Luis Echeverría (1970-76),

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Bartolomé Quialana, 1 June 2012; Anonymous man #32, interview by Joshua Walker, in his home in San Bartolomé Quialana, 20 Aug. 2012.

[130] Noel García Aguilar, interview by Joshua Walker, at his home in Tlacolula de Matamoros, 22 Aug. 2012; Conversation with peasant, field notes 17 Oct. 2012.

[131] Noel García Aguilar, interview by Joshua Walker, at his home in Tlacolula de Matamoros, 22 Aug. 2012; Conversation with peasant, field notes 17 Oct. 2012.

[132] Field notes, Silvestre Mecinas Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 20 July 2012; Anonymous peasant #30, interview by Joshua Walker, in his home in San Bartolomé Quialana, 10 Aug. 2012; Flavio Aragón-Cuevas, interview with Joshua Walker, in his office at the Instituto Nacional de Investigaciones Forestales, Agrícolas, y Pecuarias (INIFAP), Campo Experimental Valles Centrales, Villa de Etla, Oaxaca, 7 Aug. 2012. Silvestre Mecinas Martínez and peasant #30 both migrated to Chiapas. Flavio Aragón-Cuevas told me about the cotton boom in Chiapas.

designed programs like PIDER (Integrated Rural Development Program) to deliver food, fertilizers, and projects focused on infrastructure, health and education to relatively poor regions of the country.[133] The National Indigenist Institute, whose employees promoted new technologies, opened coordinating centers serving the central valleys of Oaxaca, the valley of Tlacolula, and the Juárez mountains, during this decade.[134] Heavy spending on the countryside continued into the early 1980s, when a program called the Mexican Food System (SAM) (1980-82) subsidized chemical fertilizers, insecticides, hybrid corn, credit, crop insurance, and food for poor communities.[135] Villagers in San Bartolomé Quialana took advantage of programs like these by receiving subsidized credit for oxen and fertilizer purchases and subsidized tractor rentals.

However, programs like these mostly disappeared when the administration of Carlos Salinas de Gortari (1988-1994) reduced funding for rural development in preparation for Mexico's participation in NAFTA.[136] I end my study in 1988, not because peasants stopped using new tools then (they did not), but because one major avenue for acquiring them (via government programs) shut down.

The San Bartolomé of 2012 was very different from how villagers remembered it in the more-distant past. The communal forests once decimated by overharvesting have regrown near El Picacho, in part due shrinking markets for wood and growing usage of

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[133] Grindle, *Official Interpretations,* 10-15. Regarding PIDER, Grindle writes, "Under the PIDER effort, rural underdevelopment was to be assessed and responded to on the basis of micro-regions that exhibited characteristics of rural poverty and potential for development; each micro-region was to serve as a unit for planning an integrated set of projects for agriculture, physical infrastructure, health, sanitation, and education (pg. 13, footnote 15).

[134] Gonzálo Aguirre Beltrán, "La obra del INI en el Estado de Oaxaca," *Acción Indigenista* no. 263 (May 1975), 1-3, Accessed at CDIMEX; Email correspondence with Emiliano Morales Cruz, 23 July 2014; Dillingham, "Indigenismo and Its Discontents," 13, 48-52. Interview with anonymous former INI employee, in his house in Oaxaca de Juárez, 22 May 2012.

[135] Fox, *The Politics of Food,* Ibid., 71-2, 103, 105, 152, 158.

[136] Heliodoro Díaz Cisneros, interview by Joshua Walker, in "La Casona del Llano," a restaurant in Oaxaca de Juárez, Oaxaca, 11 Sept. 2012.

gas stoves in the state.[137] Villagers who once had few other options for earning cash other than cutting wood now use roads, cars, and time-saving devices to find work in other communities.[138] Cinder block and metal have begun to replace older adobe homes, and these materials are often paid for by migrant remittances.[139]

Only agriculture remains roughly the same as it was. New technologies like tractors, wells, pumps, hoses, and fertilizers have been added to some parcels, but villagers today have little confidence in these technologies to get the job done during dry years. Instead, they rely on cars, roads, mills, and faucets to expand their opportunities to places on the other side of the bridge over the Rio Salado.

Chapter Outline

The first section of the dissertation (chapters two through five) discusses the arrival of federal development programs and their consequences for villagers. In chapter two, I show that federal programming to modernize agriculture was not evenly distributed or comprehensive in its coverage of Oaxaca. Low budgets before the 1970s and 1980s meant that many communities, including San Bartolomé Quialana, were relatively left out of government designs for improving peasant agriculture. On the other hand, communities with political connections and plenty of natural resources,

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[137] *Octavo Censo General de Población, 8 Junio de 1960: Oaxaca,* Vol. 2, Secretaría de Industria y Comercio, Dirección General de Estadistica, 1963: 2284, 2308; *IX Censo General de Población X 1970 28 de Enero: Estado de Oaxaca,* vol. 1, 1971: 271. *Censo General de Población y Vivienda, 1980: Estado de Oaxaca*, Instituto Nacional de Estadistica Geografia e Informatica, Vol. 1, Tercera Parte, 1984: 1898, 1968; Conversation with peasant, San Bartolomé Quialana, field notes 15 July 2010. Between 1960 and 1970, the number of homes in the state using gas or electricity for cooking jumped from 6,859 (2% of total homes) to 57,955 (15.4%). In 1980, 89,291 homes were using gas for cooking, while 522 were using electricity (together, they were about 20% of total homes). Gas and electricity were counted together in the censuses of 1960 and 1970, probably because homes that used electricity for cooking were statistically insignificant. I believe that the number of homes relying on gas or electricity climbed even higher in later decades, but more work in the INEGI archives is ultimately needed to answer this question.

[138] Conversation with peasants, San Bartolomé Quialana, field notes 13 Aug. 2012.

[139] Conversation with village official, San Bartolomé Quialana, 3 Feb. 2012. Fernando Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 3 Aug. 2012. My Feb. 3 conversation revealed changes in home building materials. Fernando Martínez talked to me about migrant remittances.

communities like Latuvi, benefitted from timely and appropriate support. They used new technologies to turn around sagging local economies.

In chapter three, I shift my focus away from agricultural technologies towards tools designed to reform life in the home and the community. Development programs were usually "integrated," meant to reform both field and home, and they often targeted women. In San Bartolomé and Latuvi, the arrival of "integrated" technologies like corn grinders, electricity, roads, and water faucets caused major changes in gendered work regimes. Women, especially those without husbands, used these tools to save time and to invest themselves in money-making activities like opening stores or trading produce. For the first time ever, men became involved in tortilla production.

In chapter four, I investigate the consequences of new technologies for local politics. I argue that peasants serving on local technology committees used the power and prestige that came with ushering in technological "progress" to challenge village elders, *caciques*, and other established authorities.[140] In chapter five, I extend this analysis to the level of state and nation. Peasants demanded access to new technologies and understood this access to be central to their participation in the nation-state.

The second section of the dissertation shifts the focus away from state programs and politics and places it instead on individual users. In chapter six, I explore some ways that peasants learned and acquired new tools. Speaking with extension agents or visiting a federal technology demonstration was one way to learn about new technologies, but, as the first section of the dissertation reveals, these programs were often poorly-executed.

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[140] The argument in chapter seven is heavily influenced by anthropologist Lynn Stephen's work. See Stephen, *Zapotec Women,* 160-70, 176.

Instead of learning from officials, many peasants learned from their neighbors or business associates, and many purchased the tools they wanted on the private market.

Chapter seven focuses on the place of animals in this equation. Animals' reliability and flexibility made them perfect for a situation where new technologies were hard to find and periodically ineffective. Animals filled in when new tools were broken or too expensive. This created a new technological regime that was a hybridization of old and new tools.

Chapter eight explores the growing importance of repair work. Repair skills were also crucial for allowing peasants to make broken machines usable and to start repair businesses that provided alternative sources of income.

In chapter nine, I analyze the words and the memories of peasants themselves as they were relayed to me via oral histories. I find the discourse related to technological change to be complex: peasants associate new tools with "progress" and "civilization," and they are thankful for the food, access to markets, mobility, and physical comfort that they provide. On the other hand, they also talked to me about the negative aspects of technological change. They believe that tools have led to more environmental pollution, more inorganic waste, and more health problems. Peasants bring a critical and nuanced perspective to the stories they tell about technological changes in rural Oaxaca. This dissertation is my attempt to make scholarship do the same.

Chapter 2: Fruit and Fertilizers

Montevideo, Uruguay was host to an international conference called the "Conference on the Problems of Nutrition in Latin America" in 1948. Participants included scientists from every Latin American country, the United States, United Kingdom, and France. At the conclusion of the conference, these scientists wrote a "final report" suggesting steps to improve food production in Latin America. They called for the diversification of crops. They also called for the utilization of new technologies and advanced science in agriculture, including machines, fertilizers, irrigation, animal and plant disease control, meteorology, and research in plant genetics. They stressed that the transportation of products like fertilizers needed to be cheaper and less prone to price gouging. They encouraged governments to select "zones of demonstration," where "technicians in agriculture, health, economy, and domestic economy can work with nutritionists in a program of general development."[1]

In this chapter, I argue that these ideas regarding rural development characterized the goals and strategies of Mexican development officials throughout the second half of the twentieth century. Officials saw technology and science as the key to unlocking rural Mexico's potential, but they preferred to concentrate agricultural investment in regions with favorable climates, hydrology, politics, and histories. This was true even in southern states like Oaxaca, home to peasant farmers with relatively small parcels of rocky or hilly land. Peasants in these states could be key players in the modernization of Mexican agriculture, but not all peasants were created equal. Instead, officials made strategic choices about investments: communities with amenable climate,

[1] "Conferencia Sobre los Problemas de Nutrición en America Latina Informe final," 1948, AHSS, Fondo: SSA, Sección: Sub. A., Caja: 52 Exp.: 3. It is not clear if the conference organizers were making these recommendations for peasants for rural people in general.

soil, water, politics, and histories received more timely and effective agricultural development assistance than did others.

To illustrate these arguments, this chapter focuses on the government-sponsored introduction of chemical fertilizers and fruit trees in Latuvi and San Bartolo. These programs would reformulate the economy of Latuvi for the better. In San Bartolo, results of government intervention were more ambiguous.

Food from the Mountains and the Deserts: The Design of Development Programs

In the years and decades that followed the 1948 conference in Uruguay, federal officials in Mexico put forth ideas that mimicked the conference's focus on bringing science to the countryside. Dr. Jesús Díaz Barriga, an official with Mexico's National Institute of Nutrition, wrote a long treatise on Mexican agriculture in 1949. He claimed that most of Mexico's arable land was not reliable because there was not enough water to guarantee regular harvests. Instead, he argued that Mexicans should seek new lands to farm. Since Mexico is a mountainous country, he thought that mountainous areas would be a great place to turn. He wrote that Mexicans should, "cultivate the hillsides with perennial vegetables with deep roots, which produce food and defend against soil erosion at the same time." He also thought that plants adapted to the desert could be harvested in arid lands.[2] Díaz Barriga and a co-worker offered similar proposals for the state of Michoacán in 1952, suggesting that farmers could grow fruit in the mountains and "…prickly pears, dragon fruits, dates, yuccas, and oily plants like the jojoba" in the

[2] "Estado de la alimentación del Pueblo Mexicano: sugestiones para mejorarla," Report from Dr. Jésus Díaz Barriga to Sr. Lic. Antonio Carrillo Flores, 18 Nov. 1949, AHSS, Fondo: SSA, Sección: SubSyA, Caja: 29, Exp.: 4 Fecha: 1948-1952.

desert.[3] They argued that peasants and their lands (peasants usually farm the mountains and deserts in Mexico) were ripe for development.

Mexican officials also emphasized the need for new technologies in agriculture. In 1954, two officials at the National Indigenist Institute, Gonzalo Aguirre Beltrán and Ricardo Pozas A., argued that agricultural technologies were important tools for reforming indigenous villages:

> …the modernization of agricultural technology, certainly, is not an innovation that can be implemented in isolation, it's just a cog in the gear, part of a whole, piece of an integral change of the social structure of the indigenous community that should be sought by fostering the harmonic elevation of the villages as much in technological matters as in educational, health, credit, communications, and the rest of the aspects that give tone and feature to civilization.[4]

As this quote shows, these officials believed that improvements in agricultural technology were necessary and that they should be accompanied by improvements to health and education.

The basic idea that peasants in the mountains or other "unused" areas were waiting to be unlocked by technology was one that would be repeated in the 1970s and 1980s. In 1975, an official with the National Indigenist Institute's coordinating center in Temascal, Oaxaca wrote that his work was "focused on changing the traditional agriculture system for a more technical system that permits us the take advantage of natural resources and manpower in the most efficient way, and the consequence of this is the development of the economic as well as the social aspect of the inhabitants of this

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[3] "El problema de la nutrición popular en el estado de Michoacán: Ponencia presentada por los Drs. Jesús Díaz Barriga A., y José Quintín Olascoaga, en las Asemblea Económica Social, Morelia, Michoacán, 3 Mar. 1952," AHSS, Fondo: SSA, Sección: SubSyA, Caja: 29, Exp.: 4 Fecha: 1948-1952.

[4] Gonzalo Aguirre Beltrán and Ricardo Pozas A, "Instituciones indígenas en el México actual," in *Memorias del Instituto Nacional Indigenista*, vol. 6: *Metodos y resultados de la política indigenista de Mexico,* ed. Alfonso Caso, Silvio Zavala, José Miranda, Moises González Navarro, Gonzalo Aguirre Beltrán, and Ricardo Pozas A., 171-268 (Mexico City: Instituto Nacional Indigenista, 1954), 212. Accessed at CDIOAX.

zone."[5] In 1977, Rafael Calderón, a professor in the department of agriculture and animal production at the Metropolitan Autonomous University, claimed that the mountainous areas of the states of México, Guerrero, Oaxaca, and parts of Veracruz had lands that could be suitable for flowers and fruits if they could just be properly irrigated.[6] In 1984, Antonio Mejía, a reporter for the Mexico City newspaper *El Día*, outlined the goals of a state/federal partnership called the Program for Rural Development. This program targeted Oaxaca's Mixteca Alta region. Its goals, according to Mejía, were to promote balance between people and nature and to improve employment and well-being. This would be done, in part, by spending money to fix problems with food supply, potable water, highways, and irrigation.[7] The idea that technology and government intervention could make peasants more productive and healthy held sway in official circles for a period of about four decades.

Most of these examples come from federal officials in Mexico City. But state-level officials harbored similar theories about the ability of government to improve peasants' harvests using technology and scientific farming. In his 1947 *informe de gobierno* ("state of the state") report, governor Eduardo Vasconcelos of Oaxaca lamented the "disastrous" and "backwards" state of Oaxacan agriculture. In detailing what steps his administration would take to fix it, he mentioned agricultural machines, tree nurseries, improved corn and bean seeds, and irrigation.[8] In 1953, governor Manuel Cabrera

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[5] Mario Salazar Liévano to Jacobo Montes Vásquez, 10 Oct. 1975, CDIOAX, Archivo Histórico CCI Papaloapan, Caja: 10, Exp.: 124.

[6] "Falta Tecnología Para Explotar 32 Milliones de Hectareas," 29 July 1977, Newspaper Article, Publication Unknown, Biblioteca Lerdo de Tejada, Archivos Económicos, Exp.: A02281 1958-1978 Agricultura Tecnología.

[7] Antonio Mejía, "Puso en marcha el Programa de Desarrollo Rural para la Mixteca, Miguel de la Madrid," *El Día,* 27 June 1984.

[8] *Informe del C. Lic Eduardo Vasconcelos, rendido ante la XL Legislatura,* 1947, pgs. 34-5, AGPEEO.

Carrasquedo discussed efforts to encourage peasants to use agricultural machinery, alternative crop choices, improved seeds, agricultural credit, chemical fertilizers, and insecticides.[9] In 1963, governor Rodolfo Brena Torres reported on the formation of a parastatal company for forest management. The governor said that 50% of all money the company earned would be invested back into rural communities, and this would give communities many of the technologies they had always dreamed of, including roads, schools, and potable water. This investment would also allow for the arrival of fruit trees and irrigation works to generate income, as well as electricity and telephone service.[10] In 1977, governor Eliseo Jiménez Ruiz blamed a lack of technological development for the flight of capital and migrants out of the Oaxacan countryside.[11] In each of these examples, the governor of Oaxaca argued that updating rural technologies was necessary for improving peasants' lives.

This section has shown continuity in the imaginations of developers from the state and federal governments. From the 1940s to the 1980s, officials saw peasants as producers of wealth whose potential could be unlocked by technology. How did they put these plans into action? Below, I explore development efforts in two Oaxacan communities. I argue that some communities, those with abundant water resources, political connections, or nationally-relevant local histories, received more appropriate and timely technological support, which in turn made local agriculture more lucrative. Other communities were left to fend for themselves until the 1970s.

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[9] *Informe que Rinde el C. Gobernador Interino Constitucional del Estado Gral. De DIV DEM Manuel Cabrera Carrasquedo a la XLII Legislatura del Estado*, 1953, pgs. 22, 24, AGPEEO.

[10] *Primer Informe de Gobierno del C. Lic Rodolfo Brena Torres*, 1963, pgs. 24-5, AGPEEO.

[11] *Tercer Informe de Gobierno,* 1977, pg. 53, AGPEEO.

Santa Marta Latuvi, the SEP, and the Papaloapan Commission

Fruit trees, especially apple and peach trees, are crucial sources of income in Santa Marta Latuvi. Oral interviews confirm this. Ubalda Ceballos Santiago, a sixty-six year old owner of over two hundred apple and peach trees, told me that saving money from selling fruit allows her to purchase things she needs, like repairs for her house.[12] Mario Ponciano García, arguing for the overall difficulty of making money in village agriculture, said that because of selling fruit, "we break even."[13]

The arrival of new varieties of fruit trees and grafts starting in 1946 played a major role in transforming the economy of this village from one of scarcity to one of abundance. Fruit trees were one of many innovations that became available to communities like Latuvi as a result of timely and appropriate support from Secretaría de Educación Pública (SEP), the Papaloapan Commission, and other development agencies.

Most villagers in Latuvi remember schoolteachers as the people who first introduced fruit trees.[14] Rosa Ochoa told me, "Here, nobody had fruit trees, nobody had them. A teacher from Talea came, and he came to teach us to make grafts. I believe about five people were the first to do it."[15] Ubalda Ceballos Santiago told me that they began planting apple trees because, "the teachers that were here told us that it was a good use [of the land]."[16] Ignacio García Hernández, age sixty-seven, said, "when I left school in 1960, I began to plant *siferté* apple trees…because they [the maestros] taught us how

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[12] Ubalda Ceballos Santiago, interview by Joshua Walker, in her home in Santa Marta Latuvi, 24 Apr. 2012.

[13] Mario Ponciano García, interview by Joshua Walker, in his store in Santa Marta Latuvi, 6 May 2012.

[14] Anonymous former resident of Latuvi, interview by Joshua Walker, at his home in Oaxaca de Juárez, 22 May 2012. This man told me that teachers introduced the trees in 1946.

[15] Rosa Ochoa, interview by Joshua Walker, in her home in Santa Marta Latuvi, 15 May 2012.

[16] Ubalda Ceballos Santiago, interview by Joshua Walker, in her home in Santa Marta Latuvi, 24 Apr. 2012.

to graft...[17] Mario Sebastián told me that they began planting because teachers, "told us to plant fruit trees, because soon enough buyers would come here to buy. Plant them! Plant them! Because of this, we planted them."[18]

Teachers figure prominently in the memories of peasants, but there is evidence that the Papaloapan Commission also helped to bring fruit trees to this community. Begun under the administration of President Miguel Aleman in 1947, the Papaloapan Commission was responsible for building a hydroelectric dam over the Papaloapan River, whose headwaters are in the Juárez Mountains. The Commission also worked to modernize the lives of residents of the river basin. This meant helping villagers to get roads, potable water networks, modern schools and government buildings, more resources for public health, and new agricultural tools.[19] These modernization efforts seem to have first reached Latuvi in 1957, when education official Ramón Díaz Astudillo claimed to have helped residents of the region to petition the Commission for fruit trees. The transfer of 4,500 trees to Latuvi was approved, although it is difficult to know if they ever arrived.[20] Díaz Astudillo's report suggests that both the Papaloapan Commission and the Secretariat of Education were important players in making the mountains of Latuvi blossom with fruit.

The state government of Oaxaca also played a role in the transfer of fruit trees to communities like Latuvi. In 1955, it operated two *viveros*—nurseries where officials raised saplings for distribution. One nursery was in Tlacolula, and the other was in San

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[17] Ignacio García Hernández, interview by Joshua Walker, in his home in Santa Marta Latuvi, 14 May 2012.

[18] Mario Sebastián Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 26 Apr. 2012.

[19] Cosby, "Leviathan in the Tropics," 133; Schwartz, "Resettlement as Planned Utopia" ; Poleman, *The Papaloapan Project,* 106-8.

[20] Ramón Díaz Astudillo to C. Delegado Gral de As. Indígenas, 20 Aug. 1957, AGPEEO, Fondo: Asuntos Agrarios, Serie: V Problemas por Bosques, Legajo: 900, Exp.: 23.

Felipe del Agua. The goals of the *vivero* program were fourfold: to shore up loose soils and solve the problem of soil erosion, to reforest areas that had been wasted by peasants' slash and burn agriculture, to provide more food to eat, and to improve village economies.[21] In 1955, Governor Cabrera Carrasquedo claimed to have worked with the Federal *vivero* in Mexico City to distribute 65,000 fruit trees in various communities of the state.[22] The trees that were approved for Latuvi in 1957 did not come from a state nursery, but the existence of state-run nurseries shows that the state government also played a role in transforming the lives of peasants.

Fruit would grow to be one of the staples of the economy in Latuvi. In 1965, an engineer named Pedro Zarate Loyo claimed that potatoes were the top-earning crop in Latuvi, and that people also grew corn, beans, and fruit trees.[23] He said that Latuvi was a "medium-important" village because it grew "potatoes and fruit trees like peach and apple."[24] By 1969, Commission engineer Rafael Rangel Franco claimed that fruit trees were the basic crop of the economy, and in 1972, Pedro A. Betanzos Areliano from the National Indigenist Institute reported that Latuvi was one of the few communities that planted grafted apple trees following the recommendation of the Papaloapan Commission.[25]

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[21] *Informe que Rinde el C. Gobernador Interino Constitucional del Estado Gral. De DIV DEM Manuel Cabrera Carrasquedo a la XLII Legislatura del Estado*, 1952, pg. 33, AGPEEO; *Informe que Rinde el C. Gobernador Interino Constitucional del Estado Gral. De DIV DEM Manuel Cabrera Carrasquedo a la XLII Legislatura del Estado*, 1953, pg. 34, AGPEEO.

[22] *Informe rendido por el Ciudadano Gobernador Constitucional del Estado General de División D.E.M. Manuel Cabrera Carrasquedo,* 1955*,* 27-8, AGPEEO.

[23] Pedro Zarate Loyo, "Memoria descriptiva de las obras de introducción de agua potable a la población de Latuvi Distrito de Ixtlán Oaxaca," 11 May 1965, AHA, Fondo: CP, Caja: 416 Exp.: 6852.

[24] Ibid.

[25] Rafael Rangel Franco, "Promoción Agrícola Distrito de Riego por Aspersión de Guelatao de Juárez, mes de Noviembre de 1969, 28 Nov. 1969, AHA, Fondo: CP, Caja: 267, Exp.: 4075; Pedro A. Betanzos Areliano to Reynaldo Salvatierra Castillo, 22 Sept. 1972, CDIMEX, Exp.: FD20/043.

Fruit became even more important as the potato gradually vanished from the community. Peasants repeatedly told me that potatoes used to grow abundantly in Latuvi. They would stress that these potatoes were huge: "Grande, chula papa," ("Huge, fat potatoes") in the words of Ofelia Quero Santiago. Quero Santiago also said that her family would make tortillas out of potatoes when they had no money to purchase corn.[26] This suggests that potatoes were so readily available that they even surpassed corn in local importance. At some point, however, the lands around Latuvi stopped producing potatoes. By 1969, only five years after the Papaloapan Commission claimed that potatoes were a village mainstay, engineer Rafael Rangel Franco was describing "fruit" as the community's basic crop. Just as one source of income became unavailable, innovations like tree grafting and the introduction of new trees into the community began serving as critical substitutes.

However, these technological marvels were not available to everybody in the village. A story related to me by Rosa Ochoa suggested that tree grafts were considered to be the province of men:

> **Joshua Walker:** Women were the first ones to adopt tree grafts?
> **Rosa Ochoa:** Yes, at least my mom, my aunt, my grandma were the first women. Back then we lived on some land way up there, a plain that is up there. And the teacher went there to graft trees, and did it. Well my dad nearly beat my mom. Why? Because they [the women] gave them permission to make the grafts. But when they saw the harvest, when they saw the fruit, then they liked it. And then most of the people said: 'we're going to do it.' Sometimes the women here, we are nosy.[27]

In this example, a married woman was punished for making decisions that involved fruit trees. Rosa's labeling of these women as "nosy" implies that this was an arena in which

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[26] Ofelia Quero Santiago, interview by Joshua Walker, in her home in Santa Marta Latuvi, 29 Mar. 2012.

[27] Rosa Ochoa, interview by Joshua Walker, in her home in Santa Marta Latuvi, 15 May 2012. Translation by Joshua Walker.

women were not accepted. Fruit groves were an extension of the male-dominated *milpa* (cornfield), and the only women who had total control over them were women whose husbands were not present.

Chemical fertilizers were another important technology for Latuvi. According to local memory, they were brought to the village by a man named Roque García sometime around the late 1960s or early 1970s.[28] García had been working as a day laborer in Lachatao. There, he saw a former schoolteacher using fertilizers to grow his corn. Eventually realizing that the chemicals were helping the corn to grow, he decided to try some on his lands in Latuvi.[29]

Many peasants told me that before García tried his chemical fertilizers, the land was growing sterile. Starting around 1950, corn stalks grew short and sickly, as though the land's nutrients had been used up.[30] Villagers were forced to cut wood and sell it in Oaxaca or Tlacolula in order to make money to buy corn and other basic necessities.[31] They were also in the habit of clearing forests to use as farmland when their old lands became exhausted.[32]

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[28] Carlos Contreras, interview with Joshua Walker, in his home in Santa Marta Latuvi, 3 Mar. 2012; Conversation with peasant, Santa Marta Latuvi, field notes 22 Apr. 2012; González, *Zapotec Science,* 2. It is difficult to pin down a date for the beginning of fertilizers in Latuvi. The dates here are an approximation based on an oral interview, an informal conversation with a peasant, and Roberto J. González's work on agriculture in the Sierra Juárez.

[29] Mario Ponciano García, interview by Joshua Walker, in his family's store in Santa Marta Latuvi, 24 Apr. 2012; Carlos Contreras, interview with Joshua Walker, in his home in Santa Marta Latuvi, 3 Mar. 2012.

[30] Ignacio García Hernández, interview by Joshua Walker, in his home in Santa Marta Latuvi, 14 May 2012; Mario Sebastián Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 6 May 2012; Mario Ponciano García, interview by Joshua Walker, at his family's store in Santa Marta Latuvi, 24 Apr. 2012.

[31] Mario Sebastián Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, May 6, 2012; Semehí Ramírez García, interview by Joshua Walker, in the ecotourism office in Santa Marta Latuvi, 1 Mar. 2012.

[32] Former resident of Latuvi, interview by Joshua Walker, in his home in Oaxaca de Juárez, 22 May 2012.

However, when villagers saw the success that García had with chemical fertilizers, they were quick to adopt this practice. This revolutionized the village's economy. One husband and wife, aged seventy and sixty-nine, respectively, explained the transition:

> **María Pérez Ramírez:** Before, in order to have corn, we bought it from Tlacolula, from Teotitlán [del Valle], because there was not corn. They planted it, but there were only little tiny ears…
> **Vicente García Cruz:** There were not any fertilizers…
> **María:** Now with fertilizers, now the ears grow bigger…
> **Vicente:** And now we take the corn from here to Teotitlán
> **María:** to the valley.[33]

A similar perspective on the consequences of chemical fertilizers is provided by Vicente Marcos Hernández, age fifty, who told me, "Ever since fertilizers began, there has been a change of life here, yes, because we used to buy corn, the corn came from the city to here. But now, no. Corn goes down from here to the city."[34] Chemical fertilizers became so popular in Latuvi that in 1977, the community requested twenty-five tons of ammonium sulfate from the National Indigenist Institute. This was the third-largest request in a list of eleven villages.[35] Chemical fertilizers had become crucial to the economy of Latuvi, and they remain so today.

Development planners and officials also offered crucial advice on how to use new technologies. Papaloapan Commission engineer Rafael Rangel Franco's comments about fruit in Latuvi (referenced above) were part of a 1969 report in which he claimed to have instructed villagers on how to protect fruit trees from fruit flies.[36] Other villages in the

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[33] Vicente García Cruz and María Pérez Ramírez, interview by Joshua Walker, at their home in Llano de Marta, Santa Marta Latuvi, 17 May 2012.

[34] Vicente Marcos Hernández, interview by Joshua Walker, at his home in Santa Marta Latuvi, 29 Mar. 2012.

[35] Fidel Langarcía Yarez to Diego Vásquez Juárez, 2 May 1977, CDIMEX: FD20/071.

[36] Rafael Rangel Franco, "Promoción Agrícola Distrito de Riego por Aspersión de Guelatao de Juárez, mes de Noviembre de 1969," 28 Nov. 1969, AHA, Fondo: CP, Caja: 267, Exp.: 4075.

region benefitted from similar advice. Rangel Franco claimed to have made recommendations "appropriate to the place" in the village of Benito Juárez, Latuvi's neighbor to the southeast.[37] He reported that villagers there were convinced that they needed to start a field for experimentation, presumably to try out his advice. In 1968, Victor Manuel Pérez Magallanes, another commission engineer, reported a visit to Cuajimoloyas and Llano Grande, two of Latuvi's partners in the Pueblos Mancomunados forest alliance. The purpose of the visit was to "observe, analyze, and study the conditions of production in order to make recommendations about how to raise agricultural production."[38] Later in 1968, Pérez Magallanes visited Llano Grande and talked to farmers about better practices for growing potatoes and about how to use fungicides to fight phytophthorra, a plant disease.[39] These examples show that federal officials and schoolteachers introduced more than just new products, like grafted fruit trees and fertilizers. They also dispensed advice. These interventions were crucial for the people of Latuvi.

San Bartolomé Quialana and the "Valley of Tears"

Not every village was so lucky. About an hour's drive from Latuvi, a "Pro-Irrigation Committee" in the arid Valley of Tlacolula wrote a petition to economic advisors in Mexico City asking for irrigation in their valley. This was in 1958, just months after education official Ramón Díaz Astudillo worked with the Papaloapan Commission to order 4,500 fruit trees for Latuvi and other mountain villages. The committee's petition claimed that the federal government's Secretariat of Hydraulic

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[37] Ibid.

[38] "Promoción Agrícola, Distrito de Riego por Aspersión de Guelatao de Juárez, OAX., mes de Junio de 1968, AHA, Fondo: CP, Caja: 235 Exp.: 3538.

[39] "Promoción Agrícola, Distrito de Riego por Aspersión de Guelatao de Juárez, OAX., mes de Octubre de 1968, AHA, Fondo: CP, Caja: 235 Exp.: 3539.

Resources (SRH) had already studied the proposed irrigation project and decided that irrigation in the valley was economically unfeasible. The committee acknowledged that the government's estimates might be true in terms of pure numbers, but they also argued that federal generosity would save their "Valley of Tears" from misery and hunger.[40]

This petition is important because it suggests that officials conducted cost-benefit analyses in deciding where and when to spend development funding. In order to merit sustained agricultural development funding, villages needed water, and this was something places in the Papaloapan basin, places like Latuvi, had in spades. For their part, peasants offered a cost-benefit analysis that reached a different conclusion. For them, ending misery and huger caused by water scarcity would be well worth the expense.

In the 1940s, 1950s, and 1960s, officials from various federal and state agencies made similar assessments of the valley's water resources, and they experimented with various methods to provide water to thirsty villages. In 1947, Ramon Fernández González Salas, an engineer with the Secretariat of Hydraulic Resources, surveyed the valley of Tlacolula and estimated that the land and rivers were not suitable for big irrigation projects. Instead, he recommended that irrigation wells be drilled down to the bedrock (*rocas basales*) near the valley's rivers and creeks, that small dams be used to channel water to farm fields, and that filtering tanks be built to capture water.[41] A similar study was conducted in San Bartolomé Quialana in 1964. Geologists visited the community and used *sondeos geoeléctricos* (electric sounding devices) to search for

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[40] Jaime Monterrubio, and others, to Consejo de Planeación Económico y Social, 30 Jan. 1958. AGPEEO, Fondo: Asuntos Agrarios, Serie: V Problemas por Bosques, Legajo: 905, Exp.: 10.

[41] Ramon Fernández González Salas, "Estudio geohidrológico en la región central del estado de Oaxaca," 25 Oct. 1947, AHA, Fondo: CT, Caja: 555, Exp.: 5187.

groundwater. They found that San Bartolomé's groundwater was prohibitively far underground, leading them to recommend the drilling of open-air wells (*pozos al cielo abierto)* as opposed to deep-water wells.[42]

The government did end up helping to build a limited number of irrigation works for the people of the "Valley of Tears." For instance, there was a "pilot program" to drill and test wells in Tlacolula and the neighboring community of Díaz Ordaz around 1954.[43] A man from San Bartolomé suggested to me in informal conversation that around thirty families from his village received help from the government to dig open-air wells in the 1960s.[44] In the 1960s, the state government helped villagers to build irrigation dams in Teotitlán del Valle, Díaz Ordaz, and Tlacolula.[45]

The effectiveness of these projects is not easy to evaluate. According to the anonymous man from San Bartolomé, the government did not deliver promised pumps to the thirty families so they could get water out of their wells. Instead, the villagers had to save up their money and purchase the pumps themselves.[46] Other documents, discussed more in chapter six, suggest that well digging could be problematic because land in Oaxaca is very subdivided and peasants were not often inclined to cooperate with each other in picking the optimum spot for a well.[47] On the other hand, the anonymous man

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[42] Aaron Palacios Nieto, "Resultado de los sondeos geoelectricos efectuados en los poblados de San Bartolomé Quialana, Sta. María Chachoapan, Tamazulapan y de la inspección geohidrológica al poblado de San Mateo Yucucuy, Estado de Oaxaca," Feb. 1964, AHA, Fondo: CT, Caja: 552 Exp.: 5168.

[43] Alfonso de la O Carreño, "Inspección a las perforaciones llevadas a cabo por la Dirección General de Pequeña Irrigación en Tlacolula y Díaz Ordaz, OAX, Jan. 1955, AHA, Fondo: CT, Caja: 549, Exp.: 5130.

[44] Conversation with anonymous peasant, San Bartolomé Quialana, Field notes October 1, 2012.

[45] Personal conversation with Salvador Sigüenza, in his office at CIESAS Pacífico Sur, August 2011; *Sexto informe del gobierno del C. Lic. Rodolfo Brena Torres*, 1968, pgs. 39-43.

[46] Conversation with anonymous peasant, San Bartolomé Quialana, Field notes October 1, 2012

[47] Bonafacio García Martínez, "Dictames, conclusiones, y recomendaciones de los estudios geohidrológicos efectuados en varias partes del Estado de Oaxaca," Mar. 1954, AHA, Fondo: CT, Caja: 514, Exp.: 4860.

from San Bartolomé indicated to me that having his own well allowed him to irrigate truck crops and sell them for extra income.[48]

Fruit trees, so crucial to the success story in Santa Marta Latuvi, had more mixed results in San Bartolomé. Fruit undoubtedly helped the local economy. Fernando Martínez, age sixty-six, told me about a federal program that delivered fruit trees to the school garden. He said the administration of Adolfo López Mateos (1958-1964) sent, "avocado, small sapote, apple, [and] pear" trees, and that they "gathered [the fruit] by the basket," using "five or six donkeys to carry them to Tlacolula," where the fruit was sold. Proceeds from the sale went back to the school.[49] Another informant, an anonymous peasant aged sixty-five, talked to me about working with his father to harvest and sell fruit: "peach trees, apple trees, it was filled here, in this house, because nothing happens to apples. They do not spoil like peaches. They store. A whole lot were sold, because people did not have them."[50]

However, unlike in Latuvi, where seemingly anybody could make money selling fruit in the Valley of Oaxaca, opportunities to do this in San Bartolomé were more limited. The anonymous man who worked with his father selling fruit told me that his father was one of only three or four people in the village who did this.[51] Various informants told me in informal conversation that tending fruit trees near the community's mountain (where there was more rain and water) was common in the past, but was a

[48] Conversation with anonymous peasant, San Bartolomé Quialana, field notes 1 Oct. 2012.
[49] Fernando Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 3 Aug. 2012.
[50] Anonymous peasant #30, interview by Joshua Walker, in his home in San Bartolomé Quialana, 10 Aug. 2012.
[51] Ibid.

practice that had died out.[52] Unlike in Latuvi, selling fruit was not a practical option for making a living for most villagers in San Bartolomé.

So what could they do to overcome food and resource shortages? What was the village's niche? In San Bartolomé, it was often the villagers themselves, not officials, who suggested creative, locally-appropriate solutions for transforming their economy. In a 1965 petition asking for the construction of a road, petitioners from San Bartolomé indicated that their village featured "archaeological monuments" that could be tourist attractions. This was surely a reference to El Calvario, the large hill in the center of the community that features pre-Hispanic ruins. A group of residents told me that village leaders had petitioned the federal government for the permission to excavate this landmark and make it a source of tourism and revenue. They told me that El Calvario contains treasures like those at Mitla, treasures capable of attracting tourists.[53] Similarly, in 1984, villagers petitioned for the construction of a local cinder-block factory, arguing that they had the natural resources [perhaps rocks?] to make it work.[54] These examples show that peasants recognized the unique economic potential of their village, but for reasons that are not entirely clear, their ideas failed to become reality.

In the 1970s and early 1980s, federal officials tried to correct the imbalance that had characterized agricultural development efforts in communities like Latuvi and San Bartolomé. Flush with credit resulting from favorable forecasts for oil production in the

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[52] Conversations with various residents of San Bartolomé Quialana, Field notes 22 July 2010, 25 May 2012; 25 May 2012, 24 Aug. 2012, 1 Oct. 2012.

[53] Conversation with residents, San Bartolomé Quialana, Field notes February 3, 2012; Rafael Ortega Velarde to Santiago Martínez Rios, 10 May 1965, San Bartolomé Quialana Archives, Binder: Documentos Antiguos.

[54] Ricardo Morales Hernández to Governor of Oaxaca, 23 Jan. 1984, San Bartolomé Quialana Archivo Municipal, Binder: Documentos Antiguos. This interpretation depends heavily on my read of the document. The document says, "…solicitamos una fabrica de tabicon ya que nuestra poblacion cuenta con materiales de la region."

Gulf of Mexico, high-level authorities borrowed money from international partners and development agencies in order to finance new projects for Oaxaca's underdeveloped regions. In 1980, the federal government applied for a loan from the International Agricultural Development Fund for a project called the "Oaxaca Rural Development Project." The project proposed to improve extension services, credit, technologies, crop choices, animal hygiene, irrigation, highways, and other aspects of rural life. It was targeted for communities near Miahuatlán, Pochutla, Sola de Vega, and Juquila, communities located in regions that officials identified as particularly impoverished. An investment program begun in 1973, PIDER (Investment Program for Rural Development), similarly sought to correct imbalanced development by channeling support to specially-designated "micro-regions" where poverty was prevalent.[55] By designing programs that targeted impoverished zones of states like Oaxaca, officials in the 1970s and 1980s essentially admitted that prior development schemes had served some districts and regions better than others.

Villagers in San Bartolomé benefitted from this glut of state spending. In 1978, a coordinating center for the National Indigenous Institute opened a few miles from the village on the site of a former *hacienda*. The coordinating center provided access to locally-appropriate technologies and services that could improve agricultural yields and family incomes, including vaccines for farm animals, money and technical assistance for building irrigation and small dams, access to tractors, and chemical fertilizers.[56] The

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[55] Ibid. Informe y recomendación del Presidente a la junta ejecutiva sobre una propuesta de préstamo a los Estados Unidos Mexicanos para el Proyecto de Desarrollo Rural de Oaxaca," 1 Apr.1980, AGN, Fondo: Miguel López Portillo, Secretaría de Reforma Agraria, Caja: 2337.

[56] "Programa Integral Para El Desarrollo Rural: Reporte Acumulado Del Mes de Noviembre de 1981, CDI Tlacolula, Caja: Proyectos Especiales 1983-1987, Exp.: Programa Asistencia Tecnica Pecuaria INI-PIDER AVANCE Fisico Mensual/81; Alberto Pérez Marical to Diego Vázquez Juárez, 9 Aug. 1983, CDI Tlacolula, Caja: Proyectos Especiales 1983-1987, Exp.: De Reigo, Estudios Topograficos, Costo

center's projected activities for 1982 included giving interest-free loans to help villagers purchase oxen, introducing "improved seeds that are acceptable" to villagers, and convincing peasants to accept the introduction of beneficial insects to their fields.[57] Twenty-five villagers in San Bartolomé Quialana were slated to receive credit to buy five pairs of oxen that year.

A government development bank, the Rural Credit Bank of the Isthmus, also "programmed" about two hundred hectares of drought-resistant maguey cacti for the village in 1977. Magueys are plants that can be harvested and converted into an alcohol drink called *mescal.* However, the village commissariat and other residents told a bank inspector that they didn't have enough land for magueys. Instead, they requested credit for corn.[58] This example suggests government credit was available to help peasants to try new techniques and technologies in the late 1970s.

The overall effectiveness and durability of the programs that grew from increased spending in the 1970s and 1980s is difficult to judge. Hugo Sierra Mondragón and Martha E. Rees studied the results of the work of the National Indigenist Institute's coordinating centers in Tlacolula and Miahuatlán from 1977-1982. They found that the support provided by these centers was important for some villagers and helped to produce crop increases "in some cases." But the centers were also plagued with administrative

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Aprox. De Obras, Varias Comunidades, '82; Ramón Coría Nuñez to Diego Vázquez J. 6 Jan. 1984, CDI Tlacolula, Caja: Proyectos Especiales 1983-1987, Exp.: Programas INI-PIDER Mecanización Agrícola (Tractores); Sierra Mondragón and Rees, "Los impactos del indígenismo," 186, 192. Sierra Mondragón and Rees discuss huge gains in corn yields in the Valley of Miahuatlán from 1977-1981, presumably owing, at least in part, to INI technology programs there.

[57] "Programa: Extension Agricola," 30 Nov. 1981, CDI Tlacolula, Caja: Proyectos Especiales 1984 (2), Exp: Proyectos Difinitivos Para 1982; "Nombre del Proyecto: Aquisición de Yuntas," July 1981, CDI Tlacolula, Caja: Proyectos Especiales 1984 (2), Exp: Proyectos Difinitivos Para 1982.

[58] Inspector de Campo Guillermo Acevedo, "Reporte de Visita," 29 Dec. 1977, San Bartolomé Quialana Archvies, Binder: Documentos Antiguos.

problems and tended to help peasants with disposable income and those who lived close to the centers more than others.[59]

Villagers in San Bartolomé helped me to evaluate the work of government agricultural experts in more specific terms. An anonymous man, age seventy-five, explained to me how he learned to use chemical fertilizers:

> **Joshua Walker:** How did you all learn to use fertilizer or a fumigator?
> **Anonymous #26:** They sent a technician…[who showed us] how to put it down, how to spread fertilizers to the little corn plants. You grab it like this, you throw it down like this. To every little plant. Yes, it made for a good harvest that time.

He also told me that the government once sold fertilizers in San Bartolomé's municipal center for half of the market price.[60] Two other men highlighted the work of agronomists in helping them to learn to use chemical fertilizers, and one man said this took place around 1970.[61] It is clear from these memories that some peasants from San Bartolomé received locally-appropriate agricultural support during this period. Still, nobody in the village remembered the introduction of these innovations with the enthusiasm or clarity with which fertilizers and fruit trees are remembered in Latuvi. Villagers remain pessimistic about local agriculture to this day, and the expanded missions and budgets of agencies like the National Indigenist Institute in the 1970s and 1980s ultimately were not successful enough to keep them from migrating away from the village.

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[59] Sierra Mondragón and Rees, "Los impactos del indígenismo," 183, 186, 188-9, 191-2, 198.

[60] Anonymous man #26, interview by Joshua Walker, in his home in San Bartolomé Quialana, 19 July 2014.

[61] Conversation with anonymous peasant, San Bartolomé Quialana, field notes 1 Oct. 2012; Conversation with family from San Bartolomé Quialana, field notes 23 Aug. 2012.

Why Was Agricultural Investment Uneven?

In 1963, the governor of Oaxaca admitted that development efforts in his state had targeted some areas instead of others:

> We all wish for general progress in the State. We're simply not satisfied that some regions quickly progress while others stagnate. But the reality is that making concentrated efforts in a region can produce true advances that would not be achieved if the same efforts were dispersed everywhere.[62]

In this report, the governor admitted the point I am trying to make: some regions received more support than others. But the next question is: what criteria were used to choose who received agricultural development support first? Why were Latuvi and the other communities of the Papaloapan Basin chosen for agricultural development while other regions and communities received support that came later and was relatively less effective?

Transnational discussions about development and agriculture were important. According to Patrick H. Cosby, Mexican President Manuel Ávila Camacho visited the state of Tennessee in 1947 and was "inspired" by the work of the Tennessee Valley Authority, leading him to direct resources to Mexico's own river basin in need of development, the Papaloapan River basin.[63] The late 1940s and 1950s were also the time of the Green Revolution, when the research of the Rockefeller Foundation promised abundant harvests for populations who could cobble together the correct mixture of hybrid seed, fertilizer, insecticide, and water. Much of the research behind these technologies was carried out in Mexico with the help of the Mexican government, so it is no surprise that Mexican officials looked to the Rockefeller Foundation for solutions

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[62] *Primer informe de gobierno del C. Lic. Rodolfo Brena Torres*, 1963, 29, AGPEEO.
[63] Cosby, "Leviathan in the Tropics," 78-79, 91.

even to the problems of Oaxaca.[64] To implement Rockefeller's technological solutions, villages needed water. Latuvi and other communities of the river basin had it, while arid communities like San Bartolomé did not.[65] I suspect that ecology, then, was key in deciding who got support.

Some arid villages had to choose between agricultural modernization via irrigation and fertilizers and the transformation of home life via water faucets. In San Bartolomé, Lázaro Pérez Sánchez told me, "Now, the municipal authority expropriated all the natural springs [to make] potable water. There are some people who are free to irrigate their alfalfa, but it's few, because there's not sufficient water."[66] This version of events, in which water for homes usurped water for crops, was corroborated by at least one other person in the village.[67] It suggests that in places where water was scarce, villagers could have faucets or fertilizers, but not both.

A community's other natural resources were also important in determining the effectiveness of development efforts. As I detail in later chapters, little government help was free of cost. Villagers sometimes paid two-thirds or all of the cost of a development project, and villagers often supplied the labor. In order to pay these bills, villages needed cash.

Forest communities like Latuvi benefitted from an enormous reserve of harvestable timber that they could sell for cash. As early as 1945, Latuvi's leaders leased the right to harvest communal timber to Valerio Cruz Santiago, a man from Oaxaca City

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[64] Cotter, Troubled Harvest, 188; Olsson, "Agrarian Crossings," Chapter 5.

[65] A conversation with a peasant confirmed that part of the reason fertilizers failed was due to lack of water. Conversation with peasant, San Bartolomé Quialana, field notes 12 July 2010.

[66] Lázaro Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 4 June 2012.

[67] Conversation with anonymous man, San Bartolomé Quialana, field notes 25 May 2012.

who outbid a competitor.[68] Around 1970, a company called "Maderas de Oaxaca" leased the right to harvest the forests of the Pueblos Mancomunados, and in 1977, the community alliance canceled the lease and elected to form their own company to cut and sell wood and furniture products.[69]

Peasants suggested to me that the proceeds from wood contracts were what allowed them to pay for the construction of utilities like water faucets and electricity. A man from Latuvi, age seventy-eight, said, "The Pueblos Mancomunados has the advantage of receiving payments from the mountain."[70] Mario Sebastián Contreras told me, "It was because of the resources from the mountain that we have electricity."[71] Working for the contractors also provided a needed source of cash for individuals to buy fertilizers. I asked Rosa Ochoa, "What did they do to make money to pay for fertilizers?" She answered: "Back then there was work in these mountains…they went to the mountains…[72] Working as logger was a good way get cash to buy chemical fertilizers. It is not clear that officials chose villages for development support based on the availability of cash reserves or forestry resources, but having these resources could only help communities to pay for new technologies.

A community's history also helped to decide its place in the development pecking order. Federal and local governments paid special attention to the village of Guelatao,

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[68] "Acta de Remate De Los Productos Forestales Del Pueblos de Latuvi, Municipio de Lachatao, Distrito de Ixtlán de Juárez, Estado de Oaxaca," 16 Nov. 1945, AGPEEO, Fondo: Asuntos Agrarios, Serie: XIII Tierras Comunales, Legajo: 21, Exp.: 2.

[69] Comisariado de Bienes Comunales de Pueblos de: Lachatao, Amatlan y Yavesia, Ixtlan, OAX, to Victor Bravo Ahuja, 14 May 1969, AGPEEO, Fondo: Asuntos Agrarios, Serie: XIII Tierras Comunales, Legajo: 23, Exp.: 6; Conversation with peasant, Santa Marta Latuvi, Field notes 18 Sept., 2012.

[70] Anonymous man #21, interview by Joshua Walker, in his home in Oaxaca de Juárez, 22 May 2012.

[71] Mario Sebastián Contreras, interview with Joshua Walker, in his home in Santa Marta Latuvi, 6 May 2012.

[72] Rosa Ochoa, interview by Joshua Walker, in her home in Santa Marta Latuvi, 15 May 2012.

the birthplace of Mexican national hero Benito Juárez, and to its neighboring community, Ixtlán de Juárez. In the late 1960s, they formulated a program called the Plan Guelatao, which attempted to modernize the villages using fertilizers, fruit trees, pest controls, irrigation, water faucets, and instruction for women in home economics. Guelatao became the first village in Mexico to get a gravity-operated irrigation system that used tubes, gravity, and sprinklers to irrigate crops.[73] In 1968, the Papaloapan Commission planted 257 peach trees in Ixtlán de Juarez.[74] The particularly timely and focused nature of development programs in the place of Juárez' birth suggests that villages with some connection to the regime or some significance for Mexico's image received favored status in the distribution of agricultural and development help.

