

“A Clash of Two Worlds: Chemical Fertilizer and Maya Land in Guatemala.”
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The majority of Maya are agriculturists and their holistic approach to farming encompasses their lives. The introduction of chemical fertilizer was a traumatic event for many Mayan farmers. They feared chemical fertilizer because it was a non-native substance and could upset their harmonious balance with nature. Their initial resistance receded, however, as perpetual famines forced them to employ this foreign input into their land. The Maya of Guatemala consider the land sacred. Each time before they begin a new cycle of work in the fields they make an offering to the *rajawal* (spirit of the land) and ask the spirit's permission to use the land. Agriculture is so important in their lives that their year is based on the cycle of planting and harvesting corn. Corn takes on a religious importance as well as provides the main sustenance for their diet. Even Kaqchikel professionals who work in Guatemala City or other areas outside their communities insist on planting corn on a small plot of land in their communities to maintain their connection to the *rajawal*. While some Maya hail chemical fertilizer's immediate effectiveness, many lament the long-term deterioration of their public health and economic stability. Today, some Mayan agriculturists insist on using only natural fertilizer like their forebears. Chemical fertilizer has instilled both fear and hope in the Maya and its subsequent successes and failures have left a complex mark on them. This paper will explore the impact of chemical fertilizer and the Mayan perception of it to increase our understanding of the reality of Guatemala's rural population.

Occupations among the Maya-Kaqchikel, the third largest Mayan language group in Guatemala, are diverse and include teachers, office employees, artisans, tradesmen, and factory workers, but in general Kaqchikel labor is tied to the land. Furthermore, the Kaqchikel relationship with land and labor is central to their culture. Population increases among Maya and

Ladinos (non-indigenous Guatemalans) have altered Kaqchikel relations with the land. An elder from San Juan Comalapa (henceforth referred to as Comalapa) relates, “A long time ago we could let the land lie fallow because there were not as many people.”¹ Kaqchikel oral histories record periods when the land no longer supported its population. People could not even produce enough food to support their families. Consequently, men and women migrated to the Pacific coast where harsh working and living conditions awaited them.²

Kaqchikel were not the only Guatemalans to suffer from famines. Many Mayan groups complained of crop damage and food shortages. Furthermore, Guatemala suffered repeated corn shortages from 1870 until 1940. In fact, Guatemala had experienced periodic scarcity of foodstuffs since the colonial period and these problems persisted into the twentieth century. In 1915 for example, a lack of rainfall and a locust invasion resulted in a shortage of corn. The government imported corn for the municipalities to fill the void.³ Unfortunately, this aid did not reach many of the areas in need. A Ladino author from Tecpán noted that while corn and bean production did not reach the extreme degree of scarcity expected after the lack of rain, the rising prices led to a difficult situation. The shortage in the market resulted in expensive corn.⁴ A decrease in production affected farmers directly in their own fields but also indirectly through rising prices of staple goods in the market. Subnormal harvests meant many people could not afford to buy enough corn to supplement what their own fields failed to produce. Marilyn Moors notes: “By the time forced labor was abolished [mid 1940s], the Indian population of Guatemala had increased to the point at which the remaining land base of many Indian communities could no longer support a large part of its population.”⁵ This relationship changed for many with the introduction of chemical fertilizers and an increased harvest.

In one sense, Kaqchikel oral histories laud the arrival of chemical fertilizer because it was the catalyst that terminated the need to seek agricultural employment outside their communities. Kaqchikel argue chemical fertilizers increased harvests, especially corn, in the highlands. One agriculturist observed that his harvest increased seven-fold when he used chemical fertilizer because the fertilizer gave strength to the land. According to oral histories, farmers produced enough to support their families for a full year and famines no longer plagued them. Kaqchikel assert the quality of life improved.⁶ Waqi' Iq', a sixty-seven-year-old former mayor attests: "A long time ago our people suffered because the agriculture did not give enough to support us. . . . The people suffered until the chemical fertilizer came and they did not have to go to the coast again."⁷ B'eleje' K'at, a forty-two-year-old artist adds: "The most important thing for us was the arrival of chemical fertilizer so people could farm better. Now there is a good harvest and you can even have laborers work for you. They can also farm in the hills where they could not before."⁸ Kaqchikel landowners were not the only beneficiaries of chemical fertilizer, though, since landless Kaqchikel could find jobs in the highlands. Lajuj Kan, who at age seventy one is too old to work his land alone, takes great pride in working alongside his assistants everyday. The dark, coarse, and cracked skin on the soles of his feet, developed from years of walking and working barefoot, serve as constant reminders of his bond with the land. He explains the symbiotic relationship between labor on the coast and chemical fertilizer:

We farmed four to six *cuerdas* but it did not give much maize; of the forty *varas* we barely got one *costal*.⁹ So around August through October, we went to the coast. But thanks to God, science, and studies, I do not know where it came from, but the chemical fertilizer helped the harvest. Sincerely, since then there has been no hunger and now almost all the children eat well.¹⁰

Chemical fertilizer mitigated people's need to migrate to the coast because it created more jobs, provided abundant harvests, and eradicated famines. Research indicates chemical fertilizers greatly increased agricultural production in Mayan communities.¹¹ Kaqchikel communities were no exception. One elder states, "Until about 50 years ago corn was always scarce. In June, people had to begin to buy corn and famines struck. But now, thank God, that no longer occurs because of chemical fertilizer."¹² Most people attribute the lack of food to the absence of chemical fertilizer. As Ixwatzik', a sixty-year-old woman who works in the fields as well as her home, states, "Chemical fertilizer has helped us significantly . . . without it you cannot farm. If there is no fertilizer, then there is no food."¹³ The majority of Kaqchikel claim the use of chemical fertilizer resulted in the community's self-sufficiency.¹⁴ Another rural elder concludes, "Chemical fertilizer gives us life."¹⁵

Since the turn of the century, agricultural entrepreneurs in Guatemala had been promoting the use of chemical fertilizer. In 1903, the *Boletín de Agricultura* reported, "All plants without exception need chemical fertilizer. Chemical fertilizer is essential to vegetable life."¹⁶ By the early 1920s, the Guatemalan Ministry of Agriculture stressed the importance of experimentation with chemical fertilizers, "to improve the land and augment and improve the harvests."¹⁷ Sheldon Annis suggests that fertilizers and pesticides arrived in San Antonio Aguas Calientes (henceforth referred to as Aguas Calientes) in the 1920s when evangelical missionaries established an "agricultural store" in that community.¹⁸ Aguas Calientes was the exception, however. Widespread use of chemical fertilizer did not catch on in many Mayan communities until the late 1950s. At first most Maya rejected this foreign substance. In San Antonio Ilotenango, K'ichee', chemical fertilizers entered the community in 1959, but the majority of

residents did not incorporate it into their farming techniques until 1965. Likewise, in Totoncapán, K'ichee' farmers did not introduce chemical fertilizers into their agricultural techniques until the 1960s.¹⁹ Pesticide use was also slow to attract farmers, but by 1950, K'ichee' farmers in Almolonga, Quetzaltenango began using pesticides called Cobre (Cupravit, copper ocoxichloride) and Gamexan (BCH), an extremely toxic organochlorine insecticide.²⁰ Most Mayan agriculturists approached these new technical inputs with trepidation.

