Worker Displacement in the Brazilian Sugar Industry

Lacey Jane Wolfe

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Abstract

Lacey Jane Wolfe: Worker Displacement in the Brazilian Sugar Industry

Workers around the globe are struggling with displacement. In order to effectively mitigate the effects of displacement for these individuals, policymakers need to know how they should allocate resources. This project focuses specifically on workers who have been laid off from the Brazilian sugarcane industry due to increased mechanization. The analysis was performed in two steps. First, Brazilian census data was analyzed to determine which groups of workers are most vulnerable to displacement. Second, case studies were utilized to formulate plans of action to reach out to these most vulnerable groups. The results, while most useful for retraining displaced sugar workers, also contribute to the body of knowledge concerning worker displacement.
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Introduction

From the gold mines in South Africa to computer factories in China to textile mills in the United States, workers around the globe are struggling with layoffs, wage pressures and displacement. Many factors are involved in explaining the squeeze that manufacturing workers face today: for example, the current economic crisis, globalization, disinvestment, downsizing, off-shoring, large scale migration, the decline of traditional manufacturing, and the rise of new higher tech industries with a changing skill mix.

A critical factor that is often overlooked within the broad range of forces driving labor displacement is technical change. In a variety of industries, technological advances, among other forces, are reducing labor requirements for manufacturers (Levy 2004). Furthermore, these industries now require different skills – skills that displaced employees do not possess. This problem is especially acute for low-skill workers in traditionally labor intensive industries. The poorest and least skilled workers often have very little power in their society; they may lack education, or even official documents, or legal status; they may have lived in destitute poverty for their entire lives. As a result, the perception is that they have little to offer potential employers. Even retraining programs often fail to address the true needs of these populations. More than just an economic question, worker displacement is tied to the lives people have lived, where they have worked, and where they make their homes. My paper will explore this broad issue of automation-driven displacement of low skill workers through a specific case of sugarcane production in Brazil. The overarching research question is how the sugarcane labor force is being impacted by technical innovations and rapid mechanization in this industry. Which workers are bearing the brunt of these layoffs, and what solutions should be implemented in order to aid those displaced workers?
The Brazilian sugarcane market is changing. For centuries, sugarcane has been harvested by hand. Hundreds of thousands of workers have built their lives around this profession. Technological innovations in recent decades have prompted a period of transition toward mechanized harvesting. These innovations have increased the productivity of Brazilian sugarcane farms while simultaneously causing a vast reduction in the employment of cane laborers. In February of 2009, the União da Indústria de Cana-de-Açúcar (UNICA), or the Brazilian Sugarcane Association, announced a goal for its member firms. The Brazilian sugarcane industry is to be completely mechanized by the year 2012. As a result, the typically lengthy and gradual process of production, harvesting and distribution, is to be accelerated by a concerted effort on the part of this powerful association. While growers clearly stand to gain from these productivity increases, the consequences of large scale mechanization on this previously labor intensive industry’s workforce are far from clear. For economic development planners interested in promoting the welfare of both industry and labor, it is important to understand the implications of this process on specific groups within the population.

UNICA’s goal will have real, immediate consequences for the lives of 520,000 people employed in sugar cane harvesting. As is well known, automation within any industry – be it automobile manufacturing in Michigan or farming in Pakistan or sugarcane production in Brazil – can cause layoffs that disrupt lives and force displaced workers to make difficult choices. The situation in Brazil is even more dire because cane cutters tend to lack education, savings, and often the documents required to be legally employed. Laid-off cane cutters have little power and few options. My project will endeavor to describe the changes taking place in the sugarcane workforce, as well as suggest opportunities for retraining or other policies to alleviate the effects of mechanization.