Finally, we must consider the question of reception. Did development officials focus their money and attention on communities that were more likely to accept (or demand) government intervention? The Sierra Juárez has a history of participation in national and state-level politics dating back to the nineteenth century. Communities there supported the regime of Porfirio Díaz (1876-1910) in exchange for basic guarantees of local political autonomy, the right to bear arms, jobs in mines, and infrastructure improvements like railroads and a new bridge. However, they turned on him they felt he had neglected the terms of this compromise by imposing an unpopular candidate for governor in 1906.[75] During the Revolution, soldiers from the Sierra, including some from

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[73] "Guelatao Tiene ya Suficiente Agua de Riego," *El Nacional,* 27 Mar. 1967, Biblioteca Lerdo de Tejada, Archivos Económicos, R12699-R12699; Milliones en Frutales, a la Basura," *El Universal*, 5 Aug. 1968, Biblioteca Lerdo de Tejada, Archivos Económicos, R12699-R12699; "Comienza a Obtenerse Frutos del 'Plan Guelatao," *El Universal,* 26 Sept 1967, Biblioteca Lerdo de Tejada, Archivos Económicos, R12699-R12699; "Camino Ascendente en la Vida Rural de Guelatao," 21 May 1967, Biblioteca Lerdo de Tejada, Archivos Económicos, R12699-R12699.

[74] Victor Manuel Pérez Magallanes, "Promoción Agrícola Distritos de Riego Por Aspersión de la Sierra de Juárez," 21 Mar. 1968, AHA, Fondo: CP, Caja: 416, Exp.: 6852

[75] McNamara, *Sons of the Sierra*, 3, 12, chapter four, 168-187.

Latuvi, participated in revolts against Oaxacan supporters of Venustiano Carranza.[76] In the late 1920s and early 1930s, political strongmen (*caciques*) in the Sierra earned the support of constituents and state officials by promoting, "the advantages of infrastructure and education." They organized projects to build roads, schools, and telephone lines.[77] According to a former INI official, the region was also one of the first regions in Oaxaca to adopt Spanish.[78] In sum, the region has a long history of demanding and winning inclusion in the "fruits of the revolutionary bounty," as Benjamin T. Smith describes them, and officials might have included the region in the post-WWII development mix in acknowledgement of this history.[79]

Ronald Waterbury's study of the village of San Antonino Castillo Velasco suggests that other villagers either did not want or did not need government support. San Antonino, according to Waterbury, is a "Zapotec-and Spanish-speaking community (population in 1970 was c. 4,000; in 1990, 4,400) located some 30 kilometers south of the state capital, Oaxaca City."[80] People from San Antonino used chemical fertilizers, pumps, and trucks to take up vegetable growing and trading.[81] Purchasing these tools from private merchants in nearby Ocotlán or Oaxaca City made the intervention of government officials unnecessary.[82] In Waterbury's observation, the government rarely bothered to send officials to this community, and community members rarely bothered to listen when they did. It appeared to be a situation that worked well for both parties.[83]

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[76] Smith, *Pistoleros and Popular Movements,* 31; Jaime Wilfredo Cruz Santiago, "Latuvi: Una comunidad con historia" (Unpublished history of Latuvi, 2007) 9-24.
[77] Smith, *Pistoleros and Popular Movements,* 69.
[78] Interview with former INI official, in his home in Oaxaca de Juárez, 22 May 2012.
[79] Smith, *Pistoleros and Popular Movements,* 69.
[80] Waterbury, " 'Lo Que Dice,'" 64-5.
[81] Ibid., 69-75, 85-7.
[82] Ibid., 70, 82, 85.
[83] Waterbury, " 'Lo Que Dice,'" 66-7.

Like the *antonineros* that Waterbury studies, the people of San Bartolomé also developed their own, unique ways to deal with modernity. Working in nearby Tlacolula, for instance, provided extra income when the rains failed or the fields did not produce enough food. As I mentioned in the introductory chapter, the people of Tlacolula, a market town, grew less interested in agriculture over time. This meant that villagers from San Bartolomé were able to fill a local void in farm labor.[84] Villagers also maintained a strong tradition of leaving the village to find work in other parts of the state or even in the United States.

However, unlike Waterbury's *antonineros*, the people of San Bartolomé never seemed quite so opposed to government help. They seemed surprised or disappointed when the schemes did not work out, like when the government dug wells but forgot (or declined) to provide pumps. The overall tone of my interviews there suggests that peasants would have accepted any support or advice that was useful. That relatively little arrived before the late 1970s suggests that planners' cost-benefit analyses calculated lower costs and greater benefits elsewhere.

Conclusion

This chapter challenges an argument about rural development and the Green Revolution that is too simple. Many scholars argue that Mexican officials essentially overlooked the problems of peasants and their families and instead focused on developing large-scale, capital intensive agriculture in Mexico's northern states. In the 1950s, some estimate that around 90% of government investment was spent on large-scale

[84] Noél García Aguilar, interview with Joshua Walker, in his home in Tlacolula de Matamoros, 22 Aug. 2012.

infrastructure programs in northern Mexico that benefitted wealthy landowners.[85] In most accounts, officials are depicted as unconcerned with the plight of small farmers.

I believe that we should re-think this. Even if officials were not as concerned with the plight of peasants as scholars believe they should have been, the evidence reveals that government planners saw peasants as key pieces of Mexico's future. In a predominantly peasant state like Oaxaca, agricultural development initiatives were going on in places like Latuvi as early as the 1940s.

Existing historiography is correct when it suggests that development programs helped some Mexicans more than others. We can see from the evidence in this chapter that agricultural development was uneven throughout Oaxaca, just as scholars claim it was throughout Mexico. Some communities, those that had ready to-use-water or other natural resources, received more timely, creative, comprehensive, and effective solutions than did others. As we see in the case of Latuvi, these solutions gave villagers new economic opportunities and new options for survival. On the other hand, government planners and developers came around to the economic problems of resource-poor communities later, and even with increased investment and attention in the 1970s and 1980s, they were still never really able to make the desert bloom.

The technologies discussed in this chapter were destined for farm fields and mostly used by men. However, officials' dreams for transforming the countryside were broader than this. They viewed development as an holistic enterprise that necessarily included the reformation of other aspects of daily life, including transportation, food preparation, sanitation, marketing, housing, and education. They believed that water

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[85] Foley, *Privatizing the Countryside,* 61.

faucets, mechanical corn grinders, and electricity would unleash the working potential of rural women. These ideas and their consequences are the focus of the next chapter.

Chapter 3: Faucets, Corn Grinders, and Roads

Mexican President Manuel Ávila Camacho outlined problems that he thought were plaguing the countryside in an October 1941 decree published in *El Diario Oficial*. First, women could not participate in agriculture because they were slaves to the *metate* (traditional grinding stone) and slaves to the search for water and wood for their homes. The President envisioned a future where sanitation projects (*ingenería sanitaria)* and electricity (presumably to power grinding mills) would liberate women from these chores. Second, too many rural homes were shoddily constructed and unable to keep out the weather. Teaching peasants to urbanize and to build better homes would improve their moral and physical health. Finally, rural people had poor diets lacking in fruits and vegetables, a problem that could be solved by teaching them to grow home gardens and to raise animals for consumption.[1]

In this chapter, I expand my analysis of technological change to focus on tools likely to be used by women, especially public water faucets, mechanical corn grinders, and roads. I argue that tools like these were key to the comprehensive, "integrated" development projects favored by officials like Ávila Camacho. Women were, therefore, primary targets of modernization programming.

In the second half of the chapter, I explore the consequences of these projects. I argue that updates to non-agricultural technologies inspired changes in the ways that peasants organized family and communal spaces. In both communities I studied, people wanted to live in places where they could have access to utility networks. They shifted

[1]"Decreto que autoriza la creación de Consejos Mixtos de Fomento Agropecuario," *Diario Oficial,* 8 Oct. 1941, http://www.dof.gob.mx/ (Accessed July 14, 2014)*,* 8 Oct. 1941, http://www.dof.gob.mx/ (Accessed July 14, 2014).

their daily routines, petitioned local leaders, and sometimes even built new homes in order to make this happen.

Water faucets, grinding mills, roads, and other non-agricultural tools also inspired challenges to gendered ideas about socialization and work. Women's spaces for independent work (that is, work without men around) had once been largely confined to private spaces (the home) or spaces in nature (the river, woods, or fields). The arrival of public faucets and grinding mills meant that women could be spotted in town, unaccompanied by men, waiting in line for corn grinding or for their turn at the faucet. The time they saved by using these technologies also allowed them to undertake activities previously dominated by men. They spent more time in fields and orchards, planting, growing, and tending crops instead of just bringing lunch to the men. Roads and trucks allowed them to open *misceláneas* (convenience stores), which they supplied with candy, sodas, and other products from outside of the village. Women who were freed from domestic duties also engaged in long-distance truck trading. Changes to gendered work regimes also encompassed young adults, who used new technologies to earn independent incomes and challenge the financial power their parents held over them.[2]

Of course, not everyone experienced changes to the gendered order at the same time or in the same way. As I explained in the last chapter, unmarried women and those whose husbands were absent had more opportunities to use new agricultural tools. The same held true when it came to using tools like automobiles and roads to start businesses and to travel outside of the community. While enhanced mobility and freedom from household drudgery benefitted all women, those whose men were absent enjoyed the

[2] González Montes, "Intergenerational and Gender Relations," 178-87.

most radical effects of faucets, mills, and roads. Where fruit, fertilizers, and other agricultural tools made rural life viable for men, patriarchy remained.

Integrated Development and Women

In its call for a total transformation of peasant life, Ávila Camacho's 1941 decree epitomized "integrated development" thinking. Integrated development philosophy stressed the role of technologies, science, and government intervention in reforming all aspects of peasant life simultaneously. Fertilizers, fruit trees, animals, and gardens would give peasants more crops to eat and sell, but this was useless without clean water to drink or smooth roads on which to transport the produce. Integrated development called for the technological modernization of roads, schools, homes, municipal centers and agricultural fields all at the same time.

Officials advocated this philosophy for decades. Mary Kay Vaughan, for instance, writes that federal schoolteachers in the 1930s, "were instructed to change the way people farmed, marketed, consumed, organized households and family, ate, thought, cared for their bodies, and affirmed their communal identity."[3] The Papaloapan Commission was charged with determining the "'…disposition of industrial, agricultural, and colonization matters insofar as they pertain to the integral development of the Papaloapan basin'"[4] The Commission's mandate at various times included reforms to agriculture, industry, flood control, colonization, school improvement, sanitation, and road building.[5]

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[3] Vaughan, "Literacy and Education," 112.
[4] Poleman, *The Papaloapan Project*, 8.
[5] Ibid., 102, 106, 118-9.

The National Indigenist Institute also practiced integrated development. A 1956 article in the Institute's bulletin, *Acción Indigenista,* quoted from the *Mexican Declaration on Indigenist Affairs*:

> 'Elevating the living and working conditions of indigenous people is part of an integrated development plan that includes work in education, health, economy, and promotion, which try to improve communities in an integral way…'[6]

The article claimed that the Institute followed the ideas of the *Declaration* by working to establish small industries for indigenous people in Chiapas. The industries included carpentry, candle-making, soda bottling, tile-making (for roofing), and running mechanical corn grinders.[7]

The Secretariat of Public Health, responsible for many potable water projects throughout the country, also championed integrated development. In 1961, Dr. Manuel Sánchez Rosado, a public health official, spoke to the fourth meeting of the Mexican Hygiene Society in Michoacán. He emphasized the importance of viewing communities and development in a comprehensive way: "The rural community is a whole…It's not possible to understand and solve its problems if we view them as isolated and independent; we have to realize the diverse aspects that influence its life: cultural, social, economic, etc."[8] Integrated thinking like this shaped the agency's development projects. For instance, a 1961 program to fight hookworm and intestinal parasites in the states of Hidalgo and San Luis Potosí called for an "integral study of the zone." The study would be followed by sanitation projects that included hygiene education, latrine building,

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[6] "Fomento de Industrias," *Acción Indigenista* no. 31 (1956), CDIMEX. The article quotes a document (repeated here) called *La Declaración de México en material indigenista.*

[7] Ibid.

[8] Dr. Manuel Sánchez Rosado, "La participación de la comunidad en los programas de salud pública rural," *Salud Pública de México* 5, no. 2 (1963), 229-236: 229, NLM.

promotion of shoes and better foods, and treatment for sick people.[9] Here again, development was meant to totally rebuilding people's lives via education and technology.

None of these agencies had the resources or time to completely modernize peasants on their own. The actual impact of their projects was often more limited than the broad, comprehensive visions expressed in these examples (I review the impact of non-agricultural development schemes in the next sections). Nevertheless, these examples reveal a crucial point. Officials were concerned with updating technologies for the field, the home, and the community at the same time. This means that our study and evaluation of technological change in rural Mexico must go beyond the usual, Green Revolution-centric emphasis on fertilizers, seeds, tractors, and irrigation.

Our view of technological change must also go beyond men. Women and children were key targets of technological development programs. As the quote from Ávila Camacho suggests, officials saw women as untapped sources of food production held back by the drudgery of household labor. In 1958, *Acción Indigenista* published an article about potable water projects in Chiapas. Photographs of women and girls carrying and filling jugs of water accompanied the article. The photographs showed females in spaces surrounded by dirt and foliage, their backs bent from the weight of lifting and carrying the jugs. The captions under the photos implied that this work was degrading and exhausting. One said, "The domestic work of women indigenous women is exhausting." Another read, "No Mexican family should live in sub-human conditions."[10] By contrast, photographs of women at public water hydrants in government publications

[9] José Alvarez Amézquita, "Cuatro Programas de Saneamiento en Marcha," *Salud Pública de México* 3, no. 4 (1961), 531-6: 532-3, NLM.

[10] "Agua Potable," *Acción Indigenista* no. 66 (1958), CDIOAX.

showed the women standing erect and often smiling.[11] The implication here was clear: new technologies (and the government programs that introduced them) would relieve women of terrible burdens.

Officials like Dr. Adolfo Chávez, chief of the Nutrition Division at the National Institute of Nutrition, discussed life at the *metate* in similar, stark tones, echoing this theme of technological salvation:

> In the vast majority of rural zones it is commonly seen that women spend three or more hours preparing corn for the family to eat, but with more advanced mechanical methods, they would only need a couple of minutes, freeing women from this effort and giving them the chance to dedicate themselves to other work.[12]

In this analysis, women were not only oppressed by technological backwardness, but they were also waiting for modern innovations to release them for "other work."

The official dream was for women to spend less time with *metates* and more time helping their families to grow produce for sale. In 1952, officials at the Nutrition Institute of Nutrition claimed that they would focus on teaching people to cultivate "the most nutrient-rich vegetables and fruits" in school plots, patios, and gardens.[13] In 1960, the Secretariat of Agriculture and Culture similarly declared that family gardens, spaces usually reserved for women and children, were crucial for improving rural diets.[14] In 1963, *El Nacional* reported on an educational program in the state of Puebla led by the governor's wife. The program would "teach peasant women to improve their domestic,

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[11] Mario Fonesca Mancilla, "Servicios de sanidad," *Acción Indígenista* No. 74 (1959); Cover Photo, *Mexico Indígena* No. 18 (1978), CDIOAX; "La salud del pueblo mexicano en el pensamiento presidencial," *Salud Pública de México* 10, no. 6 (1968), 739-796: 751, 755. NLM.

[12] Adolfo Chávez, "La technología de los alimentos en México," *Salud Pública de México* 7, no. 2 (1965), 235-240: 236.

[13] "Proyecto de Programa de Labores del Instituto Nacional de Nutriología de la Secretaria de Salubridad y Asistencia Para el Año de 1952," AHSS, Fondo: SSA, Sección: SubSyA, Caja: 21, Exp.: 21 Fecha: 1947-1953.

[14] "Plan para más Huertos Familiares," *El Excelsior,* 7 May 1960, Biblioteca Lerdo de Tejada, Archivos Económicos, Exp.: P06445 1936-1976 Huertas.

economic, moral, intellectual, and social lives, striving for them to dedicate themselves to the activities appropriate to their sex and to acquire the knowledge necessary to take advantage of the products of the region, making clothes, establishing family farms, etcetera."[15] In 1966, Luis Gallardo Flores wrote that part of the housewife's job was to "squeeze every drop of juice from everything," a metaphor for minimizing the wasting of resources within the home.[16]

The dream of turning women into producers persisted in the 1970s and 1980s. For example, a 1971 law stipulated the creation of Agro-Industrial Units for Women. Under the law, rural women in *ejidos* could have a plot of land for running a small business. Sewing, canning fruits and vegetables, making crafts and ceramics, running mechanical corn grinders, and farming were some of the activities that federal officials felt would prevent women from migrating.[17] In November 1975, *El Nacional* reported the planned construction of over two hundred family gardens in the state of Veracruz. These gardens were part of First Lady María Esther Zuno de Echeverría's family orientation program, "which has the purpose of promoting and organizing peasant families so that, with their own actions, they [can] elevate their living conditions, emphasizing the participation of women in very important aspects like nutrition."[18] In 1980, Lorenzo Martínez Medina, Director of the Rural Bank, said that peasant women,

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[15] Arnoldo Fernández, "Campaña para dignificar a la mujer campesina," *El Nacional,* 27 Feb. 1963, Biblioteca Lerdo de Tejada, Archivos Económicos, Exp.: H08252 Mujeres Mexico 1960-1962-63.

[16] Luis Gallardo Flores, "Adiestramiento de las mujeres en el campo," *El Nacional,* 11 July 1966, Biblioteca Lerdo de Tejada, Archivos Económicos, Exp.: H08254 Mujeres Mexico 1964-1966.

[17] *Manual Para Campesinos*, Cuaderno 1, pg. 55. Published by the Secretaría de Reforma Agraria (approximate date 1980-1982), AGN, Fondo: Miguel López Portillo, Secretaría de Reforma Agraria, Caja: 2324; Arizpe and Botey, "Mexican Agricultural Development Policy," 71.

[18] José Luis Hernández Sosa, "Establecerán 200 huertas familiares en diferentes lugares de Veracruz, 3 Nov. 1975, Biblioteca Lerdo de Tejada, Archivos Económicos, Exp.: P06445 Huertas 1936-1976.

"represent a great productive potential that has not been properly tapped."[19] Officials envisioned a countryside where women created wealth by transforming unused resources into marketable consumer goods. New technologies like corn grinders and plumbing would help them to get there.

This section has outlined the theories and plans of government officials. In the next section, I use case studies from two Oaxacan communities to examine the real-life consequences of integrated development programing.

Integrated Development in Latuvi and San Bartolomé Quialana

The Papaloapan Commission was at the center of integrated reforms in Latuvi. One of the commission's major undertakings was the introduction of potable water. Villagers worked with commission engineers to build a potable water system that used asbestos and cement tubing to transport water from a natural spring to a collection tank, a distance of almost three and a half miles (5.48 kilometers). From there, another 1,000 meters of tubing made from cement, galvanized iron, and asbestos transported the water to ten public hydrants. According to a Commission report, work on the project began in May 1965 and finished that September.[20] The Commission paid $116,000 pesos of the total $166,000 pesos needed for the project, while the "users" paid the rest. Labor for the project came from villagers.

The asbestos tube system replaced an older network of wooden, open-air canals that transported water from high-elevation springs to collection tanks in the community. This earlier system was problematic for a number of reasons. It provided insufficient

[19] "Tres milliones de mujeres podrían incorporarse a las labores del campo," *El Día,* 15 Nov. 1980, Biblioteca Lerdo de Tejada, Archivos Económicos, Exp.: H08269 Mujeres Mexico 1980.

[20] "Secretaría de Recursos Hidráulicos Comisión del Papaloapan: Oaxaca, Obras de Agua Potable, 1965-1966," AHA, Fondo: CP, Caja: 284, Exp.: 4431.

water to supply a concentrated population of residents.[21] Leaves and other debris clogged the canals and required the work of village officials to clean them.[22]

In the 1980s, the Papaloapan Commission's asbestos tube system was itself replaced by a new system that used hoses and gravity to transport water directly into people's homes. I discussed the advantages of the hoses in the introduction to the dissertation. To review: they were more sanitary (not relying on asbestos), they drew from springs that still had water, and, by locating the point of consumption within the home instead of in public, they transferred the burden of faucet repair from the community to individual families.[23] It is not clear if federal or state agencies had a role in the construction of the hose and gravity system.

Other projects brought funding to rebuild communal infrastructure, including public buildings and roads. In 1958, the municipal leader of Latuvi signed an agreement with the commission to build a new communal assembly hall (*salon de actos*). This is the place where the villagers meet to discuss important news or communal decisions, as well as the site of communal celebrations on Mother's Day, Mexican Independence Day, and Saint Martha's feast day (July 29). According to the agreement, the Papaloapan Commission promised to supply $7,915 pesos towards the overall cost ($27,815) of the building. This would cover basic construction materials, including screws, paint, glass, doors, and windows. The commission also promised to study the climate to determine

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[21] Mario Sebastián Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 26 Apr. 2012.

[22] Mario Sebastián Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 26 Apr. 2012; Carlos Contreras, interview with Joshua Walker, in his home in Santa Marta Latuvi, 3 Mar. 2012.

[23] Conversation with peasant, Santa Marta Latuvi, field notes 5 Oct. 2012; Anonymous former resident of Latuvi, interview by Joshua Walker, at his home in Oaxaca de Juárez, 22 May 2012; Angelita Herrera, interview by Joshua Walker, in her home in Santa Marta Latuvi, 2 May 2012; Conversation with peasants, field Notes 14 Oct. 2012.

the best materials for the job and to provide technical advisors and construction experts to lead the project. Villagers were responsible for transporting the materials from Oaxaca City to the village. This required them to build a road from the nearby village of Cuajimoloyas to Teotitlán del Valle in the Valley of Tlacolula. Villagers were also responsible for gathering all of the "regional" materials needed, such as wood, rocks, and gravel.[24]

It is unclear how closely the terms of this agreement were followed, or when the building was actually completed. The village's resident historian writes that in 1958, "the first steps of constructing the *salon de actos* were realized with the help of the [now] extinct Papaloapan Commission."[25] He also claims that a road from the community to the Valley was completed in 1964, and I assume this was the road that was called for in the contract.[26] The first vehicle had arrived in the community in 1950, but the centrality of this 1964 project in the memory of informants suggests that the project produced the first road that was widely accessible for automobiles.[27] Federal workers and villagers worked together to construct important pieces of communal infrastructure.

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[24] Antonio Barbosa Heldt to José Manuel Herrera, 10 Sep. 1958, AHA, Fondo: CP, Caja: 250, Exp. 3817.

[25] Jaime Wilfredo Cruz Santiago, "Latuvi: Una comunidad con historia" (Unpublished history of Latuvi, 2007) 49.

[26] Ibid., 48.

[27] Jaime Wilfredo Cruz Santiago, "Latuvi: Una comunidad con historia" (Unpublished history of Latuvi, 2007) 33; Catarino Maximiliano Santiago Quero, interview by Joshua Walker, in his home in Arroyo Largo, Latuvi, 7 May 2012; Carlos Contreras, interview with Joshua Walker, in his home in Santa Marta Latuvi, 3 Mar. 2012. It is not clear exactly when the first *carretera* (highway) arrived in Latuvi. Cruz Santiago makes it clear that 1950 was the year when the first road project allowed for a motor vehicle to pass, but he also writes that various additional works took place over the years. Catarino Maximiliano Santiago Quero and Carlos Contreras both emphasize the early 1960s as the time when the highway arrived.

The Papaloapan Commission also helped Latuvi to modernize its school. In 1957, it provided materials for masonry work and roofing.[28] When an earthquake damaged the school in 1974, the Commission (working with the Federal School Building Committee, or CAPFCE) again helped to build new, modern classrooms.[29] Education was an important part of rural reform plans, and Latuvi benefitted from federal support to make sure its classrooms were up-to-date.

Unlike the above-mentioned projects, which were funded in part by the federal and state governments, the arrival of new milling technologies in Latuvi was mostly the result of private investment. Mills arrived to the community in two forms. Around 1960, people began buying hand-powered grinders in Oaxaca City.[30] These operated via crank and were small enough to fit on the end of a bench or a table. The first gasoline-powered grinding mill also arrived sometime around the 1960s, according to calculations I made based on oral interviews.[31] A storeowner from the neighboring community of Lachatao operated the mill in his store for a few hours each day.[32] Women and children carried their *nixtamal* to the mill, waited in line, and had their grinding done by a machine in a

[28] Annuar Abdala Luna to Jose Manuel Herrera LL, 13 Dec. 1957, AHA, Fondo: CP, Caja: 293, Exp.: 4632.

[29] Jaime Wilfredo Cruz Santiago, "Latuvi: Una comunidad con historia" (Unpublished history of Latuvi, 2007) 50.

[30] Vicente García Cruz and María Pérez Ramírez, interview by Joshua Walker, at their home in Llano de Marta, Santa Marta Latuvi, 17 May 2012; Vicente Marcos Hernández, interview by Joshua Walker, at his home in Santa Marta Latuvi, 29 Mar. 2012. Vicente García Cruz told me the date of the arrival of hand grinders. Vicente Marcos Hernández told me that hand grinders came from Oaxaca City.

[31] Ibid. This date is approximate. Vicente Marcos Hernández told me that the gasoline-powered mills came after the hand grinders. Vicente García Cruz told me that the hand grinders arrived in 1960.

[32] Ubalda Ceballos Santiago, interview by Joshua Walker, in her home in Santa Marta Latuvi, 24 Apr. 2012; Cheli, interview by Joshua Walker, in her home in Oaxaca de Juárez, 27 Apr. 2012. Ubalda told me that the mill owner was from Lachatao. Cheli told me that he only ran his mill for a few hours each day.

fraction of the time it took to grind corn on the *metate*.[33] By the mid 1970s, people began buying smaller, personalized mills for their homes that were powered by electricity, which had arrived to the center of the village around 1965.[34] These *molinos familiares,* or "family mills," saved women and children time they would have spent walking to the mill or waiting in line, and it allowed for women to choose when they would grind corn instead of following the schedule of the mill owner.[35]

San Bartolomé Quialana received funding for federal infrastructure assistance at roughly the same time that Latuvi did, a contrast to the chronological disparities for agricultural development I discussed in chapter two. In 1967, the Secretariat of Public Health, working with the state government and villagers, oversaw the building of a potable water network in San Bartolomé (see Figure 3).[36] A large pump, encased in concrete, sucked water from a low-lying streambed and pumped it uphill to a holding tank. From there, more tubing distributed the water to a series of public hydrants scattered throughout the village. The community provided $15,000 pesos towards the construction of this system. This system replaced the old water provisioning technology

[33] Cheli, interview by Joshua Walker, in her home in Oaxaca de Juárez, 27 Apr. 2012. Bauer, "Millers and Grinders," 4-5. *Nixtamal*, as defined by Bauer, is corn that has been washed, soaked in lime solution, and heated. Before grinding, it would be "washed again to remove the pericarp…" (4-5).

[34] Mario Ponciano García, interview by Joshua Walker, at his family's store in Santa Marta Latuvi, 24 Apr. 2012; Vicente García Cruz and María Pérez Ramírez, interview by Joshua Walker, at their home in Llano de Marta, Santa Marta Latuvi, 17 May 2012. Mario Ponciano García estimated the date of the arrival of electrically-powered mills. Vicente García Cruz told me about the arrival of electricity.

[35] Ignacio García Hernández, interview by Joshua Walker, in his home in Santa Marta Latuvi, 14 May 2012; Ubalda Ceballos Santiago, interview by Joshua Walker, in her home in Santa Marta Latuvi, 24 Apr. 2012; Vicente Marcos Hernández, interview by Joshua Walker, at his home in Santa Marta Latuvi, 29 Mar. 2012. Ignacio spoke about saving time by milling at home. Ubalda spoke about being able to choose milling times, and Vicente used the term "family mills" to refer to electrically-powered machines in the home.

[36] *Quinto informe del gobierno del c. Lic. Rodolfo Brena Torres,* 1967, 41-4, AGPEEO; "Probando el sistema de agua potable en Quialana, San Bartolomé Quialana, Tlac. Oax. 1967," Photo#6609, Fundación Bustamante Vasconcelos. Photographer unknown.

in San Bartolomé, which consisted of a series of wells that appear to have been built around 1942.[37] It is not clear why the wells went out of favor.

As I discuss in chapter five, maintenance issues plagued the pump-operated system. For this reason, villagers elected to replace it with a new system that used gravity and hoses to carry water downhill from mountain springs. Documentation from San Bartolomé's archives shows villagers, gathered in assemblies, demanding the switch away from the pump-powered system in May and June of 1992, but I do not know exactly when municipal authorities acted on these orders.[38] In any case, the gravity-powered system was eventually adopted and continues to operate today.

Bridges and roads also made monumental impacts on daily life in San Bartolomé. In 1965, villagers formed a committee called the "Pro-Road Between Tlacolula and San Bartolomé Committee." That year, the group petitioned the National Commission of Village Roads in Mexico City for support in building a road from Tlacolula to San Bartolomé. In the petition, villagers from San Bartolomé offered to pay $340,000 pesos spread out in annual payments of $30,000 pesos until the road was finished.[39] This was approximately two-thirds of the total cost, and the petition asked the National Commission of Village Roads to pick up the remaining one-third. According to an informant from the village, the road was open by the late 1970s.[40]

In 1970, villagers from Tlacolula and San Bartolomé worked together to build a bridge that crossed the Rio Salado, which formed the communities' border. To help pay

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[37] This date comes from an engraving attached to one of the wells.

[38] "Acta de Asemblea," 4 May 1992, San Bartolomé Quialana Archives, Binder: Documentos Antiguos; Assembly minutes, 24 June 1992, San Bartolomé Quialana Archives, Binder: Documentos Antiguos.

[39] Rafael Ortega Velarde to Santiago Martínez Rios, 10 May 1965, San Bartolomé Quialana Archives, Binder: Documentos Antiguos. Petition appears as an attachment to the letter.

[40] Anonymous peasant #26, interview by Joshua Walker, in *la casa de cultura,* San Bartolomé Quialana, 1 June 2012.

for the labor, officials from San Bartolomé's Pro-Construction of a Bridge over the Rio Salado Committee delivered installments $1,718 pesos and $1,282 pesos to Tlacolula's municipal president in 1969.[41] I cannot be sure if the federal and state governments contributed to these efforts, but photographic evidence confirms that Oaxacan governor Victor Bravo Ahuja was on hand to take credit when it opened in 1970 (Figure 4).[42] The opening of the bridge meant that the people of San Bartolomé no longer had to wade in water in order to visit the nearest market center.[43]

Just like in Latuvi, early public mills in San Bartolomé used gasoline or diesel and were owned by individuals who offered grinding services to the public.[44] Someone from out of town owned at least one mill, and the father of one of my informants established another in 1960.[45] When electricity became available around 1970, more people bought electrically-powered mills, and mills spread to multiple locations throughout the community.[46]

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[41] Rosalino Hernández Hernández to El Presidente Municipal y Comité Pro-Construcción del Puente del Rio Salado, 28 Nov. 1969 San Bartolomé Quialana Archives, Binder: Documentos Antiguos; Ausencio León Ruiz, "Asunto: Recibo Bueno Por 1282.00," 31 Dic. 1969, San Bartolomé Quialana Archives, Binder: Documentos Antiguos.

[42] Inauguración puente de Tlacolula-Quialana, Tlacolula de Matamoros, Tlac. Oax. 1970, Photo #8202, Fundación Bustamante Vasconcelos, Photographer unknown.

[43] "Inauguración puente de Tlacolula-Quialana, Tlacolula de Matamoros, Tlac. Oax. 1970," Photo #8202, Fundación Bustamante Vasconcelos; Anonymous peasant #26, interview by Joshua Walker, in his home in San Bartolomé Quialana, 19 July 2012; Conversation with peasant, field notes May 31, 2012.

[44] Anonymous peasant #26, interview by Joshua Walker, at his home in San Bartolomé Quialana, 19 July 2012. This interviewer mentioned diesel as a power source for an early mill.

[45] Conversation with peasant, Field notes Oct. 19 2012; Lázaro Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 4 June, 2012.

[46] Silvestre Mecinas Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 20 July 2012. Lázaro Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 4 June, 2012. Cabildo minutes, 30 Sept. 1970, San Bartolomé Quialana Archives, Binder: Documentos Antiguos. Mecinas Martínez mentioned mills moving all over the village. Pérez Sánchez mentioned people buying their own electric mills. It is not clear exactly when electricity arrived to the village. However, the *cabildo* minutes referenced here detail the arrival of electricity to the local church in 1970. The church committee invited members of the municipal government to inspect the fixtures, and they invited the municipal president to turn the lights on in the church. This suggests that electric lighting was still novel in 1970, so if this was not the first appearance of electricity, the actual date could not have been much earlier.

Public health centers, CONASUPO stores, and home gardens were additional, important sites for integrated development programming in communities around Mexico, although I do not discuss them extensively here.[47] In the 1980s, public health centers became available in both villages I studied. A hospital opened in Tlacolula in 1980, a clinic opened in Latuvi around 1985, and a clinic opened in San Bartolomé around 1996.[48] Marta Santiago Cruz told me that the health center in Latuvi was helpful because she could get the vaccines she needed for her children without making a long trip to the next-closest clinic in Ixtlán de Juárez.[49] In San Bartolomé, an anonymous interviewee suggested that people stopped using local midwives when doctors became more available in the 1980s.[50] Stephanie L. Baker, Nicole Sanders, and Anne Emmanuel Birn have studied the impact of rural health campaigns and their associated technologies, including vaccines and latrines, in great detail. For this reason, I chose to focus my analysis on programs and technologies that have received less scholarly attention.[51]

CONASUPO stores were government-owned stores that sold basic necessities like corn, sugar, beans, rice, toothbrushes, clothes, and toilet paper to villagers at government-mandated prices. These prices were often below what peasants would pay on the open market.[52] CONASUPO also purchased corn and wheat from farmers at

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[47] CONASUPO stands for Compañía Nacional de Subsistencias Populares (The National Food Company).

[48] Marta Santiago Cruz, interview by Joshua Walker, in her home in Santa Marta Latuvi, 1 Mar. 2012; Anonymous man #26, interview by Joshua Walker, in his home in San Bartolomé Quialana, 19 July 2014.

[49] Marta Santiago Cruz, interview by Joshua Walker, in her home in Santa Marta Latuvi, 1 Mar. 2012.

[50] Anonymous man #26, interview by Joshua Walker, in his home in San Bartolomé Quialana, 19 July 2014.

[51] Baker, "*Salud Colectiva*,"; Sanders, "Gender, Welfare and the 'Mexican Miracle,'"; Birn, *Marriage of Convenience.*

[52] Semehí Ramírez García, interview by Joshua Walker, in the ecotourism office in Santa Marta Latuvi, 1 Mar. 2012.

prices above those on the open market.[53] There is some evidence that CONASUPO stores also offered technologies like fertilizers and seeds.[54] These products arrived to stores in rural villages in the back of trucks.[55]

CONASUPO stores opened in both communities I studied, although I do not know exactly when. Villagers in both places told me that they frequented CONASUPO stores when times were tough and local corn was scarce.[56] When times were good, however, people preferred to buy local corn that was a bit more expensive rather than pay for the imported corn that CONASUPO sold.[57] I found no evidence that my informants used CONASUPO to purchase seeds or fertilizers.

Finally, we know from the sources I discussed above that officials were convinced that family gardens and outdoor spaces near the home (*patios)* could become hotbeds of female economic production. Women could grow fruits and vegetables in family gardens while raising small animals nearby.[58] I found meager evidence regarding the impact of family garden programs in the communities I studied. In 1985, female *promotoras* from an agency called the National System for Integral Family Development (DIF) visited San Bartolomé and reported plans to promote gardens.[59] In Latuvi, Ignacio

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[53] Frischmann, "*Misiones Culturales,*" 291.

[54] Ochoa, *Feeding* Mexico, 185, Frishchmann, "*Misiones Culturales,*" 291.

[55] Semehí Ramírez García, interview by Joshua Walker, in the ecotourism office in Santa Marta Latuvi, 1 Mar. 2012.

[56] Amador Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 21 Apr. 2012.

[57] Beals, *The Peasant Marketing System,* 57; Mario Ponciano García, interview by Joshua Walker, at his family's store in Santa Marta Latuvi, 6 May 2012; Amador Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 21 Apr. 2012. Beals claims that people were willing to pay more than the government-mandated minimum price in order to avoid hybrid corn.

[58] For more discussion of this topic, see Clawson and Hoy, "Nealtican," 383. Sanders briefly mentions gardens as part of public health campaigns. Sanders, "Gender, Welfare, and the 'Mexican Miracle,'" 189-90.

[59] Rosalba Juana Santiago and Elia Cumplido Muños, "Informe Narrativo Correspondiente al Mes de Marzo de 1985," nd., San Bartolomé Quialana Archives, Binder: Documentos Antiguos; Dillingham, "*Indigenismo* and its Discontents," 13, 29. Following Dillingham, I define "promoter" as "Bilingual

García Hernández told me that teachers working through a program called *Misiones Culturales* came to the village in the first half of the 1990s and taught villagers to plant carrots, tomatoes, garlic, and onions. Ignacio said that most of these crops, with the exception of tomatoes, grew too slowly to interest villagers.[60] Another woman from Latuvi told me home that gardening in the village declined over time.[61] More research is ultimately needed to examine the consequences of family garden programs in Oaxaca.

Figure 3
Original Caption: Probando el sistema de agua potable en Quialana, San Bartolomé Quialana, Tlac. Oax. 1967.
Author's Caption: Testing a public water hydrant in San Bartolomé Quialana, 1967.

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ambassador of indigenous origin who encouraged other indigenous peasants to adopt government-approved modernization techniques."

[60] Ignacio García Hernández, interview by Joshua Walker, in his home in Santa Marta Latuvi, 14 May 2012.

[61] Conversation with peasant, Santa Marta Latuvi, field notes 10 May 2012.

Figure 4
Original Caption: Inaugeración puente Tlacolula-Quialana, Tlacolula de Matamoros, Tlac. Oax. 1970.
Author's Caption: Oaxaca Governor Victor Bravo Ahuja prepares to cut the ribbon opening a bridge between San Bartolomé Quialana and neighboring Tlacolula, 1970.

The Reformulation of Communal Space

In the next two sections of the chapter, I focus on some of the impacts that infrastructure improvement and "integrated development" schemes had in Latuvi, San Bartolomé, and villages whose documentation I uncovered in archives. I show that new tools and improvements to infrastructure led peasants to question the ways they conceived of communal spaces. They were also partially responsible for new changes in ideas about gender. For the sake of brevity, I focus my analysis mostly on three technologies: faucets, *molinos de nixtamal* (powered by electricity), and roads. Along with chemical fertilizers, home building materials, and shoes, the latter of which I discuss in chapter nine, these were the technologies that peasants emphasized when I asked them if the village had changed over the years.

The impact of the first potable water systems, electrical grids, and roads on the reformulation of communal space was most readily visible in Latuvi. Prior to the 1960s,

villagers lived in small groups of *ranchos* (farms) located in valleys near natural sources of water. Commonly referred to as Latuvi's *sectores* today, these places had unique names like "Cara de León," "San Lucas," and "Santa Marta." Each group of *ranchos* was separated by steep mountainsides and connected by narrow footpaths. In many ways, each was its own community, and some were counted separately from Latuvi in the general censuses of 1940 and 1950.[62] Latuvi, a cluster of *ranchos* located on a relatively level plateau, was just one neighborhood out of many.[63]

Around 1928, villagers agreed that Latuvi, as opposed to the other neighborhoods, would be home of the new federal school. Latuvi was roughly equidistant from the other groups of *ranchos*, meaning that most children would have to walk the same distance to school each day.[64] The village's government, officially recognized on December 31, 1935, was also located in Latuvi.[65] Because there were not ready sources of fresh water nearby, villagers built wooden canals to transport water downhill from springs to the school. Still, this early water delivery system could not supply enough water to support a concentrated population.[66] Until the 1960s, then, most families continue living on their

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[62] *Sexto censo de población, 1940: Oaxaca,* Secretaría de Economía, Dirección General de Estadistica, 1948, 606; *Septimo censo de población, 6 de Junio de 1950: Oaxaca,* Secretaría de Economía, Dirección General de Estadistica, 1953, 790; *Octavo Censo General de Población, 8 Junio de 1960: Oaxaca,* Vol. 1, Secretaría de Industria y Comercio, Dirección General de Estadistica, 1963, 49; Anonymous former resident of Latuvi, interview by Joshua Walker, at his home in Oaxaca de Juárez, 22 May 2012. By 1960, none of Latuvi's current *sectores* were counted separately in the census.

[63] In 2012, important groups of ranchos included: Cara de León, Llano de Marta, San Lucas, El Manantial, Arroyo Largo, Puente de Ocotal, and La Sepultura. These are known as *sectores* (sectors) of Latuvi.

[64] Mario Sebastián Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 26 Apr. 2012; Jaime Wilfredo Cruz Santiago, "Latuvi: Una comunidad con historia" (Unpublished history of Latuvi, 2007) 47. Sebastián Contreras said that 1927 was the year the school started. Jaime Wilfredo Cruz Santiago claims that it was 1928.

[65] Mario Sebastián Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 26 Apr. 2012; Sebastián Contreras discussed the location of the village government in Latuvi.

[66] Mario Sebastián Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 26 Apr. 2012; Anonymous former resident of Latuvi, interview by Joshua Walker, at his home in Oaxaca de Juárez, 22 May 2012.

ranchos, and they walked to Latuvi to visit the school or to take part in communal politics.[67]

The introduction of potable water, electricity, and improved roads to Latuvi drastically changed the community's physical layout. To take advantage of these technologies, families moved from their *ranchos* near the rivers to what is today the center of the village. Carlos Contreras, age eighty-three, explained this transition:

> We don't have water problems now. What we had before was a real pain. That was why we preferred to live on the *ranchos* (farms), where there was water, and not here in the center because it lacked water. The people who lived here, seven or eight houses, there were wells[…]they went there to get their water, carrying it in jugs[…]. And now, when the water came, it began to urbanize, but there are still people who live on the farms.[68]

Vicente Marcos and Mario Ponciano García stressed that electricity and roads also contributed to drawing people towards a unified town center.[69]

This transition was neither total nor spontaneous, as the quote from Carlos Contreras suggests. Some families maintained (and continue to maintain) *ranchos* far from the village center. Others use their homes in the center of the village during communal celebrations or other events that require them to visit the school, church, or government building, but they spend most of their time in the old *sectores* near the rivers.[70] But the high density of occupied housing in Latuvi suggests that many families moved permanently. Water faucets, electrical lines, and roads helped to convert Latuvi

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[67] Mario Sebastián Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 26 Apr. 2012.

[68] Carlos Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 3 Mar. 2012.

[69] Vicente Marcos Hernández, interview by Joshua Walker, at his home in Santa Marta Latuvi, 29 Mar. 2012; Mario Ponciano García, interview by Joshua Walker, at his family's store in Santa Marta Latuvi, 24 Apr. 2012.

[70] Mario Sebastián Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 26 Apr. 2012.

from a loose confederation of distant neighborhoods into the geographically-centered community it is today.

The introduction of potable water and roads also changed the way that people in Latuvi built homes. In the past, homes in Latuvi were built from wood. When asbestos tubes began delivering large amounts of water to the center of the village, building with adobe became a new option. Ubalda Ceballos Santiago told me, "…when there was tubing [for water], that was when they made a lot of adobe houses." I asked her why this was, and she said, "Because now there was water to make the adobe. They gathered a big pile of dirt, threw water on it, and pounded it, pounded it like cornmeal, and that's how they got adobe."[71] Of course, there had always been water for people who lived in the original neighborhoods near rivers and streams, and I suspect that adobe homes have a longer history in these places. I spoke with a family who lives in a neighborhood located downhill from Latuvi whose adobe home dated to 1935.[72] Another innovation in home building materials, sheet metal roofing *(lámina)*, arrived in 1975.[73] I assume that this and other new building materials, like concrete, cinder block, and rebar, arrived in the back of pickup trucks, but more research is needed to confirm this. In sum, faucets and potable water networks extended the availability of adobe uphill, towards the new, "urban" center, while roads and trucks helped to introduce sheet metal and concrete.

Villagers in San Bartolomé Quialana confronted different geographical and spatial issues. New water networks, roads, and electrical lines arrived to the center of town, where the largest population of people already lived. As populations grew, new

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[71] Ubalda Ceballos Santiago, interview by Joshua Walker, in her home in Santa Marta Latuvi, 24 Apr. 2012.

[72] Conversation with peasant, field notes 14 May 2012.

[73] Ignacio García Hernández, interview by Joshua Walker, in his home in Santa Marta Latuvi, 14 May 2012.

homes sprung up on streets and in neighborhoods far from the center. Residents of these streets and neighborhoods advocated expanding the technological infrastructure, and village leaders had to decide when and how to fulfill these requests. In contrast to Latuvi, people began to think about the expansion of the community and its utilities from the center outward.

Documentation supports the idea that the village outgrew its first water system, and that some parts of the village were left out of reach of the network. In 1971, a man named Francisco Sánchez Gómez, backed by the Rural Board for Administering, Operating, and Maintaining Potable Water in San Bartolomé Quialana, petitioned the local government. The petitioners claimed to lack the funding necessary to extend the village's potable water network two hundred feet down Matamoros Street. In an assembly meeting, gathered community members, the municipal president, the Rural Board, and Sánchez Gómez agreed to a deal. The municipal authority would pay $100 pesos to help the project, Sánchez Gómez would also pay $100 pesos, and the Rural Board would pay $500 pesos.[74] Similar problems arose in 1990, when village leaders petitioned Oaxaca's governor for the prefabricated materials they needed to provide water service to residents of a distant neighborhood.[75] Villagers wanted access to potable water, and getting it for certain streets and neighborhoods required a mixture of political activism and fundraising.

Disparities in development funding and government-facilitated access to new technologies extended all the way down to the level of neighborhoods and streets.

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[74] Assembly minutes, 20 June 1971, San Bartolomé Quialana Archives, Binder: Documentos Antiguos.

[75] Pablo Hernández Hernández to Heladio Ramírez López, 26 Feb. 1990, San Bartolomé Quialana Archives, Binder: Documentos Antiguos.

Census data reveals that only 24.5% of households in San Bartolomé had access to potable water in 1970, while 14.6% had electricity. In 1980, these numbers were 21% and 47.10%, respectively. For Santa Catarina Lachatao, Latuvi's head town, 54% of households had water in 1970, while 24% had electricity. These numbers increased to 60% and 53.1% by 1980.[76] This data confirms what the above-cited petitions from San Bartolomé suggest: some villagers enjoyed access to utilities before others.

Other communities found themselves in similar circumstances. In 1969, the Pro-Introduction of Potable Water Committee in the village of San Sebastian Frontera wrote to President Gustavo Díaz Ordaz. The committee stated that only forty percent of the people in their community had access to potable water.[77] In 1966, petitioners from Barrio Lieza in the city of Tehuantepec asked the President for potable water for "the neighborhood where they live."[78] These examples suggest that when technologies arrived to some neighborhoods or street corners before others, villagers had no choice but to advocate on behalf of their community within a community. Anthropologist Oscar Lewis, as quoted by Wendy Waters, observed that roads undermined the "'localism'" of the neighborhoods in Tepoztlán, Morelos.[79] This may be so, but my evidence suggests that unequal access to other technologies reinforced identities tied to streets and *barrios*.

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[76] *IX Censo General de Población X 1970 28 de Enero: Estado de Oaxaca,* vol. 2, 1971: 556, 572, 592, 602; *Censo General de Población y Vivienda, 1980: Estado de Oaxaca*, Instituto Nacional de Estadistica Geografia e Informatica, Vol 1, Tercera Parte, 1984: 1898, 1968.

[77] Comite Pro-Introducción de Agua Potable del Pueblo de San Sebastián Frontera Municipio de Santiago Chazumba to Gustavo Díaz Ordaz, 4 July 1969, AHSSA, Fondo: SSA, Sección: Spr, Caja: 131, Exp.: 4.

[78] Julio Flores Rodríguez to President of Mexico, 3 Sept. 1965, Extract summarized by the Secretaría Particular of the President, 4 Apr. 1966, AGN, Fondo: Gustavo Díaz Ordaz, Box: 68, Exp.:727.2/4 ABCCHDEF.

[79] Waters, "Remapping Identities," 238.

Gender and Space

When villagers rebuilt the physical spaces of their communities, they began to notice new people moving through these spaces. Unaccompanied women expanded their presence in public spaces as they frequented hydrants and *molinos*. In addition to drawing women into public spaces, these technologies saved women time and allowed them to participate in activities that were previously reserved for males. New thinking about space and time coincided with challenges to traditions regarding gender and work.

In the past, it was less common to see unaccompanied women working in public than it is today. Men feared for the safety and chastity of daughters and wives, and they expected women to be occupied with housework and pasturing animals. Women's weekly forays to the marketplace were often accompanied by a man.[80] Mary Kay Vaughan argues that rape and kidnappings of young women in Tecamachalco, Puebla in the 1930s "reinforced customs of female seclusion and provided an excuse for keeping girls out of the coeducational federal schools."[81] Regarding Latuvi, Cheli told me that women in the past often did not attend fiestas and school programs because they were "dedicated to the home."[82] All of these examples suggest that rural women's mobility and freedom to operate in public were once strictly limited.

New technologies helped to create public spaces where females were welcome. The line outside the grinding mill was one such space. As Maria da Glória Marroni Velázquez describes it, "Going to the mill became not only a daily task, but a new form

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[80] Conversation with family from San Bartolomé Quialana, field notes 23 Aug. 2012. This family told me that women in the past went to the market only with their husbands. One woman in the family said that women were not allowed to go alone because their husbands would be jealous, presumably of the men that spoke to their unaccompanied wives at the market.

[81] Vaughan, "Literacy and Education," 113.

[82] Cheli, interview by Joshua Walker, in her home in Oaxaca de Juárez, 27 Apr. 2012.

of sociability," a "collective activity."[83] Oral interviews confirmed this by referencing the large numbers of people that one could see at the mills. In Latuvi, Marta Santiago Cruz told me that *todos los del pueblo* (everyone from the village) went there.[84] Cheli told me that you had to wait in line and get there early, implying that there were a lot of women and/or children gathered at the mill on any given day.[85] One woman from Latuvi told me that she refused to use public mills because she did not like walking a long distance to get there and she did not like waiting in line when she arrived.[86] In San Bartolomé Quialana, Silvestre Mecinas Martínez talked to me about frustrations caused by crowded mills:

> **Silvestre Mecina Martínez:** …in 1970 or 1972, when the mill arrived here. A man from Tlacolula came to rent a house here, to set up his mill. *Hijole.* There are some that [said]: "why are you carrying your cornmeal?" "In a minute, I'm going to grind it there and for cheap." Because a lot of people [went]…the one who [went] early grinds, but the one that [went] late, now there is a clusterfuck of people. You leave at nine, ten. "No. Why am I going to go there? Better here [at home]. I'll just take a bit and grind it myself." But now that there are various [mills], one here, one here, one there, one there. One time they go here, the next there…It is not like before, when they suffered a lot. Yes, one suffered a lot before.[87]

These examples all speak to a time in the past when groups of women waited in line together at mills. Mills became spaces of sociability and spaces where it was acceptable for women to be in public unaccompanied by their husbands.