As skeptical farmers overcame their caution, chemical fertilizers greatly increased agricultural production in Mayan communities.²¹ In Chimb'al, Catholic Maryknoll priests introduced chemical fertilizers in the late 1960s and by the mid 1970s land productivity had nearly tripled. This expansion allowed Chimb'altecos to farm less land which decreased the population pressure on the land. Similarly, in San Antonio Ilotenango, K'ichee' once agriculturists began to use chemical fertilizer on a regular basis, they realized a significant improvement in their corn and bean harvest. Some vegetables, such as the squash family, would not grow without the assistance of chemical fertilizer.²²

Kaqchikel oral histories date the arrival of chemical fertilizer between the late 1950s and early 1960s. One 80 year-old farmer noted in his journal that chemical fertilizer arrived in Comalapa on January 22, 1956.²³ The *Chuwi Tinamit* Project Monograph for San Juan Comalapa states, "The use of chemical fertilizers barely had been introduced in the decade of the 50s."²⁴ By the mid-1960s, most Kaqchikel residents of Comalapa were familiar with chemical fertilizer. In 1966, a local newspaper, *Comalapan*, reported a program to, "develop the use of fertilizers for the small agriculturist to counteract the low national . . . cultivation of basic foodstuffs."²⁵ Initially, residents were reluctant to employ foreign inputs in their agricultural techniques. Agricultural promoters encouraged local residents in Comalapa to use chemical

fertilizer to boost their harvests of corn, beans, wheat, potatoes, and garden vegetables. The Development of Indigenous Economy organization studied and analyzed new forms of fertilizer to improve Mayan agricultural production. This group encouraged the widespread use of chemical fertilizer in an attempt to augment annual output. Comalapa was one of the towns where they focused their efforts.²⁶

Some Kaqchikel made direct connections between chemical fertilizer and improvements in their lifestyle. One man credited chemical fertilizer with his ability to send his children to school. He attributed his own failure to attend school to the fact that he had to work the land. But when fertilizer came, the land was more plentiful and he could allow his son to finish his studies and become a teacher.²⁷

Despite the immediate benefits that chemical fertilizer had on Kaqchikel communities, many people refused to use it at first. Oral histories recall they had no confidence in this new product because they did not understand its effects.²⁸ As a result, only a few tilled their soil with chemical fertilizers and the rest criticized these trailblazers' foolhardy approach to agriculture. Furthermore, oral accounts note in some communities men and women from the U.S. who ostensibly came to give classes about chemical fertilizer, wanted to organize an "army of the poor" and this association also gave a bad name to chemical fertilizer. According to some informants, these people planted the "seed of subversion," and massacres were the result.²⁹ The connection between aid workers and increased violence during Guatemala's civil war (1960-1996) prevented many from expressing interest in chemical fertilizer.

The majority of Kaqchikel now claim initial trepidation was warranted as chemical fertilizer has had many negative effects on the land, community, and population. Nobel Peace Prize laureate, Rigoberta Menchú agrees with Kaqchikel warnings, "If you use chemicals on a

cucumber or a merliton, they will certainly grow quickly, but the natural process will have been interfered with.”³⁰ Other Mayan farmers found that eventually some vegetables, such as the squash family, would not grow without the assistance of chemical fertilizer.³¹

In some instances, fertilizers killed crops. For example, one family in Tecpán inadvertently killed their potato harvest with the application of chemical fertilizer. Another family said that chemical fertilizer killed all their crops.³² Pesticides also potentially harm crops. For example, the application of recommended levels of insecticide have decreased strawberry and cotton crops’ growth and harvests. Furthermore, research shows that when nitrogen fertilizer applications are increased from 200 to 270 kilograms per hectare or higher, crop yields are significantly reduced.³³ The financial losses from crop failures can be devastating for farmers.

Most Kaqchikel, especially in Aguas Calientes, assert that these chemicals also adversely affect public health. Others attribute deadly diseases to pesticides that are needed to maintain the farm. Informants point out chemicals are present in agricultural products and when people eat this food they become sick. Oral accounts teach that in place of the healthy vitamins people formerly consumed in vegetables and fruits, they now ingest chemicals. Consequently, according to oral traditions, people are not as physically strong and resistant to disease as they once were and thus do not live as long as they once did. Some people attribute cancer and diabetes to the intake of these chemicals.³⁴ Unfortunately, Kaqchikel assertions about the deleterious health effects of fertilizer ingested through agricultural products have not yet been scientifically proven. Nonetheless, agricultural and environmental studies in other regions of Guatemala and the world have posited similar assertions. A number of these studies have indicated a link between cancer and agrichemical poisonings, however an explicit causal

relationship remains elusive.³⁵ A bone-setter and artist explains the long term detrimental health effects of chemical fertilizer:

A long time ago there was no chemical fertilizer and because of that men were tougher; they did not fall ill. They farmed and ate the pure strength of the land. Now chemical fertilizer weakens us. The corn is bigger but it has chemicals in it. The land is no longer strong. It has disease in it. Furthermore, the underground insect population and waste have increased. These insects and waste eat the harvest. When there was no chemical fertilizer, nothing hurt. My grandfather lived to be 85 and when he died he was never hurt. He had great teeth, but now people's teeth are worse.³⁶

Ixxeq, a forty-seven-year-old woman who has tended to her family's crops since her husband was killed during the civil war, concurs:

We only use a small amount of chemical fertilizer and we never fumigate [with pesticide], but others do. A long time ago my grandfather did not use chemical fertilizer, he only used natural fertilizer from chickens and goats. He carried it in a sack when he went to his land in the hills and then he would throw a little under each corn stalk. My grandfather said that chemical fertilizer gives illness. That is why so many people are sick now because of the poison from chemical fertilizer. In fact, there is more poison than fertilizer [in chemical fertilizer]. Now people only use poison. A long time ago there were not many diseases because people did not use pesticides. Cancer is one of the grave diseases that this poison provoked. Now people die young because there are so many diseases. A long time ago people lived much longer.³⁷