Traditional analyses of the Brazilian sugarcane market have ignored the impact of mechanization on labor, dismissing it as a natural consequence of technical change, or only relevant in the short term (Bolling and Suarez: 2001). Neo-classical economists argue that technological innovation
should result in net benefits for the firm and for employees, in that increased productivity will allow firms to pay better wages to the laborers who retain their jobs. Expanded production capabilities may even allow companies to re-hire some laid-off workers down the line. The bigger priority, from this perspective, is to promote innovation and the ensuing increases in productivity. The laid-off workers may temporarily suffer ill effects from displacement, but the assumption is that they should be absorbed into the labor market elsewhere in the long run (Bolling and Suarez, 2001).

An opposing viewpoint is that re-absorption of displaced, low skill workers is never automatic. Several mitigating factors are likely to prevent displaced laborers from finding suitable employment in a timely fashion. The skills of laid off workers may not be easily transferrable to other professions (Wolford 2004). This is especially true in sugar cane where skills are either low, or highly sector specific. For example Industrial skills such as machine maintenance and repair are in higher demand in today’s labor market because they can be tied into several end-markets. An individual who knows how to repair a tractor may find another job repairing trucks.; her basic understanding of how engines work will mean that she needs little retraining in order to perform her new job. Cutting cane, on the other hand, is a highly specialized skill and not transferrable to industrial work.

Another reason that neoclassical optimism about technology-driven displacement is misplaced pertains to the issue of time. As Keynes famously put it, “in the long run, we’re all dead.” Displaced workers with very little savings to sustain them during unemployment do not have the luxury to wait till a job that matches their skills – or any job -- shows up. When laborers run the risk of starvation while waiting to find a new job, it is time for policy-makers to intervene in the “natural” workings of the market. My analysis is couched in this approach.

The challenge, then, is to determine what kind of intervention would be appropriate for cases of labor displacement such as this. My project addresses this question in two parts. The first involves a
statistical analysis of Brazilian census data to determine who exactly is being displaced. The second involves an ethnographic review of strategies to mitigate the effects of worker displacement.

The statistical analysis will examine industry employment during the period of 1992 to 2005. This period was chosen because it encompasses a crash and rebound of the sugarcane market, thereby spanning an important transition for the industry. According to Wendy Wolford, an expert in the Brazilian sugarcane industry, this period represents a nearly complete “s-curve,” with comparable points at the beginning and the end (Personal communication, 2009). Brazil’s sugarcane industry has been interrelated with the sugar alcohol market since the 1970’s when, under a military dictatorship, Brazil looked to sugarcane for a source of vehicle fuel. A number of policies requiring Brazilian vehicles to use alcohol have acted as a hidden subsidy for the market, ensuring high demand for sugar. As the country transitioned out of a dictatorship, these policies were gradually reduced. The industry did suffer a blow when ethanol prices were liberated in the beginning of February, 1999. Ethanol prices are, after all, closely tied to sugar prices in Brazil, and both suffered a dip for about a year and then eventually recovered (Bolling and Suarez 2001).

In addition to spanning an important directional shift in the industry away from alcohol dependence, this period also reflects an agricultural cycle of bad weather. Production was down in beginning in the year 2000 and did not recover until the year 2002 (UNICA: 2007). The time period for this study extends well before and also after this temporary crisis, which followed close on the heels of the price depression when alcohol prices were liberated. The time period of 1992 to 2005 demonstrates the path that the sugarcane industry was on before these two obstacles were presented, and it reflects the sector’s return to that path afterward. Therefore, this time period allows for an analysis of the consequences for sugar labor of mechanization and not other policies and variables.

The process of mechanization has been occurring gradually throughout the country for a number of reasons. Indeed, mechanization is not the only innovation taking place. Rather, physiological
and biological improvements are constantly being researched, invented, and implemented. New strains of sugarcane, for example, are easier to grow and harvest than ones that have been used for hundreds of years in South America. In this way, innovations on other fronts are contributing to the effectiveness of mechanization. The harvest of sugarcane, therefore, has not been mechanized in fits and starts. Rather, the process has been a gradual one, mitigated and evened out by other contributing innovations.