I suspect that related changes occurred in the case of water faucets, at least in the case of Latuvi. Women who had once traveled to streams, creeks, and springs near their ranchos instead got water from wooden canals and hydrants in the center of the

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[83] Marroni Velázquez, "Changes in Rural Society and Domestic Labor," 221.

[84] Marta Santiago Cruz, interview by Joshua Walker, in her home in Santa Marta Latuvi, 1 Mar. 2012. Translation by Joshua Walker.

[85] Cheli, interview by Joshua Walker, in her home in Oaxaca de Juárez, 27 Apr. 2012.

[86] Conversation with peasant, Santa Marta Latuvi, field notes 11 Mar. 2012.

[87] Silvestre Mecinas Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 20 July 2012. Translation by Joshua Walker.

community.[88] María Pérez Ramírez told me about walking with an old woman ("*una abuelita*") to fetch water on the night of a community dance. María would take two turns on the dance floor while the woman filled her water jugs. I believe that María was talking about Latuvi's older system of wooden canals, but the point is the same: having water in public spaces gave women an excuse to get out of the house and interact with others.

The story regarding water and women in public was different in San Bartolomé. Women there also used rivers, streams, and springs for water, but in contrast to Latuvi, everyone in the village used the same few watering holes. Lázaro Pérez Sánchez told me that large groups of women used to bath together at a spot near a natural spring before the introduction of potable water for the home.[89] This suggests that rivers, streams, and springs were places of sociability and interaction long before public hydrants arrived. Women also had earlier experience working in public spaces near the center of town thanks to a group of wells built in the 1940s.[90] It is quite possible, then, that as hydrants arrived and the places where one could find potable water multiplied and moved closer to home, time spent in public doing water-based chores actually decreased.

New Options for Earning Cash

As the previous examples suggest, machines like *molinos de nixtamal* (mechanical corn grinders), water faucets, and automobiles also changed calculations

[88] Carlos Contreras told me that there were some wells in Latuvi that provisioned the few people who lived in the center of the community before the 1960s. While these would require women to go out in public, I think my point is still valid in that there were fewer houses that actually used the wells.

[89] Lázaro Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 4 June, 2012.

[90] Anonymous man #26, interview by Joshua Walker, in his home in San Bartolomé Quialana, 19 July 2014. The 1940s date is based on the inscription carved on one well. It is possible that others were drilled at different times. These wells were pointed out to me in the above-cited interview.

regarding gender and work. Below, I show that they gave women more time to do other domestic chores and more time to work in field and market.

Most of my informants remember women's work in the past being dominated by domestic chores and caring for animals. Cheli, a forty-one year old woman, elaborated on this idea:

> **Cheli:** …Before, women were only for the home.
> **Joshua Walker:** For the home.
> **Cheli:** Go to give food to the husband [in the fields], make tortillas, wash clothes, be in the house, go see the animals.[91]

Mario Ponciano, age seventy-three and from Latuvi, told me that his mother mostly did housework, including making tortillas.[92] In San Bartolomé, an anonymous sixty-five year old male told me that his mother's time was occupied mostly with making tortillas and, once that was finished, taking animals to pasture.[93] Making tortillas, cleaning, and caring for animals and children consumed much of the peasant woman's waking hours in the days before the arrival of mechanical grinders, water faucets, and washing machines.

Under this labor regime, women spent little time working in agriculture compared to males. They helped on the farm, but only after they had spent hours grinding corn and making tortillas for their husbands' lunches. Ofelia Quero Santiago, age seventy-six and from Latuvi, told me that farming was not a regular part of her duties as a married woman:

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[91] Cheli, interview by Joshua Walker, in her home, 27 Apr. 2012. Translation by Joshua Walker.

[92] Mario Ponciano García, interview by Joshua Walker, at his family's store in Santa Marta Latuvi, 24 Apr. 2012.

[93] Anonymous peasant #30, interview by Joshua Walker, in his home in San Bartolomé Quialana, 10 Aug. 2012;

> **Ofelia Quero Santiago:** …some women nowadays, too, go with the men, with their *coas*. And before, we did not work. When I was raising children, I did not go [to the fields] to drop off food, I did not go to shepherd [the animals]. I went to shepherd [the animals], but when I was a widow. Then I went to care [for the animals]. But when I lived with the children's father, I did not go to the field, rather, my work was here, inside.[94]

A seventy-five year old man from San Bartolomé told me that women's time in the fields was mostly about bringing food and drink for the men: "When they finish making the food, and some soup, then they go to the fields, with some jars in hand, they bring the food for lunch to the fields."[95] Women's primary job was to feed their husbands and sons, and they helped with farming only after they completed this task each day.

Time-saving devices gave women more time to finish other chores and to work alongside their husbands in the fields. I asked Catarino Maximiliano Santiago Quero what women could do with the time saved by using corn grinders, and he told me, "Well, other work, other chores. It's like we would say: 'A woman's work is never finished.' One thing after the other, wash clothes, then let's see, another little job."[96] Porfiria Cruz García told me she bought a grinder for her home so that she could spend more time washing, going to the field, caring for the donkey, caring for the pig, and feeding the chickens.[97] Marta Santiago Cruz emphasized that using mills in the home allows women to spend more time in the fields helping their husbands to farm. I had asked if this were the case, and she told me, "Yes, to go out, you make tortillas really early and then you

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[94] Ofelia Quero Santiago, interview by Joshua Walker, in her home in Santa Marta Latuvi, 29 Mar. 2012. Translation by Joshua Walker.

[95] Anonymous peasant #26, interview by Joshua Walker, in front of the municipal building in San Bartolomé Quialana, 1 June 2012.

[96] Catarino Maximiliano Santiago Quero, interview by Joshua Walker, in his home in Arroyo Largo, Latuvi, 7 May 2012. Translation by Joshua Walker.

[97] Porfiria Cruz García, interview by Joshua Walker, in her home in Santa Marta Latuvi, 29 Mar. 2012.

can go with the men to help them in the fields."[98] Rosa Ochoa, age fifty-five from Santa Marta Latuvi, told me that *molinos* allowed women to make enough tortillas at one time to last two days. They could then devote their "free" day to agriculture or other activities, like washing or sewing clothes.[99] These examples show that women used time-saving devices to accomplish a higher-volume of traditionally "female" chores while also devoting more time to farming, a job that was traditionally "male."

Other women used new technologies to start new businesses. In 1970, a miller from San Antonino named Alfonso Santiago told anthropologist Carole Judith Turkenik that some women brought ten kilos of corn to his grinding mill, an amount he called *bastantito* ("huge!"). They wanted enough cornmeal to allow them to make and sell tortillas or feed their pigs.[100] Porfiria Cruz García told me that owning her own mill allowed her to grind corn every other day (instead of every single day), and she spent the extra day baking bread for sale. Proceeds from the bread sales paid for soft drinks, candies, and fruits in Oaxaca City, goods that she transported to Latuvi using her uncle's truck and sold for a profit in her store.[101] Ubalda Ceballos Santiago invested the time she saved using grinders and home water faucets towards caring for her fruit trees, a significant source of income.[102] Ubalda also told me that she purchased eight transport trucks between 1979 and 2012. She used the trucks to travel to Oaxaca City selling food that she purchased from farmers in the village. In the city, she bought goods that she sold

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[98] Marta Santiago Cruz, interview by Joshua Walker, in her home in Santa Marta Latuvi, 1 Mar. 2012. Translation by Joshua Walker.

[99] Rosa Ochoa, interview by Joshua Walker, in her home in Santa Marta Latuvi, 15 May 2012. Translation by Joshua Walker.

[100] Carole Judith Turkenik's field notes, 6 Oct. 1970, GN 2059-2067.

[101] Porfiria Cruz García, interview by Joshua Walker, in her home in Santa Marta Latuvi, 29 Mar. 2012.

[102] Ubalda Ceballos Santiago, interview by Joshua Walker, in her home in Santa Marta Latuvi, 24 Apr. 2012.

in her general store in Latuvi. Women used new technologies to start business ventures like these.

Women also became more involved in long-range trading. They had always been involved in marketplace trading close to home. Work as a *regatona* (small-scale retailer) was considered a normal extension of females' domestic duties.[103] However, in San Bartolomé Quialana, men controlled this labor, accompanying their wives in public spaces in order to protect them from other men.[104]

With the arrival of roads and trucks, however, women began traveling longer distances unaccompanied by men. Ronald Waterbury told me that before the arrival of roads and time-saving devices like corn grinders, women from San Antonino would only trade in the nearby market at Ocotlán. Now, they travel all over the valley of Oaxaca.[105] In 1965, anthropologist Martin Diskin interviewed a female merchant who used a truck to sell fruit in various villages throughout the state of Oaxaca.[106] Noel García Aguilar told me that the women of San Bartolomé Quialana responded to growing population pressure by working as vendors who buy vegetables in bulk at the market in Oaxaca and resell them at a markup in Tlacolula. Cheap transportation provided by buses and group taxis (*collectivos*) makes this business possible.[107] While I believe the change in San Bartolomé to be more recent (within the last fifteen years), it still proves a broad point:

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[103] For definitions of *regatona* and *comerciante,* see Waterbury and Turkenki, "Marketplace Traders," 212. For gendered division of labor between these two, see pages 222-3.

[104] Conversation with family from San Bartolomé Quialana, field notes 23 Aug. 2012.

[105] Conversation with Ronald Waterbury, field notes 27 Sept. 2012.

[106] MD Truck Vendors, Tlacolula, July 4, 1965, Box 64, Folder: Beals—Oaxaca Project—Truckers, Ralph Beals Papers, National Anthropological Archives, Smithsonian Institution.

[107] Noel García Aguilar, interview by Joshua Walker, at his home in Tlacolula de Matamoros, 22 Aug. 2012; Conversation with family from San Bartolomé Quialana, field notes 23 Aug. 2012. The exact timeline of this change to long-distance trading and *comerciante* work in San Bartolomé is not clear. The informal interview that I conducted with a family in San Bartolomé (cited above) suggested that it is something that has taken place in the last fifteen years.

Women used roads to work outside of the community. The general idea that women took advantage of new opportunities and new technologies that allowed them to work and travel outside the home is consistent with the findings of Oscar Lewis and various secondary sources.[108]

Gendered expectations for men's work also changed. Men became more involved in the production of tortillas. In the past, men would have been ashamed to take part in any aspect of tortilla production other than farming. But as Dawn Keremitsis shows, the arrival of grinding machines and the opportunities for work and profit that they offered made men more interested than ever in grinding. Keremitsis argues that the mechanical production of tortillas transformed housework into wage labor and inspired men to "invade a traditionally female territory."[109] This was true in the villages I studied. The first public mills in both places were owned and operated by men.

Evidence also suggests that young men were more likely to help their mothers to grind corn when hand-powered or electric mills came to the home. I asked Vicente Marcos Hernández, aged fifty from Latuvi, about the changes brought about by his mother's hand-powered mill. He told me that he and his siblings helped their mother to grind corn so that she would not get tired.[110] He said he was still doing this at age fifteen. Grinding corn would have been an unthinkable behavior for a young man where only *metates* were involved, but adding a machine changed the gendered expectations

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[108] Lewis, *Life in a Mexican Village,* 323; Bauer,"Millers and Grinders," 17; Waters, "Remapping Identities," 237; Keremitsis, "Del metate al molino," 286-7; Friedlander, *Doña Zeferina Barreto,* 136-7; Mummert, "From *Metate* to *Despate*," 196; Fowler-Salamini and Vaughan, "Introduction," xviii; Vaughan, "Rural Women's Liteacy," 116-7; Gónzalez Montes, "Intergenerational and Gender Relations," 179.

[109] Keremitsis, "Del metate al molino," 285-6, 302.

[110] Vicente Marcos Hernández, interview by Joshua Walker, at his home in Santa Marta Latuvi, 29 Mar. 2012.

surrounding this work.[111] Porfiria Cruz García, also from Latuvi, relayed similar information about her family's electric mill. She told me, "…my children really loved grinding corn, because it was exciting, unbelievable, that we had a mill now. And [they said] 'I'm going to grind your corn, because I like that the mill does it.'"[112] I cannot be sure which of her children actually operated the machine, since Porfiria used a pronoun, *hijos*, which could refer to a group of men or a mixed group containing men and women. But we know that men operated the public mills in Latuvi, in San Bartolomé, and in other parts of Mexico, so I suspect that Porfiria's sons would not have been ashamed to do this in their home.[113] This story, coupled with that of Vicente Marcos Hernández, suggests that the advent of machine grinders transformed corn grinding from pure drudgery reserved only for women to a more gender-neutral endeavor.

Married Women, Resistant Men

Of course, changes in gendered work regimes did not always go down as smoothly as Marcos Hernádez's story suggests. Many men saw women using new technologies as a threat. Oscar Lewis (referencing Robert Redfield) told of a mill that failed in Tepoztlán, Morelos in the 1920s, in part because of men's fears that their women would have free time.[114] But in the end, the men who resisted mills lost, both in Tepotzlán and in the rest of Mexico. Women insisted on having access to them.[115] I also imagine that men became more amenable to mills when they realized that they could make money owning, operating, and repairing them.

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[111] Bauer, "Millers and Grinders," 10.

[112] Porfiria Cruz García, interview by Joshua Walker, in her home in Santa Marta Latuvi, 29 March 2012.

[113] Anonymous man #26, interview by Joshua Walker, in his home in San Bartolomé Quialana, 19 July 2014; Cheli, interview by Joshua Walker, in her home in Oaxaca de Juárez, 27 Apr. 2012; Keremitsis, "Del metate al molino," 285-6, 302.

[114] Lewis, *Life in a Mexican Village*, 108.

[115] Lewis, *Life in a Mexican Village,* 108; Olcott, *Postrevolutionary Women*, 22.

The battle over women's mobility and travel, however, appears to have been a more protracted one. Lewis explains that married men fought against their wives traveling:

> An increasing number of more ambitious married women are now raising animals or growing fruit on a larger scale or are devoting more time to selling the family produce at the Tepoztlán and Cuernavaca markets. However, husbands tend to balk at the latter activity and do not easily give their wives permission to go to Cuernavaca, despite the fact that the extra earnings would be welcome. This type of work has, in the past, been carried on exclusively by widows or older unmarried women who had "no man to control them."[116]

This suggests that single, divorced, widowed, or abandoned women were those most likely to use roads and trucks to open stores or travel long distances. This idea is also supported by secondary literature. Numerous studies in the edited volume *Women of the Mexican Countryside* show single women using new technologies (usually roads and automobiles) to gain mobility and independence.[117]

I observed similar trends in present-day (2012) patterns of political participation. In San Bartolomé Quialana, more time in public and more assertions of rights for women coincided with new responsibilities and rights to participate in local government. In the mid-2000s, women began voting in communal assemblies, and they also became eligible to serve *cargos*, administrative positions in the town government. In 2010, 2011, and 2012, a female town secretary and a female *Regidora de Salud Pública* (Councilwoman in Charge of Public Health) helped me to find interview subjects and archival sources in the community. Prior to the mid-2000s, women were neither required nor allowed to serve in these positions.[118]

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[116] Ibid., 323.

[117] Friedlander, "Doña Zeferina," 130, 136-7; Vaughan, "Rural Women's Literacy and Education," 116-7; Mummert, "From *Metate* to *Despate,* 196-200; Arias, "Three Microhistories," 170-1.

[118] Conversation with resident of San Bartolomé Quialana, field notes 13 July 2010.

Latuvi is more conservative when it comes to women's participation in politics. Women participate in mandatory community service (*tequios*) and serve *cargos*. However, they only do these things when a male household member is absent or when the task at hand is clearly gendered female, such as cooking food and washing dishes at community festivals or emptying public garbage cans.[119] Rosa Ochoa told me that women used to be able to voice their opinions at the communal assemblies of the Pueblos Mancomunados, but they were silenced and driven away from attending by men.[120] Cheli told me that the only women who attend and vote at the communal assembly are single women—widows and adult women not yet married, as well as women whose husbands are away. However, even these women do not have a voice in the proceedings.[121]

Latuvi's conservatism when compared to San Bartolomé might have to do with different experiences with development and migration in these communities. Women in San Bartolomé are present at a time when many men eligible for community service are away. The community needs women's voluntary labor and participation in order to maintain itself.[122] Latuvi has enough young and middle-aged males to make women's participation in politics unnecessary.

Latuvi is also a place where agricultural technology and development projects targeted towards men, including those that introduced fruit and fertilizers, enjoyed widespread success. As I mentioned in chapter two, similar projects in San Bartolomé met with mixed reviews. This suggests that where the introduction of new technologies

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[119] Angelita Hererra, interview by Joshua Walker, in her home in Santa Marta Latuvi, 2 May 2014; Conversation with peasant, Santa Marta Latuvi, 26 Apr. 2012; Field notes, Santa Marta Latuvi, 19 April 2012; Conversation with resident, Santa Marta Latuvi, 25 Jan. 2012.

[120] Rosa Ochoa, interview by Joshua Walker, in her home in Santa Marta Latuvi, 15 May 2012. Translation by Joshua Walker.

[121] Cheli, interview by Joshua Walker, in her home, 27 Apr. 2012.

[122] Worthen, "The Presence of Absence," 201. Worthen found a similar phenomenon in the *serrano* town of San Bartolomé Yatzchi El Bajo.

made rural life viable and appealing to men, women's privileges and mobility increased at a slower rate.

In sum, I mean to qualify any broad arguments that I have made concerning the expansion of women's rights and mobility over time. Women's rights and mobility expanded, but this happened at a much slower rate in places where agricultural development succeeded, places where men were more likely to stick around to defend gendered power. Finally, I acknowledge that variables not analyzed here, including education, anti-violence campaigns, and the availability of birth control, surely played a role in the (re) formulation of gendered expectations in these communities.[123]

Women as Technology Adopters

Women did more than fill the spaces that were renovated by technologies. They were also part of the process of renovation. They demanded access to the technologies they wanted.[124]

In 1947, the women's league of an *ejido* near Nochixtlán, Oaxaca asked the President of Mexico to donate a mechanical corn grinder. The petition's all-female signatories discussed the possibilities for women that this tool would create:

> …the women of this community find themselves very interested in acquiring a *molino de nixtamal* that will help them in their domestic chores and they can use the [saved] time to learn to read and to learn additional things…[125]

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[123] A family in San Bartolomé Quialana told me that smaller families and birth control allow women to spend more time outside of the home: field notes, 22 Oct. 2012; Rosa Ochoa Rosa Ochoa, from Latuvi, talked to me about women's rights involving choosing whether or not to have children: Rosa Ochoa, interview by Joshua Walker, in her home in Santa Marta Latuvi, 15 May 2012; Mario Sebastián Contreras discussed 2006 as beginning of family planning in Latuvi: Mario Sebastian Contreras, Interview by Joshua Walker, in his home in Santa Marta Latuvi, 6 May 2012.

[124] This is inspired by Marroni Velázquez, "Changes in Rural Society and Domestic Labor," 219.

[125] Victoria Santiago, and others, to Miguel Alemán, 22 Feb. 1947, AGN, Fondo: Miguel Alemán, Exp.: 136.3/140; For more on *molinos de nixtamal* and their prominence in the demands of women's leagues, see Olcott, *Revolutionary Women,* 147-53.

These women phrased their demands in terms of productivity, a rhetorical strategy that echoed officials' dreams of using machines to free women for "productive" work. Physical comfort was another theme of women's demands. Many told me about the pain caused by older tools like the grinding stone (*metate)* and by the common practice of cooking while kneeling over an open flame. These tools and techniques hurt their knees, put smoke in their eyes, and burnt them.[126] Raised hearths with chimneys, stoves and ovens, and mechanical corn grinders spared them from some of this pain. Porfiria Cruz García, from Latuvi, mentioned corn grinders, stoves, and smoke reduction when I asked her about technologies important to everyday life:

> **Joshua Walker:** For me, it seems like water in the home, mechanical corn grinders, and fertilizers are very important technologies, for the country, for life here in Latuvi, but for you, what are the most important technologies for everyday life?
> **Porfiria Cruz García:** Now, the interesting thing is that, thanks to God, we have grinders for grinding our cornmeal, there is a stove for putting in firewood, which does not make smoke, for making tortillas. Now we have our corn. Anyway, now we use fertilizers. We use them because corn does not produce like it used to.[127]

María Pérez Ramírez, also from Latuvi, remembers telling her husband to build a hearth in order to avoid burning herself over an open flame.[128] In 1975, a woman from San Antonino named Marta Santiago bought a gas stove in Mexico City because her oil-burning one "hurt her eyes and was a bother to light."[129] Work in a rural Mexican home

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[126] Cheli, interview by Joshua Walker, in her home, 27 Apr. 2012. Translation by Joshua Walker; Ubalda Ceballos Santiago, interview by Joshua Walker, in her home in Santa Marta Latuvi, 24 Apr. 2012; Porfiria Cruz García, interview by Joshua Walker, in her home in Santa Marta Latuvi, 29 Mar. 2012; Anonymous peasant woman, interview by Joshua Walker (with her husband) 14 May 2012.

[127] Porfiria Cruz García, interview by Joshua Walker, in her home in Santa Marta Latuvi, 29 Mar. 2012. Translation by Joshua Walker.

[128] Vicente García Cruz and María Pérez Ramírez, interview by Joshua Walker, at their home in Llano de Marta, Santa Marta Latuvi, 17 May 2012.

[129] Carole Judith Turkenik's field notes, 19 Oct. 1976, GN 2812.

could be physically exhausting, and women used new technologies to avoid this exhaustion when they could.

Of course, making decisions about technologies often meant deciding not to use them, or to use certain technologies instead of others. The first public mills in both San Bartolomé Quialana and Santa Marta Latuvi lost favor among women due to long wait times. In Latuvi, Ubalda Ceballos Santiago and Porfiria Cruz García both talked about the transition from large public mills to smaller, electrically-operated ones owned by individual families. The smaller grinders allowed women to make tortillas whenever they wanted and to save hours they would have spent standing in line at the public mill.[130] Ubalda stressed the convenience of family-owned mills:

> **Joshua Walker:** I do not understand why people stopped using the huge [gasoline powered, public] mills.
> **Ubalda Seballos Santiago:** Because now the smaller ones arrived. Because people began to buy their little grinders. Everyone now has theirs at home. They just turn it on, grind their corn, and make tortillas, at any hour. Because they are manual now, because they are in-home now. Now, you do not have to go all over the place. Everyone has their little mill. I grind coffee, chiles, cornmeal, dried corn for my chickens, crushed corn for my chickens.

In San Bartolomé Quialana, Silvestre Mecinas Martínez, quoted above, also told me about people who avoided long lines at the mills. Women did not like the inconvenience of walking to a single public mill and waiting in line, and so large, gas-powered corn grinders were eventually replaced with more convenient ones.

While most families today use mills to quickly grind their corn, many still use *metates* to soften the cornmeal after it has left the mechanical grinder. Just as peasants mixed animals and tractors in order to combine the best aspects of each technology in

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[130] Ubalda Ceballos Santiago, interview by Joshua Walker, in her home in Santa Marta Latuvi, 24 Apr. 2012; Porfiria Cruz García, interview by Joshua Walker, in her home in Santa Marta Latuvi, 29 Mar. 2012.

their farm fields (I explain this in chapter 5), so too did they take advantage of the extra precision offered by the old method for corn grinding. An anonymous male informant in San Bartolomé told me about this when I asked about his family's corn grinding tools:

> **Joshua Walker:** You all…does your family use a grinding mill?
> **Anonymous #26:** No, [we go] to the neighbor's place. Over where you [were], they have their grinder. You just leave and you're at the mill. It's not like it was before.
> **Joshua Walker:** You all do not use a *metate?*
> **Anonymous #26:** Yes, [we] use it, just a quick pass, no more. They use the *metate*.
> **Joshua Walker:** So that [the cornmeal] comes out smoother.
> **Anonymous #26:** Exactly. But everything else, the hardest stuff, [goes] to the grinding mill.[131]

Machine grinders did most of the hard work in making corn into cornmeal, but women still used *metates*. This could be for many reasons: to give their tortillas a familiar texture, to represent themselves as the guardians of "authentic" Mexican or indigenous culture, and to protect knowledge that has traditionally been gendered female.[132] All of these reasons speak to the idea that women had some agency to choose the tools and technologies they wanted.

Generational Conflicts

Just as women used the freedom and opportunities offered by time saving devices like water faucets, mechanical corn grinders, and roads to challenge entrenched notions of patriarchy, so too did young people use technologies to challenge the authority of their elders.

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[131] Anonymous peasant #26, interview by Joshua Walker, in front of the municipal building in San Bartolomé Quialana, 1 June 2012. Translation by Joshua Walker.

[132] Conversation with peasant, San Bartolomé Quialana, field notes 25 July 2012; Olcott, *Postrevolutionary Women,* 20; Marroni Velázquez, "Changes in Rural Society and Domestic Labor," 220-1; Pilcher, *Qué Vivan,* 107-8. Jocelyn Olcott and Maria da Glória Marroni Velázquez suggest that continuing to use the *metate* was a way for women to protect traditions, while Jeffrey Pilcher claims that making tortillas by hand was a status marker: wealthier families could have their women do it because those women did not have to do other work to support the family.

Young adults and their elders often disagreed over technological consumption and its consequences. Some disputes centered on the consumption (or non-consumption) of technologies. In 1976, Carole Turkenik recorded a story from San Antonino in which Poncho, the owner of a corn-grinding mill, was unwilling to invest in capital improvements for his business. His son Aflonso Jr. wanted to "expand their operation, buy milk cows, buy a tractor, etc," but his father would not spend the money.[133] In 1977, Turkenik reported another fight between Poncho and his offspring. This time, the issue involved Poncho's son Isaac and his desire to purchase an electric guitar and a set of amplifiers. Isaac asked his father for a loan and planned to pay it back "by renting himself and his equipment out" at parties. Poncho, "said it was a bunch of nonsense and Isaac should better learn to weld using the welder Poncho had just bought." Isaac was not interested in welding.[134] These examples showcase generational debates about which new technologies were valuable and which were not.

Migration and work outside the village were additional, contentious issues, ones that often implicated the consumption or non-consumption of new technologies. Wendy Waters claims that roads provided an outlet for young people in two villages who were yearning for "adventure, education, economic opportunity, and material gain."[135] Soledad González Montes and Oscar Lewis both explain how this could be problematic for parents and elders. As young people took to the roads and found ways to make money outside of the village, they became financially independent and no longer had to respect

[133] Carole Judith Turkenik's Field Notes, 4 Oct. 1976, GN 2825.
[134] Carole Judith Turkenik's Field Notes, May 1977, GN 2862.
[135] Waters, "Remapping Identities," 239.

abusive parents in order to receive housing and land from their parents, as young couples had done in the past.[136]

Although more research is needed, some evidence suggests that this story played out in San Bartolomé Quialana. Young people's migration to other states or to the United States undercut the authority of parents. A sixty-five year old man there told me that cars helped people to find work outside of the village in places like Tapachula, Chiapas, Cancun, and Veracruz.[137] This is a man who worked in Chiapas from around 1969 to 1975, moved to Veracruz to cut sugar cane around 1975, and went to the United States around 1978 to pick strawberries.[138] He told me that his father "did not like it when I moved around like that. He was used to me working with him, and his work went under after [I left]."[139] I suspect that cars, trucks, buses, and highways helped this man to move between Chiapas, Veracruz, and the United States, although it is possible that he took a train. In any case, his story, combined with the above-cited sources, suggests that mobility of young people provided by roads and cars could be burdensome to fathers and mothers left behind.

Of course, conflict was not always the result when parents and children encountered new technologies together. Children helped their parents to learn new technologies and vice-versa. Catarino Maximiliano Santiago Quero, from Latuvi, told me that his "*sobrina*, my daughter's daughter" taught him how to use a washing machine,

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[136] Gónzalez Montes, "Intergenerational and Gender Relations," 178-86; Lewis, *Life in a Mexican Village,* 323. Lewis provides only a brief mention of this topic.

[137] Anonymous man #30, interview by Joshua Walker, in his home in San Bartolomé Quialana, 10 Aug. 2012.

[138] Ibid. The interviewee was not precise with the dates of his migration, hence my reliance on the term "around."

[139] Ibid.

a blender, and a stove.[140] Neftalí Ortiz Medrano, an official working with the Secretariat of Public Education, taught an older generation of farmers in his home village of San Juan Tabá how to use hoses for irrigation.[141] Marta Santiago Cruz, from Latuvi, lost her father to a stomach illness at age four, and so she learned to farm and to use fertilizers from her mother.[142] New technologies challenged gendered power in families, but it is important to remember that times of conflict were interspersed with times of peace.

Conclusion

Most research on rural women and development in the twentieth century argues that governments and international research centers around the globe directed their efforts exclusively towards men.[143] In Mexico, this is true only if our analysis is confined to agricultural tools. I show that agricultural tools were one plank of an integrated development platform. Officials simultaneously planned for the arrival of potable water, grinding mills, better schoolhouses and municipal buildings, electricity, health centers, and home gardens, and they clearly had women in mind while they were planning these projects. I make a major contribution to our understanding of technological change by showing how villagers, including women, changed the ways that they conceptualized and organized rural space in order to take advantage of these tools.

Most scholars also argue that working burdens on women grew as the twentieth-century progressed. They claim that young women left communities between 1940 and

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[140] Catarino Maximiliano Santiago Quero, interview by Joshua Walker, in Arroyo Largo, Santa Marta Latuvi, 7 May 2012.

[141] Neftalí Ortiz Medrano, interview by Joshua Walker, at the Oaxaca Lending Library in Oaxaca de Juárez, 2 July 2012.

[142] Marta Santiago Cruz, interview by Joshua Walker, in her home in Santa Marta Latuvi, 1 Mar. 2012.

[143] Zapata Martelo, "Modernization, Adjustment, and Peasant Production," 118-9, 123; Arizpe and Botey, "Mexican Agricultural Development Policy 78; Tadesse, *Women and Technological Development in Agriculture,* 7-9; Jiggins, "Gender-Related Impacts and the Work of the International Agricultural Research Centers," v-vi, 9, 12, 16.

1960 and young men followed suit in the 1960s.[144] This meant that the older generation of women that was left behind had to work harder than ever to maintain families and communities.[145] Women who remained in communities took over agricultural labor and also had to do domestic chores and childcare.[146] My research supports the idea that women's work grew as the twentieth century progressed. Historian Ruth Schwartz Cowan famously wrote that the mechanization of the home in the United States created "more work for mother," and I think that this was also the case in rural Mexican homes.[147]

However, my work is one of the few to investigate benefits that women enjoyed in this scenario. Women undoubtedly suffered as their workloads increased, but they also acquired more power. They spent less time in the home under the domination of men and more time in public spaces, more time traveling in pickup trucks, taxis, and buses, and more time making independent business decisions. This does not mean that they shared power equally with men. One woman in Latuvi told me that men are still the authority figures in families, and she said that seventy-five percent of women are still stuck inside the house caring for children.[148] As I mentioned above, women still have little power in the communal assemblies of the Pueblos Mancomunados, and gendered expectations appear to have weakened drastically only in families and villages where men are absent.

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[144] For women migrating and dates, see Young, "The Creation of a Relative Surplus Population," 76-81; Crummett, *Rural Women*, 3, 16-7; Arizpe and Botey, "Mexican Agricultural Development Policy," 78, 81. Check. For men migrating in the 1960s, see Crummett, *Rural Women,* 17-18; Arizpe, *La mujer en el desarrollo de México,* 100, 176; Arizpe and Botey, "Mexican Agricultural Development Policy," 78. Crummett's claim is for Aguascalientes.

[145] Arizpe and Botey, "Mexican Agricultural Development Policy," 81; Arizpe, *La mujer en el desarrollo de México,* 100, 176.

[146] García and Oliveria, *Trabajo feminino y vida familiar en México,* 60-2; Chaney and Wells, *Women, Migration, and Decline of Smallholder Agriculture*, 1-2; Crummett, *Rural Women*, 19; Tadesse, *Women and Technological Development in Agriculture,* 11-12.

[147] Cowan, *More Work for Mother*, 99-101.

[148] Conversation with peasant woman, Santa Marta Latuvi, field notes 11 Oct. 2012.

Women have not destroyed gender imbalances, but new technologies have helped them to mount major challenges.[149]

This chapter also rejects the thesis of technological victimization that characterizes much of the literature on rural women. I show women to be active and aggressive users of the technologies that they wanted.

Finally, this chapter reinforces the idea that children and age are necessary categories of analysis when one considers gender.[150] Young adults used technologies, transportation, and wage labor to challenge power of their fathers and of village elders, and these challenges were as disruptive as the new roles and privileges enjoyed by women.

Marriages and families were the most basic social groupings to be challenged by the availability of new technologies, but they were not the only ones. Peasants used new technologies to both attack and to reinforce political authority in their villages. New technologies became weapons in ongoing struggles for local power. This story is the subject of chapter four.

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[149] Marroni Velázquez, "Rural Society and Domestic Labor in Atlixco," 218-23; Pilcher, *Que Vivan*, 107-8; Tutino, "The Revolutionary Capacities," 252; Varley, "Women and the Home in Mexican Law," 251. Varley cites Stern, *Secret History*, 82. Some historians, cited here, have mentioned these changes and challenges to patriarchy, but only the short article by Maria da Glória Marroni Veláquez explores them in any depth.

[150] Inspiration for this came from Premo, *Children of the Father King*, 3, 10.

Chapter 4: Committees

Chapter three discussed ways that peasants used the mobility and economic opportunity afforded by new technologies to challenge gender norms in families and in communal spaces. Mobility and income, both enhanced by technologies like automobiles, water faucets, and mechanical corn grinders, allowed women and adult children to assert independence from male heads-of-household in unprecedented ways.

In chapter four, I show that similar challenges to traditional authorities took place at the level of village governance. When villagers dealt with federal and state development officials, they insisted that access to new technologies be organized according to the "traditional" power structures within their communities. They largely rejected the suggestion of federal officials that they form new technology cooperatives, instead opting for forms of labor organization, fundraising, and resource management that were already part of everyday life. This helps to prove my general argument that peasants exercised agency in directing their own technological development.

Over time, however, peasants realized that even traditional power structures could become sites for local political subversion, especially when they were associated with access to scarce technological resources. A "traditional" civil service post charged with managing the distribution of new technologies was a very powerful position. Villagers used this power to both challenge and to reinforce existing political authority. Faucets, fertilizers, roads, trucks, and tractors were the centerpieces of local political feuds in many cases. In others, disputes over these tools were the latest manifestation of older, ongoing struggles for local power.

Grupos Solidarios

Grupos solidarios, or co-ops, were the organizational structures for managing and sharing technologies favored by federal officials. Technological development programs sponsored by agencies like the National Indigenous Institute (INI) and the Agrarian Bank required peasants to be part of groups consisting of at least five to ten members in order to participate.[151] In 1967, for instance, *El Universal* reported that peasants in the village of Guelatao had "intensified the planting of forage oats and alfalfa" thanks to credit from the Agricultural Bank (*Banco de Crédito Agrícola)*. To get this credit, they organized themselves in co-ops in order to "back up the credit they received."[152] The 1975 Presidential Fertilizer Plan stipulated that "the sale of fertilizer, by cash or credit, will be done through organized groups…in no instance shall sales be made to individuals."[153] In 2012, Emiliano Morales Cruz discussed the process by which peasants applied for technological support from the National Indigenist Institute's Coordinating Center in Tlacolula, where he has worked since 1982. He told me, "…We always asked that they were in groups, that they were not [petitioning] as individuals, or [that they had] the backing of local leadership, or the *comisariado*, that some authority would back [their]

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[151] Turkenik, "Agricultural Production Strategies," 183; "Nombre del Proyecto: Aquisición de Yuntas," July 1981, CDI Tlacolula, Caja: Proyectos Especiales 1984 (2), Exp: Proyectos Difinitivos Para 1982; *Manual Para Campesinos*, Cuaderno 1, pg. 55, published by the Secretaría de Reforma Agraria (approximate date 1980-1982), AGN, Fondo: Miguel López Portillo, Secretaría de Reforma Agraria, Caja: 2324. The number of members needed to form a cooperative might have been different depending on the program or the year. Carole Judith Turkenik's dissertation, which discusses loans from the Agrarian Bank, claims the number of co-op members needed was five, as does the document from the INI oxen program cited in this footnote. On the other hand, the *Manual Para Campesinos,* a general guide for peasants published by the federal government, put the number at ten.

[152] "Comienzan a obtenerse frutos del 'Plan Guelatao,'" *El Universal,* 26 Sept. 1967, Biblioteca Lerdo de Tejada, Archivos Económicos, Exp.: R12699-R12699 Oaxaca, Estado de, Agricultura.

[153] "Programa Presidencial de Fertilización para Zonas Indigenas, 1975," Instituto Nacional Indigenista, 28 Feb. 1975. CDIOAX, Archivo Histórico CCI Papaloapan, Caja: 10, Exp.: 126.

petition."[154] Cooperative farming for peasants was an idea that went back at least to the era of experiments with cooperative *ejidos* under President Lázaro Cárdenas (1934-1940),[155] and officials were eager to try cooperative techniques for sharing technologies.

Officials used arguments based on economies of scale to explain their enthusiasm for technology cooperatives. Individual peasants usually did not have enough land or money to justify purchasing (or even renting) a tractor, for example, but five or more peasants usually did. A 1981 report on a credit program for oxen buying managed by the National Indigenist Institute referenced this idea. It claimed that organizing into co-ops allowed peasants "to take better advantage" of the program.[156] Another INI report regarding a program to give peasants access to improved seeds, fertilizers, pesticides, and tractors said that co-ops "would be organized in compact areas of production so that their work is coordinated and their form of cultivating slowly improved…"[157] Achieving economy of scale would be easier in groups that could share time, labor, and resources.

Economies of scale were the official reason for the co-op requirement, but I suspect that there were political motives at play as well. In the imagination of federal officials, co-ops would challenge local *caciques* (strongmen) and other powerbrokers long entrenched in seats of local power.[158] Diagrams of the organizational structure for co-ops as envisioned by officials at the National Indigenist Institute's Tlacolula

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[154] Emiliano Morales Cruz, interview by Joshua Walker, at the Centro Coordinador para el Desarrollo Indígena Tlacolula-Zapoteca, Tlacolula, Oaxaca, 23 Oct. 2012.

[155] Fallaw, *Cárdenas Compromised,* 15, 126-7; Hewitt de Alcántara, *Modernizing Mexican Agriculture,* 181.

[156] "Nombre del Proyecto: Aquisición de Yuntas," Sept. 1981, CDI Tlacolula, Caja: Proyectos Especiales 1984 (2), Exp: Proyectos Difinitivos Para 1982.

[157] "Programa: Extensión Agrícola," Date Unknown, CDI Tlacolula, Caja: Proyectos Especiales 1984 (2), Exp.: Proyectos Definitivos 1982. This report has no date, but context clues from inside the report and from the documents that surround it in the archives suggest that it comes from either late 1981 or 1982.

[158] Fox, "The Difficult Transition," 159-163. Jonathan Fox describes how development programs in the 1970s and 1980s sought to channel federal money directly to local leadership groups, bypassing political bosses and the state government.

Coordinating Center suggest such a challenge. These diagrams called for co-ops that consisted of a president, secretary, treasurer, and two *vocales* (committee members). This structure mimicked the power structure of village governments, which also included a president, secretary, treasurer, and councilmen.[159] The idea here might have been to provide a degree of familiarity for peasants working in an otherwise novel system, but these sketches also suggest that co-ops were designed to bypass local powers altogether.

The diagrams also call for co-op members report to federal officials. The first diagram (Figure 5) makes them answerable to both federal officials and to local political authorities, although which of these authorities has ultimate control is not clear.[160] The second diagram (Figure 6) is less ambiguous: in this design, co-op members report only to federal officials, who in turn negotiate with local authorities on their behalf.[161] Federal officials hoped to build co-ops for sharing labor and technology within villages, and I suspect that they saw these organizations as competing nodes of power that could undercut the authority of local political bosses.[162]

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[159] Stephen, *Zapotec Women*, 161. Stephen describes the structure of government in the village of Teotitlán del Valle. Her model is similar to that of San Bartolomé Quialana, with the exception of the fact that San Bartolomé has a village secretary.

[160] "Nombre del Proyecto: Aquisición de Yuntas," Sept. 1981, CDI Tlacolula, Caja: Proyectos Especiales 1984 (2), Exp: Proyectos Difinitivos Para 1982 (Photo #5).

[161] "Programa: Extensión Agrícola," Date Unknown CDI Tlacolula, Caja: Proyectos Especiales 1984 (2), Exp.: Proyectos Definitivos 1982 (Photo #6).

[162] Emiliano Morales Cruz, interview by Joshua Walker, at the Centro Coordinador para el Desarrollo Indígena Tlacolula-Zapoteca, Tlacolula, Oaxaca, 23 Oct. 2012. "Nombre del Proyecto: Credito para Adquisición de Yuntas," June 1983, CDI Tlacolula, Caja: Proyectos Especiales 1983-1987, Exp: Proyecto Credito para Adquisición de Yuntas. This conclusion remains only a tentative one based on limited evidence. Other sources, including the ones cited in this footnote, suggest that officials required cooperatives to have the backing of municipal authorities.

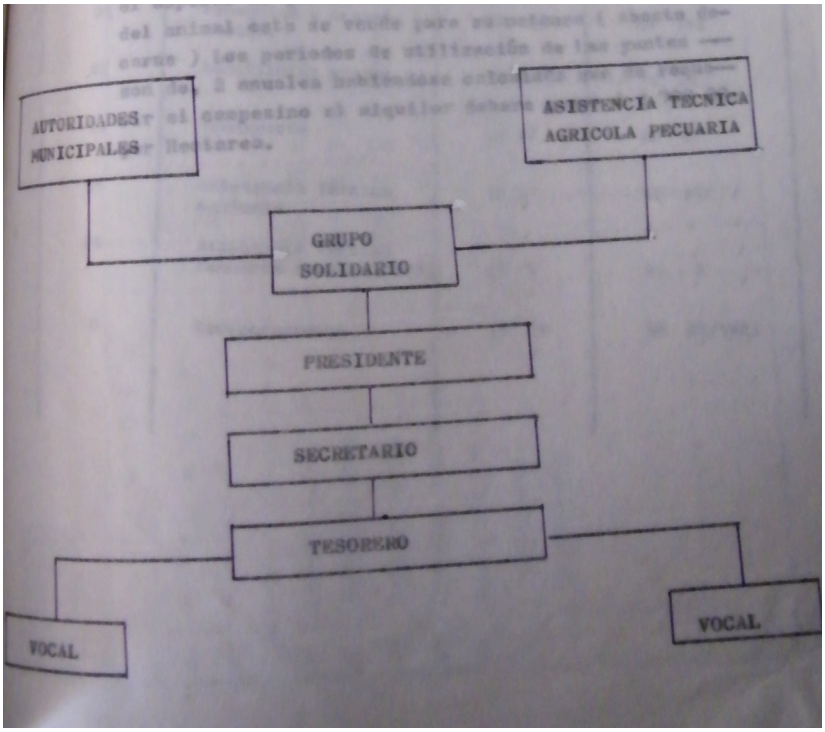

Figure 5: Co-op structure for INI Oxen Credit Program.

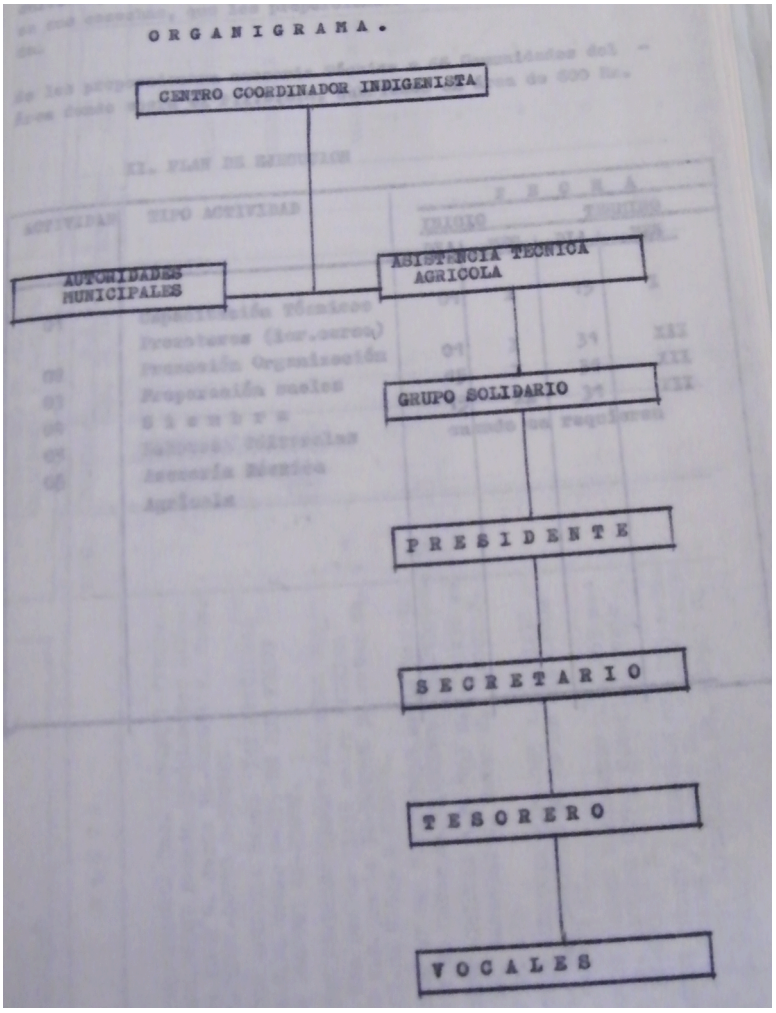

Photo 6: Co-Op Structure for INI Agricultural Extension Program

Co-ops proved harder to operate in real life than they were to sketch in reports. They were prone to breaking up, usually because of disagreements between members regarding money or the sharing of resources. In 1969, Ronald Waterbury's informants told him about a trucking cooperative in San Antonino that struggled with infighting over finances and disputes over member contributions.[163] In her 1975 dissertation on agricultural practices in the same village, anthropologist Carole Judith Turkenik noted the

[163] Ronald Waterbury's field notes, 1969, GN: 2042-3.

failure of a tractor cooperative due to disagreements over money.[164] Anthropologist Anne V.T. Kirkby observed the formation of tractor cooperatives in the Valley of Oaxaca, but she also observed that peasants struggled to organize operating schedules and levies for maintenance.[165] Participating in technology cooperatives was challenging for many peasants.

Part of the problem was that peasants were used to working their lands as individuals. Nazario Hernández Sánchez, aged sixty-four from San Bartolomé Quialana, told me that people from his village preferred to buy individual tractors rather than share them:

> **Nazario Hernández Sánchez:** …the people want their own. They do not want it through a group. Here, everyone owns their tractors. There are not groups here. But in other places, yes. In other places, there are groups, but here, no. Each bought his [own] tractor.[166]

Anthropologist Richard Lewis Berg Jr. relayed similar ideas about working styles in the village of Zoogocho. He observed in 1968 that households in Zoogocho do not often form trucking cooperatives because "economically and ideologically, each household tends to work as an individual unit."[167] Ronald Waterbury also commented on the culture of individuality amongst peasants in San Antonino, arguing that a " 'zero sum' mentality […] still does exist to a degree here, i.e., that one should never do anything that might be advantageous to another."[168] A project report from the National Indigenist Institute in 1983 also referenced peasant individualism. It said that one possible obstacle for the Institute's credit program for oxen buying was that that every member of a credit co-op

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[164] Turkenik, "Agricultural Production Strategies," 230.
[165] Kirkby, *The Use of Land and Water Resources,* 74-5.
[166] Nazario Hernández Sánchez, interview by Joshua Walker, at his home in San Bartolomé Quialana, 5 June 2012. Translation by Joshua Walker.
[167] Berg Jr., "The Impact of Modern Economy," 201.
[168] Ronald Waterbury's Field Notes, 19 Jan. 1978, GN: 3525.

would end up applying for their own oxen team.[169] These examples all show that individual peasants were accustomed to making their own decisions. Working in groups and sharing resources did not come naturally to them, especially where their family farms and businesses were concerned.

Peasant's unwillingness to cooperate on development projects could inhibit the dissemination of technologies. Bonifacio García Martínez, an engineer working for the Secretariat of Water Resources, wrote a report about water resources in Oaxaca in 1954. The report cited a previous study by Jorge Tamayo. Tamayo had argued that the subdivision of land into small parcels in Oaxaca was one of the main obstacles to well-digging, potable water, and irrigation projects. Individual landowners did not have enough money to finance the digging of wells on their own, and "none of them [had] the slightest intention of uniting in a society to form a proper administrative council." García Martínez suggested that "official institutions" should step in to fill the void when peasants refused to cooperate in sharing and managing their water resources.[170] Similarly, in 1973, Waterbury reported that villagers in San Antonino were hesitant to approve a potable water project, "since everybody had their own wells and did not need to go to the expense of *agua potable.*"[171] Individualized thinking delayed the arrival of technologies, especially in the case of utilities and other major infrastructure projects that required communal cooperation.

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[169] "Nombre del Proyecto: Credito para Adquisición de Yuntas," June 1983, CDI Tlacolula, Caja: Proyectos Especiales 1983-1987, Exp: Proyecto Credito para Adquisición de Yuntas.

[170] Ing. Bonifacio García Martínez, "Dictamenes, conclusiones, y recomendaciones de los estudios geohidrologicos efectuados en varias partes del edo. de Oaxaca," Mar. 1954, AHA, Fondo: Consultivo Técnico, Caja: 514, Exp.: 4860.

[171] Ronald Waterbury's field notes, 7 Mar. 1973, GN: 2325.