Research supports Kaqchikel observations of a cause and effect relationship between declining public health and the application of chemical fertilizers and pesticides. The poisons from these products can spread through food (particularly fruits and vegetables), water and air supplies. Over half of the pesticide-induced deaths occur in developing countries despite the fact that they use only about 20 percent of the pesticides produced in the world.³⁸ In Guatemala, forty one percent of the 10,000 tons of pesticides in use every year are restricted, no longer sold, or not allowed in food. For this reason, the U.S. rejects nearly eighteen million dollars worth of Guatemalan agricultural exports. Guatemala is second only to Mexico in the total number of U.S. detentions of Latin American agricultural exports.³⁹ The most dangerous elements in the fertilizers applied by Kaqchikel farmers are organic nitrogen (N) or nitrogen compounds (nitrites, ammonium [NH₄], and nitrates), phosphorous (P), and potassium (K). Phosphorous and potassium remain in the upper soil layer, but nitrogen easily migrates through the soil and is one of the principal contaminants of groundwater. Consequently, nitrogen is the main environmental pollutant and can rapidly increase to hazardous levels.⁴⁰ Nitrogen is the most concentrated element in most of the fertilizers that Kaqchikel employ (see appendix). Several studies indirectly link the consumption of nitrate through groundwater to brain cancer in children and stomach cancer in adults. Recent, albeit inconclusive, research also indicates a causal relationship between the maternal ingestion of nitrate through drinking water and developmental problems in their infants.⁴¹ Wuqu' Iq', a sixty-nine-year-old Catholic farmer notes: "You need poison to keep your farm going. There is no harvest if you do not apply poison, but there is also much disease in this poison."⁴²

The application of chemical fertilizers and pesticides themselves lead to health concerns. Many fertilizers and pesticides are poorly labeled, consequently farmers are unaware of their

active ingredients. Even when the elements of the fertilizer are listed no instructions accompany the packaging as to the proper precautions to use when applying it, such as protective clothing, washing after handling the product, and warnings about other hazards.⁴³ Few of the chemical fertilizers available to Kaqchikel farmers list the ingredients and even less provide application instructions or precautions (see appendix). In general, Kaqchikel farmers apply chemical fertilizer twice a year. Once in late June or early July after the rains have begun and the *milpa* (corn crops) is about a foot high, then again in August or early September. The first chemical fertilizer to arrive in the area was a liquid. Farmers mixed it with water and spread it around the base of the plant in the form of a “half moon”. Kaqchikel note they had to apply this liquid formula carefully because direct contact would burn, and in most cases, kill the plant. As the liquid fertilizer lost its potency, dry fertilizer became more common. Today, farmers continue to use their hands to apply a substance that looks like small white balls (20-20-0) or small white and dark balls (15-15-0). The dry chemical fertilizer is not mixed with water and most farmers do not have the means to wash their hands and clothes until they return home at the end of the day.⁴⁴

In general, farmers do not use pesticides on their corn crops. Consequently, many farmers use very little if any pesticides in their agricultural practices. However, both pesticides and herbicides are common with bean, tomato, pea, potato, strawberry, and blackberry crops. These crops are all present in Kaqchikel highland farming communities. The application of pesticides varies considerably depending on the crop and individual farmer. Some farmers claim they only use pesticide once or twice a year, while others use it as often as the insects or weeds return, at times once a week. Farmers apply pesticides (which come in a liquid form) with a yellow tube, which they wear on their backs. The tube is attached to a hand pump and nozzle used to spray the

liquid formula. Some farmers place a nylon bag between their backs and the yellow tube, but many fail to wear even this minimal protection.⁴⁵

The direct contact with fertilizers and pesticides is especially problematic because most farmers eat lunch in their fields without any access to water with which to wash their hands. They commonly ingest these chemicals directly with their food. These practices contribute to the approximately 25 million occupational agrichemical poisonings and several thousand agrichemical deaths that occur worldwide each year. In Guatemala, about 1,200 cases of acute pesticide intoxication (short-term reaction) are reported every year. Quantifying long term health effects is more difficult because people do not generally die from agrichemical poisoning, but from infectious diseases. Nonetheless, agrichemicals may exacerbate the break down of the immune system.⁴⁶

In addition to the adverse effects on public health, many Kaqchikel notice that the land is not as fertile as it once was. They claim chemical fertilizer has consumed the natural nutrients and vitamins of the land. Consequently, they point out people can no longer farm off the fecundity of the land alone because the land and seeds have become accustomed to chemical fertilizer. Many farmers claim crops do not grow without the application of this external stimulant.⁴⁷

At the same time that the land is losing its strength, increasing prices and a decreasing effectiveness of chemical fertilizers further compound the problem of small-scale agriculture. A former Comalapa mayor observes, "Each time chemical fertilizer is more expensive and less efficient. People should use organic fertilizer."⁴⁸ Kaqchikel remember that a quintal of fertilizer cost about four quetzals when it first came out, but now the price is 100 quetzals per quintal.⁴⁹

Many farmers argue it is too expensive and they had to give up their land and farming as a result.⁵⁰ An elder from Aguas Calientes relates:

A long time ago no one used chemical fertilizer because the population was low and land was abundant so they did not need it. Now there are more people, so the land has to give more. Most people use chemical fertilizer and it really helps. But now that people need it, the price of chemical fertilizer has increased. Chemical fertilizer is very expensive. The poor cannot afford it, so they have to work in the factories.⁵¹

Wuqu' Iq' recognizes the importance of chemical fertilizer and opines that the government should keep the prices down.⁵² In addition to excessive costs, many Kaqchikel assert that chemical fertilizer is not as potent as it once was. Oral accounts describe that in the 1960s, one could apply a small cap-full, but now large quantities are needed to bring about the desired effects. Some agriculturists claim that producers have extracted the important active ingredients from fertilizers.⁵³ Scientific evidence supports Kaqchikel assertions that crop yields are declining despite increased use of chemical fertilizers.⁵⁴ One sixty-two-year-old evangelical rural farmer opines:

In 1955 when chemical fertilizer arrived it was stronger and gave a good harvest. One *quintal* [one hundred kilograms] provided for eight to ten *cuerdas*. Now it is not as strong. The Ministry of Agriculture analyzed the chemical fertilizer from 1965 to 1970. They said it was the same, but that is not really true. They were lying to us. The price increases but not the strength. Now you pay 100 quetzals for a quintal and it only lasts for one *cuerta*.⁵⁵

The cycle of chemical fertilizer prices out small agriculturists in favor of large ones--much like the programs of liberal dictators, such as President Justo Rufino Barrios (1873-1885)--to usurp land from Maya.