While other researchers have also analyzed sugar industry statistics from this period (see literature review below), those projects looked at individual trends in employment, wages, and employee characteristics such as wage and legal status. My analysis will be more specific. After a brief review of the literature, Chapter Two will examine displacement and changes in employment between 1992 and 2005. Specifically, I will first break down the labor force by age, in order to demonstrate that some portions of the sugarcane labor force are bearing a greater brunt of displacement. Then I will address levels of education, demonstrating that less skilled workers are more vulnerable to being laid off than are workers with more education.

In Chapter Three, I will use ethnographic case studies to examine the reasons why some groups of Brazilian sugarcane workers are being hurt by mechanization more than other groups. As UNICA has offered funding to retrain workers to be employed in other industries, I will focus on retraining programs and explore the barriers to retraining that are experienced by these most vulnerable workers.

In Chapter Four, I will conclude by providing guidelines for policymakers who wish to successfully allocate resources to aid displaced workers. These guidelines will be targeted for the groups identified in Chapter Two as being the most vulnerable segments of the Brazilian sugarcane labor force. My recommendations will be tailored for this particular industry. These recommendations will contribute to the larger body of research on worker displacement, with the potential for more immediate and specific applicability in this particular case.
Chapter One

Before beginning my analysis of the labor consequences of Brazilian sugarcane mechanization, I will now present a brief review of the literature surrounding this topic. My review begins with a general overview of Brazilian sugarcane production and its importance to the Brazilian economy. Next, I address the Brazilian ethanol program, which is closely tied to the sugar industry and which is particularly relevant during this study period. Having given background information about the sugarcane industry and the ethanol policies that drive the industry, I will then incorporate the labor aspect of Brazilian sugar. In the final section of the literature review, I discuss existing literature on the impact of layoffs for low-skill or low-wage labor. With these four sections I will set the stage for my analysis of worker displacement within the Brazilian sugarcane sector.

Brazilian Sugar Cane Production

The literature affirms that the Brazilian sugarcane industry is thriving, as Brazil exports more sugar than any other country in the world and is the largest producer of sugar cane globally, around 3 million metric tons per year (Schmitz, Schmitz, and Seale, 2003). Layoffs in this sector, therefore, cannot be attributed to inefficiencies within sugar production. In fact, past research suggests that Brazil produces sugar at a lower cost than any other nation (Mitchell 2003). As a result, easing the pains of displacement for sugar workers does not necessitate aiding the firms, as one might with a dying industry. Policymakers should instead seek to directly aid those who are displaced.

Within Brazil, sugarcane production is concentrated within two main regions, the Center-South and the Northeast. The Center-South region, with its rich soil and good climate, has eagerly adopted mechanized harvesting processes because its even terrain allows vehicles to pass through the fields without difficulty. The Northeast, on the other hand, the soil is less rich and is more rocky (Schmitz,
Seale, and Buzzanell, 2002). Wolford warns that the two regions are taking very different paths towards mechanization. Even though UNICA aims to have the entire industry mechanized in the near future, Wolford doubts that the Northeast will ever completely adopt this technique. My research, therefore, is probably more applicable for workers in the Center-South region than for those in the Northeast. My data will address Brazil’s sugarcane workforce as a whole so this caveat should be kept in mind.

**Brazilian Ethanol Program**

The Brazilian sugarcane industry is clearly thriving. A key reason behind this buoyant growth and the driving force behind innovations like mechanization is a specific government initiative: the ethanol program. Thanks to this program, more than half of the country’s sugarcane is converted into fuel for automobiles (Schmitz, Schmitz and Seale, 2003). The literature suggests that recent changes in this ethanol program may have indirectly contributed to the layoffs of hundreds of thousands of people.