This is not to say that all cooperative ventures failed. In 1980, Waterbury noted that members of a co-op in San Antonino foiled a federal official who wanted to build a public well near other wells that co-op members had dug with private funds.[172] This suggests the existence of a co-op that was organized enough to fight federal officials. A more interesting incident took place in San Antonino four years earlier. Then, Waterbury witnessed the near collapse of a nineteen-person association that was dedicated to building an irrigation network fueled by electric pumps. When a federal official quoted a price of 138,000 pesos for the installation of electricity lines, some members panicked and quit the association. This created a domino effect, as other members did not want to pay the increased cost per person that resulted. In the end, however, six remaining members secured a bank loan, paid for the electricity lines, and established an electricity and irrigation system that was successful. Waterbury commented, "All are now very happy with their new system and consider it to be cheaper and less trouble than the old motorpumps."[173] This story illustrates both the financial challenges of running a co-op and the potential benefits that were available to successful groups. Well-managed cooperatives helped villagers to get access to important technologies, but many peasants were too accustomed to working as individuals to have sustained success working with others for extended periods.

Tequios* and *Cooperación

Technology adoption was usually a smoother process when familiar forms of political organization were used to manage it. One familiar form of organization used to facilitate the completion of infrastructure projects was *tequio*, mandatory community

[172] Ronald Waterbury's field notes, 20 July 1980, GN: 4148-9.

[173] Ronald Waterbury's Field Notes, 4 Nov. 1976, GN: 2808-9; Waterbury, " 'Lo Que Dice,'" 78. Waterbury tells this same story in his published article.

service. In Latuvi, San Bartolomé Quialana, and other Oaxacan villages, *tequio* required each household or family unit to designate one worker to help with community improvement projects. This work might include clearing a fallen tree from a road, removing leaves and other debris from open-air irrigation canals, or setting up tents for an upcoming village celebration.

Government development programs rarely, if ever, funded the entire cost of a project like electrifying a village or introducing potable water. To pay their share of the operation, communities donated labor via *tequio*. In 1968, Víctor Manuel Pérez Magallanes of the Papaloapan Commission reported on an irrigation project near Guelatao. He said that users of the irrigation system helped to maintain and operate it by moving tubes and "special pieces," with the happy result that the area covered by the system had no water shortages.[174] In September 1969, Papaloapan Commission engineer Rafael Rangel Franco commented on work that had been done on irrigation canals and on the potable water system in the village of Guelatao. He observed repeatedly that men from the village worked on these projects as part of *tequio*.[175] In 1990, the municipal government of San Bartolomé Quialana, "in union" with the President of the village's Potable Water System, wrote to the governor of Oaxaca asking for prefabricated materials to extend their potable water system to two hundred villagers in a neighborhood that did not have it. They said they would use *tequio* to provide the labor for the project,

[174] Víctor Manuel Pérez Magallanes, "Operación: Distrito de Riego por Aspersión de Guelatao de Juaréz, Oax.,Oct. 1968, AHA, Fondo: CP, Caja: 235, Exp.: 3542.

[175] Rafael Rangel Franco, "Conservación: Distritos de Riego por Aspersión Guelatao de Juaréz, Oax., Septiembre 1969," 1 Sept. 1969, AHA, Fondo: CP, Caja: 267 Exp.: 4072; Martínez Luna, *Guelatao*, 53. Martínez Luna's work was helpful in interpreting place names in the primary sources.

"as is the custom of our village."[176] *Tequio* was a tradition that allowed peasants to use their labor to help pay for the cost of new technologies.

Municipal authorities also asked villagers to donate money to help fund technology and infrastructure projects. Asking for or requiring donations from peasants was a concept known as *cooperación*, and it was used to pay for communal events and resources, like saint-day celebrations.[177] As new technologies like potable water networks became available, village authorities invoked *cooperación* to pay for them. In Latuvi, a report about the installation of potable water in the 1960s claimed that "users" had paid almost half of the price of the project (50,000 out of 166,000 total pesos).[178] Mario Ponciano García also told me that *cooperación* had been used to pay for the town's municipal government building. Each household had to pay fifty pesos.[179] In San Bartolomé Quialana, a petition from the local road committee to the National Village Road Commission requesting construction of a road specified that the community would pay for two-thirds of the project, about 374,000 pesos.[180] The committee also claimed to have labor power available to cover labor costs, presumably from *tequio*. *Cooperación* and *tequio* were familiar institutions that helped to facilitate local technology transfer.

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[176] Pablo Hernández Hernández, and others, to Heladio Ramírez López, 26 Feb. 1990, San Bartolomé Quialana Archives, Binder: Documentos Antiguos.

[177] Mario Ponciano Garcia, interview by Joshua Walker, at his family's store in Santa Marta Latuvi, 24 Apr. 2012; Lynn Stephen, citing Catherine Good Eshelman, suggests that community-wide collections replaced *mayordomías,* a system in which individuals sponsored festivals privately. See Stephen, *Zapotec Women*, 158.

[178] Secretaría de Recursos Hidraulicos and Comisión del Papaloapan, "Oaxaca: Obras del Agua Potable, 1965-1966" nd, AHA, Fondo: CP, Caja: 284, Exp: 4431.

[179] Mario Ponciano Garcia, interview by Joshua Walker, at his family's store in Santa Marta Latuvi, 24 Apr. 2012

[180] Rafael Ortega Velarde to Santiago Martínez Rios, 10 May 1965, San Bartolomé Quialana Archives, Binder: Documentos Antiguos.

Comites

Comites (committees) were another communal institution that peasants used to manage new technologies. *Comites* are groups of civil servants in charge of managing the arrival and administration of federal and state development projects. Common examples include: education committees that work with federal schoolteachers, health committees that work with the doctors or nurses at a village's federal health center, and committees for petitioning officials for utilities and, later, operating and maintaining them.[181] Like the structure of the co-ops proposed by officials (detailed in figures five and six, above), the structure of committees closely mimicked the structure of local government: each committee had a president, secretary, treasurer, and committee members.[182]

The key difference between co-ops and *comites* was that *comites* were part of the traditional authority and prestige structures in villages. They were part of civil service hierarchies (*cargos*). *Cargos* are mandatory community service roles that adults complete every three years.[183] As a person ages and serves in more *cargos*, the positions become more demanding and the prestige and power associated with them increases. A teenager might serve his first *cargo* as a village police officer (*topíl)* and many years and *cargos* later serve as municipal president or judge.[184]

In the past, *cargos* were closely tied to religion. Lynn Stephen argues that *cargos* in the village of Teotitlán del Valle included religious positions called *mayordomías* until

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[181] Stephen, *Zapotec Women,* 163.
[182] Ibid.,161-3.
[183] Conversation with peasant, Santa Marta Latuvi, field notes 23 Jan. 2012.
[184] Carlos Contreras, interview with Joshua Walker, in his home in Santa Marta Latuvi, 3 Mar. 2012. This is based off of Carlos' history of cargos.

the 1930s.[185] *Mayordomías* were positions that called for a man and a woman to sponsor elaborate saint-day celebrations.[186] These positions carried considerable prestige, which men used to acquire political power. Women turned the prestige gained from *mayordoma* status into and respect and influence.[187] Until 1931, *mayordomía* positions and their civil-service counterparts were mandatory and were delegated by village elders, who accumulated enormous political power by working their way through this system.[188]

One goal of the post-revolutionary government was to chip away at this power. The Constitution of 1917 mandated the election of *cargos* by village assembly, a direct attack on the authority of elders to choose village leaders.[189] President Plutarco Elías Calles and various governors of Oaxaca enforced laws that required local religious affairs to be handled by elected committees,[190] another attempt to curb the prestige of elders earned through *mayordomías*. Federal development projects for the countryside, beginning with federal schooling in the 1920s, called for officials to work not with village elders, but with elected *comites*.[191] Membership on these committees was included in the list of positions one could hold while completing *cargo* requirements.[192]

Over time, the old system for delegating political power according to religious sponsorship and age changed to one that rewarded people who had the skills to do good committee work. In the past, one had to sponsor a series of prohibitively expensive

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[185] Stephen*, Zapotec Women* Ibid., 160-170.
[186] Ibid.
[187] Ibid., 160, 176.
[188] Ibid., 27, 163-4, 170-1. On page 163, Stephen writes that civil (non-religious) *cargos* "were probably appointed by a group of elders." It is not clear to me if this story and timeline is appropriate for the villages I studied. I suspect it was true for San Bartolomé, but more evidence is ultimately needed.
[189] Stephen, *Transborder Lives,* 56.
[190] Stephen, *Zapotec Women*, 171.
[191] Stephen, *Transborder Lives*, 56; Stephen, *Zapotec Women,* 161-3.
[192] Stephen, *Zapotec Women,* 161-3.

religious festivals in order to be considered for prestige and political power.[193] As the twentieth century progressed, however, one could acquire power by using use Spanish language and writing skills learned in new federal schools to deliver a much-needed bridge or public water faucet for the community.[194] Unlike the co-ops pushed by development officials, this new system was familiar—*comites* closely resembled village governments and *comite* membership counted for *cargo* service. In other words, *comites* were woven into the fabric of normal governance. But this system was also revolutionary. As I will show, it allowed precocious peasants to challenge the entrenched power of village elders.

We can see such challenges in the language and symbols that members of *comites* used when communicating with federal officials. A 1969 petition from the village of San Lorenzo Vistahermosa to President Díaz Ordaz asked for road construction equipment, potable water, and electricity for the village. The petition carried the signature of Guadalupe Reyes López, the municipal leader (*agente municipal*), along with those of the President of the Pro-Road Committee, the President of the Pro-Electricity Committee, the President of the Pro-Potable Water Committee, the President of the Society of Parents, and the President of the Directory of the *Ejidal* Commissary.[195] Villagers other than the traditional leader claimed power and prestige through committee membership to represent the community before Mexico's president. At the same time, this petition also reveals a rhetorical strategy: by claiming the backing of many *comites* and their members, the petitioners claimed legitimacy through collective action and democratic consent.

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[193] Ibid*,* 170.
[194] Ibid.*,* 156.
[195] Guadalupe Reyes López, and others, to Gustavo Díaz Ordaz, 28 Sept. 1969, AGN, Fondo: Gustavo Díaz Ordaz, Caja: 70, Exp.: 727.2:4 Oaxaca 1968-69 3:11.

Stamps and seals on petitions like these marked parallel claims to local political authority. Stamps and seals on letters were important symbols of legitimacy and authority that municipal leaders used to verify their right to officially represent a community and to endorse official documentation. But village *comites* had their own stamps and seals, and they put these next to those of the municipal president on documents and petitions. Figure seven, for instance, shows various stamps and seals that adorned assembly minutes from San Bartolomé Quialana in 1992. Potable water was the theme of the meeting, so the President of the Potable Water System's signature and seal are prominent.[196] They accompany the signatures and seal of more traditional village authorities, such as the municipal president, the judge, and the treasurer. Symbols of authority have been important for bestowing legitimacy on leaders since at least colonial times,[197] and by deploying their own symbols, *comite* members claimed their right to help decide questions about technology.

[196] "Acta de Asemblea," San Bartolomé Quialana, 4 May 1992, San Bartolomé Quialana Archives, Binder: Documentos Antiguos.

[197] This is inspired by Cañeque, *The King's Living Image*.

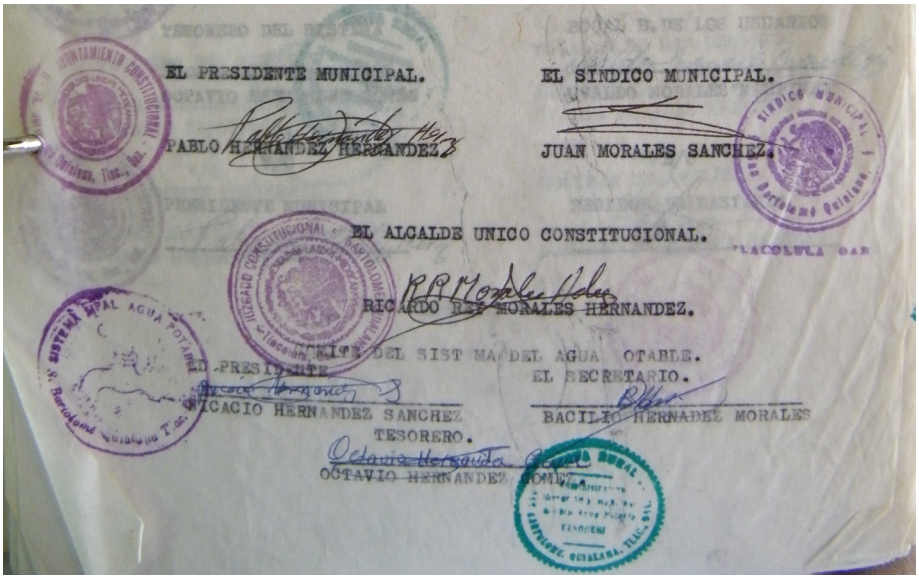

Figure 7: Stamped Seals of the Municipal President, Advisor to the President, Judge, Treasurer, and Municipal Water System of San Bartolomé Quialana.

Dueling claims to power and authority were not a problem when the municipal council and *comites* were in agreement, or when the traditional authorities and elders controlled the nominations to the *comites,* or when the elders nominated themselves to the *comites*. Conflict arose when the goals and objectives of the *comites* differed from those of village elders, *caciques*, and other traditional power brokers.

Conflict

A 1975 letter from villagers in San Bartolo Ayutla to the federal Secretariat of Governance revealed such a conflict. The petition, forwarded to Mexico City by the Union of Mexican Workers and Farmers (UGOCM), asked the Secretariat to help dissolve the village's municipal council and to hold new elections. Among the document's signatories were representatives of the village's Pro-Highway Committee, Pro-Agriculture and Community Funds Committee, Pro-Potable Water Committee, Pro-Health Committee, the Parents Society, as well as a group that claimed to be the

"authentic" PRI Municipal Committee.[198] They accused the municipal leaders of being *caciques*, murderers, and criminals. They also accused their leaders of being anti-progress and against reforms championed by the federal government and by President Luis Echeverría. According to the petitioners, the municipal leaders had forced villagers to cut down fruit trees, had blocked the arrival of highways, potable water, and industry, and were using violence to preventing villagers from paying back their loans to the federal Agriculture Bank.[199] The petitioners also claimed that municipal leaders had demanded that the communal transportation committee give up sixteen mules, and that the local Agriculture and Community Funds Committee give up money it had collected for the purpose of making small loans to villagers.[200]

This petition only tells us one side of the story. Correspondence from the leaders of the community would help us to make an informed judgment about what was going in San Bartolo Ayutla, but I did not find such evidence. However, even a very cautious interpretation of this document proves a basic point: members of technology committees used their connection to tools and "progress" to challenge local leaders. More conclusions emerge if we accept the claims of the villagers. In this case, the petition suggests that village authorities were threatened by technologies that might sever the dependence of peasants on local power brokers. These technologies included highways, mules, and fruit trees. A liberal interpretation of the document also suggests that local authorities were threatened by villagers' increasing interaction with *comites*. A system where villagers could get loans or other forms of support from a *comite* challenged a

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[198] Juan Rodríguez González and Gerardo Martínez Uriarte to Mario Moya Palencia, 28 Jan. 1975, AGN, Fondo: Luis Echeverría, Caja: 2492, Exp.: 721.1/1 I.I.

[199] Ibid.

[200] Ibid.

power structure in which villagers previously looked to politically-connected strongmen for support.

A similar conflict involving technology and political authority engulfed San Bartolomé Quialana in the late 1960s. In 1968, Manuel Hernández Hernández wrote to Rafael Moreno Valle, the director of the Secretariat of Health and Public Assistance. Hernández was President of the Potable Water Operation and Maintenance Committee in San Bartolomé. He had been nominated by municipal authorities to be the next municipal president, "because they knew my past and how I am a collaborator in the progress of our village." However, the local committee of the ruling party, the PRI, was not happy with his nomination. According to Hernández, members of the committee forced the calling of a communal assembly to decide who would be the next municipal leaders. Hernández claimed that the only people who showed up were young people who did not know about political life and who were opposed to public works. These were the same people, he said, who had opposed the introduction of potable water into the community in 1966, when he worked on the Potable Water Introduction Committee. They had eventually agreed to let the potable water project continue, but they had also joined together to oppose the new leadership team headed by Hernández. Instead, they nominated Hernández to serve in their preferred local government as a *regidor* (councilman), but Hernández refused. He wrote that his "spirit of Progress" would continue forward with his work on the Pro-Public Works Committee and the Potable Water Operation and Maintenance Committee. He said his enemies were "always

opposed to Progress" and asked Moreno Valle to help prevent him from being denied the position of municipal president.[201]

This case is fascinating for a few reasons. First, it speaks to the immense power wielded by members of technology committees. As a leader of a committee charged with managing potable water in the community, Hernández exercised an incredible amount of agency. He secured a nomination to become municipal president, he openly challenged the local representatives of the ruling party, and he was now independently petitioning a federal official asking to be placed on the seat of power in San Bartolomé Quialana. The idea that positions on technology committees were politically powerful is reinforced by Hernández's refusal to accept a lesser position in the town government. Working on tech-centric committees was better than working as a subordinate for established authorities when it came to amassing influence and prestige.

It is also possible to interpret Hernández's story as one of an established authority figure using a technology committee to reinforce his power. His complaint that young people did not know about "political life" suggests that he was experienced in village politics. This experience, though, apparently did not matter to the people at the communal assembly: the letter strongly implies that they voted against him. The petition could have been an attempt to overturn the democratic decision of the assembly by highlighting his work in favor of "public works" and "progress."

This interpretation, whether true or not, speaks to a more important generality. Just as young people and well-educated people used involvement with technology committees to challenge established power structures in villages, so, too, did *caciques*,

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[201] Manuel Hernández Hernández and Antonio Raymundo Sánchez to Rafael Moreno Valle, 12 Oct. 1968, AHSS, Fondo: SSA, Sección: Spr., Caja: 31, Exp.: 4.

elders, and other authorities use connections to infrastructure funding and new technologies to secure their own power. Ronald Waterbury told me that a *cacique* in San Antonino named Porfirio Santiago did this by serving as the head of the local Civic Improvement Committee. According to Waterbury, this committee was a direct link to funding from the ruling party for projects like roads. Santiago translated the power and prestige associated with bringing roads to the village into political power, which he used to impose his preferred candidates for village president.[202]

As we saw in the case of San Bartolo Ayatla, authorities who could not take control of technology committees might instead try to sabotage them. By 1978, the potable water system in San Antonino was working, but villagers were suspicious that the village secretary was secretly pocketing their utility payments. Waterbury offered a suggestion to the village's secretary and municipal president: form a committee of users to manage the system in order to avoid accusations of fraud. Waterbury wrote that the leaders "obviously did not think that was a very good idea" and "were not convinced."[203] In this case, leaders fought the technology committee by preventing it from forming in the first place. This is not surprising given the potential for such a committee to compete with authorities for power and influence.

Disputes over political authority and technology could produce serious consequences. Minutes from a May 5, 1967 meeting of the municipal council in San Bartolomé Quialana show that the council suggested arresting people who had not paid to support the potable water project.[204] When non-*ejido* members of the village of

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[202] Conversation with Ronald Waterbury, Field Notes 10 July, 2012.

[203] Ronald Waterbury's Field Notes, 5 April 1978, GN: 3819.

[204] Cabildo Minutes, 5 Mayo 1967, San Bartolomé Quialana Archives, Binder: Documentos Antiguos.

Huaxolotitlán convinced the Rural Credit Bank to give them tractors that had been approved specifically for *ejido* members, the village's *ejido* members took the municipal leader's office, deposed him, and demanded the return of the tractors.[205] *El Universal* reported that intervention by the governor prevented violence.[206] When villagers in Latuvi decided that they did not want Jehovah's Witnesses living in their community, they cut off electricity and water to the *sector* where they lived, and they took away their homes.[207] New technologies were both the subject of conflicts and weapons used to win them.

Just as peasants used new technologies and new forms of political organization to challenge the authority of village leaders, so too did villages use the issue of technological change to challenge the authority of their "head towns." Residents of Latuvi and neighboring villages experienced this. In 1945, village leaders in Latuvi agreed to auction a license for the right to buy wood products from Latuvi's forest.[208] The plan was to use the licensing fees to pay for "the construction of public works, the acquisition of machinery, work animals, baby animals, tools, seeds, etc" in the village.[209] But there was a major problem with this plan. Latuvi was not a legally-designated municipality. It was (and is) a sub-agency of Lachatao, which means that the people

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[205] *Ejidos* are communally-owned lands within which residents farm individual plots, usually with the supervision of federal agricultural agencies and development banks. Prior to 1992, plots within an *ejido* could not be bought or sold, but they could be inherited. *Ejidos* are not the only form of land tenure in rural Mexico. Others include private property, which can usually be bought and sold freely, communal property, the use of which is governed by local law, and "private in a special sense," in which villagers can buy and sell amongst each other, but selling to an outsider requires communal consent. Birrichaga, "Ejidos," 76-7; Fallaw, *Cárdenas Compromised*, 15-26; Dennis, *Intervillage Conflict in Oaxaca*, 40-2. "Private in a special sense" and its accompanying explanation come from Dennis.

[206] Gumersindo Magaña Negrete, "Manipuleos y fraudes en Oaxaca," *El Universal,* 8 Mayo 1981, Biblioteca Lerdo de Tejada, Archivos Económicos, Exp.: R12699-R12699 Oaxaca, Estado de, Agricultura.

[207] Rosa Ochoa, interview with Joshua Walker, in her home in Santa Marta Latuvi, 15 May 2012.

[208] Porfirio Gúzman Gil to Fidencio Hernández, 25 Nov. 1945, AGPEEO, Fondo: Asuntos Agrarios, Serie: XIII Tierras Comunales, Legajo: 21, Exp.: 2.

[209] Ibid.

from Latuvi had no legal authority to enter into contracts like these.[210] Some intense discussions must have occurred between the leaders of Lachatao and Latuvi, because by 1948, plans for using the licensing fees had changed drastically. Leaders of Lachatao agreed to authorize the forestry operations in Latuvi, but representatives from Latuvi agreed that the proceeds from the licenses would go towards building a potable water network for Lachatao.[211] This is evidence that new technologies were key components of intra-regional disputes over political authority and control of local resources.

Conclusion

A former official with the National Indigenist Institute (INI) told me an important story about the process of introducing new technologies and techniques into indigenous communities. He talked to me about the reactions of the Tlapanec people in the state of Guerrero:

> **Former Official:** They were more careful. "No, let me think about it." One would go to the assembly, and they say, "now we've heard what you have to say, we're going to think about it. Come back in a month." A month later you go back to the convened assembly, and they say, "well, we still have not decided, we still do not know if we accept what you say or no." You go to another, and another, and another assembly until you convince them…[212]

This quote was obviously not referring to Oaxacan peasants, the main subjects of my work. Actually, the official suggested that peasants from Oaxaca's Sierra Juárez reacted comparatively favorably to INI programming.[213] However, I think the quote is still relevant because it discusses intravillage dynamics that are also descriptive of those in Oaxaca. The part about villagers claiming "we still have not decided," is crucial.

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[210] Luis Pérez y Pérez to Adulfo Tamayo O., 10 Nov. 1948, AGPEEO, Fondo: Asuntos Agrarios, Serie: XIII Tierras Comunales, Legajo: 21, Exp.: 2.

[211] Clemente Hernández S., and others, to Fidencio Hernández G., 3 Sept. 1948, AGPEEO, Fondo: Asuntos Agrarios, Serie: XIII Tierras Comunales, Legajo: 21, Exp.: 2.

[212] Former INI official, interview by Joshua Walker, at his home in Oaxaca de Juárez, 22 May 2012. Translation by Joshua Walker.

[213] Ibid.

Villagers fought over how to adopt and manage new technologies. New tools and techniques could drop into old village feuds, or they could become new objects of contention themselves. When villagers told my informant "we still have not decided," I suspect that this really indicates internal conflict over the process of technology adoption. As I have shown in this chapter, such conflicts were rampant in Oaxaca. Peasants were not naturally conservative or unwilling to try new techniques, but the internal politics of villages were very complex and capable of delaying technological change.

When communities finally decided to approve major technological additions like highways or potable water systems, they turned to familiar organizational structures to manage them. Peasants preferred to use *tequio, cooperación,* and *comites* to manage and interpret new tools, and they rejected unfamiliar, government-mandated cooperatives.

Peasants fit new technologies into these existing structures of power, but they also learned over time to use them to challenge village elders and *caciques.* As the petitioners from San Bartolomé Ayutla suggested, even simple resources like mules and fruit trees could be big threats to bosses who were used to monopolizing access to business opportunities. When roads, cars, and affordable, personalized grinding mills made peasants' freedom even more robust, this threat grew.

Those who served on technology *comites* also threatened traditional power. Their skills in writing and navigating government bureaucracy delivered popular innovations like potable water and gave them prestige. This does not mean that all village elders, *caciques,* and other established leaders were necessarily against new technologies. As Waterbury suggested, some used positions on *comites* and connections with government officials to bring new technologies to villages and to shore up their support. Faucets and

fertilizers were part of ongoing formulations and reformulations of hegemonic power in villages. More research and evidence is ultimately needed to definitively prove these ideas.

Families used the new opportunities and power provided by technologies to challenge the power of household patriarchs, and villagers used the same power to challenge the authority of elders, strongmen, and residents of head towns. In the next chapter, I argue that challenges to authorities moved even further up the political hierarchy. Entire villages challenged the development planning and decisions of state and federal officials. They made access to technology central to ongoing discussions about their participation and membership in the state of Oaxaca and the nation-state of Mexico.

Chapter 5: Petitions

In February of 1984, officials from the village of San Bartolomé Quialana in the valley of Tlacolula sent a petition to Oaxaca's governor. They asked for help acquiring the following items: pavement for the village's roads, the extension of the village's potable water system, a well and an electric pump for the potable water system, a health center, a CONASUPO store,[1] deep wells for irrigation, "improvement" of the population, the extension of the village's electrical grid, the repair of ten schoolrooms, "continuation" of the municipal center,[2] farm machines "with their tools", a vehicle for the municipal authorities to conduct village business, the restoration of the village's Catholic church, credit for motorized pumps, and a cinder-block factory. The petitioners asserted that support from the governor would benefit their community and further the progress of Mexico.

The details of this petition and ones like it tell us a lot about the ways that the peasants of San Bartolomé and other locales understood rural development. Peasants realized that development funds were not distributed evenly from village to village or even from state to state. Peasants also did not readily separate agricultural concerns with those centered on domestic production, village education, religious life, or political life. In this example, wells for irrigation, farming machines, and a cinder block factory appear on the same wish list as water faucets, the repair of classrooms, the repair of the church,

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[1] Ricardo Morales Hernández to Governor of Oaxaca, 18 Feb. 1984, San Bartolomé Quialana Archivo Municipal. Binder: Documentos Antiguos. CONASUPOs were government-run general stores that sold basic necessities, like corn, beans, wheat, milk, sugar, toilet paper, and toothbrushes, at rates that were lower than peasants could find on the private market. For more on CONASUPO, see Ochoa, *Feeding Mexico,* 162-5; Sherman, "The 'Mexican Miracle' and its Collapse," 589-90.

[2] Ricardo Morales Hernández to Governor of Oaxaca, 18 Feb. 1984. San Bartolomé Quialana Archivo Municipal. Binder: Documentos Antiguos. The meaning of "continuation" here is unclear. This is my translation from the Spanish, "continuación del Palacio municipal." I assume that it means an addition to the town hall.

and the repair of the municipal center. Villagers visualized development as a holistic enterprise.

We can also use petitions like these to understand the ways that peasants envisioned their place in the Mexican nation. They saw themselves as members of villages, regions, states, and nations, and they deployed their membership in these imagined communities strategically in order to get what they wanted.[3] For example, villagers in San Bartolomé connected improvements at home to the "progress of Mexico." Peasants in Oaxaca are more likely to self-identify as members of their community than as citizens of Mexico,[4] but they leveraged their membership in broader communities like the nation-state when necessary.[5] Faucets and fertilizers connected peasants to communities that extended beyond "the view from [the] church bell tower."[6]

Peasants also expressed their place in the nation by phrasing their petitions in terms that they thought were congruous with the development goals of national officials, especially the president of Mexico. These petitions changed over time to match the changing goals and visions of officials. This is further evidence that peasants listened to and participated in conversations taking place outside of their communities.

These arguments serve three purposes in my dissertation. First, they rebuke the technological declensionism of some studies of peasants, the Green Revolution, and rural

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[3] For more on the ways that Oaxacan peasants engaged in wider political debates in order to get what they wanted, see Guardino, *The Time of Liberty*. For community formation and how it affects relations of power, see Anderson, *Imagined Communities*.

[4] Berg Jr., "The Impact of Modern Economy," 27.

[5] Lynn Stephen similarly argues that rug weavers in the Oaxacan community of Teotitlán del Valle strategically employed national, state, and ethnic identities to defend their economic interests. Stephen, *Zapotec Women,* 101-3.

[6] Guardino, *The Time of Liberty,* 284-6. Here, Guardino dialogs with Van Young, *The Other Rebellion,* 483.

technology change on Mexican small farms.[7] I make the simple yet important argument here that peasants, in many cases, asked for new tools and infrastructure improvements.

Second, by showing that peasants were both aware of the disparities in regional development that I described in chapter two and willing to respond to them, the chapter reinforces the idea that peasants were active and empowered participants in their own development.

Finally, the language of peasants' petitions helps us to see why the story of rural technology change is important even outside of local communities. There was more at stake for peasants than the success of local economies or the economic viability of their families, although these things were monumentally important. They also viewed development projects and government support as crucial for allowing villagers to reproduce local culture and to achieve full membership and participation in a united Mexico.

Appeals Using Villages and Regions

When Oaxacans petitioned for agricultural and village development support, they often focused their argument, or a portion of it, on explaining the particular circumstances of their village or region. Some claimed that their locales were uniquely harmed by geographic, climatic, ecological, or economic misfortune. For example, representatives of *ejidos* near Tuxtepec, Oaxaca wrote to the minister of agriculture in Mexico City in 1958 asking for improved corn and rice seeds, the extension of credit, an agricultural machinery center staffed with government experts, and that the local *ejidal* Bank give them a fair price for their corps. They claimed that "chaos" had taken a

[7]Tutino, "The Revolutionary Capacity of Rural Communities," 249-51; Nahmad Sittón González, and Rees, *Tecnologías Indígenas,* 14-15; Wright, *Death of Ramon González,* 153; Wasserman, "Rural Income and Labor Distribution," 103.

considerable toll on their region.[8] In 1960, in the village of Teococuilco in the district of Ixtlán, the school director, municipal president, and representatives from two local committees wrote a petition complaining that scarce vegetation had caused erosion and "some sicknesses" in the village. They asked for 3,000 trees for reforesting.[9] Also in 1960, the municipal president of Santiago Matatlán in the valley of Tlacolula wrote to the head of the Department of Agriculture and Cattle in the state government claiming that their village did not have enough water for irrigation. They asked for "four or five hundred little trees."[10] In 1964, the president of a local club in San Felipe Tejalápam in the valley of Etla wrote to Mexico's president-elect Gustavo Díaz Ordaz. He asked for the construction of a small dam for irrigation, claiming that "our village suffers from a lot of very grave problems, and the gravest of all is lack of water."[11] He claimed that the dam would allow them to jump-start agriculture using modern methods. Villagers were quick to point out the negative environmental and economic circumstances that they faced.

Others argued that their community was uniquely impoverished. In 1969, municipal leaders from San Felipe Zapotitlán in the district of Sola de Vega wrote to public health officials asking for help funding a new public water system. They wanted a system with enclosed tubes to replace their old one, which relied on open, wooden canals that allowed birds to defecate in them, the sun to shine on them, and trees to clog them up

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[8] Augustín Santos Aparicio and Cándido Rojas to Gilberto Flores Muñón, 10 February 1958. AGN, Fondo: Adolfo Ruiz Cortines, Exp: 404.11/299.

[9] Héctor Santillian P., and others, to Jefe de la Delegación de Agricultura y Ganadería, 5 June 1960. AGPEEO, Fondo: Asuntos Agrarios, Serie: V Problemas por Bosques, Legajo: 900 (09), Exp.: 26. It is not clear if the official to whom the letter is addressed worked for the state or federal government.

[10] Evaristo Jiménez Monterroza to Jefe del Dpto. de Agricultura y Ganadería, 22 June 1960. AGPEEO, Fondo: Asuntos Agrarios, Serie: V Problemas por Bosques, Legajo: 905 Exp. 12.

[11] Gonzalo Martínez Ramírez to Gustavo Díaz Ordaz, 31 Oct. 1964. AGN, Fondo: Gustavo Díaz Ordaz, Caja 67 (204), Exp. 727.2/4.

with leaves. They claimed that they were, "an utterly poor community that lacks economic resources, we do not have any way to get money because we do not have forest resources that we can exploit, we only live by our daily work, our families go half-naked, but we want to progress."[12] In the same year, peasants from San Martín del Estado argued that their village was, "one of the worst hit by misery" because their region, the Mixteca Chica, had no jobs center where peasants could work while waiting for their planted seeds to grow.[13]

Pleading poverty often involved comparing home to other, seemingly more fortunate locales. In 1949, village leaders from San Bartolomé Quialana wrote a petition to the governor of Oaxaca calling for their village to be included in a study of the groundwater resources of the region. The petitioners mentioned that they had seen the results [presumably positive] of the artisanal wells that were dug in the nearby communities of Santa Lucía del Camino and Mitla.[14] In 1966, villagers from Candelaria Loxicha in the district of Pochutla wrote to President Díaz Ordaz asking for electricity, classrooms, potable water, and a telegraph office for their village. They claimed that the giving them electricity should not be a big problem because the power lines that take electricity to other communities also passed close to theirs. They also pointed out that because they did not have potable water, they were still suffering from diseases that had been eradicated in other parts of Mexico.[15] A similar petition from the leaders of San Lorenzo Vistahermosa in 1969 informed the president that their village lacked electricity

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[12] Guillermo Salgado Salinas, and others, to Joaquin Alvarez Ordoñez, 22 Feb. 1969. AHSS, Fondo: SSA, Sección: Spr, Caja: 131 Exp. 4.

[13] Various petitioners from San Martín del Estado, District of Silacayoapam, Oaxaca, to Gustavo Díaz Ordaz, 10 Jan. 1969. AHSS, Fondo: SSA, Sección: Spr, Caja: 131 Exp. 4.

[14] Francisco Sánchez and Rosakino Hernández Hernández to Governor of Oaxaca, 10 Nov. 1949. San Bartolomé Quialana Archivo Municipal, Binder: Documentos Antiguos.

[15] Benito Hernández Cruz, and others, to Gustavo Díaz Ordaz, 27 Sept. 1966. AGN, Fondo: Gustavo Díaz Ordaz, Box: 68, Exp: 727.2:4 GHIJKLLL.

"notwithstanding the fact that all the villages of our Mixteca are already electrified."[16] In 1985, *ejidal* leaders from San Pablo Güilá asked the local office of the National Indigenist Institute for credit to buy a tractor, complaining that the only way they could use a tractor was to hire somebody from another village who owned one.[17] These examples suggest that peasants took note of which villages and regions got access to certain tools and technologies, and they also show that peasants were quick to point out perceived disparities in development support.

Some petitions extended this logic by making arguments based on region. A group called the "Committee for Economic Action For the Isthmus" from the Isthmus of Tehuantepec wrote to President Manuel Ávila Camacho in 1941 asking for the completion of an irrigation project and the building of the Pan-American Highway through the town of Juchitán. They argued that their region had not received its share of development attention:

> Other regions of the country, from the North [to the] Center and other latitudes have received the benefit of the Government of the Revolution, while the Isthmus of Tehuantepec still is not familiar with revolutionary economic programs, like: monetary credit for the *campesino*, irrigation of rain-fed lands, and the various advantages of socialist education.[18]

Similarly, a 1964 petition from members of a peasant committee in Oaxaca's Mixe region argued that the Mixes deserved the same type of support that comparable peasants in other states had received. They claimed that their region had been denied this attention.[19]

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[16] Guadalupe Reyes López, and others, to Gustavo Díaz Ordaz, 23 Sept. 1969. AGN, Fondo: Gustavo Díaz Ordaz, Box: 70, Exp. 727.2:4 Oaxaca 1968-69 3:11.

[17] Zacárias Gómez Cruz and O.Alfonzo Morales to C. Diego Vásquez Juárez, 17 Dec. 1985. CDI Tlacolula, Box: Proyectos Especiales 1983-1987, Folder: Programas INI-PIDER Mecanización Agrícola (Tractores).

[18] Wilfrido C. Cruz, and others, to Manuel Ávila Camacho, memorandum, 1 Oct. 1941, AGN, Fondo: Ávila Camacho, Exp: 508.1/123.

[19] Martín Aguilar Domingo, and others, to Adolfo López Mateos, 27 May 1964. AGN, Fondo: Gustavo Díaz Ordaz, Box: 67 (204), Exp: 727.2/4.

Another 1964 petition, this from an association of coffee farmers in the Mixteca Alta, claimed that in "we are abandoned in these corners of the State of Oaxaca."[20] When it came to advocating for development help, villagers wanted support for their village, but they were also willing to transcend local ties and make claims based on region.

Appeals using Mexico

Villagers also made claims based on membership in the nation. Development support for their villages, they claimed, would fulfill the president's policy goals and benefit all of Mexico. While the specific national goals and plans cited by peasants changed over time, the strategy of speaking in terms of nationality in order to lobby for local improvements remained consistent from the 1940s to the 1980s.

Some petitioners tried a broad approach, claiming that a certain project would improve the nation overall. In 1953, a group from Tlacolula called the "Pro-Irrigation Committee of the Valley of Tlacolula" wrote to President Ruiz Cortines asking the government to continue work on an irrigation project for their valley. They claimed that the work would "fatten the national coffers, raising the production of the land, social wellbeing, and the glory of the homeland.[21] In 1964, the municipal president of Zapotitlán Lagunas wrote to PRI candidate and future president Díaz Ordaz. He asked for a tractor and cows, stating that he hoped to help with nutritional problems in the village, and that the village wanted to, "transform our children from ignorant to cultured,

[20] Asociación Agricola Local de Productores de Café de Zaragoza to Gustavo Díaz Ordaz, 30 May 1964, AGN, Fondo: Gustavo Díaz Ordaz, Box: 67 (204) Exp: 727.2/4.

[21] Hilario López Antonio, and others, to Adolfo Ruiz Cortines, 29 Aug. 1953, AGN, Fondo: Ruiz Cortines, Exp.: 609/87.

in order to better serve Mexico."[22] He also quoted parts of a Díaz Ordaz speech about developing agriculture as a way of bolstering his case.

Another strategy was to employ specific language that matched the stated goals and ideas of Mexico's leaders. During World War II, for instance, peasants echoed Mexican leaders' call for more agricultural production. The municipal president of Juchitán wrote to President Ávila Camacho about irrigation projects near his town. He claimed that his town had an "ardent desire to collaborate patriotically with your government in order to reach maximum production during this critical international situation [presumably, a reference to World War II].[23] In 1943, a representative of the *Comisión Agrario* in the village of Soledad de Etla petitioned the president for help paying for either a tractor or an irrigation pump (he left it up to the president to decide between these two). He concluded his letter using the president's own words:

> In light of the work that we are doing to improve agriculture in our region, and seeing that the machines we need will help us to increase our future production, we respectfully ask one more time for your attention, and with it, we will fulfill the recommendations that you yourself have made to the nation to <u>PRODUCE MORE AND BETTER</u> for the homeland.[24]

A year later, a representative from an *ejido* in the district of Huajuapan complained to the president about not receiving plows that they had purchased from government agents. He claimed that the *ejido*'s "humble peasants" had bought the plows "complying with the

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[22] Salomón Moranleón to Gustavo Díaz Ordaz, 14 Aug. 1964, AGN, Fondo: Gustavo Díaz Ordaz Box: 67 (204), Exp.: 727.2/4.

[23] Otilio E. Gallegos to Manuel Ávila Camacho, telegram, 2 April 1942, AGN, Fondo: Ávila Camacho, Exp.: 508.1/123.

[24] Enrique Gris Olivier to Manuel Ávila Camacho, 28 Dec. 1943, AGN, Fondo: Ávila Camacho, Exp.: 507.1/149. Capital letters and underlining in original.

order of the President, with the goal of making agricultural production extensive in this community."[25]

This strategy of mimicking the words and ideas of high-level officials continued in the postwar period. In 1949, village leaders from Chazumba in the district of Huajuapan wrote to Beatríz Velasco de Alemán, the wife of Mexican President Miguel Alemán Valdés. They asked for school building materials, a kindergarten and a preschool, furnishings for the local school, funding to conduct a literacy campaign, medicines, a nurses office, agricultural credit, and clothing. They made sure to point out that they were working to "advance the just and noble proposals outlined in the politics of Mexican reconstruction that our President champions."[26] When a representative from the Regional Peasant Committee of Tuxtepec wrote to President Ruiz Cortines in 1958, he reminded the president of his own goals before asking for support, stating that, "the improvement, development, expansion and productivity of agriculture in the Republic" has "always constituted one of the principal hallmarks of your administration."[27] In 1981, the municipal president of Tlacolula wrote to the Oaxaca representative of the federal Secretariat of Agriculture and Water Resources asking for the construction of a dam for irrigation. He claimed that the dam would help the people of the Valley of Tlacolula to fulfill the production goals that Mexican president José López Portillo had established through his signature program, the Mexican Food System:

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[25] Presidente Municipal of Chinango to Manuel Ávila Camacho, 16 Aug. 1944. AGN, Fondo: Ávila Camacho, Exp: 705.2:671. The full name of the letter writer is illegible on the document.

[26] Dario Barrios R., and others, to Beatríz Velasco de Alemán, 10 June 1949. AGN, Fondo: Miguel Alemán Valdés, Exp.: 111/461.

[27] Manuel Hernández H. to Adolfo Ruiz Cortines, 10 Feb. 1958. AGN, Fondo: Adolfo Ruiz Cortines, Exp: 404.11/299. Translation by Joshua Walker.

> We consider the construction of this dam to be urgent, so that agriculture in the Valley of Tlacolula can be more effective and production will surge…actually it is urgent that we produce more grains and forage crops, the President of the Republic launched his Mexican Food System program for this, [and] we want to comply with it as much as possible.[28]

Incorporating the language and goals of national-level development officials was a strategy that remained consistent throughout the 1940s-1980s period I study. Peasants kept the strategy fresh and relevant by adding topical references to World War II or the Mexican Food System when appropriate.

Petitioners also appropriated the gendered language of politicians and development officials. Government officials consistently placed women and children in the center of development plans. As I explained in chapter three, they visualized them as untapped sources of income-generating labor that could lift families out of poverty. Petitioners repeated these ideas. In 1948, villagers from Jaltianguis used the same words to describe women's household labor that President Ávila Camacho had used in 1941 (see chapter three).[29] After asking for a mechanical corn grinder, they wrote that, "the women of this village are anxiously waiting to see themselves freed from the slavery of the *metate.*"[30] It is impossible to know if peasants were repeating phrases and language invented by politicians, or vice-versa. Either way, this suggests that officials and villagers often spoke the same language when it came to development.

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[28] Abel Aguilar Perez to Severo de la Cruz Campa, 7 May 1981, AHA, Fondo: I.H., Caja: 4, Exp. 25. For an extensive study of the Mexican Food System, see Fox, *The Politics of Food in Mexico*.

[29] Secretaría de Gobernación, *Diario Oficial de la Federación*, "Directo que autoriza la creación de Consejos Mixtos de Fomenato Agropecuario," *Diario Oficial de la Federación,* 8 Oct. 1941, http://www.dof.gob.mx/index.php?year=1941&month=10&day=08 (accessed 22 May 2014).

[30] Felix Santiago, and others, to Miguel Alemán, 7 April 1948. AGN, Fondo: Miguel Alemán Valdés, Exp: 136.3/73.

Women also used the gendered imperatives of motherhood to appeal for help. In 1947, a Revolutionary Women's Committee in San Andrés Lagunas wrote to Mexican President Miguel Alemán asking for potable water in their village. They claimed that this project would help to cure some of the village's children of stomach sicknesses.[31] Here, they used caring for children as a tool to advocate for more development support. Similarly, in 1987, the municipal president of San Jerónimo Atzompa wrote with a group of local mothers to the governor of Oaxaca. The petitioners asked for a government-run milk store, funding to help them build municipal offices, equipment for roadwork, tractors for agriculture, and projects to prevent soil from eroding into the nearby Atoyac River. Regarding the milk store, they claimed that their main concern was making sure their children were properly fed. They prefaced their request for tractors by saying, "another of our concerns is the production of basic foodstuffs to sustain our families."[32] Here again, caring for family was a rhetorical device used to advocate for technology support.[33]

Men also used gendered language in their petitions. In his doctoral dissertation from 1968, Richard Lewis Berg, Jr. writes that people from the village of Zoogocho in the Juárez Mountains, "…view themselves as poor, hard-working Indian *campesinos*, a view so culturally ingrained that even those who are financially better off than the majority view themselves no differently."[34] Villagers, especially men, often relayed this

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[31] Comité de Mujeres Revolucionarias, San Andrés Lagunas, Teposc., Oax., to Miguel Alemán, 24 March 1947, Extract summarized by the Secretaría Particular of the President, 1 April 1947, AGN, Fondo: Miguel Alemán Valdés, Exp.:609/177.

[32] Leonardo Cruz, and others, to Heladio Ramirez López, 9 Feb. 1987, CDI Tlacolula, Caja: Proyectos Especiales 1984 (1), Exp.: Oficio Para San Pedro Toviche Ocot.

[33] This is similar to Jocelyn Olcott's argument that Mexican women in the 1920s and 1930s phrased their demands of the government in terms of the *mujer abnegada*, or self-sacrificing mother. Olcott, *Revolutionary Women*, 15-18.

[34] Richard Lewis Berg Jr., "The Impact of Modern Economy," 27.

this image of the hard worker in their petitions. In 1956, the secretary general of the Regional Peasant Committee in Tuxtepec wrote to President Ruiz Cortines, claiming that their lives as *ejido* farmers were "precarious" in spite of "the spirit of work that animates us."[35] In 1964, a group called the "Regional Committee of Mixe Peasants" wrote a long letter to President Adolfo López Mateos asking for a highway, a secondary school, and postal service. They claimed that the Mixes had received little benefit from the Revolution, and had to resort to "climbing and descending mountains transporting sacks on their backs" filled with goods that they could sell in cities.[36] The petitioners use this image of back-breaking labor to make one final argument for a highway, which they claimed would be the "economic and social salvation" of the Mixes.[37] Complaining to President Díaz Ordaz about rising irrigation prices in the Isthmus of Tehuantepec, Epifanio Pañón Castellanos told the story of male villagers in the region who were "constantly working" in their fields in order to provide for their families.[38] Officials from Nejapa de Madero in the district of Yautepec claimed that, "this is a place of honorable, working men" when they asked President Díaz Ordaz for a highway, a health center, and a school.[39]

These appeals to gendered rhetoric bring to mind Mary Kay Vaughan's article in *Hidden Histories of Gender and the State in Latin America*. Vaughan argues that federal development policy between 1930 and 1940 sought to transform men into sober, efficient

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[35] Manuel Hernández H. to Adolfo Ruiz Cortines, 20 Feb. 1956. AGN, Fondo: Ruiz Cortines, Exp.: 404.1/299.

[36] Adulfo Hernández Rodríguez, and others, to Adolfo López Mateos, 27 May 1964. AGN, Fondo: Gustavo Díaz Ordaz, Caja: 67 (204) Exp.: 727.2/4.

[37] Ibid.

[38] Epifanio Pañón Castellanos to Gustavo Díaz Ordaz, 20 Nov. 1964. AGN, Fondo: Gustavo Díaz Ordaz, Caja: 67 (204) Exp.: 727.2/4.

[39] Luis Miguel Hernández, and others, to Gustavo Díaz Ordaz, 2 Oct. 1966. AGN, Fondo: Gustavo Díaz Ordaz, Caja: 68, Exp.: 727.2/4 GHIKLLL. This is inspired by French, *A Peaceful and Working People*.

producers, and to transform women into rationalized homemakers who found the most nutritious ways to feed their families.[40] I argue that these ideas resonated with peasants, who used the same gendered images of hardworking men and nurturing mothers to make a pitch for new tools and infrastructure.

Appeals Using History

Peasants also appealed to a common, national historical narrative. Not surprisingly, citing participation in the Mexican Revolution of 1910-1920 was common.[41] A group of municipal presidents from the Sierra Juárez wrote to the president asking for a bridge, roads, and boarding schools for indigenous children. They claimed that the Sierra Juárez had served the state, "contributed with their blood to the triumph of the Revolution," and gave the nation Mexican hero Benito Juárez (1806-1872).[42] In 1947, Felipe Murgía Valdés wrote to President Miguel Alemán, citing his service to the Revolution while asking for "machines" to cultivate his newly acquired farm.[43] Only a few decades after the fighting of the Revolution stopped, the memory of the event was fresh in the minds of petitioners.

The more abstract "promise" of the Revolution was also something that peasants cited in their appeals. In the 1966 petition from authorities in Candelaria Loxicha to President Díaz Ordaz, referenced above, villagers said they were sure that the president would help them, because they knew his feelings about making the benefits of the

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[40] Vaughan, "Modernizing Patriarchy," 199-200.

[41] This is not surprising given the tradition in Latin America of using combat participation to make claims on citizenship. See Florencia Mallon, *Peasant and Nation,* 17-8, 312; McNamara, *Sons of the Sierra,* Marixa Lasso, "Race War and Nation," 353.

[42] Juan Sánchez, Emilio Gómez, Maximiano Mestas, and Federico Martínez to the President of the Republic, nd, AGN, Fondo: Ávila Camacho, Exp.: 609/947. Letter is addressed to the "Citizen President of the Republic." Since it has been filed in Ávila Camacho section of the Archivo General, I assume that it was intended for Mexican President Manuel Ávila Camacho (1940-1946).

[43] Felipe Murgía Valdés to President Miguel Alemán, 9 July 1947, extract summarized by the Secretaría Particular of the President, 10 July 1947. AGN, Fondo: Miguel Alemán Valdés, Exp.: 507.1/124.

Revolution available to peasants.[44] In the same year, a letter from the village of Pinotepa de Don Luis asking for roads, classrooms, electricity, agricultural credit, stud animals, and a telegraph office cited the exact number of years (forty-six) since the village had received any help with school construction. They claimed to be proud of the president's "deeply revolutionary and patriotic" administration, and they hoped the administration would help them like it had helped other villages.[45] These letters imply that the Revolution had yet to help certain villages and peasants, and they put the responsibility for fixing this problem squarely on the shoulders of the president.