The cost of additional inputs, such as pesticides, results from the use of chemical fertilizers. Many Kaqchikel farmers assert that fertilizer produces plant-eating insects and microbes in the ground. They note these destructive insects eat crops before they can be harvested. Consequently, Kaqchikel assert agriculturists must purchase a poison to kill them, but fumigation costs are also high. In addition, some Kaqchikel believe that chemical fertilizer brought a new strand of plague that kills crops.⁵⁶ Agrichemicals can disrupt effective natural biological controls. Scientists estimate that natural enemies account for between fifty and ninety percent of the control of pest species but pesticides destroy beneficial natural predators. Secondary pest outbreaks result from the reduction or elimination of their natural enemies. Another problem is that pests develop resistance to pesticides. By 1983, 447 insect and mite species had developed resistance to pesticides. As a result, farmers must purchase new pesticides or in extreme cases crops must be surrendered. In the early 1970s cotton crops in northeastern Mexico had to be abandoned because pesticides became ineffective against the tobacco budworm, a major cotton pest. Similar patterns of resistance to pesticides and secondary pest problems surfaced in the U.S., Peru, Colombia, Australia, Thailand, and Turkey.⁵⁷ The use of chemical fertilizer multiplies costs. Furthermore, Kaqchikel lament while the costs of fertilizer and pesticides increase, the price of corn remains stagnant, and therefore, profits diminish.⁵⁸ Such circumstances have forced some farmers to lose their land.

Kaqchikel farmers were not the only ones to suffer from increased costs. Another Mayan group explains:

Small and medium agricultural production fundamentally based on the use of fertilizers was cut short when the price of fertilizers, derived from petroleum, rose from Q2.85 to Q18.00 per hundred pounds. This resulted in bankruptcy for thousands of farmers. . . . At

the same time that cultivation of such crops ceased to be affordable, the crisis also reduced the national and Central American market for fruits and vegetables coming from the Guatemalan highlands. Thousands upon thousands of farmers were forced to migrate to the plantations and to the capital.⁵⁹

Fluctuations in the price of chemical fertilizers and decreased demand for their products reduced Mayan self-sufficiency. Increased agricultural productivity failed to offset the rising price of chemical fertilizers so people had to seek outside income to meet these expenses.⁶⁰

Migration to the coast remains significant in some communities. San José Poaquil's (henceforth referred to as Poaquil) most intense coastal labor period was in the 1970s.⁶¹ Some Kaqchikel estimate that today in Poaquil as much as sixty percent of the population, generally the poor and landless, migrate to the coast.⁶² The Poaquil health center monograph states:

During the summer due to a lack of [employment] activity approximately forty percent of the manual laborers emigrate seasonally to the coast to take advantage of the cutting of cotton and coffee. It is affirmed that ninety-five percent of the agriculturists that go to cut on the coast work to pay for their fertilizers or money that has been lent to them for the purchase of those goods. The salaries paid the agricultural peon fluctuate between 1.50 and 2.00 quetzals daily.⁶³

Nearly half the Kaqchikel population in Poaquil had to migrate to the coast because of a dearth in labor opportunities in their community. This migration reflected a nationwide trend. In 1970, municipal functionaries estimated that sixty percent of the Mayan population still had to migrate to the coast in search of employment. One reason for this emigration was that the price of basic foodstuffs such as beans and corn increased in the 1970s at the same time that seventy-five percent of Guatemala's children were undernourished. Furthermore, many people needed to earn

money to pay for chemical fertilizer they employed in their local harvests. The 1973 international oil crisis resulted in an increase in the price of fertilizer as oil prices rose. Tragically, many families who had become accustomed to the use of chemical fertilizer could no longer afford it. Consequently, Maya with sufficient land and cash resources avoided coastal migration, while less fortunate laborers continued to work on plantations.⁶⁴ Most farmers became dependent on the use of chemical fertilizers. Arturo Arias asserts that chemical fertilizers, “constituted an indispensable technical base,” for many indigenous farmers.⁶⁵ Literacy campaigns that focused on the problems and necessities of the indigenous population recognized fertilizers as a main concern.⁶⁶ The arrival of chemical fertilizer did not alleviate the need to work on the coast for these farmers, but rather, it perpetuated a dependent relationship.

Even today, an intimate relationship between chemical fertilizer and coastal migration persists. Ka’i’ Kame, a fifty-year-old Catholic whose third grade education does not preclude his effectiveness as a facilitator of local development groups, explains:

Now about ten percent of [Poaquil’s] population goes to the coast. It used to be sixty percent . . . Then chemical fertilizer came, but as the cost of fertilizer increased more people had to go to the coast to pay for it. The *contratistas* [labor brokers] gave them fertilizer in exchange for work on the coast. They owed between 500 and 2,000 quetzals. The chemical fertilizer resolved one problem, but then caused another. Forty years ago fertilizer cost five *quetzals* per *quintal*, but now it is 100 *quetzals* per *quintal*. A long time ago the land was stronger. It was not yet ruined, but now the chemicals have burned the land. The animals in the land have died. The land has lost its life.⁶⁷

Ka’i’ Kame argues chemical fertilizer replaced one form of dependency with another.

Temporal emigration to the coast still permeates all aspects of Kaqchikel lives. It causes a high level of truancy and the inability of children to complete their studies. Kaqchikel lament that families go in September or October and children do not finish school.⁶⁸ The Poaquil health center monograph continues:

In some *aldeas* [hamlets] one observes the phenomenon of school absenteeism because of the migration of the parents to the coast. They register their children [for school] but do not allow them to conclude the school year. Consequently, the children need to repeat the school year, which they also fail to complete because they dedicate themselves to the farm work with their parents. In the economic conditions in which they live the earnings of all family members is necessary.⁶⁹

For some parents, the children's contribution to the family income took precedence over education. Consequently, coastal migration denies many children educational opportunities.

Newly elected President Alfonso Portillo recognized these challenges. When he assumed office in 2000 he began a program to sell chemical fertilizer (20-20-0) to low income families for about half the retail price. Each low income family is eligible for two one hundred-pound bags at a cost of forty eight quetzals each. A local Christian Children organization also donates two one hundred-pound bags of chemical fertilizer to each family whose children are enrolled in its program. A one hundred-pound bag of fertilizer will provide for about two *cuerdas*. Consequently, most small farmers must purchase more chemical fertilizer than the government subsidy provides.⁷⁰

Kaqchikel recognize that other regions such as El K'ichee', Huehuetenango, and Chichicastenango are more dependent on coastal labor for a portion of their income than are Kaqchikel.⁷¹ In fact, Carol Smith argues that the Kaqchikel department of Chimaltenango sends

few people to work on the coast. Agriculturists from Chimaltenango take advantage of their close location to Guatemala City to produce basic foodstuffs for national consumption. In contrast, much of the adult labor force in the peripheral areas of Huehuetenango, northern K'ichee', and northern San Marcos work on the lowland plantations from three to six months a year.⁷²

The improved agricultural situation in the highlands means that coastal plantations must offer humane working conditions and increased pay to attract workers. People now can earn an average of about five quetzals a day more on the coast than the daily wage in their communities. As a result, coastal labor is not as exploitative as it once was. Kaqchikel opine the work remains arduous, however, and in many cases the pay does not compensate adequately for the manual labor. In 1998, the average daily wage on the coast was twenty-five quetzals, barely enough to cover the cost of living for a family with two children, let alone the expenses from agricultural inputs such as fertilizer and seed. Informants also deplore that many migrants continue to return with diseases.⁷³ While coastal work conditions have improved, many Kaqchikel continue to suffer because they must uproot their lives and seek temporary employment outside their communities.