Schmitz, Schmitz, and Seale point out that the ethanol program has been acting as a hidden subsidy for the Brazilian sugarcane market since the policy was enacted in 1975. Rather than depend on the Middle East for fuel, the government dictated that alcohol should be converted from sugar grown in Brazil to be used as fuel. A number of policies were enacted. For example, a yearly presidential decree mandated a specific alcohol-to-gasoline blend to be used in Brazilian gasoline, usually around twenty percent alcohol. The government also subsidized the sale of vehicles that ran on mixed fuel (Schmitz, Schmitz, and Seale 2003).

In 1999 the policies changed dramatically when ethanol prices were liberated and subsidies to hydrous-alcohol producers were reduced by half. The subsidies paid to anhydrous-alcohol producers were extinguished. Bolling and Suarez explain that these changes resulted in a year-long drop in the price of sugar (2003). The artificial demand for sugar had been removed, and the sugarcane industry suffered. The Brazilian ethanol program is thus key in framing the study period for this project. When
ethanol prices were liberalized in 1999, the demand for sugar dropped and this had an effect on sugar production. My study period begins in 1992 and extends until 2005 so that worker displacement here reflects the greater trend towards mechanization rather than the short-term effects of ethanol policy changes.

*Labor Conditions of Sugar Production in Brazil*

Changes in the ethanol program have impacted the lives of sugarcane workers and now I want to focus on that work. Unfortunately, the sugar plantations of Brazil are responsible for a shocking number of human rights abuses. The cultivation system was built on the backs of slaves in the late 1500s, when “the old world, gorged with gold, began to hunger after sugar; and sugar took a lot of slaves” (Levi-Strauss 1961:95). The prohibition of slavery in 1831 did little to change the lives of those who lived on the plantations; for lack of money and food, “the ex-slaves continued to live in the converted *senzalas* [slave huts]... impoverished, illiterate, and dependent on the whims of their *senhor de engenho* [plantation owners and bosses]” (Schepers-Hughes 1992). When modern sugar factories were established at the close of the nineteenth century small farm owners were forced off of the land. The sugar worker was forced instead to live in settlements owned by the *senhores de engenho* and to pay exorbitant rates for rent.

This tradition is alive and well today, to the extent that the sugar farm workers in Brazil are referred to as “ethanol slaves” (Phillips 2007). The working conditions are among the chief complaints of watchdog groups. In order to cut cane, the workers are supposed to use heavy protective clothing to ward off the sharp machete blades. The temperature can easily reach 86 degrees Fahrenheit. Unsurprisingly, death from hyperthermia or exhaustion is all too common. One *cortador* (worker who cuts cane) described the gear, explaining that “it’s like you are in a bread oven” (Phillips 2007). And for this work, the laborers earn as little as 400 *reais* (about $235 U.S.) a month.
The living conditions of the cortadores are also a concern. The shacks, or “guest houses,” are made of red brick. After a twelve-hour workday this temporary housing is of little comfort. Overcrowding adds health risks to the burden of the cortadores.

The greatest problem, though, lies in the isolation of the plantations. Workers have little hope of finding a better job. In addition to the inflated costs of renting housing from the owners of the farms, cortadores also need to purchase food, tools, and even transportation out to the plantation. They often fall into debt. According to the Roman Catholic Church, “there are some 25,000 workers living in slave-like conditions throughout Brazil” (BBC 2007). Other organizations say that the ethanol slaves actually number closer to 200,000 (Phillips 2007). Exact data is difficult to come by because of the isolation of the farms and also because of the industry leaders’ interest in promoting a positive, paternalistic or benevolent image of the cane plantations.

Unfortunately, the appalling conditions faced by the sugar laborers do not constitute an isolated event in time and space. Some experts argue that the all-too-recent military regime has ingrained a tradition of violence into certain industries. Nancy Scheper-Hughes, an anthropologist who specializes in Brazilian sugar cane plantations, insists that “at certain levels of political-economic development – and the sugar plantation is one of these – violence... is the only technique available to a military government such as the one that... still plays an important role in the state today” (1992:223). According to Brazilian President Luiz Inacio Lula da Silva, working conditions on sugar farms will not be ignored. He points to the special law enforcement body, the Mobile Verification Task Force, which has freed tens of thousands of debt-slaves from sugar plantations throughout the country.