The Pro-Irrigation Committee in the Valley of Tlacolula, referenced above in a 1953 petition asking for irrigation work, wrote a petition again in 1958, this time to an official of the "Economic and Social Planning Council" in Mexico City. In this later petition, the committee used history and the Revolution in a different way. They cited their long history of trying to accomplish the same irrigation project, claiming that their village had worked in 1913 and again in 1950 to make it happen. The efforts of their ancestors in 1913, they claimed, had been foiled by the revolution. Here, petitioners invoke the common, national memory of the revolution to explain why they had not received something they felt was rightfully theirs.[46] By emphasizing the timeline of past efforts, the Committee also used history to emphasize their persistence and dedication.

A different way of using history to make political claims was to appeal to an official's personal or family history. In 1947, for instance, a man wrote to President

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[44] Benito Hernández Cruz, and others, to President Díaz Ordaz, 27 Sept. 1966, AGN, Fondo: Gustavo Díaz Ordaz, Caja: 68, Exp.: 727.2/4 GHIKLLL.

[45] Isaias Franco Sánchez, and others, to Gustavo Díaz Ordaz, 1 June 1966, AGN, Fondo: Gustavo Díaz Ordaz, Caja: 68 Exp.: 727.2/4 ABCCHDEF.

[46] Jaime Monterrubio, and others, to Consejo de Planeación Económico y Social, 30 Jan. 1958, AGPEEO, Fondo: Asuntos Agrarios, Serie: V Problemas por Bosques, Legajo: 905, Exp.: 10.

Miguel Alemán claiming to have served as a solider under Alemán's father, who was a military general.[47] He asked for plow animals and a plow.[48] In 1966, municipal authorities from the town of Tlacolula wrote to President Díaz Ordaz asking for a secondary school, help securing the governor's approval of a potable water project, irrigation, and city planning services. They claimed that Tlacolula was the homeland of the president's ancestors and the place where he had spent part of his childhood.[49] An ex-municipal president of Tlacolula, Noel García Aguilar, told me that his father, who was also an ex-municipal president, made a similar, personal appeal to President Díaz Ordaz to advocate for potable water for Tlacolula:

> **Noel García Aguilar:** …how did we get potable water? It was when my father went to see him. The President of the Republic came to Cuilapan de Guerrero [a village south of Oaxaca City] to an event, and my dad gave him a bouquet of flowers, red carnations. And he surprised the president: why would he give him flowers if he were not a woman? Then my father said to him, "I'm giving this to you because I am from Tlacolula de Matamoros." Then the president said to him, "What does Tlacolula want?" My father said to him, "the village needs potable water." Within fifteen days, the federal government had started on the [water] project…[50]

García Aguilar told this story while informing me that Díaz Ordaz was actually born near Tlacolula, not in the state of Puebla. He was implying that the president had a soft spot in his heart for the region where he was born. García Aguilar's story suggests that appealing to the personal history of officials could have an enormous payoff for petitioners. Appeals to personal and family history are less common than the other strategies detailed in this chapter, but they should not be overlooked. Jeffrey Rubin

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[47]Wikipedia, "Miguel Alemán González," http://es.wikipedia.org/wiki/Miguel_Alemán_González, (accessed May 24, 2014).

[48] Fidel Zubeldía Delgado to Miguel Alemán. 21 Oct. 1947. Extract summarized by the Secretaría Particular of the President, 23 Oct. 1947, AGN, Fondo: Miguel Alemán Valdés, Exp.: 509/4.

[49] Florentino Garcías Gómez, and others, to Gustavo Díaz Ordaz. 3 Oct.1966. There is a village that borders Tlacolula to the north named Díaz Ordaz.

[50] Noel García Aguilar, interview by Joshua Walker, in García Aguilar's car, near Villa Díaz Ordaz, Oaxaca, August 25, 2012.

argues that alliances between regional and national leaders helped to make infrastructure improvements like roads, schools, and dams possible in Oaxaca's Isthmus of Tehuantepec. García Aguilar's story suggests that personal connections based on history or geography could help to solidify alliances like these.[51]

Appeals Using Indigeneity

Beginning in the 1920s, the policy of the Mexican government towards Indians centered on the concept of *indigenismo*.[52] In contrast to the Porfirio Díaz regime's (1876-1910) murderous policy towards Indians, officials who practiced *indigenismo* called for the government to respect and celebrate Indians while also trying to reform their ways.[53] As Alan Knight eloquently defined it, it was a policy that called for the "progressive, persuasive integration of the Indian into Mexican society."[54]

Indigenismo was practiced mostly by rural schoolteachers in the 1920s and 1930s.[55] After 1948, regional coordinating centers of the National Indigenist Institute (INI) would become additional, important sites for *indigenista* training and practice. There, officials trained bilingual *promotores* (promotors) to "negotiate INI development policies in education, road construction, agriculture, and public health in their home communities."[56] Mary Kay Vaughan, Alexander Dawson, Stephen Lewis, and Alan

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[51] Rubin, "Decentering the Regime," 104-105; Smith, *Pistoleros and Popular Movements,* 4-5. Both Jeffrey Rubin and Benjamin Smith document the fragile hegemony that resulted when national political leaders struck deals with regional *caciques* in Oaxaca. PRI rule in the twentieth century, they argue, was maintained by allowing local strongmen the freedom and independence to continue ruling in ways that protected regional and local culture.

[52] Knight, "Racism, Revolution, and *Indigenismo"* 99-100.

[53] Ibid., 78-80, 100.

[54] Ibid., 81-2.

[55] Knight, "Racism, Revolution, and *Indigenismo,* 82; Vaughan, *Cultural Politics in Revolution,* 5, 46.

[56] Lewis, "Mexico's National Indigenist Institute," 610; Dillingham, "*Indigenismo* and its Discontents" 12-13.

Dillingham have all shown how rural residents learned over time to negotiate the form and shape of government-led modernization efforts like these.[57]

In the prevailing context of official *indigenimso* that lasted from the 1920s until at least the 1980s, being Indian made one eligible for modernization. Villagers knew this, and they stressed their indigeneity to advocate for the technologies they wanted. For example, in the above-cited petition from the "Committee for Economic Action for the Isthmus" in 1941, petitioners highlighted the national-level contributions of Zapotecs in the Isthmus of Tehuantepec:

> [The Isthmus is] always demonstrating [itself] to be a region where liberty lives and is sustained by the Indian blood of the Zapotec. Fighting against the Intervention and the Empire in the so-called second period of Independence, and afterwards offering complete battalions of its race in the efforts towards democracy started by Francisco Madero.[58]

Here, not only do the petitioners draw on the Revolution and other historical events to make their case, but they also do so while citing their indigenous roots. Interestingly, the letterhead of this document reads, "Committee for Economic Action for the Isthmus of Tehuantepec," but the group's name at the conclusion of the letter is different. There, they identify themselves as "The Committee For Zapotec Economic Action," a name that plays up an indigenous, Zapotec identity. I suspect that the group included both names on the document in order to make the broadest appeal possible. Some officials might have responded more favorably to a region-based argument (one referencing the Isthmus of Tehuantepec), and others to this ethnicity-centered argument. Trying to maximize their chances of being heard, this group deployed both identities at once.

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[57] Vaughan, *Cultural Politics in Revolution,* 4; Lewis, "Mexico's National Indigenist Institute," 615-618; Dawson, *Indian and Nation,* xxii-xxiii, 153; Dillingham, "*Indigenismo* and its Discontents," 5.

[58] Lic. Wilfredo C. Cruz, and others, to Manuel Ávila Camacho, 1 Oct. 1941, AGN, Fondo: Ávila Camacho, Exp.: 508.1/123.

A similar petition to President López Mateos in 1961 by *ejidatarios* in the Tuxtepec district of Oaxaca stressed that the president was "the caretaker of the peasant masses who always aspires towards knowing and resolving the problems of the autonomous Indians of Mexico..."[59] Here, the petitioners deploy a reference to class (peasants), ethnicity (Indians), and nation (Mexico) in making their claim. In the above-mentioned petition from Candelaria Loxicha from 1966, the petitioners wrote that the majority of their "4,200 indigenous compatriots" had not received any help from the achievements of the Revolutionary movement.[60] They also stressed the President's concern for the poor (*"las clases más humildes")* and for peasants in the same document. This is further evidence that peasants were willing to deploy their indigenous identity, and that they often did so alongside other identities related to class or region.

Some villagers also spoke of themselves as "antiquated," "primitive" or "behind the times," terms that implicitly reference indigeneity. In 1953, authorities from Santo Domingo Armenta asked for tractors or plows because they said their form of planting was "completely antiquated" and produced poor returns.[61] Manuel Hernandéz H., in an above-mentioned petition on behalf of various *ejidos* in the Tuxtepec district in 1956, claimed that *ejidatarios'* techniques were "almost primitive," relying on a stick instead of a team of oxen, a team of mules, or a tractor.[62] In 1966, municipal authorities in Villa Díaz Ordaz complained about a lack of technical orientation in agriculture, claiming that this resulted in a style of work that they inherited from their ancestors many centuries in

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[59] Cornelio Santiago Hernández, and others, to Adolfo López Mateos, 27 April 1961. AGN, Fondo: Adolfo López Mateos, Exp.: 508.3/116.

[60] Benito Hernández Cruz, and others, to Gustavo Díaz Ordaz, 27 Sept. 1966. AGN, Fondo: Gustavo Díaz Ordaz, Box: 68, Exp: 727.2:4 GHIJKLLL.

[61] Bernardo Mayrén Pérez, and others, to Adolfo Ruiz Cortines, 21 June 1953. AGN, Fondo: Adolfo Ruiz Cortines, Exp.: 404.1/1462.

[62] Manuel Hernández H. to Adolfo Ruiz Cortines, 20 February 1956. AGN, Fondo: Adolfo Ruiz Cortines, Exp.: 404.11/299.

the past.[63] Another village claimed that their work styles were "rustic" while asking for agricultural implements.[64]

How do we know that terms like "rustic" and "primitive" reference indigeneity? Amongst Mexican officials, this rhetorical connection was an old one. Linking "Indian" and "backwardness" while pushing modernization efforts was something that had been done by leaders like Manuel Gamio since at least the 1920s, and it is clear from speaking with peasants that the linkage between "indigenous" and "backwards" is one that persists.[65] In 2012, Rosa Ochoa, age fifty-five from Santa Marta Latuvi, told me, "…we want to modernize already, we do not want to be indigenous...Many of us think the word 'indigenous' is very lowly."[66] In this quote, Rosa clearly contrasts being indigenous with modernizing, suggesting that the opposite of "modern," i.e. "rustic" or "primitive" is "indigenous."[67] In their petitions, villagers were willing to draw similar contrasts and connections if it meant receiving the specific types of technology and infrastructure support that they needed.

In 2012, Amador Pérez Sánchez, the fifty-nine year old ex-municipal president of San Bartolomé Quialana, insinuated that indigeneity remains a great way to get funding from the government:

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[63] Pedro Cortés García, and others, to Gustavo Díaz Ordaz, 3 Oct. 1966, AGN, Fondo: Gustavo Díaz Ordaz, Caja: 68, Exp.: 727.2/2.

[64] Miguel Pérez Vielma, and others, to Gustavo Díaz Ordaz, 3 June 1966. AGN, Fondo: Gustavo Díaz Ordaz, Caja: 68, Exp.: 727.2/4 ABCCHDEF.

[65] Brading, "Manuel Gamio and Official *Indigenismo*," 84.

[66] Rosa Ochoa, interview by Joshua Walker, in her home in Latuvi, 15 May 2012. Spanish transcript reads: "…como ya queremos modernizarnos, ya no queremos ser indígenas, porque muchos, yo así siempre he oído. Y a la mejor, pues, pueda que sí, que no, porque muchos no queremos ser, porque la palabra indígena, mucho de nosotros pensamos que el algo que está muy hasta allá abajo…"

[67] Ibid.

> **Amador Pérez Sánchez:** Support from the government comes, yes. Here, they always give support because it is an indigenous village. In Tlacolula, they do not give support these days. There is no support because now it is commercial. There is a baker, a butcher, a pork-butcher, a carpenter. But here [in San Bartolo], only indigenous people. And the government likes the way the women dress. The government likes it a lot. When they go to a meeting, they always take photos.[68]

This statement suggests that it is easier for a village classified as "indigenous" to get government funding than it is for non-indigenous villages or towns like Tlacolula. It also suggests that in this region, class, one's relation to work and capital, determines race. Since Tlacolula has more "commercial" jobs like butchering and baking, the town is less indigenous in Pérez Sánchez's telling.[69] Finally, the fact that Pérez Sánchez did not seem outraged by the story about government workers photographing women suggests that some villagers were perfectly ok parading "indigenous" clothing and bodies in front of officials' cameras, as long as it meant more funding for local projects. Regrettably, I never asked a woman from San Bartolo what she thought of this, and a female opinion on this issue could complicate this interpretation. Nevertheless, this story fits with other evidence in which villagers used (and continue to use) indigenous identity to lobby a state that was (and still is) in the business of modernizing Indians.

The Content of Peasants' Petitions

In February of 1941, villagers from Yodocono in the district of Nochixtlán wrote to Mexican president Manuel Ávila Camacho petitioning for a host of items. They sent a

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[68] Amador Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, Oaxaca, August 21, 2012.

[69] Rosemblatt, "Other Americas," 612. This interpretation is influenced by Karin Alejandra Rosemblatt's October 2009 contribution to the *Hispanic American Historical Review*, which argues that for Mexican sociologists and anthropologists, "class distinctions increasingly replaced, but also subsumed, racial distinctions…" Apparently, this statement was also true of Pérez Sánchez's thinking in 2012.

copy of the letter to the National Peasant Confederation (CNC), whose general secretary asked the president to help the village to get the tools they had requested. The items on Yodocono's wish list included: cement and other materials to build an irrigation system, sheet metal for their school's roof, carpentry tools to be used by schoolchildren, a postnatal care facility, some plows for working the fields, sewing machines for women, and a typewriter.[70] This petition is very similar to the one penned by the villagers of San Bartolomé Quialana over forty years later (I discussed the petition from San Bartolomé in the opening paragraph of this chapter). Both petitions show peasants asking for tools in a way that is integrated: they asked for tools that will help produce more goods for sale immediately, like plows or sewing machines, and they asked for tools that will help assure the health and reproduction of village life over a longer period, like properly-constructed schools, postnatal care facilities, and typewriters. Development officials throughout the period of the 1940s to the 1980s were concerned with the comprehensive reform of agriculture, roads, schools, water, public buildings, and health services,[71] and these petitions suggest that peasants envisioned development in a similar, comprehensive way.

The village of Yodocono was one of many that put their requests and petitions in lists that made it difficult to tell which new technologies, if any, they found to be the most important. Officials from the village of Magdalena Teitipac petitioned President Ruiz Cortines asking for a list of nine items, including a dozen plows, five *escrépas*

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[70] Garciano Sánchez to Manuel Ávila Camacho, 5 June 1941. AGN, Fondo: Manuel Ávila Camacho, Exp.: 151.3/218.

[71] Sanderson, *The Transformation of Mexican Agriculture*, 238; Barkin and King, *Regional Economic Development:* 54, 91-2, 131-2; Sergio Reyes Osorio and others, eds., *Estructura agraria,* 43-44. Grindle, *State and Countryside,* 161. Here, Grindle focuses on integrated development in Latin America in the 1970s.

[scrapers?], five wheelbarrows of iron, a pump and tubing for irrigation, two dozen plows and two dozen shovels (for building roads), an electrical plant for providing lighting in the school, a sewing machine to establish a seamstress shop for girls, a typewriter for use in the school and the town government, and two lamps *"de luz de capuchones*."[72] In this example, the electrification of the school, something that would presumably pay out over the long term as the village produced a generation of educated young adults, is treated on the same plane as an irrigation pump, which would reap benefits during the next crop cycle.

Tools to help agriculture and industry were important to peasants, but so was reproducing culture. Brass bands, for instance, are crucial providers of entertainment and music at community events in many Oaxacan communities, and they are also sources of communal pride and links to the past.[73] Some communities asked for help buying instruments for their bands. For example, in 1947, the Confederation of National Workers (CNT), a labor union, forwarded a series of memos to the president on behalf of twenty-two villages in the districts of Silacayopan and Juxtlahuaca. These memos featured lists of needs and problems for each community. Out of twenty-two villages included in the memos, eight needed instruments for town bands, making musical instruments the fourth most-mentioned item in these memos. Musical instruments trailed only plows, roadways, and schools for most-mentioned item, and they beat out potable

[72] Manuel Ignacio, and others, to Adolfo Ruiz Cortines, Date unknown, AGN, Fondo: Adolfo Ruiz Cortines, Exp.: 507.1/35. I have no idea how to translate *escrépas. "Capuchón*" means top or hood, so *"lampara de luz de capuchones*" could refer to lights that hang from the opened hood of a car that is under repair.

[73] Thomson, "Bulwarks of Patriotic Liberalism," 43, 55, 59, 65. According to Thomson, patriotic bands, along with national guards and patriotic festivals, were mediums through which peasants could articulate a locally-appropriate vision of liberalism.

water, irrigation, fruit trees, credit, and other issues.[74] Similarly, the village of Jaltianguis wrote to President Miguel Alemán in 1947, reminding him that they had greeted him with their "humble band" while he toured the Sierra Juárez as a presidential candidate in 1946. They asked the president first for musical instruments for their band, aptly named "The Miguel Alemán Musical Band," and also for a mechanical corn grinder for the village's women. In this petition, the band instruments were given clear priority over the corn grinder. However, the fact they asked for both items shows that peasants were thinking about technological solutions for problems involving both the reproduction of culture and the production of food.[75]

How Effective Were These Petitions?

What were the results of these petitions? Because few, if any, of these petitions are archived with responses written by government officials, it is difficult to quantify the ratio of successful petitions to unsuccessful ones. However, we can get some clues by carefully reading the language of individual petitions, especially in cases where villagers complain about not having their ideas heard or, in the opposite case, where they thank officials for delivering desired programs.

Many peasants had their requests denied. In 1945, two men from Loma Bonita wrote to the president asking for help acquiring oxen. The president's office forwarded the petition to the Secretariat of Agricultural Development, who denied the request due to

[74] Eucario Leon I. to Miguel Alemán Valdés, 10 April 1947, AGN, Fondo: Miguel Alemán Valdés, Exp.: 437.3/56. Although the boilerplate format of each memo suggests that they were created by representatives from the labor union and not by peasants, each memo lists distinct needs for each community, indicating that peasants had some input in their creation.

[75] Felix Santiago, and others, to the President, 15 Jan. 1947, AGN, Fondo: Miguel Alemán Valdés, Exp.: 136.3/73.

lack of funds. This inspired the men to write to the President again.[76] Zurieta Palma Dolores, a resident of the village of San Jorge Nuchita, wrote to the president in 1962 asking for a pump for irrigation and claiming that various executive-branch agencies had already denied the request.[77] Petitioners from San Lorenzo Vistahermosa similarly complained, "Multiple have been our efforts,"[78] suggesting that writers had not been successful with earlier petitions. In 1993, authorities in San Bartolomé Quialana, who were supervising the construction of a basketball court, claimed to have been "abandoned" by the state government.[79] It was not uncommon for peasants to complain about abandonment and unresponsiveness of government officials.

When requests were approved, most government programs only paid for part of the cost of a project, usually between one-third and one-half of the project's total cost. In some cases, the state government would pick up another one-third of the cost of the project, and the rest of the expense would be left to the village. In 1942, an official from the Secretariat of Agricultural Development (SAF) wrote a response to a petition from the community of Yanhuitlán, which asked for a tractor and a threshing machine. The official agreed that the government would contribute one-third of the price of these tools, as long as the government of Oaxaca and the community itself provided the rest of the money.[80] In 1943, an official from the SAF informed a petitioner who had asked for a

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[76] Luis López S. and César Pérez A., to Manuel Ávila Camacho, 23 June1945, AGN, Fondo: Miguel Ávila Camacho, Exp.: 501.7/99.

[77] Zurieta Palma Dolores to President. 3 Aug. 1963, Extract prepared 4 Aug. 1963, AGN, Fondo: Adolfo López Mateos, Exp.: 508.1/784.

[78] Guadalupe Reyes López, and others, to Gustavo Díaz Ordaz, 23 Sept. 1969, AGN, Fondo: Gustavo Díaz Ordaz, Caja: 70, Exp.: 727.2/4 Oaxaca 1968-69 3/11.

[79] Presidente Municipal Martinez Hernández (first name illegible) to Diodoro Carrasco Altamirano, 15 May 1993, San Bartolomé Quialana Archivo Municipal. Binder: Documentos Antiguos.

[80] Eduardo Morillo Safa to Noé R. Caballos, and others, 11 Nov. 1942, AGN, Fondo: Manuel Ávila Camacho, Exp.: 507.1/111.

pair of oxen, a plow, and a covered wagon, that the federal government would pick up part of the cost of the plow.[81]

Even paying this reduced price for tools proved to be too much for some villages. The "Peasant Committee of Tuxtepec" wrote to the president in 1943. Their petition argued that even though the SAF had agreed to pay half of the price of tools like harrows, cultivators, and plows, most *ejidatarios* in their district still could not even afford this reduced price.[82] This suggests that villagers were not always denied their requests, but some were still not totally satisfied with federal development assistance.

On the other hand, some petitions were answered. In 1945, *ejidatarios* from the district of Tuxtepec wrote to the president informing him that they had received four plows from the Ejidal Bank of Tuxtepec and thanking him for making this happen.[83] Recall that officials from Tlacolula appealed to President Díaz Ordaz for potable water by citing his family's ancestral ties to their community. According to Noel García Aguilar, this strategy was successful and resulted in the beginning of a potable water project fifteen days later. For reasons I explored in chapter two, not all villages had their requests denied, and some villages were more likely to receive positive feedback from their petitions than were others. Having personal or ancestral ties to high-level officials was one way to increase a village's chances of receiving positive feedback.

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[81] Manuel Castaños V. to Calixto de la O. Álvarez, 27 Nov. 1943. AGN, Fondo: Manuel Ávila Camacho, Exp.: 507.1/154.

[82] Manuel Martínez, and others, to Manuel Ávila Camacho, 19 Feb. 1943. AGN, Fondo: Manuel Ávila Camacho, Exp.: 507.1/252.

[83] Mariano Hernández to Manuel Ávila Camacho, 1945. AGN, Fondo: Manuel Ávila Camacho, Exp.: 507.1/232 (Exact date unknown by my error).

Conclusion

In this chapter, I have shown that peasants did not passively accept the conclusions I reached in chapter two. Development programs in Oaxaca were distributed in an uneven way and in a way that was more effective for some villages than for others, and peasants knew this. It was easy to see how other villages or parts of the country were faring when peasants left their village to find work or to sell goods in a weekly market. As we have seen, peasants made their awareness of the situation known to officials, and they asked them to rectify it. This chapter debunks two scholarly assumptions at once: that new technologies like tractors were impositions on local communities, and that peasants were outside of the processes that introduced them. In fact, peasants requested many of the new technologies in question.

By examining the logic used in the petitions, we can also learn about peasants' understanding of their place in Mexico. Just as relations of power were constantly being negotiated by family members and villagers, so too was there a negotiation taking place between federal officials and their constituents. If peasants were to participate in a united Mexico, as officials had wanted them to since at least the 1920s,[84] then they demanded to do so with equal access to the technologies and development funding that they needed. They saw this support as necessary both for improving their incomes and for fortifying traditional institutions like the town band.

However, many of their petitions were ultimately denied, and government programs for delivering tools were often poorly designed. This left it up to peasants themselves to make the visions and desires expressed in these petitions come to life. In the next three chapters, I explore the ways that peasants made that happen.

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[84] Knight, "Racism, Revolution, and *Indigenismo"* 81-2, 99.

Chapter 6: Experiments

Chapters two through five investigated the designs of federal and state-level development planners. They also explored some of the broad consequences of technological development in rural communities, including economic (chapter two), gendered (chapter three), and political consequences (chapters four and five).

In the next three chapters, I focus more on the strategies and skills that peasants used to make new technologies fit their everyday lives. These chapters concentrate on technology users, and in many cases I train my analytical lens on individuals. Local, state, and national politics helped to determine whether new technologies were easy or difficult to obtain, but the final decision to use or not use a technology often depended on an individual's resources, skills, and preferences.

In this chapter, I ask how peasants experimented with new tools and got access to the ones they wanted. Government development programs were one avenue. They exposed peasants to new tools in *parcelas escolares* (school plots) and demonstration plots. These were pieces of farmland in villages where peasants tried seeds, tree grafts, and fertilizers for the first time in a relatively risk-free setting.[85] *Promotores,* engineers, and other officials also visited homes and fields to pitch the benefits of new technologies directly to families and individuals. I argue that officials depended on the help and cooperation of peasants to make these programs successful.

However, as I discussed in chapters two and five, government-sponsored development programs like these were inconsistent in Oaxaca. They targeted some regions to the exclusion of others, and peasants who complained to officials often had

[85] Schwartz, "Resettlement as Planned Utopia," (presentation, American Historical Association Annual Meeting, January 4, 2014). Schwartz discusses the introduction of chemical fertilizers to *parcelas escolares* as part of the Papaloapan Commission's work in the Lower Papaloapan Basin.

their petitions denied or ignored. With this idea in mind, the second half of the chapter argues that peasants found non-government options for learning about and acquiring new technologies. It was often neighbors, people in other villages and cities, hired labor, and equipment vendors who introduced them to new tools.[86] Furthermore, the absence of state coercion meant that peasants were free to purchase and use new technologies however they saw fit. They chose to use their tools in ways that fit their particular needs, even if these practices differed from the recommendations of officials.[87]

Demonstration

In 2012, I interviewed a retired official who had worked for the National Indigenist Institute at various coordinating centers around the country. The man, who preferred to remain anonymous, insisted to me that forcing peasants to change their ways was never part of the Institute's development plans. He told me, "…Never was it about forcing. We never said, 'That is for you, it's going to do it better so accept it.' No. [It was] 'If you want it, here is the demonstration, here is the test of what it offers.'"[88] A key word in this quote is "demonstration." Demonstration was a common development strategy: government officials showed off new technologies in public spaces, and peasants decided for themselves whether or not they wanted to try them. This was an easy way to reach a mass audience when resources and personnel were stretched thin. Below, I explore the design and function of two physical spaces where demonstrations took place: *parcelas escolares* (school parcels) and demonstration plots.

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[86] The idea about hired labor introducing new tools and techniques comes from Turkenik, "Agricultural Production Strategies," 243.

[87] Shepherd, "From In Vitro to In Situ," 411-14. Shepherd makes a related claim about the way that *campesinos* used sprinkler systems in Peru. The politics and geography of Peru are obviously different, but the argument about peasants interpreting technologies creatively holds true both in Peru and in Oaxaca.

[88] Anonymous man #21, interview by Joshua Walker, in his home in Oaxaca de Juárez, 22 May 2014.

A few hectares of land in each community were typically reserved for students and community members to practice agriculture and to try new techniques under the supervision of federal schoolteachers.[89] These were *parcelas escolares*, or school parcels. School parcels predate the Green Revolution and the time period in question in this dissertation, but their importance was renewed in the period after 1940 as the tools of modern agriculture spread around the country.[90]

In 1975, Mario Salazar Liévano, the man in charge of the Agriculture Section at the National Indigenist Institute's Papaloapan Coordinating Center in Temascal, revealed officials' thinking about school parcels:

> Means of forming demonstrative school parcels will be sought, with the goal of divulging technical knowledge; like the application of fertilizers and other chemical products, or, barring that, to establish these parcels in totally independent communities.
>
> The principal object of this demonstration is to get premature harvests of superior quality, economic income that will pay down the cost of establishing both gardens and rain-fed [operations] while these reach their productive stage.[91]

For Salazar, school parcels served three purposes: to disseminate knowledge about new technologies, to raise money, and to "establish parcels in totally independent communities." The meaning of this last goal is unclear, but it could mean that he saw school parcels as footholds for the entry of new technologies and government influence into otherwise "independent" villages.[92] School plots were spaces for introducing new

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[89] Fernando Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 3 Aug. 2012. Translation by Joshua Walker. Martínez estimated that the *parcela escolar* in San Bartolomé Quialana has between fifteen and twenty hectares.

[90] Vaughan, *Cultural Politics in Revolution*, 27. Vaughan found that inspectors from the federal Secretariat of Education asked schoolteachers about their school's garden and about the school's role in introducing new farming methods in the late 1920s and 1930s.

[91] Mario Salazar Liévano to Jacobo Montes Vázquez, 10 Oct. 1975. CDIOAX, Fondo: CCI Papaloapan, Caja: 10, Exp.: 124.

[92] Vaughan, *Cultural Politics in Revolution,* 4. Vaughan's chapter about federal schools in remote Yaqui territory is relevant here.

technologies, and they were also sources of public funding and sites from which officials hoped to influence local agriculture.

Work on school plots was a community affair. School children did much of the labor, but other community members were also involved. The community usually owned the parcel, and its proceeds benefited the school.[93] This meant that working on the *parcela* could be part of adults' routine, required community service (*tequio* or *faena)*. For example, plans to establish gardens at National Indigenist Institute boarding schools in 1975 recommended mobilizing village parent associations to do the hardest work on the parcels. This would be part of their "*faenas dominicales*," required Sunday service to the community.[94] Fernando Martínez, from San Bartolomé Quialana, told me, "…it's our work. When those lands are worked, all of us go to *tequio*. We go and we do not charge anything. Everyone goes to plant."[95] School parcels were the responsibility of the entire community, not just people who were associated with the school.

School parcels in San Bartolomé Quialana and Santa Marta Latuvi were income generators for the community, and they were good places to try out new technologies. The apples, peaches, and other crops that grew on school parcels helped the community's bottom line in San Bartolomé Quialana. Recall comments from Fernando Martínez that I summarized in chapter two. Martínez remembers "five or six donkeys" carrying fruit from the school parcel in San Bartolomé Quialana to the market in Tlacolula during the

[93] Fernando Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 3 Aug. 2012. Martínez told me that the Catholic church in San Bartolomé Quialana also had its own parcel that was tended by community members. The proceeds from this parcel benefitted the church.

[94] Jacobo Montes Vázquez to Juan Larios Tolentino, 29 Aug. 1975. CDIOAXACA, Fondo: CCI Papaloapan, Caja: 10, Exp.: 124.

[95] Fernando Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 3 Aug. 2012.

administration of Adolfo López Mateos (1958-1964). The money from selling this fruit went back to the community's school.[96] School parcels helped to sustain communal life.

Parcels also gave peasants the chance to experiment with new tools that might otherwise seem too risky. Semehí Ramírez García, age forty-six from Santa Marta Latuvi, told me about trying new technologies in Latuvi's school parcel:

> **Joshua Walker:** I have read that the government tried to experiment with fertilizers, with seeds, with machinery on the school parcels. Did that happen here?
> **Semehí Ramírez García:** This was experimentation exactly, when this started, when they began doing apples or grafted peaches. It was always started on the parcels. 'Here we send you a *púa* of this variety, graft it and see what happens.' First, the experiment is in the parcel of the school or the community, to see what happens. And then we continue with the rest. There was a bit of distrust, but when they saw that the crop produced, [they said] 'I want it, too…'[97]

Here, Ramírez suggests that peasants were initially reluctant to try new tools and techniques, but successful experiments on the school parcel could change their minds. He also implied that the government "sent" new technologies for villagers to try, further evidence that parcels were an entry point for officials to influence the practice of agriculture in villages. However, officials' "try it and see what happens" approach shows that they realized that personal experience and experimentation were the most effective teachers and the surest way to allow their ideas to take hold.

Demonstration parcels were additional locations where peasants learned about new technologies under the guidance of federal supervisors. Demonstration parcels were a few acres of a peasant's land dedicated to growing crops with new technologies and techniques. Peasants who owned the land voluntarily followed agronomists'

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[96] Fernando Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 3 Aug. 2012. Martínez said that the local Catholic church had its own parcel that functioned similarly.

[97] Semehí Ramírez García, interview by Joshua Walker, in the ecotourism office in Santa Marta Latuvi, March 1, 2012. Translation by Joshua Walker. I am not sure exactly how to translate *púa*. "Spike" or "barb" are the best translations.

recommendations and used the tools they suggested. At the end of the growing season, visitors from the community and from neighboring villages congregated on the parcel to judge the results. They spoke with development officials and with the farmer who had tried the new technologies, and they touched and tasted the crops that had been produced. Ultimately, visitors decided for themselves which new technologies to transfer to their own fields.

The peasant who agreed to host a demonstration parcel was the key piece of this strategy. He or she could explain the application of fertilizers and hybrid seeds using language that was familiar to visitors. Heliodoro Díaz Cisneros, the principal evaluator of a massive demonstration program for small-scale and rain fed farmers called the Plan Puebla (1967-1972), explained the importance of what he called "cooperating farmers":

> **Heliodoro Díaz Cisneros**: …When they [the peasants] saw just once the increases in production, the cornstalks were piled up there, that is what interested them.
> **Joshua Walker:** Did you all explain to them how this increase was made?
> **Heliodoro Díaz Cisneros**: The extensionist did it, but there was a cooperating farmer where the demonstration parcel had been built, and he explained things to the *campesinos*. But he was also the farmer, too.[98]

Demonstration parcels, like school parcels, were places for introducing new technologies to peasants. Like school parcels, they required a measure of cooperation between officials, farmers, and community members. Their design alone proves that they were not top-down affairs. Participating peasants followed the research and recommendations of officials, but officials depended on individuals to donate a plot of land and to interpret results for their neighbors.

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[98] Heliodoro Díaz Cisneros, interview by Joshua Walker, in "La Casona del Llano," a restaurant in Oaxaca de Juárez, Oaxaca, 11 Sept. 2012. For more about the Plan Puebla, see International Maize and Wheat Improvement Center, *The Puebla Project, 1967-69*; Redclift, "Production Programs for Small Farmers," Barkin and DeWalt, "Sorghum and the Mexican Food Crisis," 48; Fox, *The Politics of Food*, 103; Eakin, *Weathering Risk,* 41.

***Pláticas* (Conversations)**

School parcels and demonstration parcels were some of the most visible techniques that development officials used to expose peasants to new technologies, but they were not the only ones. Officials also tried to enter communities and homes directly in order to spread the word about technology change. Agronomists from the Secretariat of Agriculture and Hydraulic Resources and the Papaloapan Commission visited towns and marketplaces and disseminated research pioneered by agencies like the National Institute of Agricultural Investigation (INIA).[99] Bilingual *promotores* from the National Indigenist Institute, *Mejoradoras del Hogar Rural* (Rural Home Improvement workers), nurses, technicians, social workers, teachers and other conducted "*pláticas*," conversations with residents concerning agricultural practices and rational management of the household.[100] Figure 8 shows a "*plática*" between residents of Latuvi and Papaloapan Commission officials.[101]

[99] Waterbury, " 'Lo Que Dice,'" 66-7; Flavio Aragón-Cuevas, interview with Joshua Walker, in his office at the Instituto Nacional de Investigaciones Forestales, Agrícolas, y Pecuarias (INIFAP), Campo Experimental Valles Centrales, Villa de Etla, Oaxaca, 7 Aug. 2012.

[100] Vaughan, "Modernizing Patriarchy," 205, Lewis, "Mexico's National Indigenist Institute," 616; Reyes Osorio and others, eds., *Estructura agraria y desarrollo agrícola en México*, 916-7. *Mejoradoras del Hogar Rural* were female employees of the state of Oaxaca who had come from villages all around the state to study principles of household hygiene and household economics in Oaxaca City. They returned to their home villages to pass their knowledge to their families. See *Segundo informe del gobierno del C. Lic. Rodolfo Brena Torres*, 1964, pgs. 26-7, AGPEEO.

[101] Rafael Rangel Franco, "Distrito de Riego Por Aspersion de Guelatao de Juarez, Oax., mes de Noviembre de 1969," 28 Nov. 1969, AHA, Fondo: CP, Caja: 267 Exp.: 4075. The exact date of the photograph is unknown. Based on the documentation that surrounds it in the archive, I believe it comes from 1968 or 1969.

Figure 8: "Orientation talks given to the community of Latuvi, Ixlan, Oax." 1969.

Many of these conversations were directed towards women. For example, efforts to reform women's lives were an important component of the Plan Guelatao. This was a mid-1960s development project in which officials from various government agencies worked to modernize the village where Mexican hero Benito Juárez was born. Programming included planting fruit trees, building homes and stables for animals, planting cash crops like sorghum, peas, clover, and forage crops, and building potable water systems for domestic consumption and irrigation. While all of this was taking place, four *Mejoradoras del Hogar Rural* "[oriented] housewives to work like cutting and tailoring, raising hygienic children, cooking, and other related [activities].[102] They also tried to teach the women of Guelatao how to manage their money, how to produce and preserve healthy foods, how to build simple furniture, how to improve their homes, first

[102] Jacob Aragon Aguillon, "Datos Para el Señor Gustavo Díaz Ordaz, President de la Republica, 'Plan Guelatao,' trabajos realizados al tres de octubre de 1966," 5 Oct. 1966, AGN, Fondo: Gustavo Díaz Ordaz, Caja: 68, Exp.: 727.2/3.

aid, and "family relations."[103] Similarly, a 1966 news story about a national "family garden" program claimed that extension agents from the Secretariat of Agriculture were giving advice about home gardens, fertilizers, and seeds at the same time that "specialized feminine personnel" were teaching housewives about domestic economy.[104] Women were also part of the Plan Puebla demonstration projects, according to Heliodoro Díaz Cisneros. They planted, harvested, and applied fertilizers.[105] As I explained in chapter three, officials viewed women as key players in reforming the Mexican countryside, and they targeted women with many of their development strategies.

Successes and Challenges in Government-Led Development

How effective were these government-sponsored methods for spreading the word on new agricultural tools? In some cases, it is clear that peasants benefitted. One of Carole Judith Turkenik's informants, Meliton Cornelia, learned to mix fertilizers by going to an experimental field run by the Secretariat of Agriculture and Cattle (SAG).[106] The SAG also mailed him pamphlets, which taught him to create a mixture of fertilizers and pesticides to spray on his fields.[107] Recall, also, the story of the seventy-five year old man from San Bartolomé Quialana who claimed to have learned to apply fertilizers from

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[103] "Camino Ascendente en la Vida Rural de Guelatao," *El Universal,* 21 May 1967, Biblioteca Lerdo de Tejada, Archivos Económicos, Exp.: R12699-R12699 Oaxaca, Estado de, Agricultura.

[104] "Impulso a la Formación de Huertos Familiares en Casas Campesinas," *El Nacional,* 9 May 1966, Biblioteca Lerdo de Tejada, Archivos Económicos, Exp.: P06445 Huertas 1936-1976.

[105] Heliodoro Díaz Cisneros, interview by Joshua Walker, in "La Casona del Llano," a restaurant in Oaxaca de Juárez, Oaxaca, 11 Sept. 2012.

[106] Field notes of Carole Judith Turkenik, 10 Oct. 1976, GN 2814. The difference between "experimental" fields and "demonstration" fields is not entirely clear to me, but I believe the distinction is thus: experimental fields were places where government agencies tried new ideas. Once the ideas produced good results, farmers were enlisted to create a demonstration field, where other farmers came to visit; Turkenik's data says that Meliton Cornelia learned to mix soil fertilizer ("soil abonos") at the experimental field. I am not sure what "soil fertilizer" means. It could mean natural fertilizers produced by combining insects, leafs, and other plant materials, but I cannot be certain.

[107] Ibid.

a government technician (chapter two).[108] Another man from San Bartolomé told me an almost identical story in an informal conversation: an agronomist from the government taught him about chemical fertilizers around the year 1970.[109] These examples suggest that villagers were open to ideas and techniques that officials introduced.

Secondary source literature suggests that officials learned to be more persuasive over time. They learned to make villagers a part of the education process, to incorporate peasants' traditions and worldviews into their presentations and advice. Donald H. Frischmann studied the strategies of officials from CONASUPO, the agency in charge of federal grocery stories in rural communities. From 1972-1976, CONASUPO officials directed one-act plays in rural communities to inform villagers of the rural store's offerings, which included chemical fertilizers and silos for crop storage.[110] Frischmann found that these plays were only successful when villagers began acting in them. Local actors knew how to speak the language of the audience.[111] Steven Lewis tells a similar story regarding the modernization campaigns of the National Indigenist Institute in 1950s Chiapas. Officials used puppet shows to teach residents about the Institute's programs and to "soften resistance." When the shows began incorporating indigenous actors who spoke in native languages, they became so popular that some villagers incorporated the characters into their cosmology.[112] *Pláticas*, demonstration, and other education

[108] Anonymous peasant #26, interview by Joshua Walker, in his home in San Bartolomé Quialana, 19 July 2014. Translation by Joshua Walker.
[109] Conversation with peasant, in his home in San Bartolomé Quialana, Field notes 1 Oct. 2012.
[110] Frischmann, "*Misiones Culturales, Teatro CONASUPO,"* 290-6.
[111] Ibid.
[112] Lewis, "Mexico's National Indigenist Institute," 621-3.

strategies worked when officials spoke the language of villagers and allowed them to make their own decisions.[113]

But peasant-centric strategies also consumed a lot of time and resources. Too often, effective extension programming did not reach Oaxacan villages, or they were available only for a short time. Demonstration plots, for instance, only helped farmers who lived near the plot or who had the time and resources to travel. Ronald Waterbury suggests that peasants in San Antonino either did not know about or were not interested in an experimental plot near a neighboring village in 1976.[114] Flavio Aragón-Cuevas, a researcher who has worked with the National Institute of Agricultural Research (INIA) since 1984, suggested that his institute's demonstration parcels had a limited audience:

> **Flavio Aragón-Cuevas:** We did a lot of demonstration parcels, validation parcels and demonstration parcels, in order to invite producers to go, to understand what we were doing. There were training courses, too. The problem is that we were not able to impact many people, only some organized groups, because we do not give technical assistance directly to the producer. It's not possible, because we are only a few researchers, that's a job for the technicians. [115]

For Aragón-Cuevas, the research focus of the INIA explained why their demonstration plots had such a limited impact. His organization was never meant to interact directly with growers. This does not, however, disprove my point, which is that demonstration parcels were only useful for small numbers of peasants. I surmise that demonstration plots had poor attendance outside of the community where they were located, but more research is ultimately needed to make definitive judgments about this point.

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[113] Vaughan, *Cultural Politics*, 93-5. Mary Kay Vaughan made this argument regarding teacher's participation in rural festivals in the 1920s and 1930s.

[114] Waterbury " 'Lo Que Dice,'" 67.

[115] Flavio Aragón-Cuevas, interview with Joshua Walker, in his office at the Instituto Nacional de Investigaciones Forestales, Agrícolas, y Pecuarias (INIFAP), Campo Experimental Valles Centrales, Villa de Etla, Oaxaca, 7 Aug. 2012.

Another problem preventing effective extension efforts was that villagers and development officials did not always get along. In 1984, an official at the National Indigenist Institute's Tlacolula Coordinating Center listed problems with the program he was implementing. One problem he cited was "the lack of confidence of peasants in personnel, because they [personnel] do not come back on the scheduled day."[116] Official corruption (or the perception of corruption) was a related concern. In 1962, petitioners from the Oaxacan municipality of Chihualtepec wrote to the President of Mexico, denouncing an engineer in charge of potable water installation. They were not happy because the man was demanding payment for his services.[117] It was not uncommon for villagers to pay for a portion of project costs, but this official was obviously demanding sums that exceeded what the community thought was proper. In 1984, peasants in Oaxaca's Mixteca Alta region suggested that the state government's *Central Maquinaria* was being abused by its operators. The *Central Maquinaria* was an equipment center from which peasants could rent the services of tractors, trucks, and wheat harvesters. A group of peasants led by a man named Arturo Gómez Salazar claimed that the center was "about to disappear due to lack of maintenance and the bad practices of the people in charge." They also claimed that machines were being taken to other regions instead of being rented to peasants in the Mixteca, and that officials were using the center's

[116] Rosalino Guzmán Marcos to C. Joel Zamora Zamora, 26 Apr. 1984. CDI Tlacolula, Caja: Proyectos Especiales 1983-1987; Exp.: Tec Agricola Dto. Tlacolula.

[117] Ortega Rosario Pablo y otro Com. Ejec. Agrario Nvo. Cent. Pob. Agrícola 'Lic. Alfonso Pérez Gasga' to the President, 16 July 1962, petition summarized in a memo, AGN, Fondo: Adolfo López Mateos, Exp.: 703.4/1736. It is not clear if Rosario Pablo was representing the entire community of Chihualtepec or just an *ejido* that villagers hoped to locate in the community. It is also not clear where the engineer was installing the potable water—in the village or the proposed *ejido*. A related file that might help future researchers to answer these questions is: Juan Orozco Carrera, and others, to Adolfo López Mateos, 8 July 1962, AGN, Fondo: Adolfo López Mateos, Exp.: 703.4/1736.

resources for private gain.[118] Mario Sebastián Contreras, a peasant from Santa Marta Latuvi, and Neftalí Ortiz Medrano, a development official with the Secretariat of Public Education, both told me that development support often gets siphoned by politically-connected parties before it reaches villagers.[119] The perception that corrupt officials were mismanaging programs made peasants less than eager to cooperate in modernization efforts.

Geography was another factor that limited the effectiveness of development programming. As I will explain in chapter eight, Oaxaca's steep, rocky soils contributed to the breakdown of government-operated machines. It was also difficult for developers to reach communities that were not connected to highways and passable roads. Francisco Alvárez Silva, an engineer with the Papaloapan Commission, reported on the installation of potable water in various communities of Oaxaca and Veracruz in 1973. He wrote this about the Oaxacan community of Paso Nuevo la Hamaca: "Since it is now possible to travel the access road to this community, preparations are being made to resume the work of supplying potable water…"[120] Whether the road had been made inaccessible by bad weather or simply was not finished is not clear, but without reliable roads, a potable water project for this community was not going to happen. As we saw in chapter three, Papaloapan Commission officials made the building of a new road by villagers in Latuvi

[118] Ismael Sanmartin, "Intereses políticos provocaron el fracaso de un proyecto de desarrollo agrícola en Oaxaca," *El Universal,* 9 Oct. 1984, Biblioteca Lerdo de Tejada, Archivos Económicos, Fondo: Oaxaca, Estado de, Agricultura R12699-R12699.

[119] Neftalí Ortiz Medrano, interview by Joshua Walker, at the Oaxaca Lending Library, Oaxaca de Juárez, 2 July 2012; Mario Sebastián Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 6 May 2012.

[120] Francisco Alvárez Silva, "Informe de labores desarrollados de la jefatura de agua potable en el periodo comprendido del 21 de octubre al 20 de noviembre de 1973," 5 Dec. 1973, AHA, Fondo: CP, Caja: 267 Exp.: 4068.

a condition for receiving support to finish their assembly hall.[121] Passable roads were essential if communities were to receive support from the government, and some communities did not have them.

"Development without Developers"[122]

Since government-sponsored development programs suffered from many of the problems outlined above and in chapter two, peasants often took development into their own hands. They learned about new tools and purchased them with little help from officials.

Many learned about new technologies by watching their neighbors. Carlos Contreras described the spread of chemical fertilizers in Latuvi in the 1960s. He said that Roque García planted corn seeds and put fertilizers on them, and then had a good harvest. After that, "…people woke up. [They asked] 'Well, how did he do it, how?' 'We have to ask: where is [fertilizer] sold?' And so began that movement."[123] Contreras also said that watching one's neighbors was a great way to be inspired to try something different. He told me, "The truth is that seeing a neighbor bring in a good crop gets one's attention. One says: 'Very well, I have to give it fertilizer.'"[124] Although she remembers fertilizers arriving in Latuvi much later, in the 1980s, Porfiria Cruz García (age sixty) describes a similar process. She said that seeing a neighbor's thick, fertilizer-fed corn and

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[121] Antonio Barbosa Heldt to José Manuel Herrera, 10 Sep. 1958, AHA, Fondo: CP, Caja: 250, Exp. 3817.

[122] This term is borrowed from the title of Ronald Waterbury's chapter, " 'Lo Que Dice el Mercado': Development without Developers in a Oaxacan Peasant Community." I think the idea of development without developers is appropriate for many locations and times, but not for all of them. Government developers were not totally incompetent or absent all of the time.

[123] Carlos Contreras, interview with Joshua Walker, in his home in Santa Marta Latuvi, 3 Mar. 2012. Translation by Joshua Walker.

[124] Ibid.

comparing it to one's own sickly corn made the chemicals seem like a good option.[125] The story was the same for mechanical corn grinders. Catarino Maximiliano Santiago Quero, an eighty-eight year old man from Latuvi, told me, "When we saw that someone had bought their mill, well we [were] also going to buy one. And so it was."[126] Watching neighbors and competing with them was a common way to learn about new tools.

Traveling outside of the village was another way to learn about new technologies. Villagers incorporated tools and techniques that they observed in urban gardening. Neftalí Ortiz Medrano helped to promote the usage of gravity-powered hose and sprinkler irrigation systems in his home village of San Juan Tabá. He claimed that this idea came from Martiniano García, a villager who had seen a sprinkler while working as a gardener in Mexico City.[127] When I asked Vicente Marcos Hernández about the beginnings of sprinkler systems in Latuvi, he related a similar story. He told me that they started seeing sprinklers "in the gardens of the city, and from there we began buying hoses and sprinklers, and we started to use them."[128] Time spent in cities led to technological experimentation when peasants returned to the countryside.

Peasants also learned by observing their neighbors and peers in other rural communities. Silvestre Mecinas Martínez, age sixty-nine from San Bartolomé Quialana, remembers seeing a tractor for the first time while working as a wage laborer for a man named Filemón in Tlacolula. Mecinas Martínez asked Filemón, "'why do you do that [tractor plowing] to the land?' 'It keeps it soft,' he says, 'so the corn grows.'" Mecinas

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[125] Porfiria Cruz García, interview by Joshua Walker, in her home in Santa Marta Latuvi, 29 March 2012.

[126] Catarino Maximiliano Santiago Quero, interview by Joshua Walker, in his home in Arroyo Largo, Latuvi, 7 May 2012. Translation by Joshua Walker.

[127] Neftalí Ortiz Medrano, interview by Joshua Walker, at the Oaxaca Lending Library, Oaxaca de Juárez, 2 July 2012. Translation by Joshua Walker.

[128] Vicente Marcos Hernández, interview by Joshua Walker, at his home in Santa Marta Latuvi, 29 Mar. 2012. Translation by Joshua Walker.

Martínez then asked Filemón to bring the tractor to his land.[129] Nazario Hernández Sánchez remembers a similar process for the adoption of chemical fertilizers in San Bartolomé. He told me, "We saw that some people, from Tlacolula, from other villages, used that, and we saw that yes, corn grows with that, and we started to use it too."[130] A retired official from the National Indigenist Institute claimed that neighboring communities helped to spread ideas to new locales. He told me, "…When they saw that another community was already working with a certain program, they said, 'We're going to do that, too.' And they convinced themselves."[131] Peasants were not wiling to sit by and let their counterparts in other villages monopolize the success that new techniques could bring.