As a result of the negative consequences of chemical fertilizer, many Kaqchikel farmers prefer natural fertilizer. One seventy-four-year-old agriculturist from Aguas Calientes explains:

I use natural, not chemical, fertilizer because there are no costs. It is good for my corn, bean, and tomato harvest. I have not had a plague in a while. The chemical fertilizer brought the plague [of insects] so then farmers had to buy poison from the same people who make the chemical fertilizer. It was a way to deceive the people. If you buy chemical

fertilizer, you can make big money; but it will catch up with you because each day you have to fumigate.⁷⁴

Chemical fertilizers begin a vicious cycle of increased costs from which farmers cannot escape. Many Kaqchikel reflect on a time when agriculturists only employed natural fertilizer from feces of domestic animals, such as goats, sheep, horses, and cows. A seventy-year-old evangelical barber and farmer explains one method of acquiring organic fertilizer: “A long time ago people only used fertilizer from their home. Each home had a hole and you swept everything from the courtyard into it. Then you would gather this compost and bring it to your fields. . . . Organic fertilizer is a tremendous aid, but [most] people no longer have the animals to make it.”⁷⁵ Some continue to use feces because it is better for the land. They argue natural fertilizer replenishes, rather than eliminates, the land’s fecundity. They assert as a result, crops produced with natural fertilizer provide a healthier diet than those produced with chemicals. They also note for some crops, such as potatoes, natural fertilizer produces a better harvest. Furthermore, for those who have access to these resources, natural fertilizer is cheaper than chemical fertilizer.

Unfortunately, for those who do not own domestic animals, natural fertilizer can be prohibitively expensive and hard to locate. Some farmers advocate a mixture of the two forms of fertilizer for best results.⁷⁶ As Ix’ajmaq, a 31 year old teacher and university student notes, “Organic fertilizer from compost is not enough so we have to use chemical fertilizer for our corn crops.”⁷⁷ Most Kaqchikel see the benefits of natural fertilizer and they believe more people would employ it if they had the resources.

Clearly, most Kaqchikel desire agricultural practices free from chemical fertilizer and pesticides. One school director includes lessons about agriculture and agrichemicals in the curriculum because she views it as crucial to her people’s survival. She says:

Here in Patzicía we have plenty of agricultural work, but there are also problems that go along with that. It is important that children know how to farm, that they know what is good for the land and what hurts the land. We have plenty of vegetables here, but we also have much insecticide and chemicals. Some farmers do not know it is a problem, so it is important that students understand it is a problem. Here in our town we have gastritis because there are so many chemicals. They use too many chemicals in agriculture. When you go to the hills and fields you can smell the poison.⁷⁸

Conclusion

Kaqchikel welcomed the development of chemical fertilizer as an escape from migrant labor. The majority of men and many families had to work on the coast to supplement their income prior to the introduction of chemical fertilizers. At first, Maya approached this foreign input cautiously. By the mid-1960s and 1970s, however, most Maya were enjoying increased harvests as a result of chemical fertilizer. Many, especially Kaqchikel, no longer had to supplement their income with outside sources. As soon as they reaped the benefits of chemical fertilizer, their dependence upon plantation labor ended (at least temporarily). Kaqchikel cite chemical fertilizer as the catalyst that ended migrant labor for a majority of the population. They took advantage of fertilizers to increase their freedom from coastal migration, but not from the national economy. The arrival of chemical fertilizers allowed them to increase their control of their own destiny.

Chemical fertilizer was not a panacea, however. It initially increased harvests, but eventually trapped farmers in a cycle of dependency. Nearly all agriculturists lament that it has corrupted the natural fecundity of the land. Furthermore, the ingestion of agrichemicals in food

adversely has affected the health of those who consume them. These deleterious effects include people's loss of strength and stamina, increased vulnerability to disease, and decreased life span. Moreover, although chemical fertilizer temporarily resolved the migration problem for Kaqchikel, it also caused long term problems in agricultural sustainability. The production of export, domestic, and subsistence crops now requires increased supplements such as fertilizers and insecticides, and therefore, the cost of agricultural inputs has increased. The decreased effectiveness and increased price of chemical fertilizer have caused many to return to the coast for supplemental income that is necessary to pay for their farming inputs. Improved working conditions and wages on the coast are little consolation for farmers who hoped to break their dependency on plantation labor.

The health of their people, community and land is the most salient issue for Kaqchikel. Research supports Kaqchikel concerns that associate the application of chemical fertilizer and pesticides with deteriorating public health. Unfortunately, scientific evidence is scarce. Nonetheless, the aforementioned data underscores the urgent need for a more concerted effort to reveal the causal relationship between agrichemicals and human health status. Research proves Kaqchikel claims of the decreasing fecundity of the land, pesticide resistance, and secondary pests caused by chemical fertilizer and pesticide application. Clearly, their observations about health effects are meritorious also. Kaqchikel recognize that the introduction of agrichemicals has jeopardized their health and relationship with the land. They share this knowledge with younger generations through their oral histories, some have even incorporated it in the school curriculum. They are aware of the dangers and seek solutions. Sadly, few have the resources to use to organic fertilizer.

¹ Waqxaqi' Ajmaq, 7/7/01, Comalapa.

² For detailed analysis of Kaqchikel coastal migration and working and living conditions on plantations see David Carey, Jr., *Our Elders Teach Us: Maya-Kaqchikel Historical Perspectives Xkib'ij kan qate qatata*, (Tuscaloosa: University of Alabama Press, forthcoming).

³ *Memoria de la secretaria de Gobernación y Justicia presentada a la Asamblea Nacional Legislativa en sus sesiones ordinarias*, (Guatemala: Tipografía Nacional, 1915), pp. 3, 214; David McCreery, *Rural Guatemala 1760-1940*, (Stanford: Stanford University Press, 1994), pp. 148, 294, 308.

⁴ M. Vargas Ortíz, "Situación Penosa," *El Impulso*, 28 de febrero 1915, p. 2.

⁵ Marilyn Moors, "Indian Labor and the Guatemalan Crisis: Evidence from History and Anthropology," in Ralph Lee Woodward, ed., *Central America: Historical Perspectives on the Contemporary Crisis* (New York: Greenwood Press, 1988), p. 71.

⁶ Kab'lajuj Ajpu', 5/5/98, Comalapa; Ix'aq'om, 11/5/97, Comalapa; B'eleje' Ey, 11/23/97, Poaquil; Ix'aq'ab'al, 3/17/98, Hacienda María, Poaquil; Waqi' Imox, 5/3/98, Tecpán; Kab'lajuj Aq'ab'al, 11/19/97, Tecpán; Oxi' Kawoq, 10/31/97, Pamumus, Comalapa; Jun Imox, 12/9/97, Xenimaquín, Comalapa; Oxlajuj Ajpu', 1/19/98, Panabajal, Comalapa; Lajuj Kan, 10/16/97, Pachitur, Comalapa; Ixk'aj, 12/17/97, Xiquín Sanahí, Comalapa; Ixchiköp, 12/17/97, Xiquín Sanahí, Comalapa; Wo'o' No'j, 4/22/98, Xenimaquín, Comalapa; Ixkame, 8/17/98, Comalapa; Wuqu' B'atz', 2/10/98, Pawit, Comalapa; Ixmanik, 11/17/97, Poaquil.

⁷ Waqi' Iq', 4/22/98, Comalapa

⁸ B'eleje' K'at, 11/5/97, Comalapa.

⁹ A *cuerda* is 4,810 square yards; a *vara* is a measurement of about 33 inches in length; a *costal* is a large sack used to transport goods.

¹⁰ Lajuj Kan, 12/20/97, Pachitur, Comalapa.

¹¹ Richard Adams, "La población indígena en el estado liberal," in Jorge Luján Muñoz, ed., *Historia General de Guatemala*, (Guatemala: Asociación de Amigos del País, Fundación para la Cultura y Desarrollo, 1996), Vol. V, p. 177; John Watanabe, "Enduring Yet Ineffable Community in the Western Periphery of Guatemala," in Carol Smith, ed., *Guatemalan Indians and the State*, (Austin: University of Texas Press, 1990), p. 188; Ricardo Falla, *Quiché rebelde: estudio de un movimiento de conversión religiosa rebelde a las creencias tradicionales en San Antonio Olotenango, Quiché, 1948-70*, (Guatemala: Editorial Universitaria, 1978), p. 82.

¹² Junlajuj K'at, 7/9/98, Comalapa. The date of chemical fertilizer's arrival in oral histories ranged from as recently as thirty years ago (Jun Iq', 4/18/98, Comalapa; Oxlajuj Ajpu', 1/19/98, Panabajal, Comalapa) to as far back as sixty years ago (Oxi' Kawoq, 10/31/97, Pamumus, Comalapa).

¹³ Ixwatzik', 1/12/98, Xiquín Sanahí, Comalapa.

¹⁴ Wuqu' K'at, 4/5/98, Comalapa; Kab'lajuj Tijax, 4/7/98, Comalapa; Waqi' Kame, 5/17/98, Pamumus, Comalapa; Wo'o' Ey and Kab'lajuj B'atz', 3/28/98, Panimacac, Comalapa; Kaji' No'j, Waqxaqi' B'atz', Lajuj Q'anil, 3/25/98, Ojer K'ayb'al, Poaquil; Ka'i' Kan, 11/24/97, Chuwatz'unuj, Tecpán; B'eleje' Iq', 6/4/98, Tecpán.

¹⁵ Oxi' Kawoq, 10/31/97, Pamumus, Comalapa.

¹⁶ "La doctrina de los abonos químicos" in *Boletín de Agricultura, Revista Mensual*, (April 1903), p. 246.

¹⁷ *Memoria del Ministerio de Agricultura 1922*, pp. 10-1.

¹⁸ Sheldon Annis, *God and Production in a Guatemalan Town*, (Austin: University of Texas Press, 1987), p. 44.

¹⁹ Falla, *Quiché Rebelde*, pp. 82-3; Carol Smith, *Indian Class and Class Consciousness in Prerevolutionary Guatemala*, (Washington, D.C.: Latin American Program, Wilson Center, 1984), p. 32. Also see Ricardo Falla, "Hacia la revolución verde: Adopción y dependencia del fertilizante químico en un Municipio del Quiché, Guatemala," *Estudios Sociales*, vol. 6, pp. 16-51, (Instituto de Ciencias Político-Sociales, Universidad Rafael Landívar, Guatemala).

²⁰ Sonia I. Arbona, "Commerical Agriculture and Agrochemicals in Almolonga, Guatemala," *The Geographical Review*, vol. 88 no. 1, (January 1998), p. 49; AVANSCO (Asociación para el Avance de las Ciencias Sociales en Guatemala), *Agricultura intensiva y cambios en la comunidad de Almolonga, Quetzaltenango*, (Guatemala: Instituto AVANSCO, 1994), p. 5.

²¹ Adams, "La población indígena en el estado liberal," p. 177.

²² Watanabe, "Enduring Yet Ineffable Community," p. 188; Falla, *Quiché Rebelde*, p. 82.

²³ Wuqu' K'at, "Libreta de Apuntes," (personal document, n.d.).

²⁴ Miguel Angel Sotz O., "Monografía de Comalapa, Diagnóstico Comunitario 1994," Proyecto 2439 Chuwi tinamit: San Juan Comalapa. Unpublished typescript, n.d., p. 9.