It is likely that peasants also learned new techniques by working as laborers in the United States. Many served as temporary workers sponsored by the United States government under the *Bracero* Program, which lasted from 1942-1964. Part of the program's goal was to turn peasants into "modernized men" who would return south and apply the new tools and skills that they had learned in the United States.[132] Mario Sebastián Contreras of Latuvi claimed that this was exactly how knowledge of chemical fertilizers reached Latuvi: a returning *bracero* spread the word to his neighbors.[133] In 1967, Richard Lewis Berg Jr. recorded a case history of a man from the village of Zoogocho who migrated to United States various times between 1956 and 1961. The

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[129] Silvestre Mecinas Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 20 July 2012.

[130] Nazario Hernández Sánchez, interview by Joshua Walker, at his home in San Bartolomé Quialana, 5 June 2012. Translation by Joshua Walker.

[131] Anonymous man #21, interview by Joshua Walker, in his home in Oaxaca de Juárez, 22 May 2014.

[132] Cohen, *Braceros*, 6.

[133] Mario Sebastián Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 26 Apr. 2012. It is not clear if the returning *bracero* was Roque García, but Mario Sebastián agrees that Roque García was the first person to actually apply chemical fertilizers in the village.

man said that the United States changed him in two ways: it converted him from Catholicism to Evangelicalism, and it taught him to love driving trucks for a living.[134] Peasants who migrated between Mexico and the United States brought knowledge of new technologies home.

Peasants did not leave it to officials to teach them about new technologies, and they also did not leave it in the government's hands when it came time to purchase or rent them. Private vendors were an important option when technology programs and subsidies were not available. According to anthropologist Ronald Waterbury, the owners of equipment stores in Oaxaca City offered credit to farmers for purchasing pumps and tractors. Waterbury found that the Ford dealer in Oaxaca City, "adjusted payment schedules in accordance with the agricultural cycle."[135] When private individuals or groups purchased machinery this way, they could recuperate costs by renting the technologies to their neighbors.[136] Buying on credit was a response to the high costs of machine purchase.

Peasants also bought fertilizers in the city. Silvestre Mecinas Martínez learned about chemical fertilizers while working as a migrant laborer in the cotton fields of Chiapas, and he purchased his first sack of sulfate fertilizers from a store in Oaxaca City for around twenty pesos in the late 1970s.[137] Mario Sebastián Contreras, from Latuvi, told me more about this process: "Little by little they sold [chemical fertilizers] in Oaxaca, eventually there was a store in Oaxaca, and they sold it. Back then it cost

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[134] Case History: Romaludo Pérez Carleta, 8 Oct. 1967, Box: 74, Folder: Beals—Oaxaca Project—Berg—Zoogocho—Case Histories, Ralph Beals Papers, National Anthropological Archives, Smithsonian Institution.

[135] Waterbury, " 'Lo Que Dice,'" 85.

[136] Waterbury, " 'Lo Que Dice,'" 85; Field notes of Carole Judith Turkenik, 12 Aug. 1973, GN: 4402. Carole Judith Turkenik found similar data in an with an informant named Bulmaro Santiago in 1973.

[137] Silvestre Mecinas Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 20 July 2012.

seventy pesos a sack, I think, and so we bought one or two sacks. But it was also tough to get one-hundred pesos back then."[138] Buying technologies from private vendors was an option for farmers, but it was one that required cash.

As I explained in the introduction, Oaxacan peasants have a long tradition of finding creative ways to earn cash. Seasonal migration was one of these. Migrants used the money they earned while working as laborers in the United States or in other parts of Mexico to buy expensive technologies on the private market. An anonymous forty-two year old man from San Bartolomé told me that working abroad allowed peasants to purchase new tools:

> **Joshua Walker:** Why are there more people who plant today than before, what happened?
> **Anonymous #32:** Because now, with the money they got in the United States, they come here, and then they buy a pump to irrigate. Then they can rent a retro excavator to make a well. Then they buy their pump and they can plant flowers, even avocado trees. Now many people already planted avocado trees[…]with the money that they make in the United States. They save it and then they arrive here. Then they spend it here, but they buy useful stuff so that they can work in agriculture.[139]

This man also suggested that cars came to the village at roughly the same time that people started migrating to the United States, which suggests that migrant remittances helped them to pay for the vehicles.[140] In sum, migration and working outside of the village gave peasants cash and allowed them to participate in the technological transformation of their villages.[141]

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[138] Mario Sebastián Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 26 Apr. 2012.

[139] Anonymous man #32, interview by Joshua Walker, in his home in San Bartolomé Quialana, 20 Aug. 2012.

[140] Ibid.

[141] Tutino, "The Revolutionary Capacity," 251. Tutino claims that migrant work helped people to buy trucks, open stores, and lease land, although he claims that those who did this were the "enterprising few."

This logic complicates the usual narrative about agriculture, technology, and migration in Mexico. As the story usually goes, the spread of new technologies in rural Mexico benefitted rich farmers and left everyone else to deal with "debt, drugs, and illegal aliens."[142] Interviewing members of the communities that sent out these "illegal aliens" shows that the cash that migrant laborers brought back to villages allowed them to participate in a technological marketplace of which they were often otherwise priced out.

To summarize this section, peasants had a few different ways to learn about and acquire new technologies. They could do it through government programs and subsidies, or they could use the private market. Both of these options had serious pitfalls. As we have seen, government programs often did not cover an extensive geography, or they were mismanaged. The private market could be expensive and required peasants to travel long distances in search of cash-generating wage labor.

Creative Responses

Peasants responded to these challenges in a few different ways. One way was to simply refuse to use the new technologies without major government subsidies to reduce their cost. In 1975, the head of the agricultural division at the National Indigenist Institute's coordinating center in Temascal, Oaxaca reported on communities whose economies relied mostly on fishing. He claimed that these communities' low dependence on farming made them mostly uninterested in chemical fertilizers. When they did petition for fertilizers, they wanted them for free.[143] Similarly, Heliodoro Díaz Cisneros said that without credit and technical assistance, peasants would not participate in

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[142] DeWalt and DeWalt, "The Results of Mexican Agriculture and Food Policy: Debt, Drugs, and Illegal Aliens."

[143] Jacobo Montes Vázquez to Juan Larios Tolentino, 6 Nov. 1975, CDIOAX, Archivo Histórico CCI Papaloapan, Caja: 10, Exp.: 124.

development programs. He told me that "there was good participation" by peasants in Plan Puebla-style development projects outside of Puebla until 1988. When the Salinas de Gortari administration cut development subsidies for things like credit and fertilizers, Díaz Cisneros claims that peasants, "quit using the [new] technology and returned to their traditional technology…"[144] Cash was scarce in many rural communities, and lack of government subsidies made peasants reticent to wager precious resources on new techniques.[145]

Peasants also practiced partial adoption of new techniques, taking only the portions that they wanted or could afford. This was an especially common practice with chemical fertilizers. Peasants diluted mixtures and skimped on certain chemicals in order to save money. Two development officials, Flavio Aragón-Cuevas, a twenty-eight year employee of the National Institute of Agricultural Investigation, and Emiliano Morales Cruz, a thirty-year veteran of the National Indigenist Institute, talked about this in separate interviews:

> **Emiliano Morales Cruz:** They [peasants] only bought what was necessary. They did not buy compound fertilizer [because of the] cost. They did not make a mixture of urea with ammonium sulfate, urea with ammonium phosphate, because it's more expensive, urea was more expensive. There [was] this whole process where we tried to get them to understand: urea is a little more expensive, but it has a superior amount of nitrogen. Well you would go explaining all these things to the people, but they would continue buying the cheapest one, which is ammonium sulfate.[146]

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[144] Heliodoro Díaz Cisneros, interview by Joshua Walker, in "La Casona del Llano," a restaurant in Oaxaca de Juárez, Oaxaca, 11 Sept. 2012.

[145] Turkenik, "Agricultural Production Strategies," xiv-xv, 385. Carole Judith Turkenik made a slightly different argument for San Antonino. She found that it was the poor farmers, those with less land, who were more likely to adopt new technologies there. This was because they could grow truck crops on small pieces of land, and truck crops require more modern technologies. More established and wealthy farmers could afford to stick with the traditional ways of growing corn, but poorer people had to take the risk involved in labor-intensive and technology-intensive cash cropping.

[146] Emiliano Morales Cruz, interview by Joshua Walker, at the Centro Coordinador para el Desarrollo Indígena Tlacolula-Zapoteca, Tlacolula, Oaxaca, 23 Oct. 2012.

> **Flavio Aragón-Cuevas:** Some farmers adopt [new technologies/fertilizers] in partial form, sometimes not with the recommended dosage, but 50% of it. Why? Because there is not money…there are many factors that go into technology adoption. First, they have to be familiar with the technology. If they are not familiar with it they are never going to use it. If they do know about it, then great: what else is involved with that technology? What does the producer have to invest to use it, what is the cost? Is it available close by, can you get it? A chemical product, for instance, that is recommended…where to get it? If it's not in the community, he has go to Oaxaca, and that implies an expense….[147]

Aragón-Cuevas outlines many problems with technology adoption: money, education and supply are three big ones. He and Morales Cruz both discussed one peasant-devised solution: using more affordable dosages and chemicals. Peasants took matters into their own hands when it came to technological development, applying technologies like fertilizers in quantities and mixtures that they judged to be appropriate.

Conclusion

Peasants' handling of fertilizers as depicted by Morales Cruz and Aragón-Cuevas in the quotes above is emblematic of one of the major argument of this dissertation: peasants directed their own development and modernization. Government programs designed to introduce them to fertilizers and other technologies could be helpful, but they were neither comprehensive nor coercive enough to sever peasants from their regular order of things, which included control over their fields, their budgets, and their technologies.[148]

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[147] Flavio Aragón-Cuevas, interview with Joshua Walker, in his office at the Instituto Nacional de Investigaciones Forestales, Agrícolas, y Pecuarias (INIFAP), Campo Experimental Valles Centrales, Villa de Etla, Oaxaca, 7 Aug. 2012;

[148] This might have been different in the case of *ejidos*, where credit depended on following the orders of the Ejidal Bank, although I have my doubts that *ejidatarios* would allow themselves to be totally dominated by a government bureaucracy. To understand more about relationships between the Ejidal Bank and *ejidatarios*, see Fallaw, *Cárdenas Compromised*, 26-32. For more about the agency of *ejidatarios*, see Nugent and Alonso, "Multiple Selective Traditions."

Community memory reinforces this idea of government as a subordinate partner in the development process. An interview with Mario Ponciano García, a peasant from Santa Marta Latuvi, revealed this:

> **Joshua Walker:** The government help to build the pipes [for potable water], right?
> **Mario Ponciano García:** No, No, We [the community] did it. We pooled our money together to buy those. Because there was not support back then. Ah, yes, I lie. There was a commission that we call the Papaloapan Commission. It gave us the asbestos pipes.
> **JW:** The Papaloapan Commission?
> **MP:** Yes, the Papaloapan Commission. It gave us the pipes. I remember that now. [It was] our town center that was done on our account. Nobody helped us. We, the citizens, had to give fifty pesos (each).[149]

This quote is revealing because it highlights the insistence and pride of most peasants when discussing the modernization of their villages. Most are quick to point out that they worked together to take care of problems using resources and labor power that came from within the community. This does not mean that they have forgotten about the important role of the federal and (sometimes) state governments in helping to make this happen. Once his memory was jarred, Mario Ponciano had no problem giving credit for the asbestos tubes where it was due. Other villagers in Latuvi similarly credited the Papaloapan Commission for helping to make potable water a reality. Villagers in San Bartolomé talked to me about the government programs bringing potable water, subsidized fertilizers, geological surveying equipment, and tractor services to the village.

Villagers were willing to give credit to government programs for helping to introduce them to new technologies, especially when I mentioned specific programs that I suspected had operated in their communities. But peasants were still the central actors in the development process. In Oaxaca, official development efforts took place in

[149] Mario Ponciano García, interview by Joshua Walker, in his family's store in Santa Marta Latuvi, 24 Apr. 2012;

communal spaces like school parcels or in private fields that peasants volunteered to convert into demonstration plots. Community members, not officials, ultimately decided how these spaces would be managed, whether or not officials would enter them, and how many official recommendations would be carried out. They filled in when government money and labor ran out, and they solved the problems that new technologies created.

The dominance of peasants in the development process may be something that is unique to the regions of Oaxaca that I studied. These regions were relatively unencumbered by the colossal *haciendas* (loosely translated as "private farming estates") that dominated other parts of Mexico and other parts of Oaxaca in the Porfirian period (1876-1910) and before.[150] This meant that they had strong traditions of defending communal autonomy. The relative independence of peasants vis-à-vis modernization programs could also have to do with their connection to Oaxaca's ancient system of rotating weekly markets. Ralph Beals and his student Martin Diskin suggested that the strong tradition of inter-village trading in Oaxacan markets helped to soften the disruptions caused by the arrival of modern goods and services in the 1960s and 1970s. Beals writes that the marketing system provides "options and alternatives" for peasants.[151] Diskin elaborates on this concept, arguing that participating in subsistence exchanges in Oaxacan marketplaces gave peasants time to decide whether or not to purchase unfamiliar items. They could use the ancient markets to supply their basic needs, as they

[150] Knight, *The Mexican Revolution*, Vol. 1, 99; Chassen-López, *From Liberal to Revolutionary Oaxaca*, 81, 541-2; Waterbury, "Non-Revolutionary Peasants," 424-5, 438-9; Smith, *Pistoleros and Popular Movements*, 116-7, 217.

[151] Beals, *The Peasant Marketing System,* 261.

had always done, while selectively choosing products to purchase from outside of the system.[152]

The leeway that the people I interviewed enjoyed in charting their own way through the modernized landscape could also be the result of the relative lack of government attention to the areas I studied (see chapter 2). According to Patrick H. Cosby, a "high-modernist" version of the Mexican state was active in the Lower Papaloapan Basin of Oaxaca and Veracruz during the time period in question. The government evacuated entire communities of indigenous people in order to make way for hydroelectric dams. In new colonies like Las Naranjas and Uxapanapa, Cosby claims that relocated peasants were forced to accept a "package" of Green Revolution technologies, including hybrid seeds, chemical fertilizers, and irrigation.[153] My evidence can neither support nor refute this thesis. Government officials applied coercive force in selected zones around the country in the period after 1940, and the Lower Papaloapan could very well have been one of those zones.[154]

What I can say is that the metaphor of the state as Leviathan is wholly inappropriate for the Upper Papaloapan Basin and for Oaxaca's central valleys. Even in places like Latuvi (part of the Upper Papaloapan Basin), where government officials spearheaded development projects more frequently than they did in the central valleys, development programs still relied on the acceptance and hard work of villagers in order to have meaningful effects. Government might suggest a path forward, agronomists or teachers might suggest a new tool or technique to try, but peasants had to put the plans

[152] Diskin, "Economics and Society in Tlacolula, Mexico," 23-6, 127-9, 177-9.
[153] Cosby, "Leviathan in the Tropics," 8, 48-9, 166, 174.
[154] Gillingham, "Preface," x-xi.

into action. They often did so in ways that were creative and incongruous with the visions of officials.

One way that peasants responded creatively was to mix new tools and techniques with old ones. Animal laborers were key to making this process work, and my next chapter will detail how peasants used animals to overcome the pitfalls of the "modern," mechanized agricultural regime of the twentieth century.

Chapter 7: Animals

Raw numbers of tractors and trucks in Oaxaca increased steadily from the 1940s to the 1980s. Census data I collected in the state of Oaxaca show the total number of tractors in the state increasing from 107 in 1950 to 264 in 1960 and 829 in 1970. For the same years, total numbers of trucks were 139, 415, and 552.[1] These trends echo David A. Sonnenfeld's figures for all of Mexico, where he claims (citing Merilee Grindle) that the total number of tractors increased from 17,000 in 1947 to 125,000 in 1981.[2]

During these same decades, numbers of animal laborers also increased in the state. The total number of "work animals" (*animales de trabajo)* identified in census reports for Oaxaca went from 234,401 in 1950 to 256,048 in 1960 and 342,566 in 1970.[3] Folke Dovring found a similar, national-level trend by studying census data from the 1940s and 1950s.[4] This census evidence supports a pattern observable in archival documents and oral interviews. Even in the age of mechanical production, in a countryside that was quickly filling with machines, animal laborers, especially oxen, mules, and donkeys, remained essential to peasant life.

In earlier chapters, we saw that both the government and the private market often failed to give peasants full access to the technologies they wanted. This meant that peasants often purchased or used new technologies in partial or incomplete form.

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[1] *Tercer censo agrícola ganadero y Ejidal, 1950: Oaxaca,* Secretaría de Economía, Dirección General de Estadistica, 1956, 27; *IV Censos agrícola, ganadero y ejidal, 1960*, *Oaxaca*, Secretaría de Economía, Dirección General de Estadistica, 1965, 15; *V Censos agricola-ganadero y ejidal, 1970, Oaxaca*, Secretaría de Economía, Dirección General de Estadistica, 1975, 293.

[2] Sonnenfeld, 33. Sonnenfeld cites Grindle, *State and Countryside*, 84-5.

[3] *Tercer censo agrícola ganadero y Ejidal, 1950: Oaxaca,* Secretaría de Economía, Dirección General de Estadistica, 1956; 120; *IV Censos agrícola, ganadero y ejidal, 1960*, *Oaxaca*, Secretaría de Economía, Dirección General de Estadistica, 1965, 36; *V Censos agricola-ganadero y ejidal, 1970, Oaxaca*, Secretaría de Economía, Dirección General de Estadistica, 1975, 269. The census definition of "work animal," as found in the *V Censos Agricola-ganadero y ejidal*, 1970, is "All larger livestock (bovine, equine, mules) used in agricultural work." See pages 268-269.

[4] Dovring, *Land Reform and Productivity,* 15 (footnote 6). Dovring's data cover only *ejidos* and "private farms over 5 hectares."

Animals were perfect for this new regime of improvised and hybridized production because they were flexible in a world that was changing. They were easily transferable to new spaces, new crops, new working schedules, and new owners. At a time when families were growing and land was becoming scarcer, they helped farmers to cultivate steep terrain. They took over when paved roads ran out, and they filled in when new machines broke down (the next chapter focuses on broken tools). They were investments that appreciated as they grew and ones that could be sold for cash.[5]

It is impossible to understand how peasants interpreted technological change without considering animal laborers. Animal laborers allowed peasants to experiment with new technologies without becoming totally dependent on them. They allowed peasants to use new tools part of the time, when it was feasible and affordable, secure in the knowledge that animal laborers would be available if something went wrong. They worked with peasants to make sense of the changing technological landscape.

The Work of Animals

Oaxacan peasants relied on animal laborers to work in areas of the state where modern technologies like trucks and tractors could not reach. Pack animals like donkeys, mules, and human porters were key players in a hybridized transportation network that included trucks and roads. They transported goods and people from villages that lacked roads to the nearest waypoint on major highways, where automobiles took over.

José Olivera Lázaro's family history, as told to anthropologist Richard Lewis Berg Jr., illustrates this idea. José and his father were both itinerate traders in the period between the 1920s and the 1960s. José's father used *bestias mulares* (beasts of burden)

[5] Beals, *The Peasant Marketing System,* 83; Kirkby, *The Use of Land and Water Resources,* 90; Cohen, *The Culture of Migration in Southern Mexico*, 134.

to transport goods from Zoogocho to the village of Ixtlán. From there, motor vehicles took his products to the market in Oaxaca City.[6] In 1967, Aurelio Morales Crúz talked to Berg Jr. about his experiences as an itinerant vendor of *mescal* (a locally produced alcohol drink) and avocados. He told Berg, "I had two burros [donkeys] to make my trips for mescal. The camino [road] is not very good, but there is no mud to worry about." He told Berg that four to five mules or donkeys were ideal for avocado trading. He also said that, "before 1960, we used to take our [avocados] to Solaga where two or three trucks were waiting to take the [avocados] to Oaxaca [City]."[7] His earlier emphasis on the desirability of four to five mules for trading avocados suggests that mules helped him to reach the trucks in Solaga with fruit intact. In both of these examples, beasts did essential labor where trucks were either unavailable or unaffordable.

Florentino Geronimo Cervantes told Berg a similar story of a hybridized transportation route that combined trucks and human portage:

> That year when it was my turn to be *mayor de vara* I went to Oaxaca [City] to get a steel plow that the Federal government gave to Zoogocho on some development program they had. This was in 1940. I was going to carry it on my back all the way to Zoogocho. In Oaxaca [City], I met Fidencio de San Francisco Cajonos and he helped me carry the plow to Zoogocho. Fidencio told me that the plow was too heavy to carry on ones back the total distance and we payed [sic] 75 centavos to have the truck that went to La Puenta to carry the plow to that point. From La Puenta I carried it on my back to Zoogocho. The plow was a deep burrowing plow and it would not work in the rocky lands of Zoogocho. The peoples' stupidity in the government scares me.[8]

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[6] Case History: Informante: Jose Olivera Lázaro, Feb. 20, 1967, Box: 74, Folder: Beals—Oaxaca Project—Berg—Zoogocho—Case Histories, Ralph Beals Papers, National Anthropological Archives, Smithsonian Institution.

[7] Case History: Aurelio Morales Crúz, Sept. 19, 1967, Box: 74, Folder: Beals—Oaxaca Project—Berg—Zoogocho—Case Histories, Ralph Beals Papers, National Anthropological Archives, Smithsonian Institution.

[8] Case History: Florentino Geronimo Cervantes, Box: 74, Folder: Beals—Oaxaca Project—Berg—Zoogocho—Case Histories, Ralph Beals Papers, National Anthropological Archives, Smithsonian Institution.

In this case, human portage filled in where automobile service ended. Roads reached the mountain towns of Santa Marta Latuvi and Zoogocho in 1950 and 1952, respectively, and they reached San Bartolomé Quialana in the late 1970s, but it is not clear how reliable these first roads were, especially in the mountain towns.[9] "Traditional" transportation methods dependent on animals linked these places to waypoints along passable highways.

Like trucks and mules, tractors and oxen made a formidable team. In his 1975 book, *The Peasant Marketing System of Oaxaca, Mexico,* Ralph Beals writes that in San Antonino, "oxen are the most important draft animals, essential to most farming activities." A few pages later, he writes, "tractor plowing and cultivating is increasing rapidly," and that, "cultivators are well aware that 'when tractors are not working, they do not eat.'" He also claims that tractor plowing is "now the most common practice."[10] Beals' student Ronald Waterbury found that some farmers used both types of technology. Waterbury calculated that Fidencio López spent about sixty pesos in 1965 for tractor rentals. López also incurred an annual expense of at least one hundred pesos for the rental of oxen.[11] Similarly, Porfirio Santiago reported in 1966 that his farming routine consisted of plowing with a tractor and then using "a traditional plow pulled by torros" to make furrows.[12] Tractors and oxen complemented each other in many villages.

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[9] Berg Jr., "The Impact of Modern Economy," 72; Jaime Wilfredo Cruz Santiago, "Latuvi: Una comunidad con historia" (Unpublished history of Latuvi, 2007) 33; "Inauguración puente de Tlacolula-Quialana, Tlacolula de Matamoros, Tlac. Oax. 1970," Foto #8202, Fundación Bustamante Vasconcelos; "El Gob. Bravo Ahuja, al abrir el camino Tlacolula-Quialana, Tlacolula de Matamoros, Tlac. Oax. 1970," Foto #8201, Fundación Bustamante Vasconcelos.

[10] Beals, *The Peasant Marketing System,* 64, 70.

[11] Case Histories Fidencio Lopez, Feb. 13, 1966, Box: 67, Folder: Beals—Oaxaca Project— San Antonino—Case Histories, Ralph Beals Papers, National Anthropological Archives, Smithsonian Institution.

[12] Case Histories Porfirio Santiago, Apr. 24, 1966, Box: 64, Folder: Beals—Oaxaca Project—San Antonino—Case Histories, Ralph Beals Papers, National Anthropological Archives, Smithsonian Institution.

Economic considerations, coupled with concerns for the health of plants and animals, made this hybrid technological regime appealing. Silvestre Mecinas Martínez, a sixty-nine year old farmer from San Bartolomé Quialana, told me about hiring a tractor to plow his field. When the tractor was done, Don Silvestre went back over it with an oxen team to make furrows. I asked him why he did this, and he told me it was a matter of money. "I had bulls," he told me, "so I had to make furrows with bulls."[13] Nazario Hernández Sánchez, a sixty-four year old peasant from San Bartolomé Quialana, said that oxen are helpful when corn is growing. Unlike tractors, they do not crush corn when turning around. For him, tractors are fine for plowing up the ground and for planting, but oxen are better for weeding around young plants.[14] Another man told me that the hybrid system is advantageous because it means less suffering for the oxen—they work land that has already been broken by a machine.[15] Tractors were good sources of brute force for unbroken soil, but oxen were needed for operations that had to be precise and economical.

Tractor scarcity meant that this strategy was not always available. Arturo Warman claims that insufficient numbers of tractors were available to cover the growing number of small farmers in the nearby state of Morelos.[16] Kirby notes a similar shortage of "tractors available for hire" in Oaxaca.[17] The low availability of tractors was caused in part by the Mexican government's import substitution industrialization (ISI) policies, which hampered the ability of tractor companies to supply the Mexican market with

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[13] Silvestre Mecinas Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 20 July 2012.

[14] Nazario Hernández Sánchez, interview by Joshua Walker, at his home in San Bartolomé Quialana, 5 June 2012. Translation by Joshua Walker.

[15] Conversation with a peasant, San Bartolomé Quialana, field notes 1 Oct. 2012.

[16] Warman, *We Come to Object,* 200-1.

[17] Kirkby, *The Use of Land and Water Resources,* 74.

machines and spare parts. From at least the late 1930s until the1980s, ISI policies put restrictions on the amount of tractors and spare parts that tractor manufacturers could import. ISI laws also incentivized companies to set up factories in Mexico using Mexican labor and Mexican materials.[18] Werner Baer, reviewing the arguments of Jack Baranson, discussed the inefficiencies of this system in *The Latin American Research Review*:

> Thus, Baranson found that many "…basic materials that are considered standard stock in open economies often must be procured locally or specially ordered in small batches at considerably higher cost or at inferior quality….Lack of uniformity in raw materials and semi-finished goods such as castings and forgings creates special problems in milling and machining to required specifications…"[19]

In other words, using tax incentives and other policies to encourage or force companies to use nationally-sourced materials results in uneven quality and high costs.

E. P. Neufeld wrote similar ideas in a 1969 case study of Massey-Ferguson Limited's international operations (Massey-Ferguson was a major supplier of tractors around the world).[20] Neufeld argued that manufacturing policies in "lesser developed countries" led to the production of expensive tractors:

> The authorities involved usually want to maximize 'local content' in the tractor at the beginning of the project, and the rate at which deletions of imported components are planned to take place. They also usually aim at minimizing the price of the final product to the farmer, and hope, in vain, that it will not be higher than the imported tractor…[21]

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[18] Review of Mexican laws confirms the design of ISI programs. For some examples, see: Declaratoria general de exención de impuestos número 218, para la fabricación de tractors agrícolas con motor de combustión interna," *El Diario Oficial,* 6 Oct. 1969; Acuerdo que dispone que en la importación de tractors, los agentes aduanales cobren los honorarios que señala el artículo 6º de la Tarifa 18 de septiembre de 1939," *El Diario Oficial*, 8 Oct. 1957; "Acuerdo que fija el volumen susceptible de importarse de llantas neumáticas para maquinaria y tractores agrícolas e industriales de las medidas que no se fabrican en el país, hasta el 31 de enero de 1983," *El Diario Oficial*, 23 Jul. 1982.

[19] Baer, "Import Substitution and Industrialization in Latin America, 104. Baer cites Jack Baranson, *Automotive Industries in Developing Countries*.

[20] Williams, *Massey Ferguson Tractors,* 112. Williams claims that Massey-Ferguson had the largest share of the world market for tractors of any company in 1985 (17%).

[21] Neufeld, *A Global Corporation*, 347-8.

Relying on local materials for manufacturing produced machines that were more expensive than imports, and more expensive machines meant that less people were able to buy them.

Geography also limited when and where tractors could work. Anthropologist Michael Kearney argued that the high economic costs of tractors and "the inclination of the slopes" in the mountain town of Ixtepeji made plowing with oxen a necessity around 1970.[22] In 1982 and 1983, the head of the mechanization program at the National Indigenist Institute's coordinating center in Tlacolula wrote reports detailing extensive damages to tractors caused by capsizing.[23] He also complained that the "topography, texture, and structure" of the lands made it difficult to get good work out of the tractors that the Institute rented.[24] This evidence suggests that ISI policies and geography helped to keep oxen and other farm animals relevant members of the labor force in the age of mechanical production.

The Lives of Animals

Hybridized technological regimes changed the daily lives of animals. So too did new ideas about rationalizing animals' spaces and mobility in the name of public health. Animal labor became more specialized, the spaces in which animals lived and worked shrunk, and animals were more likely to be bought, sold, or rented for cash.

Donkeys, mules, oxen, and other workers became more specialized. They transitioned from being all-purpose tools to being used in specific situations where new

[22] Kearney, *The Winds of Ixtepeji*, 10.

[23] Ramón A. Coria Nuñez to Carlos Gómez Díaz, 22 Dec. 1982, CDI Tlacolula, Box: Proyectos Especiales 1983-1987, Folder: Folder: Programas INI-PIDER Mecanización Agrícola (Tractores); Ramón Coria Nuñez to Diego Vazquez J, 8 Apr. 1983, CDI Tlacolula, Box: Proyectos Especiales 1983-1987, Folder: Folder: Programas INI-PIDER Mecanización Agrícola (Tractores).

[24] Ramón Coria Nuñez to Diego Vazquez Juárez, 16 May 1983, CDI Tlacolula, Box: Proyectos Especiales 1983-1987, Folder: Programas INI-PIDER Mecanización Agrícola (Tractores).

technologies were ineffective or unaffordable. Evidence for this has already been cited above: Fidencio López, Porfirio Santiago, Silvestre Mecinas Martínez, and Nazario Hernández Sanchez all used bulls or oxen in conjunction with tractor plowing. Oxen went from being the only source of non-human traction to being specialized workers called in to do precision plowing in the wake of a tractor. Similarly, the work of donkeys, mules, and horses changed as they went from being the only source of transportation to being links in multi-modal distribution networks. They were especially useful where roads and trucks did not reach. The work of animals was still essential to peasants, but the presence of machines made animals' jobs more specialized.

The spaces in which animals lived also became more restricted. Domesticated animals that were once free to roam towns and fields were confined to pens and barns or yoked to stakes. This conformed to the new rural economic regime, which privileged delicate cash crops like fruit. In 1961, education official Ramón M. Díaz Astudillo reminded community leaders in Guelatao to put fences around fruit trees in order to prevent "cattle and every type of animal" from destroying them.[25] Richard Lewis Berg Jr. noted a decline in cattle in the village of Zoogocho as people began devoting pastures to the planting of avocado trees.[26] In Latuvi, husband and wife Vicente García Cruz and María Pérez Ramírez told me that in the past, it was more common to put animals out to pasture. They could roam freely and eat grass. Now, because fruit trees and corn are so important to the economy of Latuvi, cattle ownership and pasturing have declined. Most cattle are fed corn stalks (*zacate*) and prevented from wandering near fruit orchards,

[25] Ramón M. Díaz Astudillo to C. Presidente Mpal y Del Comite "Pro-Arbol," July 1961, AGPEEO, Fondo: Asuntos Agrarios, Serie: V, Legajo: 900 (09), Exp.: 26.

[26] Berg Jr., "The Impact of Modern Economy," 128.

where their horns might damage the fruit.[27] Peasants curtailed the mobility of their animals in order to take advantage of new business opportunities based around fruit.

Reduced mobility for animals also reflected new ideas about health and sanitation. Official prescriptions dating back to the 1920s and 1930s called for animals to be confined to specially-designated spaces like pens. They were no longer to share living spaces with humans. Vaughan points out that some federal schoolteachers in the 1930s were expected to teach women to "get the animals out of the house…"[28] Designs for "improved" rural homes published by the Secretariat of Public Health in 1961 called for the construction of animal pens, which would end peasants' habit of sharing living space with animals like hens, sheep, pigs, cats, and dogs.[29] Restriction of animal mobility was a key component of public health campaigns.

These ideas were largely acceptable to villagers in both communities I studied. In present-day San Bartolomé, animals like chickens, hens, and oxen live in *solares,* outdoor spaces surrounded by fences and buildings in a family's compound. I saw no sign that they entered peasants' living quarters. On the other hand, dogs freely roam the streets of the village, and most villagers seem to view them as a nuisance. In Santa Marta Latuvi, local law prohibits animals, including dogs, from wandering the streets. Villagers keep their animals yoked to stakes or trees. Two villagers said that this law protects public health and the cleanliness of the streets.[30] I saw no evidence of animals sharing living

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[27] Vicente García Cruz and María Pérez Ramírez, interview by Joshua Walker, at their home in Llano de Marta, Santa Marta Latuvi, 17 May 2012.

[28] Vaughan, *Cultural Politics in Revolution,* 88.

[29] Miguel Montes de Oca Alcaráz, Joaquín Tello Zabalegui, Héctor Fernández de Castro, Tomás Fernández de Castro, Tomás Chávez Ramírez, Leopoldo Castell Estrada, "Saneamiento de la vivienda rural*," Salud Pública de México* 3 no. 4 (1961), 545-563: 547. NLM.

[30] Anonymous former resident of Latuvi, interview by Joshua Walker, at his home in Oaxaca de Juárez, 22 May 2012; Conversation with peasants, Santa Marta Latuvi, Field notes 28 July 2010.

spaces with humans. Health and commerce dictate the restriction of mobility and the designation of acceptable and non-acceptable spaces for animals in these communities.

Domesticated animals also experienced rapid changes in their ownership and breeding during the age of mechanical production. Peasants sold them to pay for expensive new technologies. For example, one peasant told me that he made "*mucho dinero"* raising a team of oxen and selling it when the beasts had grown. The money he earned helped to pay for a car.[31] Another man, age seventy-eight, told me that he earned money by buying bulls at a young age and selling them to a butcher when they aged and became *bravo* (daring). He implied that this money helped him to build his home.[32] This focus on resale value changed the breeds of animals that roamed the fields in San Bartolomé. Villagers switched from *criollo* bulls to zebu bulls because the zebus grow larger and fetch more money at resale.[33] Larger animals are heavier and have more trouble working inclined lands, but this seems to have been a less-important consideration.[34]

Women were key players in the bull and animal economy. They fed the animals and looked after them. I asked a sixty-five year old man from San Bartolomé about his mother's daily activities, and he told me that she would make tortillas, then take the bulls to pasture.[35] María Pérez Ramírez, from Latuvi, told me about a very similar daily routine: make tortillas, feed the kids, put the bulls out to pasture, bring the bulls back in and give them water. She pointed out that women had to do this because men would be

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[31] Conversation with peasant, San Bartolomé Quialana, Field Notes 1 Oct. 2012.
[32] Conversation with peasant, San Bartolomé Quialana, Field Notes 1 Oct. 2012.
[33] Conversation with family, San Bartolomé Quialana, Field Notes 23 Aug. 2012.
[34] Conversation with peasant, San Bartolomé Quialana, Field Notes 22 July 2010.
[35] Anonymous peasant #30, interview by Joshua Walker, in his home in San Bartolomé Quialana, 10 Aug. 2012.

busy with *cargo* service.[36] Women also raised chickens, pigs, and turkeys, which were investments that helped peasants to save money and could be sold if a need for cash arose.[37] Selling animals brought in cash at a time when peasants needed it more than ever, and the cash they earned gave them access to technologies like automobiles and construction materials for homes.

Renting or loaning animals was another way to make income. In his 1967 field notes from the village of Villa Díaz Ordaz, anthropologist Theodore Downing noted that people who left the village looking for work loaned their oxen on a yearly basis. The borrower had to feed the beasts and give the owner a portion of the harvest that they helped to produce.[38] Downing observed a similar process with goats. Hired hands (*mozos*) capable of caring for goats became more difficult to find after 1940,[39] so goat owners put their goats in the custody of other owners. The owner who cared for someone else's goats kept as payment half of the newborn goats born during the period of caretaking.[40] In the cash and labor-scarce world of post-1940 Oaxaca, animals had to accustom themselves to taking orders from a changing cadre of bosses.

Some animals, of course, have no bosses, at least not human ones. Unlike their domesticated counterparts, wild animals actually became freer to roam the countryside as

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[36] María Pérez Ramírez (with Vicente Garíca Cruz), Interview by Joshua Walker, at their home in Llano de Marta, Latuvi, 17 May 2012.

[37] Beals, *Peasant Marketing System,* 83; Turkenik, "Agricultural Production Strategies," 245-53; Kirkby, *The Use of Land and Water,* 90; Jeffrey H. Cohen, *The Culture of Migration in Southern Mexico* (Austin: University of Texas Press, 2004), 134.

[38] Renting of Cultivable Lands, Aug. 10, 1967, Box: 57, Folder: Beals—Oaxaca Project—Downing—Diaz Ordaz—Agriculture—Field Notes/Transcriptions, Ralph Beals Papers, National Anthropological Archives, Smithsonian Institution.

[39] For the declining availability of *mozo* labor after 1940, see Types of Agricultural Labor in Diaz Ordaz, Sept. 8, 1967, Box: 57, Folder: Beals—Oaxaca Project—Downing—Diaz Ordaz—Agriculture—Field Notes/Transcriptions, Ralph Beals Papers, National Anthropological Archives, Smithsonian Institution.

[40] Mediero System with Goats, Sept. 6, 1967 Box 57, Folder: Beals—Oaxaca Project—Downing—Diaz Ordaz—Agriculture—Field Notes/Transcriptions, Ralph Beals Papers, National Anthropological Archives, Smithsonian Institution.

technologies like grafted fruit trees and chemical fertilizers transformed village economics. Today, prohibitions against hunting protect wild animals like foxes, badgers, squirrels, skunks, white-tailed deer, and mountain lions in Santa Marta Latuvi.[41] In the past, these animals were nearly driven out of the community altogether. Villagers hunted them because they ate crops and because they were good sources of food.[42] I suspect that the extensive, unregulated cutting of trees in Latuvi in the period before the arrival of chemical fertilizers and before the formation of the community forestry cooperative also helped to drive away wild animals. Nowadays, villagers buy meat using proceeds from corn and fruit sales, migrant remittances, or payouts from the forestry, wood, water, tourism cooperatives. They no longer need wild animals to supplement their diets. Deforestation is less of a problem because chemical fertilizers make once-barren ground tillable again, and because villagers need special permission from the government of the Pueblos Mancomunados to cut trees.[43] Nevertheless, Porfiria Cruz García told me that wild animals are rare in Latuvi today.[44] They are freer to roam than they have been in decades, but there are few left to do the roaming. Like their domesticated counterparts, wild animals faced big changes in the age of modern agriculture, and the biggest one was being allowed to exist at all.

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[41] Porfiria Cruz García, interview by Joshua Walker, in her home in Santa Marta Latuvi, 29 Mar. 2012; Carlos Contreras, interview with Joshua Walker, in his home in Santa Marta Latuvi, 3 Mar. 2012.

[42] Carlos Contreras, interview with Joshua Walker, in his home in Santa Marta Latuvi, 3 Mar. 2012. Porfiria Cruz García, interview by Joshua Walker, in her home in Santa Marta Latuvi, 29 Mar. 2012; Mario Sebastián Contreras, interview with Joshua Walker, in his home in Santa Marta Latuvi, 26 Apr. 2012.

[43] Anonymous former resident of Latuvi, interview by Joshua Walker, at his home in Oaxaca de Juárez, 22 May 2012; Carlos Contreras, interview with Joshua Walker, in his home in Santa Marta Latuvi, 3 Mar. 2012; Field Notes 14 Mar. 2012.

[44] Porfiria Cruz García, interview by Joshua Walker, in her home in Santa Marta Latuvi, 29 Mar. 2012; Carlos Contreras, interview with Joshua Walker, in his home in Santa Marta Latuvi, 3 Mar. 2012.

Conclusion

Even in a time when roads, tractors, fertilizers, and other new technologies became increasingly available to peasants, animals remained essential to their daily lives. They were reliable alternatives to tools and technologies that were not always available or appropriate. New, partially-mechanized work routines gave birth to new habits and new restrictions on space and mobility for animals, but animals proved to be flexible and adaptable to the new order of things.

The continued importance of animal laborers is further proof that "traditional" or "peasant" ways of working and living were not destroyed by new technologies. Instead, peasants used the tools they already had, the beasts with which they shared their lives, to make trucks, tractors, and other new technologies fit into their routines. In order to make new technologies work for them, they also had to know how to fix them when they broke. Animals could always take over for broken machines, but fixing them saved time and money in many cases. Just as they used animals to fill in the gaps where technologies failed, peasants also used repair skills to make new tools more useful. Repair is the subject of the next chapter.

Chapter 8: Repairs

On February 9, 1960, an American Vice-Consul named Howard Blutstein took a ride on a tractor with a Mexican farmer in the Baja California town of Villa Constitución. The tractor was a Soviet import, and Blutstein was busy collecting all the information he could about tractors that arrived to this region from the USSR. On a subsequent trip to the region, Blutstein spoke with a man who told him that farmers, "were experiencing trouble with the tractors and several were in for repairs." He also reported that "major parts" for repairing the machines were not available, a situation he felt would lead to "cannibalism of parts," the taking of parts from one machine to fix another.[45]

This story reveals a problem that plagued users of new technology in Oaxaca and throughout Mexico. In order for peasants and other farmers to use new tools successfully, they had to learn to repair them. As Blutstein's report suggests, new technologies like tractors were constantly breaking. Broken tools often were the result of inappropriate geographic conditions, especially in the steep, rocky terrain that characterizes much of Oaxaca. But they were also caused by user error and other human factors. Peasants had little familiarity with tractors, automobiles, and other tools, and there were few qualified teachers around to instruct them.

Broken tools challenged the people who purchased or rented new technologies for their farms. But they also provided important opportunities. As we can see from Blutstein's report about the "cannibalism of parts," farmers were avid practitioners of

[45] Robert F. Hale to The Department of State, 31 Mar. 1960. NARAII, Records of the Foreign Agricultural Service (RG166), Narrative Reports 1955-1961, Box: 610; Robert F. Hale to the Department of State, 12 Feb. 1960. NARAII, Records of the Foreign Agricultural Service (RG166), Narrative Reports 1955-1961, Box: 610.

bricolage, the building of things with whatever materials are available.[46] Over time, many learned to convert their skills in building, operating, and repairing machines into small businesses that supplemented or replaced their work on the farm. In a country long on broken machines and short on the parts and labor needed to fix them, a new market opened for people, usually men, who could make broken things work again. Repairing new tools was a source of frustration for many farmers but a valuable source of income for others.

Breaking

New tools broke for a variety of reasons: farmers were inexperienced users, landscapes were inappropriate, machines were subject to normal wear and tear, and tools were delivered to farmers in poor condition.[47]

Geography was a major cause for concern. In mountainous states like Oaxaca, where I did most of my dissertation research, terrain was ill-suited for machines like tractors. Capsizing was a constant danger, along with damages caused by rocks in the soil. Evidence for this can be found in the records of the National Indigenist Institute's coordinating center in Tlacolula. In the late 1970s and 1980s, this center ran an agricultural mechanization program that served indigenous farming communities nearby. Groups of peasants paid for a tractor and a driver to come to their fields and plow.[48] As I

[46] Douglas Harper's *Working Knowledge: Skill and Community in a Small Shop* was influential here.

[47] The fact that some tools in Mexico were imported used from the United States might have increased the chances of breakdowns. See Gabriel Baldovinos de la Peña, "Tractorización del Campo," *El Universal,* 12 Aug. 1978, Biblioteca Lerdo de Tejada, , Archivos Económicos, Exp.: A02281 Agricultura Tecnología.

[48] *Promotores* drove the tractors. See "Operación del Tractor No. 2 International 724, Distrito de Tlacolula, Período Comprendido del 26 de enero al 27 de febrero de 1976," CDIMEX, Exp.: FD20/0063.

suggested in the last chapter, capsizing and other difficulties caused by terrain were major causes for concern for INI officials involved with this program.[49]

But the problem was not purely environmental. Users were also to blame. Inexperienced users pushed tools faster, farther, and harder than they were intended to go. For example, in 1969, a man from San Antonino described the treatment of automobiles in his village for anthropologist Ronald Waterbury. He did not seem impressed with the ways people used their cars and trucks. "…Those cars," he told Waterbury, "how those people in the village mistreat them, they're starting to fall apart bit by bit."[50] He then told a story of a truck, loaded with cargo, which got stuck in a creek during a rainstorm. After eight days, an oxen team managed to pull the filthy vehicle out of the muck. Here, rural residents asked a vehicle to do something it was never intended to do: to cross a rushing creek loaded with cargo. The result was a vehicle incapable of moving without animal traction.

Similar stories regarding inexperienced operators of machines abound. Nazario Hernández Sánchez, a sixty-four year old peasant from San Bartolomé Quialana, told me about owning his first truck at the age of thirty. He said that he had minor accidents driving it over uneven terrain (*barrancas*) and that his unfamiliarity with automobiles led him to believe "that because it was metal, nothing was going to happen to it."[51] While he owned that truck, he said, the money he earned from agriculture went straight to the

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[49] Ramón A. Coria Nuñez to Carlos Gómez Díaz, 22 Dec. 1982, CDI Tlacolula, Box: Proyectos Especiales 1983-1987, Folder: Folder: Programas INI-PIDER Mecanización Agrícola (Tractores); Ramón Coria Nuñez to Diego Vazquez J, 8 Apr. 1983, CDI Tlacolula, Box: Proyectos Especiales 1983-1987, Folder: Folder: Programas INI-PIDER Mecanización Agrícola (Tractores); Ramón Coria Nuñez to Diego Vazquez Juárez, 16 May 1983, CDI Tlacolula, Box: Proyectos Especiales 1983-1987, Folder: Programas INI-PIDER Mecanización Agrícola (Tractores).

[50] Ronald Waterbury's field notes, 1969, GN 2042.

[51] Nazario Hernández Sánchez, interview by Joshua Walker, at his home in San Bartolomé Quialana, 5 June 2012. Translation by Joshua Walker.

mechanic in Tlacolula. Amador Perez Sanchez, age fifty-nine and also from San Bartolomé, told me that he bought his first car after his friend had an auto accident.[52] Inexperience and lack of familiarity with new technologies inevitably led farmers towards accidents that broke their new machines.

Some people misused tools on purpose, a strategy I refer to as "repurposing." Figure 9, from 1945, shows children near Tlacolula, Oaxaca swimming in a reservoir created by an irrigation dam.[53] This is a clear example of rural residents repurposing a technology, although it is tough to tell if these children broke anything.

Figure 9, 1945.

Other examples are clearer in this regard. A peasant from Santa Marta Latuvi told me in informal conversation that the first public water hydrants, located on public streets, were tempting targets for children, who played with them and broke them (see figure 2, chapter one).[54] A 1975 report from the National Indigenist Institute's coordinating center in Temascal, Oaxaca accuses children of stealing oranges and mangoes from the center's demonstration plots.[55] Demonstration plots were intended to be places where farmers could observe new technologies in action and judge the quality of the fruits and

[52] Amador Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 21 Apr. 2012.

[53] "Represa Grande de Tlacolula, Tlacolula Oax," 31 Mar. 1945. AHA, Fondo: AS, Caja: 3976, Exp.: 54890.

[54] Conversation with anonymous peasant, Santa Marta Latuvi, field notes, 5 Oct. 2012; Figure 2: "Hyrdrante Público," from "Oaxaca: Obras de Agua Potable, 1965-6," AHA, Fondo: CdP, Caja: 284, Exp.: 4431, Legajo: 1.

[55] Mario Salazar Liévano to Teodoro Guadalupe Cruz, 25 Jul. 1975, CDIOAX, Archivo Histórico CCI Papaloapan, Caja: 10, Exp.: 124.

vegetables that they produced (chapter six). Some children in the region apparently had different plans for these spaces.

Other technologies never worked well in the first place, either due to faulty design or to poor installation. In his field notes from San Antonino, Ronald Waterbury transcribed an interview with Juanico Ruíz, the municipal president, who told the story of the building of a well in 1978:

> Problem, according to Juanico, is that the well never was up to standard. It was supposed to produce a certain number of [liters per meter] but never did. However the [engineer] in charge at the time signed off as if the well was producing properly. When it began to go dry in January and [engineer] came out, the new fellow, and blamed the old [engineer] for the problems. They attempted to deepen or otherwise put the well in operation but apparently screwed it up even more…[56]

In this case, officials' incompetence and disorganization left villagers with a faulty technology that had to be repaired in order to function properly.

The normal wear and tear that comes with age also put technologies out of commission. Waterbury interviewed a man, Noe Santiago, who used a diesel motor to provide electricity for the village of San Antonino from 1934 to 1956. The man quit this business in part because his motor had "[given] out."[57] In San Bartolomé Quialana, a pump that moved water from a low-lying creek into a distribution tank gave out after fourteen years of service (1967-1981), forcing municipal leaders to scramble to find a mechanic.[58] In these cases, it was not user misuse, but the passing of time that put technologies out of commission.

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[56] Ronald Waterbury's field notes, 28 Mar. 1978, GN3818.

[57] Ronald Waterbury's field notes, 18 June 1978, GN3917.

[58] Manuel Hernández Hernández to Gorge Aristaín Figueroa, 10 Feb. 1981. San Bartolomé Quialana Archives, Binder: Documentos Antiguos; Gonzalo Sánchez Sánchez to Jorge Atristaín Figueroha, 29 Jan. 1981, San Bartolomé Quialana Archives, Binder: Documentos Antiguos; Lázaro Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 4 June, 2012.

Consequences of Breaking

Depending on the tool that broke and the severity of the break, malfunctioning technologies could cause major disruptions for farmers and government officials alike. In San Antonino, Noe Santiago had to shut down a business producing castor oil in part due to aging equipment.[59] In Latuvi, schoolchildren who waited in line at the diesel-powered corn-grinding mill might miss a day of school while the machines were under repair. María Pérez Ramírez told me they might not leave the mill until noon, "because the mill broke down…and what time are we going to get to school? We wouldn't go to school, because it was late."[60] Even the smaller, electrically-operated grinders that families bought for the home required a lot of maintenance. Ignacio García Hérnandez, age sixty-seven, told me, "we used to have a corn grinder here [in his house], but it broke down. And there is nothing [you can do] but try to buy the piece you need."[61] Until they bought the needed repair parts, his wife was carrying her corn to another family's home, where she paid to have it ground. In these examples, broken tools disrupted the lives of men, who had to find the parts and the time to fix them, of women, who had to spend time, energy, and money to use someone else's tools, and of children, whose chores were made more time-consuming by maintenance problems.

Broken tools also disrupted the schedules and plans of federal agronomists, engineers, technicians, and other officials. "Tractor No.1" was a Massey-Ferguson tractor owned by the National Indigenist Institute that worked in the fields of Oaxacan villages. A work report from 1976 showed that the tractor lost eight out of twenty-one

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[59] Ronald Waterbury's Field Notes, 18 June 1978, GN3917.

[60] María Pérez Ramírez (with Vicente Garíca Cruz), interview by Joshua Walker, at their home in Llano de Marta, Latuvi, 17 May 2012, translation by Joshua Walker.

[61] Ignacio García Hernández, interview by Joshua Walker, in his home in Santa Marta Latuvi, 14 May 2012.

working days (not including weekends) between January 19 and February 27 due to repair.[62] While working in San Bartolomé Quialana, "Tractor No. 1" suffered two punctured tires, a broken *tornillo*, and a broken hydraulic system, in addition to having its discs changed.[63] A report from Ramón Coria Nuñez, the head of the mechanization program at the Institute's Tlacolula coordinating center, reported that tractor labor was relatively low in May of 1983. He claimed that this was because the machines had undergone extensive repairs to prepare for the upcoming month.[64] A few weeks later, the center's director, Diego Vásquez Juárez, told Coria Nuñez to "find the right time to repair tractors and try to have all of them in service for most of the year."[65] Nevertheless, in 1984, Vásquez Juárez reported that seven out of eleven of the tractors belonging to his center were out of service.[66] It is not hard to imagine the frustration of these officials when programs designed to help rural residents were limited by constant equipment failures.

Repairs

Repairing new technologies was burdensome. For starters, replacement parts were difficult to find. This problem was already becoming apparent in some parts of Mexico as early as the 1940s. Agricultural attachés and other agents for the U.S. Consulate delivered regular reports about business opportunities for agricultural

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[62] "Instituto Nacional Indigenista Programa de Inversiones Públicas para el Desarrollo Rural Valles Centrales: Tractor No. 1, M-F-265, Periodo comprendido del 19 de enero al 27 de febrero de 1976." CDIMEX, Exp.: FD20/0063.

[63] Ibid. The meaning of *tornillo* is unclear to me. A literal translation yields "screw," but this could refer to all shapes and sizes of fasteners that one might find on farm equipment. *Tornillo* might refer to the pin on the hitch that holds attachments like plows to the tractor.

[64] Ramón Coria Nuñez to Diego Vazquez Juárez, 16 May 1983, CDI Tlacolula, Box: Proyectos Especiales 1983-1987, Folder: Folder: Programas INI-PIDER Mecanización Agrícola (Tractores).

[65] Diego Vázquez Juárez to Ramon Coria Nuñez, 7 June 1983, CDI Tlacolula, Box: Proyectos Especiales 1983-1987, Folder: Folder: Programas INI-PIDER Mecanización Agrícola (Tractores).

[66] Diego Vázuez Juárez to Jaime Hugo Talancon Escobedo, 12 July 1984, CDI Tlacolula, Box: Proyectos Especiales 1983-1987, Folder: Folder: Programas INI-PIDER Mecanización Agrícola (Tractores).

manufacturing companies in Mexico. They made it clear that replacement parts were in short supply and could be sold for a lot of money. In 1944, acting Agricultural Attaché Mervin G. Smith wrote, "Automobile and truck repair parts are very scarce and are being sold at high prices. Tires and inner tubes, when available, are usually being sold at 'black market' prices."[67] Reporting from the state of Chihuahua in 1944, Vice-Consul Robert F. Peyton said "All of the farmers of this district have experienced extreme difficulty in replacing farm implements during the year under review and it is certain that planting for 1944, will be sharply curtailed because of the shortage of such equipment."[68] According to a report from U.S. Embassy worker H. Gerald Smith, U.S. machinery dominated the market in northern Mexico in 1959 in part because of the "ease of spare part replacement" that presumably came from being close to the border.[69] These examples all underscore the same point that Howard Blutstein highlighted in 1960: new machines were plentiful in Mexico, but finding parts to fix them was a major concern.

Finding qualified mechanics was also a daunting task. Evaluating the potential for domestic manufacture of farm machinery in Mexico, U.S. embassy analyst John P. Wagman wrote that, "Simple designs [for equipment] are preferable, since repair facilities are limited in the interior of Mexico." He added, "Most local manufacturers of agricultural equipment have failed to provide adequate and reasonably priced replacement parts."[70] In 1981, Manuel Hernández Hernández, the President of the

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[67] Mervin G. Smith, "Winter Vegetable Prospects—Mexico," 1 Dec. 1944, NARAII, Records of the Foreign Agricultural Service (RG166), Narrative Reports 1942-1945, Box: 318.

[68] Robert F. Peyton, "Sales of Agricultural Implements in the Chihuahua Consular District," 23 Feb. 1944, NARAII, Records of the Foreign Agricultural Service (RG166), Narrative Reports 1942-1945, Box: 318.

[69] H. Gerald Smith to Department of State, 9 July 1959, NARAII, Records of the Foreign Agricultural Service (RG166), Narrative Reports 1955-1961, Box: 610.

[70] John P. Wagman to Department of State, 6 Aug. 1943, NARAII, Records of the Foreign Agricultural Service (RG166), Narrative Reports 1942-1945, Box: 318.

governing board of the potable water system in San Bartolomé Quialana, wrote to an administrator in Oaxaca City asking for help repairing the pump that supplied the village's potable water. The pump had been broken for over twenty days. Hernández wrote, "..it has not been possible to find the master mechanic so that he can come and look at the motor…"[71] The fact that villagers went without water service for over twenty days attests to the scarcity of qualified people who could fix machines. In some cases, officials from federal agencies like the National Indigenist Institute or the Papaloapan Commission repaired broken machines, but relying on them was an uncertain strategy considering the time-sensitive nature of agricultural work and the fact that these officials served multiple communities.

In spite of these obstacles, or perhaps because of them, farmers found creative ways to get repair jobs done. As we saw with Howard Blutstein's comment regarding "cannibalism of parts" at the beginning of the chapter, farmers learned to find what they needed from their surroundings. This might mean destroying one tractor to save another. In an excerpt from a 1943 report, L. B. Clark, Senior Economic Analyst at the U.S. embassy, reported on the arrival of 1500 mules to an unnamed district. He opined that the farmers were justified in their decision by the rash of cannibalization that was occurring:

[71] Manuel Hernández Hedez to Gorge Aristaín Figueroa, 10 Feb. 1981, San Bartolomé Quialana Archives, Binder: Documentos Antiguos; 10 Feb. 1981.

> To aid in the carrying on of agricultural work in this area some 1500 mules were brought into the district for cultivating and crop planting purposes. The farmers have taken this precautionary measure with an eye on complete cessation of tractor and other farming equipment imports. Their foresight seems to be justified by a report that in one farming colony near Mexicali, 20 tractors have been dismantled out of a total of 30, the parts of the dismantled machines being used to keep the remaining 10 tractors in working condition. Such practice is known to have occurred in connection with road construction work in other parts of the country, and indicates the desperate situation prevailing in Mexico with respect to equipment of this nature.[72]

In 1984, people in Oaxaca practiced an apparent act of machine cannibalization by stealing parts from a tractor at the National Indigenist Institute's Coordinating Center in Tlacolula.[73] Cannibalizing parts was a destructive strategy that put machines out of commission. However, I also think it is fair to interpret this phenomenon as a creative solution to problems of technological scarcity.

Another option was to use Mexico's growing network of highways to find parts in other areas of the country. This required reliable transportation, time, and money for fuel, but some people did it. For example, an informant told anthropologists Carole Judith Turkenik and Ronald Waterbury about a mechanic who used a pickup truck to transport replacement parts for a tractor from Monterrey to Oaxaca.[74] In 1983, Ramón Coria Nuñez, the man in charge of the mechanization program at the National Indigenist Institute's Tlacolula center, drove to the city of Cuautla in the state of Morelos to find replacement parts for tractors. He argued that they were cheaper there than in nearby

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[72] L.B. Clark, "Excerpts from Monthly Economic Review—Mexico, January 1943," 22 Feb. 1943, NARAII, Records of the Foreign Agricultural Service (RG166), Narrative Reports 1942-1945, Box: 318.

[73] Diego Vázquez J. to Taurino Valintin Polanco, 30 Jul. 1984, CDI Tlacolula, Box: Proyectos Especiales 1983-1987, Folder: Programas INI-PIDER Mecanización Agrícola (Tractores). The precise spelling of the recipient's name is difficult to discern from my blurry photograph of the document.

[74] The Field Notes of Ronald Waterbury and Carole Judith Turkenik, 12 Aug. 1973, GN4401.

Oaxaca City.[75] Finding replacement parts was a challenge, but the right mixture of creativity, time, and travel yielded success stories like these.

Employment

Locating spare parts was only helpful insofar as there was somebody around who knew what to do with them. Men learned to take advantage of the market for mechanics by starting repair businesses and by working as mechanics for existing establishments. In 1959, consular agent H. Gerald Smith reported that " 'custom'" shops were being used to a "considerable extent" to produce farm equipment in Mexico.[76] Ronald Waterbury learned about such a shop in the Oaxacan village of Ocotlán. In 1975, a man and four of his sons started a business there repairing trucks and building truck beds and bodies. This business was an outgrowth of the family's existing machine shop, "where they repair and build *carretas* [wagons] and other mechanic [sic] gadgets."[77]

Mechanical corn-grinding mills were another place where men could operate machines and repair them. Grinding corn, an activity that had been the exclusive province of females, became a task that involved both men and women when mechanical grinders called *molinos de nixtamal* became popular. In 1970, Alfonso Santiago told anthropologist Carole Turkenik about his electric corn grinder, which he and his son Fernando worked each morning grinding corn for women in his village. Santiago said that Fernando saved his father money by repairing the mill when it broke. He told Turkenik, "[the breaking of the grinding machines] has not cost us anything. Sometimes

[75] Ramón Coria Nuñez to Diego Vazquez Juárez, 16 May 1983, CDI Tlacolula, Box: Proyectos Especiales 1983-1987, Folder: Programas INI-PIDER Mecanización Agrícola (Tractores).

[76] H. Gerald Smith to The Department of State, 14 May 1959, NARAII, Records of the Foreign Agricultural Service (RG166), Narrative Reports 1955-1961, Box: 610.

[77] Carole Judith Turkenik's Field Notes, 6 Oct. 1973, GN 4146.

it does not want to work, but Fernando himself is in charge of repair."[78] Fernando also made money on the side installing electricity in people's homes, money that his father allowed him to spend however he wanted.[79] So not only did Fernando's talent for building and repairing things help to keep the family business afloat, it also made him more independent.

Young men also sought work as drivers and operators of vehicles. Emiliano Morales Cruz, longtime employee of the National Indigenist Institute's Coordinating Center in Tlacolula, told me that the Institute's personnel trained indigenous farmers to drive tractors at times when drivers were not available. People who received this training could then sell their services as a tractor driver to farmers in other villages. Morales Cruz said, "It was another good thing about the [mechanization] program, that that there was employment, that there were people that learned to drive and until this day continue being tractor drivers."[80] Noel García Aguilar, a sixty-six year old former mayor of the town of Tlacolua, told me that from around 1955 to 1970, only three or four people in his town had tractors. To put that into perspective, he estimated that from the 1990s to 2012, there were around 150 working machines in Tlacolula. Such a small number of available tractors in earlier years meant that the owners of these machines could rent their services in order to earn extra income.[81]

Early adopters of automobiles told me similar stories. People paid them for rides to and from major marketplaces and for help moving large quantities of produce. Porfiria

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[78] Carole Judith Turkenik's Field Notes, 6 Oct. 1970, GN 2059-2082.

[79] Ibid.

[80] Emiliano Morales Cruz, interview with Joshua Walker, at the Tlacolula office of the *Comisión para el Desarrollo del Pueblo Indígena,* 23 Oct. 2012.

[81] Noel García Aguilar, interview by Joshua Walker, at his home in Tlacolula de Matamoros, 22 Aug. 2012.

Cruz García, a sixty-year-old woman from Santa Marta Latuvi, told me that in the 1980s, her uncle had a truck that he used to transport people from the village to the city of Oaxaca and back. The people would bring the things they intended to sell in the city and return with the things they had bought there, including candies, fruits, and soft drinks. Although she did not say it, I presume that Cruz García's uncle charged a small fee for this transportation service.[82] An anonymous informant, age forty-two, said something similar about the arrival of automobiles in San Bartolomé Quialana. Drivers started businesses shuttling people back and forth between the village and the nearby marketplace at Tlacolula:

> **Anonymous #32**…I remember when the first guy bought his car. He had his car, and he got the idea to shuttle people from here to Tlacolula. And everyone got in his car, they went to Tlacolula, and they came back. And when they saw that it was good business back then, because there were not any other cars, then another person realized, and bought his car, too, and started to do the same. So they all began. And little by little, now almost everyone has a car.[83]

Amador Pérez Sánchez, age fifty-nine, took advantage of this growing market for automobile transport in San Bartolomé Quialana. He drove people to the market using trucks and a minibus until a dispute with local authorities over licenses led him to quit the business and move to Los Angeles.[84]

Of course, any business that relied on vehicles to bring in cash also relied on repair work to keep the vehicles running. As I referenced earlier, Nazario Hernández Sánchez told me that he frequently would take his truck to a mechanic's shop in Tlacolula. Over time, automobile owners learned to be their own mechanics to a certain

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[82] Porfiria Cruz García, interview by Joshua Walker, in her home in Santa Marta Latuvi, 29 Mar. 2012.

[83] Anonymous man, interview by Joshua Walker, at his home in San Bartolomé Quialana, 20 Aug. 2012.

[84] Amador Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, Oaxaca, August 21, 2012.

degree. Regarding his first truck, Hernández Sánchez told me: "It died. I finished it off. But I learned something. I learned something from that car. Yes, it taught me a lot of things. Now, I can fix simple problems on cars."[85] Hernández Sánchez learned to fix simple problems, but he also needed the help of more experienced men when more complex issues arose. Today, he runs a side business repairing punctured tires, and another man runs a repair shop not far from his house. That these men continue to earn income from fixing broken stuff attests to a steady market for repair work in the 1980s and after.

In some cases, operating and fixing machines and other technologies replaced farm work as the primary source of income for males. Carole Turkenik and Ronald Waterbury interviewed a man named Bulmaro Santiago in San Antonino in 1973. They asked him about a man named Gildo Aguilar and his tractor. Santiago informed them that Aguilar chose to buy a tractor instead of buying more land. He made a choice to invest his money in the business of renting tractors instead of reinvesting in his own farm.[86] Alfonso Santiago told Carole Turkenik in 1973 that he goes to his fields, "very little, I only go when I'm needed. Basically, my work is not in agriculture, it's in the mill."[87] As I explained in the introduction, feeding families with agriculture had always been a dicey business in the dry, rocky terrain of states like Oaxaca. Running and fixing machines offered some men an option for escaping this line of work altogether.

Migration to cities in Mexico and in the United States is another, familiar way of escaping the difficulty of farming in places like Oaxaca. Migration enhanced the market

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[85] Nazario Hernández Sánchez, interview by Joshua Walker, at his home in San Bartolomé Quialana, 5 June 2012.

[86] Field notes of Ronald Waterbury and Carole Judith Turkenik, 12 Aug. 1973, GN 4400-07.

[87] Carole Judith Turkenik's field notes, 6 Oct. 1970, GN: 2079.

for building and repair work in rural villages. Migrants who returned home with extra cash or who sent money home while working out of town gave their families money to pay mechanics, welders, and technicians. For example, when electricity lines finally reached his home in San Bartolomé Quialana in the 1990s, Fernando Martínez, age sixty-six, used this new technology to power the tools he needed to start a welding business. Since then, he has welded metal into doors, windows, gates, and other features of "modern" homes, and many of his clients pay for these products using remittances earned while working in the United States.[88] Men also found work helping to build homes. Nazario Hernández Sánchez told me more about new opportunities in the village:

> **Nazario Hernández Sánchez**…Now things have changed a bit because now, the guys who started to go to the north, as we call it, they save their money, they send it here, now they are building their house. Well, now we have work, those of us who are here have work, because the money comes from there.[89]

As laborers left villages, new jobs arose for those who stayed behind. Many of them involved building and repairing things.[90]

Men continue to make income through fixing and building. Nazario Hernández Sánchez worked in construction and as a plumber before starting his current tire repair business. Another anonymous man from San Bartolomé Quialana that I interviewed in

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[88] Fernando Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 3 Aug. 2012.

[89] Nazario Hernández Sánchez, interview by Joshua Walker, at his home in San Bartolomé Quialana, 5 June 2012.

[90] Hernández-Cross, *The U.S.—Mexico Remittance Corridor,* 86; Massey, Durand, and Malone, *Beyond Smoke and Mirrors,* 62; Meyers, "Migrant Remittances to Latin America," 60-7. There is an immense scholarship on the usage of migrant remittances in sending communities. The scholarship that I reviewed, cited in this note, is in general agreement with the points I have made here. Hernández-Cross discusses the formation of home construction businesses in Tlacolula, writing, "…many construction material businesses have developed, and the local residents attribute this to the great inflow of migrant remittances that, to a large extent, are applied to construction" (86). Deborah Waller Meyers' literature review on remittances claims that remittances are spent on homes, land, cattle, and consumer appliances, although basic necessities like food, clothing, and health care are the most common expenses (60). Massey, Durand, and Malone write about remittance being used to start small businesses: "Although most migradollars [remittances] were spent on consumption, household also invested in productive enterprises when personal circumstances and community conditions warranted…"(62).

July of 2012, age seventy-five, repairs broken water pumps for wells.[91] Mario Sebastián Contreras, age seventy-nine from Latuvi, sharpens grinding stones for home grinders owned by villagers, having learned this skill while working at a corn-grinding mill as a younger man.[92] Further research is needed to determine exactly how much money these jobs produce and how significant is their impact on peasants' budgets.

Conclusion

The main arguments of this chapter are twofold. First, the transfer of farming technologies like tractors and the introduction of other tools like mechanical corn grinders, automobiles, and highways was made more difficult by the phenomenon of constantly breaking tools. The second and more important argument is that peasants and government officials found ways to work around these challenges. People who were particularly deft with a wrench found new job opportunities in an increasingly mechanized economy.

These insights offer contributions to the history of technology and to the history of Mexico. Concerning the history of technology: In *The Shock of the Old*, David Edgerton argues that maintenance is an essential category of analysis that is often neglected in "our histories."[93] My work puts repair at the very heart of technological change, and suggests that such change would not have happened in Mexico or Oaxaca without the skill and perseverance of peasants and mechanics to work through various glitches.

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[91] Anonymous peasant, interview by Joshua Walker, in his home in San Bartolomé Quialana, 19 July 2012.

[92] Mario Sebastián Contreras, interview by Joshua Walker, in his home in Santa Marta Latuvi, 26 Apr. 2012.

[93] Edgerton, *The Shock of the Old,* 77-9.

Peasants' work breaking and repairing tools shows, again, how they weathered the changing technological winds. New technologies might have arrived in villages in "inappropriate" form, but many were able to use their repair skills to transform them into valuable assets. Instead of being victims of modernity, many became (quite literally) its mechanics, responsible for shaping and forming new technologies until they fit the landscape and culture of their village.

Chapter 9: Memories

This chapter explores the ways that peasants remembered and interpreted technological changes as they talked to me in 2010, 2011, and 2012. I argue that peasants used loaded terms like "progress," "civilization," and "modern" to describe themselves and their relationship with new tools, and they contrasted the technologically-sophisticated present with a "sad" and "difficult" past. "Progress" for peasants typically meant more food to eat, more access to consumer goods that made life comfortable, especially clothing and sandals, and more mobility. Many informants believe that new technologies helped them to achieve this definition of progress. However, they also juxtaposed this story of technological triumphalism with frank discussions of threats to health, environment, and village traditions.[1] In other words, peasants gave me more than a sanitized story of improvement. Rather, they remember the consequences of technological change to be dynamic.

In the second half of the chapter, I argue that buzzwords like "progress" and "civilization" were terms shared by government officials and peasants as they discussed and negotiated the arrival of new technologies with each other. Officials and peasants shared similar definitions of "progress" and similar goals. Development officials hoped to help peasants to grow more food to supply national markets, but also to become participants in markets themselves. They also sought to make peasants better able to provide for themselves. Officials saw technology as a way to achieve these goals, but they, too, understood that technological change came with challenges for peasants to confront.

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[1] "Technological triumphalism" is inspired by Portelli, *The Death of Luigi Trastulli,* 110-13.

By discussing the visions and goals of both peasants and officials, this chapter aims to shed light on previous chapters, which mostly answered the question of *how*. Most of this dissertation is dedicated to showing how technological change came to Oaxaca. Analyzing discourse helps to move the dissertation towards a better understanding of the goals and motivations of the actors, towards answering the question of *why*. Both peasants and officials were interested in higher crop output, more access to markets, and more purchasing power, and they were constantly weighing the potential benefits of technological change against the very real challenges and dangers that new tools posed. This further disproves the revisionist narrative of a dominating state while reinforcing the idea that peasants were capable of making informed decisions about the tools they used.

No Había

Peasants repeated the phrase *no había*...(there were not any…) when describing the history of their village to me. *Huaraches* (sandals) and *zapatos* (shoes) were frequently the subject of these phrases, along with items like soap, food, and transportation technologies. Below are a few examples from the transcripts of my oral interviews:

Vicente Marcos Hernández, age fifty, Santa Marta Latuvi:

> JW: ¿Usted sufrió de la caminata?
> VM: Sí, porque nosotros anduvimos descalzos anteriormente. Salir del Manantial a la escuela era descalzo. No había zapatos. Hasta los trece años ya conocí cual era zapato, sí.
> JW: ¿Y le causó a usted dolor caminar?
> VM: No, pues se acostumbra uno.
> JW: ¿Sí?
> VM: Sí, se acostumbra. Es que los pies pues ya se acostumbraron que no tenían zapato.
> JW: ¿Cómo cambió la vida con la entrada de zapatos?
> VM: Pues le digo que cuando llegó el fertilizante, como anteriormente puro para comprar maíz, pues no había para comprar zapato. Entonces cuando ya llegó el fertilizante, pues ya había maíz entonces ya se procuro de comprar zapato.
> J: Sí, qué interesante. ¿De dónde, de dónde vinieron sus, de dónde vino su primer par de zapatos?
> V: De la ciudad, de Oaxaca.

J: ¿Y cómo encontró usted el dinero pagar por los zapatos?
V: No pues mi, mi madre lo compró. Cómo ya iba a terminar la escuela primaria, entonces ella lo compró, sí.
J: ¿Y qué pensó usted?
V: No, pues que ya, ya era momento de pisar zapato, je, sí

English Translation:
JW: Did you have to walk everywhere?
VM: Yes, because we walked barefoot back then. Leaving el Manatial for school, it was barefoot, there were not any shoes. I did not know what shoes were until I was thirteen.
JW: Did it hurt to walk?
VM: No, you get used to it.
JW: Yes?
VM: Yes, you get used to it, your feet get used to not having shoes.
JW: How did life change with the arrival of shoes?
VM: When fertilizers arrived, seeing as before corn had to be bought, there was not any [money] to buy shoes. Then when the fertilizers arrived, well now there was corn and money to buy shoes.[2]
JW: How interesting. Where did your first pair of shoes come from?
VM: From the city, from Oaxaca.
JW: And how did you get the money to pay for them?
VM: No, my mom bought them. Seeing as I was just about to finish elementary school, she bought them.
JW: And what did you think?
VM: That now it was time to walk with shoes, ha! Yes.

[2] Vicente Marcos Hernández, interview by Joshua Walker, at his home in Santa Marta Latuvi, 29 Mar. 2012. Translation by Joshua Walker.

Sadot Santiago Herández, age fifty-three, Santa Marta Latuvi:

JW: ¿Por qué adoptaron las mujeres o los hombres, no sé, los molinos eléctricos, en vez de los molinos aperados por mano?
SS: Porque mucha gente, como ya hay trabajo, hay mamás que tienen dos, tres niños, pues rápido, para que vayan a la escuela, sí. Donde no hay luz, pues órale, tienes que, a éstas horas sale, temprano, hacer tus tortillitas, para que el niño se venga a la escuela. Pero ya que llegó la energía eléctrica, pues tuvo otra evolución. Va cambiando ahorita, como lo que pasa con el celular, con el Internet, pues todos ya…Yo anteriormente, íbamos a la escuela aquí descalzos, no había zapatos. O si había zapatos, pero no había con qué comprarlo. Entonces ahorita no, pues ahorita los niños ya no quieren esos zapatos. Ya quieren puro Jordan, puro Nike, [JW: puro Kobe?] puro Kobe sí. Ya si les dan un pantalón de estos, no se los ponen, quieren de los otros. Pero porque la misma tecnología pues cambia, todo cambia. Yo cuando salí de aquí, pues no había autobús, no había carro, no había nada de eso. Puro puro caminito por allí.

English Translation:
JW: Why did women, or men (I do not know), adopt electric grinders as opposed to hand-powered ones?
SS: Because a lot of people, seeing as there is work, there are moms who have two, three children, well [you make tortillas] quickly so they can go to school. Where there is not electricity, well then you have to go earlier to make your tortillas, so that the child can go to school. Now that we have electricity, there has been another revolution, things are changing, like what happened with cellphones, Internet, everything. Before, we went to school barefoot, there were not any shoes, or, rather, there were shoes, but nothing to buy them with. But now, no. Now, the children do not want those shoes. They want only Jordans, Nikes, Kobes. If you give them a certain pair of pants, they won't put them on, they want the other ones. But technology changes, everything changes. When I left here, there was not a bus, there were not cars, nothing of that. Only walking…[3]

[3] Sadot Santiago Hérnandez, interview by Joshua Walker, on the basketball court of *la agencia municipal* in Santa Marta Latuvi, 19 Apr. 2012. Translation by Joshua Walker.

Ofelia Quero Santiago, age seventy-six, Santa Marta Latuvi:

JW: ¿Acuerda usted, el gobierno de su juventud? No había apoyos de gobierno ni nada?
OQ: No, nada, nada de gobierno, nada de gobierno en mi juventud. Lo que me acuerdo es otro poco de la revolución. Porque aquel cuando estábamos, éramos niños, como ocho, nueve años, va a tronar. Entonces anda mi papa trabajando en los terrenos. Va a venir la casa, va a decir, va a agarrar su cardillera, sus rifles, sombrero. Va a despedir de nosotros y se va, dice: voy a ir porque ya se tronó. Va a haber guerra. Ya me voy y tan bonito te quedas con ellos. Allí veras qué vas [inaudible], le decía a mi mama. No había sal. No había chile. No había jabón. No había hilo para remendar ropa. No había ropa. No había huarache. Aquel antes, huarache. Descalzo. No había nada. Pura papa. No había maíz, nada. Pura papa comimos. Cuando era yo, tenía yo quince, dieciséis años. No, pan, ni panela, ni azúcar, ni nada.

English Translation:
JW: Do you remember the government of your youth? Was there no support or anything from the government?
OQ: No, nothing from the government, nothing, in my childhood. What I remember is a little bit of the revolution. Because back then, we were children, eight or nine years old, and it was going to start. Back then, my dad was working his fields. He came to the house to get his cartridges, his rifles, his hat. He came to say goodbye to us and he left, saying, "I'm going because it has started. There is going to be a war. He said to my mother: 'I'm leaving and you stay with them. There you'll see [inaudible]. There was not salt. There were not any chilies. There was not soap. There was not thread to patch clothing. There was not clothing. There were not sandals. Back then, sandals. Barefoot. There was not anything. Only potatoes. There was not corn, nothing. We only ate potatoes. When I was fifteen, sixteen years old. No bread, no sweetbread, no sugar, no nothing.[4]

Anonymous Former Resident of Santa Marta Latuvi, age seventy-eight:

JW: Imagino que es un cambio en la economía, no? Tener menos animales, hay que, hay que tener otro fuente de gasto.
A: Sí, sí, otra fuente de economía. Ahorita ellos se ayudan mucho con, con la fruta, se ayudan mucho con la fruta, bastante, bastante. La economía de Latuvi ha cambiado completamente. Cuando yo era niño, cuando yo iba a la escuela, eran tres o cuatro mujeres que usaban huaraches. Todas las mujeres, la mayoría, descalzas, descalzas. Ahora no ve usted una mujer descalza en Latuvi?

English Translation:
JW: I imagine that this is an economic change, no? Having less animals means finding another source of income.
A: Yes, yes, other means. Now, [the people of Latuvi] help themselves a lot with fruit, they help themselves a whole lot. The economy of Latuvi has changed completely. When I was a child, when I went to school, there were three or four women who wore sandals. The majority: barefoot. Now, do you see a barefooted woman in Latuvi?[5]

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[4] Ofelia Quero Santiago, interview by Joshua Walker, in her home in Santa Marta Latuvi, 29 Mar. 2012. Translation by Joshua Walker.

[5] Anonymous former resident of Latuvi, interview by Joshua Walker, at his home in Oaxaca de Juárez, 22 May 2012. Translation by Joshua Walker.

Fernando Martínez, age sixty-six, San Bartolomé Quialana:

JW: ¿Por qué se fue de San Bartolo?
FM: Por, por lo mismo de que mi, mi edad, bueno, tal vez mi travesura. Yo no tenía huaraches, no, no fui con huaraches, así descalzo. Tenía yo nueve años, y no sabía el castellano.

English Translation:
JW: Why did you leave San Bartolomé?
FM: Because of my age, well, maybe because I was mischievous. I did not have sandals, no, I did not leave with sandals, but barefoot. I was nine years old, and I did not know Spanish.[6]

Anonymous man, age forty-two, San Bartolomé Quialana:

A: Pero si no hay dinero, ¿cómo vamos a comprar? Antes, antes la gente nomás se dedicaba a trabajar en el campo, y juntaban maíz. Pero, y luego el dinero no hay. No podíamos comprar un jabón. No podíamos comprar cosas así, para todo lo que se usa en un hogar: jabón, sal, todo lo que se usa en la cocina también. No hay dinero. Y sí la mazorca hay, pero luego para comprar un jabón, para comprar, este, una ropa, un huarache, porque ahorita la gente ya, todos usan zapatos, ya poca gente usa huaraches. Pero en aquel tiempo toda la gente usaba huaraches, puros huaraches usaban.
JW: ¿Porque cuestan menos?
A: Sí, cuestan menos. O algunas, algunas persona caminaban así descalzo, sin, sin huarache, sin zapato, así caminaban.
JW: ¿Y usted recuerda de eso?
A: Sí, mi mamá caminaba así. Yo también caminé así descalzo, no usaba huarache. Porque a veces no había dinero para comprar.

English Translation:
A: But when there is not any money, how are we going to buy things? Back in the day, people only worked in the fields, and they gathered corn. But then there is no money. And we could not buy soap. We could not buy things like that, everything that is used in the home: soap, salt, everything you would use in the kitchen, too. There is not money. Yes, there is corn, but then to buy soap, to buy clothes, sandals, because now, everyone wears shoes, few people wear sandals. But back then everyone wore sandals, they only used sandals.
JW: Because they are cheaper?
A: Yes, they are cheaper. Or some people walked around like so, barefoot, without sandals, without shoes, they walked around like that.
JW. And you remember this?
A: Yes, my mother walked around like that. I also walked around barefoot, I did not use sandals. Because sometimes there was not money to buy them.[7]

[6] Fernando Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 3 Aug. 2012. Translation by Joshua Walker.

[7] Anonymous man #32, interview by Joshua Walker, in his home in San Bartolomé Quialana, 20 Aug. 2012. Translation by Joshua Walker.

Anonymous Man, age sixty-five, San Bartolomé Quialana:

JW: Luego, cree usted que la vida ahorita está mejor que antes?
A: Sí, está mejorando. Por eso es la que le decimos civilización. Porque en antes no había nada. En antes, en las tiendas, lo que había: mezcal no más. Había unos refrescos como ese tamaño, de bote de agua. Pero, quién sabe hasta cuándo, cada dos meses o tres meses. No, ahora se acostumbraron, los hijos ahora, toman refresco. Ya no aquí, hay algunos que ya no quieren tomar tejate. Puro refresco. En aquel tiempo todos parejo toman tejate. Por eso tienen más fuerza que, más resistente.

English Translation:
JW: Then, you believe that life is better now than before?
A: Yes, it is getting better, for that we use the term civilization. Because before there was not anything. Before, in the stores, there was just *mescal*. There were some sodas the size of a bottle of water. But who knows when, [it was available] every two or three months. No, now the children are used to drinking sodas. There are some that do not like drinking *tejate*. Only soda. Back then, they drank it all equally. Because of this, they [were] stronger…[8]

In each of the preceding examples, peasants contrasted the availability of material goods in their present-day village with what they remember as a relative scarcity of those goods in the past. For the case of sandals, these memories match with census data. According to census questions about shoes, the percentage of people over one year of age who walked around without shoes in San Bartolomé decreased from 28.6% in 1940 to 20.6% in 1960 (between 1940 and 1950, the percentage went up slightly, from 28.6% to 30.4%). In a span of twenty years, the percentage of barefoot people went from roughly one in three to one in five. Declines in barefootednesss were even more drastic in Santa Catarina Lachatao, Latuvi's *municipio*. The respective percentages of barefoot people for 1940, 1950, and 1960 were 43%, 12.30%, and 2.20%.[9] It is clear that sandals and other material items became more accessible to villagers over time. As we can see from the interviews cited above, peasants connect the present-day availability of these items with

[8] Anonymous peasant #30, interview by Joshua Walker, in his home in San Bartolomé Quialana, 10 Aug. 2012.

[9] *Sexto censo de población, 1940: Oaxaca,* Secretaría de Economía, Dirección General de Estadistica, 1948: 411-2, 195-6; *Septimo censo de población, 6 de Junio de 1950: Oaxaca,* Secretaría de Economía, Dirección General de Estadistica, 1953: 659, 670; *Octavo Censo General de Población, 8 Junio de 1960: Oaxaca,* Secretaría de Industria y Comercio, Dirección General de Estadistica, 1963: 854, 890.

the arrival of production tools like improved fruit trees, *molinos de nixtamal*, and chemical fertilizers.

Progress

Peasants evaluated the arrival of technologies and consumer goods using terms "progress," "civilization," and "improvement." The last quote I included above, by the sixty-five year old man from San Bartolomé Quialana, is an appropriate example. This man defines "civilization" as access to material goods, and he links the coming of "civilization" to a village life that is improving. This narrative of improvement via technology and access to goods was one I encountered repeatedly in oral interviews. Peasants used value-laden words like "triste" (sad), "desvantaja" (disadvantage), and "sufrir" (to suffer) to describe situations of scarcity in the past. They contrasted these with descriptions of a more prosperous present. Examples follow.

Carlos Contreras, age eighty-three, Santa Marta Latuvi:

> CC:…dije no aquí ya me voy a dedicar al campo si ya estoy acostumbrado, no? Ya hay caminos, esa era una de las desventajas porque anteriormente, no había caminos, no había luz, no había agua.
>
> English Translation:
> CC:…I said, "I'm going to commit myself to farming here since I'm already used to it. There are roads now. That was one of the disadvantages [of the past] because before, there were not any roads, there was not electricity, was not any [potable] water.[10]

[10] Carlos Contreras, interview with Joshua Walker, in his home in Santa Marta Latuvi, 3 Mar. 2012. Translation by Joshua Walker.

Silvestre Mecinas Martínez, age sixty-nine, San Bartolomé Quialana:

JW: Pues, me parece que usted piensa que el pueblo es muy diferente, hoy, que antes?
SM: Sí es muy diferente. Porque yo le digo, porque le digo, muy diferente, porque en el pueblo, desde la autoridad de antes, digamos pues, del municipio, porque dilata y tres años cambia, no?, de la, o del municipio. Pues, ya hay carro, fletes del pasajes para, para Tlacolula. Hay, hay tractores, ya hay volteo, bueno. Sí hay varias cosas que luego y que, que cuando vengo creciendo, pues no hay nada de eso. Por eso digo, pues, que ya está progresando el pueblo.

English Translation:
JW: It seems to me that you think the village is very different today than before.
SM: Yes, very different. I'll tell you, the municipal authorities back then, the ones that stay in office for three years then change, now they have cars, shared cabs heading to Tlacolula, now there are tractors, there is plowing. Yes, there are various things that did not exist when I was growing up. Because of that, I say the village is progressing.[11]

Anonymous Man, age seventy-five, San Bartolomé Quialana:

A: De este pueblo, no había ninguna maquinaria entonces esa vez, cuando venía yo creciendo. Ni carro, ni, ni coches, nada, pues, absolutamente. Aquí utilizaban carretas, el que jalan los bueyes. Pero no carretón, porque hay otro, otro tipo de carretas que le dicen carretones, no. Entonces van por el, por acá abajo, van cortando árboles así de grueso. Allí le, le hacen forma para carretas y los bueyes lo jalan así, pues. Fue muy triste la situación de anterior.
JW: ¿Por qué dice triste?
A: Pues no había nada, pues, no había nada, sí. Nada, nada, absolutamente nada. Porque ahorita hay muchos carros. Hoy, no, pues, un ratito nomás, vamos. Sí. Pues esa vez no había nada.
JW: ¿Usted piensa que la vida ahorita está mejor?
A: Oh, está mejor, todavía. Sí. Y ya hay carreteras para ir a Tlacolula, ya. Pero esa vez, no, está pero, un caminito así angostito nomás para ir, en Tlacolula, pues. Y así se van, van caminando. Son siete kilómetros de acá a Tlacolula, y a, a pie, se van. Salen temprano, a las, a las cinco o las seis de la mañana para llegar a las ocho ya, en Tlacolula.

English Translation:
A: In this village, there were not any machines back then, when I was growing up. No cars, nothing, absolutely not. Here, they used wagons pulled by oxen, but not *carretones*, because there is another type of wagon called *carreton.* They went down there and cut thick trees to make into wagons, and the oxen pulled it. The old days were sad.
JW: Why do you say sad?
A: Well, there was not anything, there was absolutely nothing. Now, there are many cars, and today, you can go really quickly. But back then there was not anything.
JW: Do you think that life is better now?
A: Oh, it is better, yes. Now there are highways headed to Tlacolula, but back then, no, only a narrow path going to Tlacolula. And they walked. It is seven kilometers from here to Tlacolula, and they went on foot. They got up early, at five or six in the morning to arrive in Tlacolula at eight.[12]

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[11] Silvestre Mecinas Martínez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 20 July 2012. Translation by Joshua Walker.

[12] Anonymous man #26, interview by Joshua Walker, in his home in San Bartolomé Quialana, 19 July 2014. Translation by Joshua Walker. In this interview, the informant also talked about people wading in the water in order to cross the Salado River.

Catarino Maximiliano Santiago Quero, age eighty-eight, Santa Marta Latuvi:

JW: ¿Cambió la vida mucho, acá en Latuvi, con la entrada de la carretera, de coches?
CS: Sí, todo ya, ya algo, ahí se ha mejorado.
JW: ¿Ha mejorado?
CS: Sí, ha mejorado, porque, ya hay tiendas, uh, medio grandes, ya hay…todo. Cosa de salida, rápido, con los carros.
JW: Hay más cosas que comprar.
CS: Sí, hay cosas de vender y cosas de ir a comprar.
JW: ¿Pero antes no había?
CS: No había, aunque queremos, lo tenemos que ir a comprar hasta Oaxaca, en burrito, en caballo.
JW: Más difícil.
CS: O sea, era muy, mucho muy difícil. Ese es el cambio que ya hubo acá, en cuestión de, por los carros. Sí, porque si vamos por el caso, se muere una gente, para comprar, gastos, para que, para su velorio, su entierro, un ratito va el carro, ya está luego. Ese es el cambio que ya, ya se hizo.

English Translation:
JW: Did life change a lot here in Latuvi when highways and cars arrived?
CS: Yes, everything, something there has improved.
JW: Improved?
CS: Yes, it has improved, because there are medium-large stores, there is…everything. You can leave quickly with cars.
JW: There are more things to buy.
CS: Yes, there are things to sell and things to go to buy.
JW: But before, there were not?
CS: There were not, even though we wanted them, we had to go buy it in Oaxaca, on a donkey, on horseback.
JW: More difficult.
CS: Very difficult. That is the change that happened here, concerning cars. Let's take an example: if a person dies, in order to buy things for his funeral, his burial, the car goes off in a second, and the stuff is here. That is the change that took place.[13]

[13] Catarino Maximiliano Santiago Quero, interview by Joshua Walker, in his home in Arroyo Largo, Latuvi, 7 May 2012. Translation by Joshua Walker.

Semehí Ramírez García, age forty-six, Santa Marta Latuvi:

SR: Sí, demasiados cambios, eh? Ahora nomás estoy platicando de cuando yo fui niño. Ahora cómo cuentan nuestros padres cuando ellos se iban descalzos a la escuela. No, bueno, todavía compañeros míos, todavía iban descalzos a la escuela. Nosotros, no, no había ropa, pues la misma ropa llevábamos toda la semana, a la escuela.
JW: ¿Para ustedes o para sus padres?
SR: Nosotros, nosotros. No teníamos, con la misma ropa íbamos toda la semana a la escuela. Ahora los niños tienen uniforme diario. Diario tienen su uniforme, tienen el de lunes, tienen martes, de educación física, bueno todo su, hasta viernes, y nosotros no. En un día festivo, veinte de noviembre, o veinticuatro de febrero, o dieciséis de septiembre, eran los únicos días que nos iban a poner una camisa blanca y un pantalón azul. Ese era nuestro. Y todavía no se uniformaba, porque uno estaba bien azul y otro estaba medio azul, medio negro, medio blanco, despintado, y la camisa medio blanca, y ahí así. No estaba, no había uniformes. Y lo que platican nuestros viejos, todos descalzos, todos descalzos, cargando su taquito, una tortilla con sal y ya. Y ahora no. Tienen sus desayunos escolares, pues se les apoya. Es un gran alivio, un gran apoyo que se le brinda. Tienen sus uniformes, todo cambiado.
JW: Me parece que hay más abundancia, es lo que me dice usted.
SR: Está, está, me refiero, no es abundancia, bueno, sí, viene siendo así. Porque se, ya hay cambios, eh, quiere decir que el pueblo se está desarrollando. Sé que sí, está creciendo, o México está creciendo económicamente. Ya no es como antes.

English Translation:
SR: Yes, so many changes, you know? Now, I'm only talking about when I was a kid. Now, our parents tell stories about when they went barefoot to school. Actually, friends of mine still went barefoot to school. Us…there was no clothing, we wore the same clothes all week to school.
JW: You or your parents?
SR: Us, us! We did not have [anything]. We went to school all week with the same clothes. Now the children have their uniform for each day. They have the one for Monday, for Tuesday, for physical education…all the way until Friday, and us, no. On a festival day, the twentieth of November, the twenty-fourth of February, or the sixteenth of September, these were the only days that we wore a white shirt or blue pants. That was what we had. And there were not uniforms, because one [outfit] was really blue, the other medium-blue, medium-black, faded, with a half-white shirt, that was it. We did not have uniforms. And our ancestors talk about everyone being barefoot, everyone barefoot, carrying their tacos, a tortilla with salt and that was it. Now, no. They have their school breakfasts, they support the students. It is a big relief, a huge support that they give. They have their uniforms, everything is changed.
JW: It seems to me that what you are saying is that there is more abundance.
SR: It's not abundance, well, it's starting to be that. Because now there are changes, I mean the nation is developing, it is growing. Mexico is growing economically. It's not how it was before.[14]

[14] Semehí Ramírez García, interview by Joshua Walker, in the ecotourism office in Santa Marta Latuvi, 1 Mar. 2012. Translation by Joshua Walker.

Angelita Herrera, age forty-four, Santa Marta Latuvi:

> AH: Ajá, en Teotitlán, sí. Sí, así ya todo vendíamos y ya íbamos a hacer nuestras compras, pues, azúcar, cosas que se necesitan. Sí, especias para la comida, chiles secos, eso para hacer un amarillo, para hacer…sí, ya nos veníamos, ya se cargaba el burro las cosas, ya regresábamos. A veces once, doce, una de la mañana, apenas llegábamos acá. Sí, muy difícil.
> JW: Es como casi veinticuatro horas.
> AH: Ah, sí.
> JW: De viajar.
> AH: Ajá, de viajar.
> JW: Sin descansar.
> AH: Sin descansar.
> JW: No tomaban siestas?
> AH: No, no así nomás, teníamos que caminar. Fue muy difícil.
> JW: Imagino. Ahorita no veo muchas personas caminando a Teotitlán.
> AH: Ajá, ahora como ya hay carro, ya hay carreteras por todos lados, ora pues ya no se quiere caminar, dicen: no, pues espero ese carro que sale, me voy. Anteriormente no. Sí, no. Aquí este camino de Reynoso, ese era una vereda. A mí me tocó caminar todavía en la vereda. Así caminando salíamos a Reynoso y de ahí esperábamos carro, en cualquier carro nos subíamos para Oaxaca. Pero caminando, no había carretera, era vereda.
>
> English Translation:
> AH: Yup, in Teotitlán, yes. Yes, we sold everything and we went to do our shopping. Sugar, things that you need, spices for cooking, dry chilies, for making an *amarillo.* Then we came back, the donkeys carrying the stuff. Sometimes eleven, twelve, one in the morning we would arrive here. Yes, very difficult.
> JW: That's almost twenty-four hours.
> AH: Yup.
> JW. Of traveling
> AH: Yup, of traveling.
> JW: Without resting.
> AH: Without resting.
> JW: You did not take naps.
> AH: No, that's how it was. We had to walk. It was very difficult.
> JW: I imagine. Nowadays I do not see many people walking to Teotitlán.
> AH: Yeah, now there are cars, highways everywhere, and people do not want to walk. They say: no, I'll wait till that car leaves and I'll go. Back then, no. No. Over here, this road to Reynoso, it was just a footpath. I had to walk the footpath. We would leave walking to Reynoso and wait there for a car, we would get into whichever car to go to Oaxaca. But walking, cause there was not the highway, only the footpath.[15]

As these examples show, peasants used words like "progress" (Mecinas Martínez), "civilization" (Anonymous peasant #30), "improve" (Santiago Quero), and "development" (Ramírez García) to describe the increasing availability of new tools, like cars, and new consumer items, like clothing. By contrast, peasants described the lack of

[15] Angelita Herrera, interview by Joshua Walker, in her home in Santa Marta Latuvi, 2 May 2012. Translation by Joshua Walker.

technologies and consumer goods in the past as "sad" (Anonymous man #26) and "difficult" (Herrera)

Peasants' Concerns about Progress

Embedded within this over-arching tale of technological progress were some real concerns about the negative consequences of new tools. I interpret this to mean that peasants were not simply telling me a story of triumph in order to rationalize their past decisions. For them, the benefits of technological changes came with real challenges and potentially troubling features. Some of these I have already discussed in previous chapters, including intense, intra-village disputes over tools, failed development policies, and changes to traditional gender roles. The excerpts included below show that peasants also associated tools with concerns about health problems, changes in the taste of their food, and the loss of tradition.

Carlos Contreras, age eighty-three, Santa Marta Latuvi:

> JW: ¿Es mejor la vida ahora que antes o qué opina usted?
> CC: Bueno, ahorita hay suficiente de comer, pero nosotros hemos deducido que nos ha creado muchas enfermedades. Y hay una serie de enfermedades que nosotros no conocíamos antes. Nuestros abuelos, mi abuelo, perdón, su papa de mi abuelo, Julián se llamó, ése curaba. Me acuerdo todavía de él que curaba. Él murió por 1938. Ya tenía yo ocho años por eso me acuerdo muy bien de él. Ya estaba grande, ya tenía cerca de cien años cuando murió. Iba a curar con yerbitas que se da aquí en la comunidad. Cáscara del encino: despegaba la cáscara y lo machucaba la [inaudible] del encino, con ese curaba. ¿Quién sabe? Lo que ahora ya no se ve. No se quejaba la gente de enfermedades. ¡Fuertes! La gente no usaba pantalón. La gente pura tela de manta, camisa de manta, calzón de manta, cacle le llamaban a unos huaraches de material para caminar. Usaban unos huarachitos, pies de gallos, con unas suelitas abajo y una correíta aquí entre los dedos, y eso era su calzado antes. Descalzo nada más la puro suelita pisaban. Lo componían fácil, se reventaba, le ponían otro pedazo de suela y otra correíta y aquí nomás lo hacían y lo pisaban. Y la gente cuando salía a veces sí no descalzos, descalzos yo conocí mucha gente descalza. Sin huaraches, pies duros, lo que ahorita ya no se ve. Pero no había enfermedad. Y hoy de diario está la casa de salud, diario está la gente allí.
> JW: ¿Por qué?
> CC: Porque se están controlando, si no tienen diabetes, si no les duele alguna parte, que no se les desarrolle el cáncer, todo se está controlando. Por eso a veces nos ponernos a platicar: Hubo mucho cambio pero también hay mucha enfermedad. Porque a cualquier enfermedad es: que la apéndice, que la vesícula, que una operación, lo que nosotros no conocimos antes. Yo no llevo ninguna operación, mi esposa tampoco. No nos hemos operado. Pero yo veo jóvenes de veinticinco, treinta, treinta y cinco años <<no que me duele, que voy a operarme>>. ¡Hay Dios! Regresan y dicen <<no, que me pusieron de dieta>>. Y eso es lo que también hemos visto.

Decimos que será porque come uno fertilizante. Todo tiene fertilizante. Se desarrolla mucha enfermedad. Aquí se vive esto que, nuestros antepasados no sufrían eso, pero ahora ya no.
JW: ¿Opina usted que los fertilizantes causan enfermedades?
CC: Bueno, probablemente, sí. Porque ya no es natural ya son productos químicos que uno está comiendo, está bebiendo. Está en todo ya.