- ²⁵ Santiago Xet, “Campos de Ensayos y de Demostraciones, Prácticas del Programa de Fertilización de ‘FAO-SFEI’ en San Juan Comalapa, Chimaltenango,” *Comalapan*, vol. I, no. 1, (September 1966) p. 6.
- ²⁶ “Técnica sobre la agricultura: Servicio de Fomento de Economía Indígena cuenta con programas de ensayo sobre fertilización,” *Comalapan*, vol. I, no. 1, (September 1966), p. 7.
- ²⁷ Junlajuj Tz’i’, 10/24/97, Xiquín Sanahí, Comalapa.
- ²⁸ Jun Kame, 5/1/98, Agua Caliente, Comalapa; Jun Tz’i’, 7/11/98, Pamumus, Comalapa; Jun Iq’, 4/18/98, Comalapa; Jun Kan, 8/19/98, Comalapa; Waqi’ K’at, 5/3/98, Comalapa.
- ²⁹ Oxi’ Kame, 3/4/98, Chi Chalí, Comalapa. Oral accounts of these men and women from the U.S. did not associate them with any group affiliation. The implication is that these U.S. citizens came as individuals and acted of their own accord, not on behalf of an organization. Similarly, Kaqchikel also accused 1976 earthquake relief workers of disseminating Marxist ideology which attracted the Guatemalan military and heightened violence in Kaqchikel communities, see Carey, *Our Elders Teach Us*.
- ³⁰ Rigoberta Menchú, *Crossing Borders*, (London: Verso, 1998), p. 219.
- ³¹ Watanabe, “Enduring Yet Ineffable Community,” p. 188; Falla, *Quiché Rebelde*, p. 82.
- ³² Ixb’oq’, 5/31/98, Tecpán; Ixb’utz’, 6/21/98, Comalapa.
- ³³ Instituto Centroamericano de investigación y tecnología industrial (ICAITI), “An Environmental and Economic Study of the Consequences of Pesticide Use in Central American Cotton Production: Final Report,” Central American Research Institute for Industry, United Nations Environmental Programme (Guatemala City: ICAITI, 1977); David Pimentel, H. Acquay, M. Biltonen, P. Rice, M. Silva, J. Nelson, V. Lipner, S. Giordano, A. Horowitz, and M. D’Amore, “Environmental and Economic Costs of Pesticide Use,” *BioScience*, vol. 42, no. 10 (Nov. 1992): 755; David Pimentel, “Green Revolution Agriculture and Chemical Hazards,” *The Science of the Total Environment* vol. 188 Supplement 1 (1996), pp. S86, S91.
- ³⁴ Wuqu’ Imox, 11/12/97, Aguas Calientes; Lajuj Aq’ab’al, 11/14/97, Aguas Calientes; Ka’i’ B’atz’, 11/26/97, Tecpán; Waqi’ K’at, 5/3/98, Comalapa; Wo’o’ Kan, 4/27/98, Comalapa; Oxlajuj Kan, 3/8/98, Comalapa; Oxlajuj Iq’, 4/17/98, Simajulew, Comalapa; Wuqu’ Iq’, 12/17/97, Xiquín Sanahí, Comalapa; Ixchel, 2/12/98, Comalapa; Ixsamaj, 9/6/98, Comalapa; Ixsu’m, 6/1/98, Tecpán.
- ³⁵ AVANSCO [Asociación para el Avance de las Ciencias Sociales en Guatemala], *Impacto ecológico de los cultivos hortícolas no-tradicionales en el altiplano de Guatemala*, (Guatemala: Instituto AVANSCO, 1994), p. 42; Dennis D. Weisenberger, “Human Health Effects of Agrichemical Use,” *Human Pathology* vol. 24, no. 6 (June 1993), pp. 571, 573; Pimentel, et al. “Environmental and Economic Costs,” p. 751, 758.
- ³⁶ Wo’o’ Ajpu’, 11/11/97, Comalapa.
- ³⁷ Ixxeq, 7/1/01, Poaquil.
- ³⁸ Arbona, “Commerical Agriculture,” p. 47, 53, 56, 61, 62; Pimentel, “Green Revolution,” pp. S87, S92; Pimentel, et al. “Environmental and Economic Costs,” pp. 750-51.
- ³⁹ AVANSCO, *Impacto ecológico*, p. 1; Lori Ann Thrupp, Gilles Bergeron, and William Walters, *Bittersweet Harvests for Global Supermarkets: Challenges in Latin America’s Agricultural Export Boom*, (Washington, D.C.: World Resources Institute, 1995), p. 7; Arbona, “Commercial Agriculture,” p. 55.
- ⁴⁰ Martin G. Khublarian, “Chemical Substance Transport in Soils and Its Effect on Groundwater Quality,” *Environmental Health Perspectives* vol. 83 (1989), pp. 31-2; Pimentel, “Green Revolution,” p. S93-4; David Pimentel, “Impacts of Pesticides and Fertilizers on the Environment and Public Health,” in *Toxic Substances in Agricultural Water Supply and Drainage*, ed. Joseph Summers and Susan Anderson (Denver: U.S. Committee on Irrigation and Drainage, 1989), pp. 102-3.
- ⁴¹ A. M. Fan and V. E. Steinberg, “Health Implications of Nitrate and Nitrite in Drinking Water: An Update on Methemoglobinemia Occurrence and Reproductive and Developmental Toxicity,” *Regulatory Toxicology and Pharmacology*, vol. 23, no. 1, pp. 41-2; Arbona, “Commercial Agriculture,” p. 58; Weisenburger, “Human Health Effects,” p. 574.
- ⁴² Wuqu’ Iq’, 12/17/97, Xiquín Sanahí, Comalapa
- ⁴³ Pimentel, “Green Revolution,” p. S87; Prabhu L. Pingali and Cynthia Marquez, “Health Costs of Long Term Pesticide Exposure in the Philippines: A Medical and Economic Analysis,” *International Rice Research Institute Social Science Division Papers*, no. 90-04 (August 1990), pp. 1-2.
- ⁴⁴ Wuqu’ Umül, 6/24/01, Comalapa; Ixxeq, 7/1/01, Poaquil; Jun Masat, 7/1/01, Tecpán; Oxi’ Imox, 7/3/01, Comalapa; Kab’lajuj Kawoq, 7/1/01, Poaquil; Oxi’ Masat, 6/26/01, Comalapa; Ka’i’ Imox, 6/29/01, Panabajal, Comalapa; Ixq’iz’, 7/6/01, Comalapa; Ixq’a’n, 7/3/01, Comalapa.