JW: Is life better now than before or what do you think?
CC: Well, now there is enough to eat, but we have noticed that it has given us many illnesses. And there is a set of illnesses that we did not have before. The father of my grandfather, Julián he was called, he was a curer. I remember the curer. He died in 1938. I was eight years old, that's why I remember him very well. He was old when he died, he was one hundred. He would cure with herbs that are found here in the community. Oak shells. He would peel the shell and grind it, the [inaudible] of the oak, and he cured with this. Who knows? Something you do not see today: people did not complain about sickness. They were strong! The people did not wear pants. Only rough cotton fabrics, rough cotton shirts, rough cotton underpants, they wore some little sandals, *cacle* was the name of the fabric sandals for walking. They wore some sandals, "rooster's feet," with little soles underneath and a strap between the toes, and this was their footwear back then. They walked around barefoot, with nothing but the little sole underneath. They were annoying but easy to fix, they just got another piece for the sole and another strap and they did it here and walked on it. When people walked sometimes it was barefoot: I knew a lot of barefoot people. Without sandals, hard feet, which you do not see today. But there was not sickness. Today, every day the health center is there, full of people.
JW: Why?
CC: Because they are monitoring: if you have diabetes, if something is hurting, if you are developing cancer, everything is monitored. Because of this, sometimes we get to talking: there has been a lot of change, but also there is a lot of sickness. Because for every illness, maybe it is the appendix, maybe it is the gallbladder, it's: how about an operation? We did not do this back then. I have not had any operations, nor has my wife. They have not operated on us. But I see young people of twenty-five, thirty, thirty-five [who say]: "It hurts, so I'm going to have an operation." Oh God! Then they come back and say: "no, they put me on a diet." And that is what we see. We say it could be because people eat fertilizers. Everything has fertilizers. Many illnesses develop. We are experiencing something our ancestors did not have to deal with.
JW: You think that fertilizers cause illness?
CC: Well, probably yes. Because now it's not natural, now it's chemical products that one is eating, drinking. It's in everything.[16]

[16] Carlos Contreras, interview with Joshua Walker, in his home in Santa Marta Latuvi, 3 Mar. 2012. Translation by Joshua Walker.

Nazario Hernández Sánchez, age sixty-four, San Bartolomé Quialana:

JW: A veces me pregunto, y usted puede decirme, me pregunto si en el pasado era más fácil crecer comida, maíz para comer, porque había más terreno por cada persona.
NH: Ándale
JW: ¿O no?
NH: Sí, había más, más terreno, pero también no había tantas plagas como ahorita. Antes no acostumbraban de fumigar milpas ni nada, ni abono químico ni nada, puro abono, estiércol, le decimos, abono de animales. Puro eso le echamos en la milpa. Pero ahorita es puro fertilizante. Le echan fertilizante, fumigan cuantas cosas. Ya es puro químico ahora. Pero antes era puro natural.
JW: ¿Y usted piensa que el uso de estos químicos y cosas no naturales causa plaga?
NH: Pues no sé. La verdad, es lo único que causa son enfermedades. Enfermedades son lo que causan los químicos. De plagas no sé, pues puede ser también, no? Pero esos químicos son los que producen muchas enfermedades, porque anteriormente la gente no conocía eso que le dicen diabetes. Nunca, nunca mencionaban eso. Pero ahora ya que, que diabetes, que muchas cosas ya tiene la gente, pero yo pienso que por eso, por esos químicos. Ya no comemos cosas normales, naturales. Por ejemplo, un pollo, cualquier animal, un res, o cerdo, como, como quiera no? Puro alimento balanceado ya comen, puro químico que digamos. Por eso todos lo que comemos ahora, es puro químico, por eso es que pienso que hay tantas enfermedades.

English Translation
JW: Sometimes I ask myself, and you can tell me, I ask myself if it was easier in the past to grow food, corn to eat, because there was more land for each person.
NH: There you go.
JW: Or not?
NH: Yes, there was more land, but also not as many infestations as now. Before, they were not in the habit of fumigating cornfields or anything like that, no chemical fertilizers, no anything, strictly fertilizer from animals, *estiércol* we call it. That was all we put on the cornfields. But now it's all fertilizers. They're giving it fertilizers, they fumigate so many things. It's all chemicals now. But before, it was only natural.
JW: And you think that the usage of these chemicals and non-natural things causes infestations?
NH: Well I do not know. The truth is the only thing it causes is illness. Illness is what chemicals cause. I do not know about infestations, but it could be that too, right? It could be that too. But those chemicals are what produce a lot of illnesses, because before, people did not know about what they call diabetes. They never, ever mentioned that. But now people have diabetes and many [other diseases], and I think it's from those chemicals. We do not eat normal things, natural things. For example, a chicken, whichever animal, cattle, or a pig, whichever. They only eat balanced feed, all chemicals. And so everything we eat now, it's all chemicals, and that's why I think there are so many illnesses.[17]

[17] Nazario Hernández Sánchez, interview by Joshua Walker, at his home in San Bartolomé Quialana, 5 June 2012. Translation by Joshua Walker.

Anonymous Man, age sixty-five, San Bartolomé Quialana:

A: …el químico quema la tierra. No sé si te has dado cuenta de que el químico quema.
JW: Sí.
A: Quema la tierra. En cambio el abono, afloja. ¿Por qué? Porque el abono como es de toro, lo vamos a extenderlo así, empiezo a cultivar la tierra. Es natural. Pero el químico es fuerte. Por eso también, cuando se echa mucho químico en las plantas, quema. Entonces también nosotros también nos perjudica el químico, el órgano del ser humano. ¿Por qué? Porque ya no es natural. Por ejemplo, las carnes que venden, las carnes de res, hay toros que se ponen gordos, pero es bofo. No tiene fuerza. En cambio, el toro de acá, le damos mazorca. Esos toros tienen mucha grasa, tiene más fuerza. ¿Por qué? Porque está muy resistente, por ejemplo la, la mazorca. Y el químico no, lo deja débil. Se ve gordo, se ve chulo, pero no tiene mucha fuerza. Pero el abono de toro, es bueno, para, por ejemplo, sembrar lechuga, sembrar rabanito, sembrar, este, col, coliflor. Es macizo, es bueno. Zanahoria también. Todo eso es bueno. Pero cuando se le echa el fertilizante, como el fertilizante sube, dentro de, de la planta. Entonces ahí, entonces ya cuando comemos eso, nos perjudica el órgano de adentro.

English Translation:
A: …chemicals burn the land. I do not know if you realize that chemicals burn.
JW: Yes.
A: It burns the land. On the other hand, [natural] fertilizers loosen the land. Why? Because [natural] fertilizer, seeing as it comes from bulls, we're going to put it down like so, and I begin to cultivate the land. It's natural. But chemicals are strong. And because of this, when you put a lot of chemicals on the plants it burns. Also, the chemicals are not good for us, for human organs. Why? Because it's not natural. For example, the meats they sell, the beef, there are bulls that get fat, but it's flab. It's not strong. On the other hand, bulls from here, we give them corn husks. Those bulls have a lot of fat, more strength. But why? Because it is very durable, for example [from eating] corn. And chemicals, no, they leave [the animal] weak. They look fat and big, but they are not strong. But fertilizer from bulls is good for planting lettuce, radishes, cabbage, cauliflower. It's strong, good. Carrots, too. All of that is good. But when you give it fertilizer, the fertilizer gets taken up by the plant. Then, when we eat it, it hurts our organs on the inside.[18]

Angelita Herrera, age forty-four, Santa Marta Latuvi:

JW: Muchas personas me han dicho que, discutiendo de enfermedades, me han dicho que en el pasado había menos enfermedades.
AH: Sí.
JW: Yo no sé si es la verdad o no. ¿Qué piensa usted?
AH: Ajá, sí, porque antes, pues no sé por qué, le digo, tal vez todo por la química, y eso tal vez. Pienso yo que afectó, porque anteriormente pues no, no había muchas enfermedades, o será porque no iban al doctor.

[18] Anonymous peasant #30, interview by Joshua Walker, in his home in San Bartolomé Quialana, 10 Aug. 2012. Translation by Joshua Walker.

English Translation:
JW: Many people have told me, talking about sickness, that there was less sickness in the past.
AH: Yes.
JW: I do not know if it's true or not. What do you think?
AH: Yes, because before, I do not know why, maybe because of chemicals. I think maybe that affected it, because before, there were not so many sicknesses, or it could be because they did not go to the doctor.[19]

As these examples show, peasants agreed that chemical fertilizers produced more food, undoubtedly a positive development, but they weighed this against the troubling growth of illness, which they believe to be caused by non-"natural" foods.

Other concerns regarding food and technology focused on taste. As the excerpts below show, some peasants thought that new tools like chemical fertilizers, mechanical corn grinders, and iron tortilla presses ruined the taste of their food:

Cheli, age forty-one, from Santa Marta Latuvi:

JW Pero ahorita, así, todavía se comen tortillas recién hechos, no?
CH Sí, pero ya no tan sabroso. ¿Me entiende?
JW Sí, la cosa es que yo no entiendo por qué son menos sabrosas cuando vienen de un molino?
CH No, no, no. El cambio de ahora, antes era el maíz puro, sin fertilizante. Era puro de tierra. Y ahora no. Ya tiene fertilizante. Si va a tardar allí, va a ver, el tiempo que llega el elote. El elote ya no sabe tan sabroso. Pero hay personas que sí siembran todavía un pedacito sin fertilizante. Dan chiquitas las mazorcas pero están muy sabrosas. ¿Por qué? Porque no tienen fertilizante.

English Translation
JW: But now, they still eat fresh-baked tortillas, right?
CH: Yes, but now they're not as tasty. You know what I mean?
JW: Yes, the thing that I do not understand is why they are less tasty when they come from a mechanical grinder.
CH: No, no, no. The change nowadays [is that] before it was pure corn, without fertilizer. It was only from the earth. And now, no. Now it has fertilizers. If you stick around [in Latuvi], you will see the corn come in. The corn today is not as tasty. But there are people who still plant a little plot without fertilizer. It makes small cobs but they are very tasty. Why? Because they do not have fertilizers.[20]

[19] Angelita Herrera, interview by Joshua Walker, in her home in Santa Marta Latuvi, 2 May 2012. Translation by Joshua Walker.

[20] Cheli, interview by Joshua Walker, in her home in Oaxaca de Juárez, 27 Apr. 2012. Translation by Joshua Walker.

Lázaro Pérez Sánchez, age seventy-eight, San Bartolomé Quialana:

JW: ¿Qué pensaban los hombres sobre los molinos cuando llegaron? Porque imagino que sus esposas tenían más tiempo, no?
LP: Sí, pues hay veces que van cinco, seis, diez mujeres al molino. Pero ya de que vieron, que hay algunos que dicen: huele puro fierro, por su sabor, porque lo muele el molino, trae sabor de fierro, bueno, equis palabra hablan, hablaban en aquel tiempo. Pero poco a poco, no? Puta, caray, ahorita hasta con Nestle que hacen téjate, ya lo llevan al molino. Así está la movida Tío Josué.

English Translation:
JW: What did men think about mechanical grinders when they showed up? Because I imagine that their wives had more time, right?
LP: Yes, there are times when five, six, ten women go to the grinding mill. But they found that there are some who say: it smells like iron, its taste, because the mechanical grinder ground it, it tastes like iron, they said whatever thing back then. But little by little, no? And I'll be damned: now, they make *tejate* with Nestle and take it to the grinding mill. Such is the change, Uncle Joshua.[21]

[21] Lázaro Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 4 June, 2012. Translation by Joshua Walker.

Rosa Ochoa, age fifty-five, Santa Marta Latuvi:

JW: Me parece que hay muchas cosas acá en Latuvi que hacen más cómoda la vida de la mujer. Como la refrigerador, la estufa, el horno, y el molino de nixtamal. ¿Qué pensaban los hombres sobre éstas cosas?
RO: No, pues costó un trabajo esto porque antes era moler en el metate. Y ahora este cambio que dieron que ya hay molinos de nixtamal individuales. Y pues dicen que ya no sabe mejor la tortilla, que no se qué, que ya no llena, que ya no sé qué. Pero pues para nosotras las mujeres, pues fue un alivio. Fue un alivio que ya se dieron esos molinos de nixtamal, porque así no, no quebrajabas en el metate, piedra con piedra, y molías la masa, hacías tortilla. Porque así hacían las abuelitas de hace, hace ochenta años, hace cien años, hace noventa años. Así se hacía el, así se hacía las tortillas. Y ahora pues no.

English Translation:
JW: It appears to me that there are many things here in Latuvi that make the life of the woman more comfortable. Like the refrigerator, the stove, the oven, and the mechanical corn grinder. What did men think about these things?
RO: Well it was a lot of work, because before you had to grind corn on the *metate.* And now the change is that there are individual corn grinders. And they say that tortillas do not taste better, that I do not know what, that now [the tortilla] is not filling, that I do not know what. But for us women, it was a relief. It was a relief that mechanical corn grinders arrived, because you did not have to work on the *metate*, rock on rock, grinding for cornmeal and making tortillas. That was how grandmas did it eighty, one hundred, ninety years ago. That was how they made tortillas. But now, no.[22]

Ofelia Quero Santiago, age seventy-six, Santa Marta Latuvi:

OQ: Mi hijo dice que ya no voy hacer tortilla a mano. Porque ya me canso. <<Y mejor lo va usted a hacer en la prensa.>> Pero yo no me acostumbro, porque la tortilla sale muy tostada. Y la mano ya ve como estaba la de este rato: blandito, aunque gruesecito, pero está blandito.

English Translation:
OQ: My son told me not to make any more tortillas by hand. Because I'll tire myself out. "Better that you use the tortilla press." But I'm not used to that, because the tortilla comes out really toasted. And when you do it by hand, you see how it was a second ago: soft. Thick, but soft.[23]

The familiar taste of tortillas was one part of village life and culture that peasants were interested in protecting. Villagers also expressed concern about protecting local planting and plowing practices, language, and ritual celebrations.

[22] Rosa Ochoa, interview by Joshua Walker, in her home in Santa Marta Latuvi, 15 May 2012. Translation by Joshua Walker.

[23] Ofelia Quero Santiago, interview by Joshua Walker, in her home in Santa Marta Latuvi, 29 Mar. 2012. Translation by Joshua Walker.

Marta Santiago Cruz, age forty-seven, Santa Marta Latuvi (speaking about corn planting)

JW: Y las semillas híbridas mejoradas: ¿Usaban ustedes aquí?
MS: No, aquí no usamos otras semillas de otro lado, como dicen, no. Ahora dicen que hay muchas semillas que ya no se siguen reproduciendo. Aquí no, nomas aquí usamos la que sembramos de allí mismo escogemos para volver a sembrar, sí.
JW: ¿Por qué?
MS: Pues no, porque siempre decimos que la semilla criolla (así se le llama aquí), la semilla criolla es la mejor para nosotros. Nosotros lo sembramos, nosotros lo volvemos a sembrar y a comer. Nosotros casi no traernos semillas de otros lados.

English Translation:
JW: And improved hybrid seeds, did you use them here?
MS: No, here we do not use different seeds from outside like they talk about, no. Now they say that there are many seeds that do not reproduce. Here, no, we only use what we plant and from those same plants we pick [seeds] to plant the next time.
JW: Why?
MS: Because we always say that creole seed (that's what it's called here), creole seed is the best for us. We plant it over and over and eat it. We basically never work with seeds from elsewhere.[24]

[24] Marta Santiago Cruz, interview by Joshua Walker, in her home in Santa Marta Latuvi, 1 Mar. 2012. Translation by Joshua Walker.

Lázaro Pérez Sánchez, age seventy-eight, San Bartolomé Quialana (speaking about corn planting)

JW: Yo sé que en otras comunidades los agrónomos del INI trataron de introducir químicos, fertilizantes químicos y semillas híbridas. ¿Trataron de eso acá?
LP: No, se anunció eso pero no llegó. No llegó.
JW: Puro tractor.
LP: Puro tractor. Ahora dos años creo, se anunció que allí viene el tipo de maíz híbrida. Pero no llegó. Tal vez algunos pobladores, por allí, a lo mejor agarraron ese tipo de maíz. Pero por acá no. Porque no sabemos qué tipo de temperatura daba ese maíz, y no sabemos: ¿Es tardón? ¿O es violento? Por eso nosotros con, confiamos, con nuestro mismo maíz.

English Translation:
JW: I know that in other communities, agronomists from the INI tried to introduce chemical fertilizers and hybrid seeds. Did they try that here?
LP: No. They announced that, but it never arrived.
JW: Only tractors.
LP: Only tractors. Two years ago I believe, they announced that some type of hybrid corn was coming there. But it did not arrive. Maybe some villagers, over there, grabbed some of that type of corn. But here, no. Because we do not know what type of temperature that corn needs, and we do not know: does it grow slowly? Does it grow quickly? So we trust our own corn.[25]

[25] Lázaro Pérez Sánchez, interview by Joshua Walker, in his home in San Bartolomé Quialana, 4 June 2012. Translation by Joshua Walker.

Carlos Contreras, age eighty-three, Santa Marta Latuvi (speaking about Zapotec language)

JW: Cuando asistió usted a las clases de la escuela: ¿Qué aprendió usted? ¿Qué enseñaron?
CC: Bueno, nuestra escuela no tenía nombre. Porque nomás nos mandaron el maestro, la secretaría mandó el maestro y vino a enseñarle a los alumnos y cuando estaba el maestro Rodolfo, le puso el nombre una Luz en la Montaña.
JW: ¿Es lo mismo ahora no?
CC: Es lo mismo. Por qué? Porque aquí estaba lleno de arboles. Habían acaso unas siete, ocho casas acá en el centro de Latuvi. Todo era puro monte. Y la gente no sabía hablar español, hablaba puro zapoteco. Por eso el primer maestro que llegó aquí, no podía trabajar porque no sabían los alumnos hablar español. Hablaban puro zapoteco. Nomás mi abuelo hablaba español. Y con mi abuelo platicaba el maestro << ¿Cómo le hago para enseñar a estos niños, como le hago?>>. Hablaba el maestro y mi abuelo les explicaba en español que era lo que estaba diciendo el maestro. Así estuvieron como tres años y ya fueron aprendiendo el español para entenderle al maestro. Por eso ya cuando entré, yo sí hablaba español porque mis padres sí me enseñaron español, sí sabían. Pero mucha gente que no fue a la escuela, pues esos nunca hablaron español. La gente aquí, la mayoría, no fue a la escuela. Y ya cuando verdaderamente se construyó la escuela, ya empezaron hablar español. Así nos fuimos poco a poco. Lo que ahorita, la juventud que está ahorita en Latuvi no pueden hablar el zapoteco. Muchos ni le entienden. Y unos le entienden y no lo hablan.
JW: ¿Por qué?
CC: Se olvidó. Se perdió. Se está perdiendo. Ya nomás la gente grande habla el zapoteco, y la juventud ya no. Tratamos de enseñarles ya no nos toman en cuenta, <<no>> dice <<eso ya pasó>>. Pero sí es muy necesario hablar en zapoteco. Porque es un idioma muy propio de los antepasados.

JW: When you went to school classes, what did you learn? What did they teach?
CC: Well, our school did not have a name. Because all they did was send a teacher, the secretariat sent the teacher and he came to teach the students. And when Maestro Rodolfo was here they gave it the name "A Light on the Mountain."
JW: It's the same now, no?
CC: It's the same. Why? Because it was full of trees here. There were maybe some seven or eight houses here in the center of Latuvi. Everything was mountainous. And the people did not know how to speak Spanish, they only spoke Zapotec. Because of this, the first teacher who showed up here could not work because the students did not know how to speak Spanish. They only spoke Zapotec. Only my grandfather spoke Spanish. And the teacher asked my grandfather: "How am I going to teach these children, how?" The teacher would speak and my grandfather would explain what the teacher was saying in Spanish. They did that for three years and they went along learning Spanish in order to understand the teacher. Because of this, when I started, I knew Spanish, because my parents taught me Spanish, they knew it. But many people that did not go to school, well, they never spoke Spanish. The people here, the majority, did not go to school. And truly [it was] when they built the school that they began to speak Spanish. So we went, little by little. Now, the youth of Latuvi cannot speak Zapotec. Many of them cannot understand it, and some understand it and do not speak it.
JW: Why?
CC: It was forgotten. It was lost. It is vanishing. Now only old people speak Zapotec, and not the youth. We tried to teach them and they did not give us the time of day. "No," they said, "that has passed." But yes, it is necessary to speak Zapotec. It is our language, from our ancestors.[26]

[26] Carlos Contreras, interview with Joshua Walker, in his home in Santa Marta Latuvi, 3 Mar. 2012. Translation by Joshua Walker.

Cheli, age forty-one, from Santa Marta Latuvi (speaking about community rituals):

CH: Sí, así estaba el motor y estaba la música. Y están bailando. <<¿Ya tiene usted sueño?>> Se duerme un ratito, come, vuelve a pararse al baile y órale. Así se hacía. Antes, una verdadera boda. Y ahora ya no. Ahora ya no. Ya no más es un solo día, una nochecita, y ya. Ora, eso es una boda. Ahora la fiesta de la escuela vamos, del pueblo, vamos, la fiesta del pueblo, igual. Así se hacía. Vamos que empezó el baile a las seis de tarde, hasta que se acabe la gente, a las diez, once de la mañana del otro día. Así de día, allí estaban. Las señoras, con su bebe aquí en su espalda, (Ya ha visto como las cargan? Acá, en la espalda.) y los señores con sus redes de tortillas, y estaban bailando. Les daba hambre, se sentaban, y sacaban su taco y se lo comían, y seguían bailando. Era muy bonito.
JW Sí, me imagino
CH: Era muy bonito. Pero poco a poco se fue perdiendo todo.
JW: ¿Por qué?
CH: Ya se volvieron modernos, ya se fue perdiendo.

English Translation:
CH: Yes, the motor was there and so was the music. And they were dancing. "Are you tired already?" They would sleep a bit, eat, and go back to the dance. That was how it was done. Back then, a real wedding. And now, no. Now it is only one day, one little night, and it's over. Now, that counts as a wedding. We go to the festival of the school, the festival of the village, it's the same thing. That was how it was done. We go, the dance starts at six in the afternoon, [it continues] until the people are done at ten or eleven in the morning the next day. They were there in the day. The women, with their babies on their backs (Have you seen how they carry them around? Here, on their backs) and the men with their sacks of tortillas, and they were dancing. When they got hungry, they would sit, take out their taco, eat it, and keep dancing. It was really beautiful.
JW: I imagine.
CH: It was really beautiful. But little by little, it was all lost.
JW: Why?
CH: Now people came back modern, and it was lost.[27]

[27] Cheli, interview by Joshua Walker, in her home, 27 Apr. 2012. Translation by Joshua Walker.

Rosa Ochoa, age fifty-five, Santa Marta Latuvi (speaking about plowing and other working habits):

> RO: Sí aquí siempre ha habido toros o vacas o bueyes, como se le llamen, de hecho la gente, la mayoría, pues siempre ha tenido para arar sus terrenos. Ahora nomás es que tiene como unos cuatro años, y ahora sí llega, ahora sí ya hay máquina. Ya hay máquina y la máquina ya va a los terrenos, ya, revuelve, los terrenos, ya, ya, ya es otro relajo. Ya la mayoría pues ya dice: fuera, con mi yunta, ya no la ocupo y ya las vendí. Ya, ya nos están modernizando. Pero pues viéndolo bien, le digo, pero se están perdiendo las costumbres, se está perdiendo lo nuestro, se está perdiendo nuestra manera de trabajar.
>
> RO: Here there were always bulls or cows or oxen, as they are called, the fact is people, the majority, always had them to plow their fields. Now, less than four years ago machines [tractors] arrived. Now there are machines, and the machine now goes to the fields, turns them, and that is another commotion. The majority now says: "Away with my oxen. I do not use them and I sold them." They are modernizing us. But taking a good long look at it, I say: we are losing our customs, what is ours, our way of working is vanishing.[28]

As the quotes in this section show, informants in both communities where I worked were adamant about guarding the integrity of local corn seeds, and everyone told me that foreign corn seeds were unacceptable for planting. When it came to seeds, villagers focused on protecting what was "ours." Hybrid corn seeds never made much headway in the villages where I worked. On the other hand, villagers showed little compunction about using tree grafts that came from outside of the village, and this further emphasized the emotional and cultural importance they gave to corn.

The other quotes in this section also show fear of losing what is "ours" in the face of modernity. Some, like Rosa Ochoa, link this fear to technological change. For others, like Carlos Contreras and Doña Cheli, technology is part of a broader concern about young people abandoning traditions and finding new ways to make sense of the world.

[28] Rosa Ochoa, interview by Joshua Walker, in her home in Santa Marta Latuvi, 15 May 2012. Translation by Joshua Walker.

Definitions of Progress: Peasants and Officials

Pedro Zarate Loyo, an official with the Papaloapan Commission, commented on the attitude of villagers in Latuvi towards modernization in a report about potable water from 1965. He wrote, "The economic situation of the village is impoverished. On the other hand socially it's a village with a markedly idealist spirit that wants progress for both the village and the region."[29] Since the report was all about potable water hydrants, the connection between "progress" and water faucets in this example is implicit.

Reports like these suggest that officials harbored relatively simple definitions of progress, and some assuredly did. But closer examination of official justification for technology transfer reveals that, like peasants, officials considered technology change from various angles and weighed potentially negative consequences against potential benefits. In some cases, they even tried to communicate this nuanced view to peasants, who, as we have seen, often talked back. Peasants' rhetorical linking of progress with technology was not an ideology imposed on them by outsiders, but the result of negotiations, conversations, and experimentation that evolved organically over time.

Peasants and officials largely spoke the same language when they linked new tools to terms like "progress" and "improvement." In *Salud Pública de México*, the quarterly journal of the Secretariat of Public Health (SSA), scientists, engineers, and other officials repeatedly used the term *mejorar* (to improve) when discussing the addition of technologies like water faucets, new homebuilding materials, and processed foods to rural villages. They contrasted their "improvements" with the "noxious" or

[29] Pedro Zarate Loyo, "Memoria descriptiva de las obras de introducción de agua potable a la población de Latuvi Distrito de Ixtlán Oaxaca," 11 May 1965, AHA, Fondo: CP, Caja: 416 Exp.: 6852. The translation here was difficult. The original text reads, "La situación económica del poblado es raquítica en cambio socialmente es un poblado con un espíritu idealista y con fisos de querer progresar en bien no solo del pueblo sino de la región."

"primitive" habits and technologies of peasants. For example, in 1961, officials working with the SSA published a pamphlet outlining specific plans and strategies for public health efforts in the countryside. The pamphlet called for "a program for improving rural homes" that included the addition of dirt/cement flooring, the fortification of exterior walls, the addition of windows for natural light and increased airflow, the building of latrines, and work to insure the potability of water. These "improvements" would replace "primitive" sanitary systems and eliminate "noxious" habits like defecating in the open air. An illustration that came with the pamphlet (Figure 10) shows the centrality of the term "improvement" (*mejoramiento*) in the language of officials.[30]

[30] Miguel Montes de Oca Alcaráz, Joaquín Tello Zabalegui, Héctor Fernández de Castro, Tomás Fernández de Castro, Tomás Chávez Ramírez, Leopoldo Castell Estrada, "Saneamiento de la vivienda rural." *Salud Pública de México*, 3 (4) (1961) 545-563: 545-8.

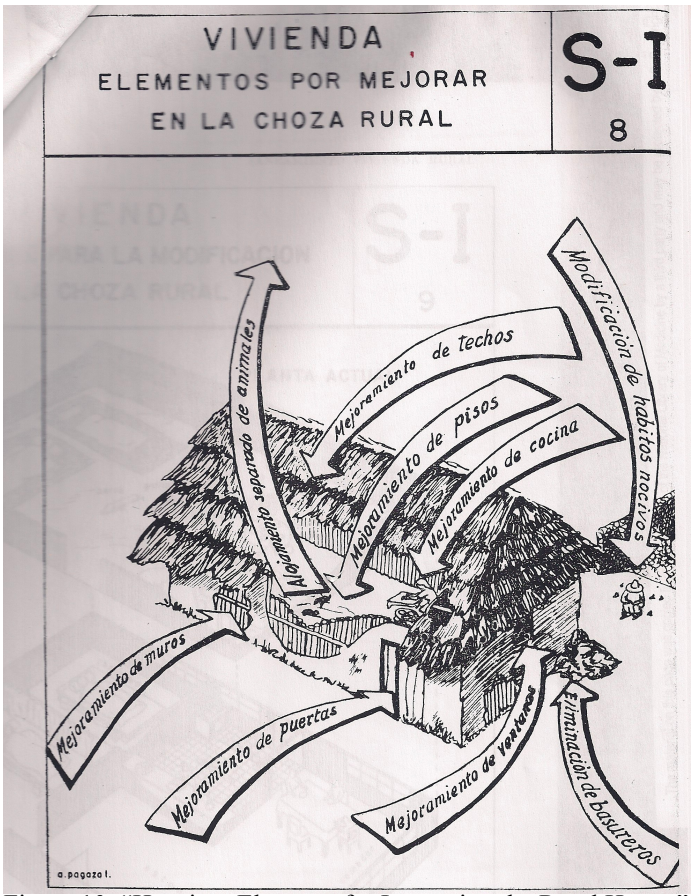

Figure 10: “Housing: Elements for Improving the Rural Home,” 1961.

In another example, Dr. Manuel Sánchez Rosado, a public health official, wrote a 1963 article in which he argued that public health programming in the countryside should start with studies of the geography, history, and demographics of communities, as well as "the population's willingness to improve itself." The inclusion of the word "improve" is key here, as it shows the author's belief that conditions in villages could be better and that public health and technology programs could make it so.[31]

The language of improvement also permeated lessons for schoolchildren in Mexico's federal school system. In 1960, the *Consejo Nacional Técnico de la Educación* (National Technical Advisory on Education) submitted a proposed primary school curriculum to the Secretariat of Public Education (SEP) for the 1961 school year. The plan, published by the SEP, called for second-year students to use snack time as a way to "improve nutrition" and for students to develop comic strips around the theme of "improving our house."[32] Second year students would also have discussions about how people "satisfy necessities" and go about "improving [their] daily lives."[33] Third-year students would study their region and formulate plans for "improve existing crops and/or introduce other, more productive ones…" They would also learn to analyze soil, to test fertilizers and other "improvements" (*mejoradores*), and to study "the possibility of correcting and improving the conditions of farmlands."[34] The curriculum makes it clear that teachers and federal education officials felt that students and families had a lot of

[31] Manuel Sánchez Rosado, "La participación de la comunidad en los programas de salud pública rural," *Salud Pública de México* 5 (2) (1963) 229-236: 232.

[32] *Programas de educación primaria aprobados por el consejo nacional técnico de la educación.* Mexico City: Secretaría de Educación Pública, 1961: 36-7.

[33] Ibid., 45.

[34] Ibid., 84.

work to do in order to make their existence better. Technologies like fertilizers and new crops choices were part of their vision for making this "improvement" happen.

Officials generally favored the intervention of government and the transfer of technology as a way of uplifting the lives of rural residents. But they also understood that this strategy came with risks and difficulties. A booklet for peasants called *Nuevas técnicas del cultivo* (*New Techniques for Growing*), published by *Arbol Editorial* with the help of federal officials from the Secretariat of Public Education, is the best example here. The book begins by making a simple claim: more technology means more crop production.[35] However, most of the text is dedicated to enumerating the risks inherent in this formulation. The booklet discusses environmental problems with new farming technologies, health problems, problems of socio-economic inequality and the inability of small farmers to pay for new tools, regional technological disparities within Mexico, problems with ineffective extension agents (see chapter six), and the poor design of rural credit programs.[36] The message here is very nuanced: new technologies can help to improve daily life, but peasants need to be aware of the risks and problems that accompany them.

Public health officials exercised similar caution. Dr. Adolfo Chávez, leader of the nutrition division at the National Institute of Nutrition, called for more food processing technologies for poor communities. But he also warned that these tools, "can create problems, sometimes grave ones," including monoculture, monopolies, excessive foreign

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[35] *Los libros del maíz: nuevas técnicas de cultivo,* Mexico City: Arbol Editorial, 1982: 14-17. The author thanks Jack Corbett for providing a copy of this text.

[36] Ibid., 18-23, 29, 52-4, 138.

investment, and concentration of capital.[37] Dr. Manuel Sánchez Rosado (referenced above) made clear that the success of public health projects depended on complex factors like the enthusiasm of villagers, local economic conditions, the responsiveness of projects to local culture, and the quality of government personnel.[38] In other words, technology and government intervention would not lead to automatic "improvement." For the most part, officials like Sánchez Rosado seemed to grasp the simple fact that technology transfer and development programs carried considerable risks and required coordination between villagers and officials in order to be successful.

Officials who entered rural villages quickly reached the same realization. They negotiated the meaning of "progress" and "improvement" with peasants as they advocated for the adoption of new technologies. A great example comes from Ronald Waterbury's field notes. In 1974, he attended a meeting in the village of San Antonino in which an engineer from the federal Secretariat of Water Resources tried to convince villagers to approve the introduction of a potable water network. Waterbury reported that the "overriding theme" of the official's introductory remarks was that, "[potable water], like electricity, means progress."[39] At least three villagers at the meeting voiced strong opposition to the project, but two others spoke in favor of it, emphasizing the word "progress" in their speeches. The village president, for instance, said that "the new school was progress, electricity was progress, and [potable water] will be progress." The meeting ended with the government engineer assuring villagers that the project was

[37] Adolfo Chávez, "La tecnología de los alimentos en México," *Salud Pública de México,* 7 (2) (1965), 235-40: 236.

[38] Manuel Sánchez Rosado, "La participación de la comunidad en los programas de salud pública rural," *Salud Pública de México* 5 (2) (1963) 229-236: 230.

[39] Ronald Waterbury's field notes, 18 Aug. 1974, GN 2325-2330.

meant "to help the village with its progress."[40] In this example, we see government officials trying to convince peasants that water faucets bring progress.

The end-game for officials, the definition of an "improved" or "progressive" rural society, was one where peasants could feed the nation and themselves with their produce while also gaining purchasing power in national and international markets. Dr. Adolfo Chávez, referenced above, enumerated some of the positive outcomes that better food processing technologies would provide. Among them were: supplying villages in the country's interior with products from the coast, supplying huge cities with food, improving the quality and nutritional value of food, and saving women's time in the home. He wrote, "Better quantities and quality of food stimulate yield and productivity, and these help health and well-being, and so climbs the spiral of progress."[41] An undated document I found at the National Indigenist Institute's Coordinating Center in Tlacolula enumerated the objectives of the INI coordinating centers in 1977. They included, in numbered order: " 1) to achieve better participation of the Indian in the production and benefits of national development 2) to satisfy his basic necessities 3) to elevate the capacity of ethnic groups to defend their social and individual rights 4) to fortify the national conscience through respect for ethnic pluralism."[42] Officials like Chávez and those at the INI wanted to make peasants participants in a modernized Mexico while also helping them to gain access to basic resources and better social standing.

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[40] Ronald Waterbury's field notes, 18 Aug. 1974, FN 2325-2330.

[41] Adolfo Chávez, "La tecnología de los alimentos en México," *Salud Pública de México,* 7 (2) (1965), 235-40: 236.

[42] "Esquema Comparativo de Accion a Partir de los Centros Cordinadores Ingenistas" date and author unknown, CDI Tlacolula, Caja: PIDER.

More research is ultimately needed to track changes in officials' goals over time, but I believe these documents to be broadly instructive of what officials were hoping for when they advocated for progress brought about by technology. They wanted better participation by peasants in national development, and better opportunities for peasants to meet basic needs. The oral interviews and evidence cited above show that while peasants mostly wanted the same things, they were willing to fight and negotiate over the meaning of progress and the ways to achieve it when their goals diverged with those of officials.

Conclusion

"Progress" is a term that appears repeatedly in the evidence upon which this dissertation is based. The examples in this chapter show that for both peasants and officials, "progress" meant better standards of living, especially more consistent access to necessities like food, housing, and clothing, and more robust participation in marketplace exchanges. Officials stressed that the intervention of government officials and new technologies would help villagers to achieve this definition of progress. Oral interviews reveal that villagers largely agreed with the idea that technologies bring progress.

The actors in this story believed in the power of technology to transform rural lives, but they also considered the negative consequences of this equation. Just as they shared ideas regarding the potential benefits of new tools, they also agreed on the downsides. This is important because it is more evidence that technological change in these communities was a cooperative endeavor between peasants and officials rather than a coercive one. Peasants were not forced to use tools they did not want, nor were they forced to adopt a certain interpretation of new tools. Rather, the nuanced interpretation of

technological change that peasants provide is one that emerged organically and in conversation with community members and government officials.

This chapter also leads to conclusions about the place of the interviewer (in this case, myself) in the creation and narration of these memories. It is possible that villagers were telling me a story of technological triumphalism in order to make themselves look good to an outsider. However, I believe the nuanced perspectives, the good and the bad of technological change that they revealed to me, argue otherwise. Peasants understand technology to be dynamic, and this dynamism emerged in the interview excerpts I cited above. They are proud to discuss the tangible gains that technologies have brought, but they are sure to mention the challenges and difficulties as well. This model of historical interpretation is intuitively appealing, yet requires the experience and perspective that only time spent talking and working with subjects can provide. This dissertation is my attempt to lead scholarship towards this methodology and towards an interpretation of technological change as robust and nuanced as that held by peasants themselves.

Chapter 10: Conclusion

The technological landscape of Oaxaca was very different in 1988 than what it had been in the 1940s. Dirt roads crisscrossed steep mountainsides and wound their way to villages buried deep in valleys. Automobiles and buses labored up and down these roads carrying people and goods for sale. In Latuvi, fertilizers and grafted fruit trees were common tools. In San Bartolomé Quialana and other villages of the central valleys, tractors could be heard growling as they pulled steel disks and plows through the soil. In both communities and regions, water hydrants and faucets occupied prominent spaces on roads and in some homes, and many homes also had electric grinding mills for corn meal preparation. Some tools, like wooden plows, grinding stones, oxen, and donkeys, remained relevant where new technologies were imprecise or likely to break down. Others, like wooden wagons and trains, had mostly vanished, displaced by a new regime, automobility, whose advantages were too immense to resist.

Peasants' lives changed along with the tools they were using. Women, freed from the drudgery of tortilla-production and water carrying by faucets and corn mills, participated more directly in agricultural production and marketing and started new businesses operating stores, sewing clothing, or trading.[43] Men traveled more often, made extra money repairing and maintaining machines, and expanded their growing practices to include new crops (Latuvi) or new lands (San Bartolomé). In *The Peasant Marketing System of Oaxaca, Mexico,* Ralph Beals argued that peasants were doing all right in the modern economy, which provided many "options and alternatives" to make a living.[44]

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[43] The wealth of income-generating activities available to women listed here was inspired by Turkenik, "Agricultural Production Strategies," 359.

[44] Beals, *The Peasant Marketing System*, 278.

This dissertation shows that new technologies helped peasants to find these options and alternatives, as they opened spaces and possibilities unimaginable before the 1940s.

Beals also argued that peasants' standard of living was rising over time: "…over a long period of observation, it seems clear that many people in villages are better housed, better clothed, and perhaps better fed than was so thirty or forty years ago."[45] The overall tone of the interviews I recorded suggests that, with some caveats, peasants today agree with Beals' assessment. However, this rosy generalization should not obscure the struggles that peasants faced on a daily basis. To make technological change work for them, peasants had to learn to negotiate with development officials and to navigate poorly-designed development programs. They also learned to mix old tools with new ones in order to use the best qualities of each, to fix tools that frequently broke, and to fight and compromise over the distribution of new technologies within their communities, regions, and nation. They relied on familiar routines to make new technologies manageable, then used the technologies to help them change old routines and established relationships of gendered power. In short, I show that the consequences of technological change in Oaxaca were the result of the creativity, initiative, and leadership of technologies' users.

This process of peasant-centric development became even more important in the period after 1988. Although peasants continue to struggle to make tractors, fertilizers, *molinos*, and water faucets fit their needs to this day, the arrival of President Carlos Salinas de Gortari to the presidency in 1988 created a major change in the story. Salinas accelerated Mexico's turn towards neoliberalism and made major cuts to subsidies that

[45] Ibid., 278.

supported rural producers.[46] Rural spending was channeled through new programs like PROCAMPO (Program of Direct Support for the Countryside), which as of 2012 was still providing small cash payments to individual peasants that they could spend however they wanted.[47] Salinas' direct-to-producer payment model was a major blow to the theory of rural development that had held sway in Mexico since at least 1943. The idea of guiding peasants to modernization via technology transfer programs and the close instruction of experts was replaced by a neoliberal model in which individual peasants were given a small payment and left to fend for themselves.[48] The story I tell ends in 1988, but not for the villagers with whom I worked. Instead, their intuition and initiative became more important than ever in a period when the government stepped away from direct involvement in development.

My heavy emphasis on the agency of users in shaping their technologies comes from scholarship in the history of technology. For some time, the dominant trend in this field has been to view technologies as socially-constructed artifacts. Nelly Oudshoorn and Trevor Pinch extended this logic by calling for scholars to consider the power and agency of technology users in their edited volume *How Users Matter.* In this dissertation, I extend their analytical focus to places and topics to which it has rarely been applied, namely, rural Mexico and the Green Revolution.

Focusing on users and the social context in which they operated allows me to make major contributions to various fields of scholarship. For instance, some scholars

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[46] Appendini, "La transformación de la vida economica, del campo mexicano," 58-61; Moreno-Brid and Ros, *Development and Growth*, 172.

[47] Carlos Contreras, interview by Joshua Walker, at his home in Santa Marta Latuvi, 9 Mar. 2012; Flavio Aragón-Cuevas, interview with Joshua Walker, in his office at the Instituto Nacional de Investigaciones Forestales, Agrícolas, y Pecuarias (INIFAP), Campo Experimental Valles Centrales, Villa de Etla, Oaxaca, 7 Aug. 2012. Aragón-Cuevas discussed the prevalence of present day farmers who use PROCAMPO funds for things other than agriculture. Contreras told me that PROCAMPO gives out cash.

[48] De la Peña, "Civil Society," 319-21.

have acknowledged that peasants could pick and choose the technologies they wanted,[49] but most describe peasants' choices as ultimately limited to the options offered by government officials. In this reading, officials introduced technologies, and peasants displayed agency by accepting or rejecting them.[50] By contrast, I invert this relationship by showing that users, peasants, often led and directed the process of technological change. The design and scope of officials' programs were limited by what peasants would or would not support.[51] This was especially true in parts of Oaxaca where government attention was scarce. Peasants also used familiar political structures and traditions, including *tequio, cooperación, comites,* petitions, and participation in open markets, to shape their technological choices. They did more than accept or reject tools at the ground level. By advocating for development, donating labor and money to make projects come to life, and sharing information with their neighbors, peasants helped to structure the flow of new technologies into their communities and around Mexico. I do not believe that the government should be written out of the story entirely, but I do argue that users, not officials, were the key actors in the villages I studied.

Focusing on users and their experiences helped me to see that women were the ones using many new tools. This allowed me to contribute to our understanding of women and gender relations in the countryside. First, I show that government

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[49] Scholars who acknowledge that peasants made choices regarding technologies include: Pilcher, *Que Vivan*, 100; Barkin and Suarez, "El impacto de la biotecnología," 118; Redclift, "Production Programs for Small Farmers," 556-8; Cotter, *Troubled Harvest,* 237; Gladwin. "Cognitive Strategies," 156-7; Clawson and Hoy, "Nealtican," 379-83.

[50] Cotter *Troubled Harvest,* 237, Gladwin, "Cognitive Strategies"; Redclift, "Production Programs for Small Farmers," 556-8, 565; Clawson and Hoy, "Nealtican," 377, 379-83. Clawson and Hoy mention that peasants could form cooperatives to get access to irrigation instead of working through the government (377), while Redclift mentions that peasants were already familiar with the technologies they adopted as part of the *Plan Puebla* demonstration project (565). However, none of these works explores ways that peasants acquired and learned about tools without the help of government experts.

[51] Ronald Waterbury's work was influential here. Waterbury, " 'Lo Que Dice.'"

development programs targeted women for technological modernization throughout the period in question, and they called for technological reformation of homes and public spaces at the same time that they were encouraging men to modernize agriculture.[52] Second, I show that families were receptive to the idea that women should be modernized. The reorganization of streets and neighborhoods in rural communities in order to take advantage of water faucets, electricity, *molinos,* and roads attests to this. Finally, my work cautions against exaggerating the liberating effects of technologies for women. Many studies, including my work and various essays in the edited volume *Women of the Mexican Countryside,* describe women who used time saved by devices like automobiles, *molinos*, and faucets to travel, to become more active participants in markets, to go to school, or to take up wage labor.[53] I argue that this happened more often in circumstances where women were apart from their husbands.[54] In cases where men used the tools of the Green Revolution to fortify their positions as farmers, patriarchy persisted with subtle but real changes.

This dissertation owes a great debt to scholars of the history of technology, but it also adds something new to the field. Repair and maintenance are categories of analysis

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[52] Vaughan, "Rural Women's Literacy," 116-7; Sanders, "Gender, Welfare, and the 'Mexican Miracle'" 128, 188-91; Appendini, "La transformación de la vida rural en tres ejidos," 29-30; Appendini and De Luca, "¿Empoderamiento o apoderamiento?" 193-4; World Bank, *Engendering Development,* 19, 24-5; Zapata Martelo, "Modernization, Adjustment, and Peasant Production," 118-9, 123; Arizpe and Botey, "Mexican Agricultural Development Policy 78; Tadesse, *Women and Technological Development in Agriculture,* 7-9; Jiggins, "Gender-Related Impacts and the Work of the International Agricultural Research Centers," v-vi, 9, 12, 16. Vaughan, Sanders, Appendini Appendini and De Luca, and *Engendering Development* take seriously the integrated nature of government development programs and the effects of both domestic and agricultural production technologies. By contrast, Zapata Martelo, Arizpe and Botey, Tadasse, and Jiggins argue that women were ignored in official development plans. These studies are concerned mostly with agriculture and overlook efforts to reform women and domestic life. Note: Jiggins, Tadesse, and *Engendering Development* concern women around the world, not just in Mexico.

[53] Friedlander, "Doña Zeferina," 130, 136-7; Vaughan, "Rural Women's Literacy and Education," 116-7; Mummert, "From *Metate* to *Despate,* 196-200; Arias, "Three Microhistories," 170-1.

[54] Ibid. The citations from *Women of the Mexican Countryside* also emphasize that it was single who women had the most freedom to do these things.

that have not received full consideration amongst historians of technology.[55] Following the work of Pierre Claude Raynard, my dissertation shows that repair and maintenance were daily concerns for both peasants and officials, who had to adjust their schedules and their plans on the fly in order to account for repair work.[56] Learning to repair and maintain tools also gave peasants another opportunity to make money in the new cash-based economies of their villages. In sum, repair and maintenance were clearly central to the process of technological change in Mexico, and my dissertation suggests that historians of technology should pay just as close attention to these categories as they usually do to understanding technology design and use.

My work suggests paths for future research topics and methodologies in Mexico. If historians accept that technologies are shaped by (and shape) the societies and the users that design and deploy them, then they need to do more to understand social contexts. This means visiting rural communities, observing work and *fiestas*, and asking about memories. Whereas ethnographic observation and the recording of oral histories are routine practice in anthropology, they remain the exception rather than the rule for historians of Mexico. By relying on oral interviews, my work places peasants' perspectives and subjectivity at the heart of twentieth-century changes. Future work on rural life must make visits to communities a core component of methodology in order to understand the geographic and social conditions under which change takes place.

Scholars should also pay more attention to intravillage disputes over technologies. I began to examine this question in chapter four, but my conclusions were based on a relatively small base of sources. With more research in federal and state repositories and

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[55] This is inspired by Edgerton, *The Shock of the Old,* 77-9.
[56] Raynard, "Unreliable Mills."

local archives like those I found in San Bartolomé, I believe that scholars will find that technological change was one of the central questions that village councils and assemblies faced in the twentieth century. In the cases where cooperation was needed to introduce technologies like water faucets, villagers had to forge compromises and to reconcile competing visions of technological progress. As I suggested in chapter four, they also had to adapt components of local government to accommodate or to administer new tools. Additional research could do more to explain the role of technologies in changing the structure of local government in the long twentieth century.

Finally, there is more work to be done on the history of national-level development policies. Plenty of ink has been spilled over the Rockefeller Foundation's work in the 1940s and 1950s, and, to a lesser extend, over the Papaloapan Project.[57] Comparatively little has been written on later efforts to extend the technological advances of the Green Revolution to small farmers and peasants who did not live near river basins.[58] My work suggests that even these peasants, peasants who would appear to be only minor players in the high-modernist schemes of the state in places like the Lower Papaloapan Basin, were profoundly influenced by the availability of new tools in the period after 1940. The period of heavy state investment in the countryside that lasted from approximately 1970 to 1982 especially deserves more attention. This was when the federal and state government specifically targeted regions and communities like San Bartolomé, those which had received comparatively meager state attention up to that

[57] Some examples include: Matchett, "At Odds over Inbreeding," Harwood, "Peasant Friendly Plant Breeding"; Cotter, *Troubled Harvest;* Hewitt de Alcántara, *Modernizing Mexican Agriculture*; Fitzgerald, "Exporting American Agriculture"; Olsson, "Agrarian Crossings," Chapter 5; Poleman, *The Papaloapan Project*; Cosby, "Leviathan in the Tropics"; Schwartz, "Resettlement as Planned Utopia."

[58] Exceptions include: Sierra Mondragón and Rees, "Los impactos del indígenismo"; Clawson and Hoy, "Nealitcan, Mexico"; Fox, *The Politics of Food.*

point. My work proves that peasants wanted this increased development attention and state investment and considered them to be rights earned through loyalty and service to the government.

Walking through many Oaxacan villages today, one sees the results of government policies and programs translated into reality. On the one hand, it is hard to avoid drawing the conclusion that the rusted and forgotten public faucets are nothing more than silent tributes to government failure. San Bartolomé's first public hydrant, the one featured in the photograph on page 81 (figure 3), still stands in the village today. Children play near it, but it gives no water. There are many such faucets in Latuvi.

On the other hand, the gravity-and-hose systems that power contemporary potable water systems are clearly inspired by these earlier designs. Both use water holding tanks to build needed pressure to push water into people's homes. Government programs introduced the first potable water systems, the ones that are now disused, but villagers learned from their problems and played a central role in building, maintaining, breaking, and fixing acceptable replacements. One should not view the disused hydrants and faucets in isolation, but rather, as intermediate steps that inspired peasants to design more stable and useful alternatives.

In the San Bartolomé of 2012, miles of black hoses transported water from holding tanks near the community's forests to people's homes further downhill. In Latuvi, similar hoses were thick and hissing with water, so much so that one once startled me. Alone on a dirt road on a sunny afternoon, surrounded by pine forests and cornfields, I thought I had stepped on a spitting cobra. Instead, it was the village's main water line, partially buried, carrying precious liquid down the mountain and towards the

center of town. Building systems like this one required peasants to talk, to fight, to consider the plans and designs of officials and outsiders, and to reach consensus. I maintain that this complex, peasant-centric process best describes the unfolding of technological change in rural Oaxaca's twentieth century.

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