- ⁴⁵ Ixkotz'i'j, 7/3/01, 7/6/01, Pamamus, Comalapa; Ka'i' Masat, 7/1/01, Poaquil; Jun Masat, 7/1/01, Tecpán; Ixpajb'äl, 7/4/01, Comalapa; Oxi' Imox, 7/3/01, Comalapa; Kab'lajuj Kawoq, 7/1/01, Poaquil; Waqxaqi' Ajmaq, 7/7/01, Comalapa; Oxi' Masat, 6/26/01, Comalapa; B'eleje' Imox, 6/25/01, Comalapa; Ixqo'ch, 6/28/01, Comalapa.
- ⁴⁶ J Jeyaratnam, "Acute Pesticide Poisoning: A Major Global Health Problem," *World Health Statistics Quarterly*, vol. 43 (1990), pp. 139-144; Pimentel, "Green Revolution," p. S96; Agencia Española de Cooperación Internacional, *Medio ambiente y salud*, (Madrid: Ministerio de Salud Pública y Asistencia Social, 1995), p. 3; Robert Repetto and Sanjay Baliga, *Pesticides and the Immune System: The Public Health Risks*, (Washington, D.C.: World Resources Institute, 1996), p. 55. Weisenburger, "Human Health Effects," p. 575.
- ⁴⁷ Ixche', 11/22/97, Poaquil; Lajuj Kame, 2/14/98, Comalapa; Junlajuj Kej, 3/22/98, Poaquil; Wuqu' Ey, 3/26/98, Hacienda Vieja, Poaquil; Ixtz'ib', 3/27/98, Paley, Poaquil; Waqxaqi' Kej, 2/7/98, Barahona; Ixmukane', 11/30/97, Tecpán; Ka'i' Tz'i', 5/26/98, Tecpán; Junlajuj Kame, 4/12/98, Pachitur, Comalapa; Jun Q'anil, 2/9/98, Patzaj, Comalapa; Jun Imox, 12/9/97, Xenimaquín, Comalapa; Oxi' Kej, 6/14/98, Comalapa.
- ⁴⁸ Wuqu' Kawoq , 4/7/98, Comalapa.
- ⁴⁹ Today one quetzal is worth about US \$0.13.
- ⁵⁰ Junlajuj Imox and Wo'o' Imox, 5/23/98, Comalapa; Jun Iq', 4/18/98, Comalapa; B'eleje' Kan, 11/9/97, Aguas Calientes; Oxi' Tz'i', 5/29/98, Tecpán; Waqi' No'j, 3/16/98, Poaquil; Jun Kame, 5/1/98, Agua Caliente, Comalapa; Kaji' Aj, 3/8/98, Simajulew, Comalapa.
- ⁵¹ Kaji' Kej, 11/12/97, Aguas Calientes.
- ⁵² Wuqu' Iq', 12/17/97, Xiquín Sanahí, Comalapa.
- ⁵³ Wuqu' Kej, 5/31/98, Tecpán; Kab'lajuj Iq', 5/31/98, Tecpán; Oxi' Tojil, 3/21/98, Nueva Esperanza, Poaquil; Waqi' K'at, 9/6/98, Comalapa; Wuqu' K'at, 4/5/98, Comalapa; Ixnum, 4/29/98, Comalapa.
- ⁵⁴ Pimentel, "Green Revolution," S95.
- ⁵⁵ Waqi' Kame, 5/17/98, Pamumus, Comalapa.
- ⁵⁶ Jun Ey, 11/12/97, Aguas Calientes; Oxlajuj Imox, 1/13/98, Paraxaquen, Comalapa; Kab'lajuj Ajpu', 11/14/97, Comalapa; B'eleje' Iq', 6/4/98, Tecpán.
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- ⁵⁹ Ja C'Amabal I'b, "La primera gran confrontación: El movimiento campesino indígena del altiplano guatemalteco," paper presented to the United Nations Subcommission on Ethnic Minorities, Geneva, August, 1984.
- ⁶⁰ Arturo Arias, "Changing Indian Identity: Guatemala's Violent Transition to Modernity," in Carol Smith, ed., *Guatemalan Indians and the State*, (Austin: University of Texas Press, 1990), pp. 235, 238, 240.
- ⁶¹ Clayton Maxwell, "Selective Hybridity and Development in San José Poaquil, Guatemala," (Master's Thesis, University of Texas at Austin, 1998), p. 49.
- ⁶² Ka'i' Kame , 4/29/98, Saqirtacaj, Poaquil.
- ⁶³ "Diagnóstico de salud, distrito San José Poaquil Chimaltenango," (unpublished typescript, 1980), p. 16.
- ⁶⁴ Luisa Frank and Philip Wheaton, *Indian Guatemala: The Path to Liberation*, (Washington: EPICA Task Force, 1984), p. 39; Jim Handy, *Gift of the Devil: A History of Guatemala*, (Boston: South End Press, 1984), pp. 221-4; Moors, "Indian Labor and the Guatemalan Crisis," pp. 75-6; Adams, "La población indígena en el estado liberal," p. 176.
- ⁶⁵ Arias, "Changing Indian Identity," p. 235.
- ⁶⁶ Ibid., pp. 238, 240.
- ⁶⁷ Ka'i' Kame , 4/29/98, Saqirtacaj, Poaquil.
- ⁶⁸ Junlajuj Kawoq, 11/17/97, Poaquil; Ixche', 11/22/97, Poaquil; Ix'ajmaq, 11/29/97, Poaquil; Jun Tojil, 12/1/97, Barahona; Oxi' Kame, 3/4/98, Chi Chalí, Comalapa. The school year in Guatemala begins in January, offers a fifteen day interim in July and concludes at the end of October.
- ⁶⁹ "Diagnóstico de salud, distrito San José Poaquil," p. 25.
- ⁷⁰ Oxi' Imox, 7/3/01, Comalapa; Ixq'anil and Jun Ajpu', 7/1/01, 7/3/01, Comalapa; Ixq'iz', 7/6/01, Comalapa; Ixpajb'äl, 7/4/01, Comalapa; Kaji' Kan, 6/22/01, Comalapa.
- ⁷¹ Waqxaqi' Q'anil, 3/21/98, Nueva Esperanza, Poaquil; Ixtz'ib', 3/27/98, Paley, Poaquil; Ixmanik, 11/17/97, Poaquil; Waqi' No'j, 3/16/98, Poaquil; Junlajuj Ajpu', 8/2/98, Comalapa; Wuqu' Tijax, 3/2/98, Palima, Comalapa; Waqxaqi' Iq', 6/23/98, Comalapa.
- ⁷² Smith, *Indian Class and Class Consciousness*, p. 2; Carol Smith, "Labor and International Capital in the Making of a Peripheral Social Formation: Economic Transformations of Guatemala, 1850-1980," (Washington,

D.C.: Latin American Program, Working Papers, The Wilson Center, 1984), p. 12; Carol Smith, "Beyond Dependency Theory: National and Regional Patterns of Underdevelopment in Guatemala," *American Ethnologist*, (August 1978) vol. 5, no. 3, pp. 605-6.

⁷³ Junlajuj Kawoq, 11/17/97, Poaquil; Ixche', 11/22/97, Poaquil; Ix'ajmaq, 11/29/97, Poaquil; Jun Tojil, 12/1/97, Barahona; Oxi' Kame, 3/4/98, Chi Chalí, Comalapa.

⁷⁴ Jun Ey, 11/12/97, Aguas Calientes.

⁷⁵ Oxi' Imox, 7/3/01, Comalapa.

⁷⁶ Waqxaqi' Kej, 2/7/98, Barahona; Waqi' No'j, 3/16/98, Poaquil; Waqxaqi' Q'anil, 3/21/98, Nueva Esperanza, Poaquil; Wuqu' Kej, 5/31/98, Tecpán; Kaji' Aq'ab'al, 6/8/98, Tecpán; Kab'lajuj K'at, 6/27/98, Comalapa; Kaji' Tojil, 3/2/98, Palima, Comalapa; Jun Imox, Ka'i' Ajpu' and Oxi' Ajpu', 12/2/98, Panicuy, Comalapa; Wuqu' Kawoq, 1/29/98, Comalapa; Ixk'echelaj, 1/19/98, Comalapa.

⁷⁷ Ix'ajmaq, 7/1/01, Poaquil.

⁷⁸ Ixsya', 7/2/01, Patzicía.