This literature suggests that sugarcane laborers may be better off working in another industry that has better working conditions. To explore this claim further, I address worker displacement in similar industries, and the reasons why displaced workers resist retraining.
Worker Displacement and Barriers to Retraining

While there is no existing research that specifically addresses retraining displaced sugarcane workers, there is a rich body of work on displacement in similar low-wage, low-skill industries. These articles assert that workers resist changes in lifestyle and also resist changes in location.

One barrier to reemployment training is workers’ resistance to leave their profession. In many cases, individuals will derive a sense of identity from their work. For example, displaced woods workers in Idaho expressed this sentiment when asked why they chose to remain in the industry even when this choice brought about negative consequences (Carroll et al. 2000). After a large company laid off loggers, the majority of these individuals chose to hire on with smaller contract logging firms. Workers suffered from wage cuts at their new jobs, and “their days were longer and fringe benefits substantially reduced” (2000:101). Even the working conditions were worse with the logging contractors, but they chose to stay in their original industry. The literature suggests, therefore, that changes in lifestyle will be difficult for displaced sugar workers as well.

Why would displaced loggers choose to remain in the wood industry instead of exploring opportunities in other fields? The answer lies in lifestyle choices and the workers’ sense of familiarity with the field. Citing their independence and their enjoyment of their work, interviewees expressed a deep affinity for woodworking. Sometimes respondents described their attachment to the field even as they criticized it. One man told the researchers, “I’m satisfied with logging. I was making a lot of money in logging. I wouldn’t be in it for the fun of it, no way!” (2000:101). The security and stability offered by the profession attracted workers back to the field even if they tried to leave it in search of work elsewhere.

Wolford concurs. Her interviews with sugarcane workers reveal a deep attachment to the profession (2005, 2006). Leaving the profession is akin to abandoning the only way of life that worker
has ever known. Wolford’s work also emphasizes the laborers’ attachment to their land as an essential part of this attachment. The land is a part of this way of life (Wolford 2005).

Other literature reflects the connection between work, lifestyle and place. The Idaho woods workers, for example, were partial to small-town living. Some chose to remain in the woodwork industry because there were very limited jobs available in rural Idaho. Some respondents were willing to relocate to another small town but not to an urban area, explaining, “In the city I’d be lost” (Carroll et al. 2000:103). Surely sugarcane workers will feel completely at a loss in a new environment. This means that it is even more important to give workers the skills they need to survive after being laid off.

In summary, changing one’s lifestyle and location are two barriers for the reemployment of displaced workers. In the case of laid off Brazilian sugarcane workers, however, not all workers are equally vulnerable to being laid off. In the following chapter I will turn to Brazilian census data to identify which groups are disproportionately facing layoffs.

**Chapter Two: Statistical Analysis**

The data used for this part of my analysis was compiled from Brazilian census data and first published by Moraes in her article “Indicadores do Mercado de Trabalho do Sistema Agroindustrial da Cana-de-Açúcar do Brasil no Período 1992-2005” (2007). Our analyses greatly differ in that she sought to paint a general picture of this particular labor force using broad strokes with these statistics. My study, on the other hand, utilizes some of this data specifically to frame the problem of mechanization and to inform a discussion of mechanization and the labor force. Moraes’ data has been utilized by other researchers seeking to explore different aspects of the labor force, such as an analysis of global sugar prices and worker compensation performed by a World Bank Development Research Group (Krivonos and Olarreaga: 2006).
The data from Moraes discussed here comes from two different data sets. The first set is the Pesquisa Nacional por Amostra de Domicílios (PNAD). This survey is conducted each year by the Instituto Brasileiro de Geografia e Estatística (IBGE) or the Brazilian Institute of Geography and Statistics. The IBGE collects this household information by going door-to-door and interviewing Brazilians. The second source of data is from the Relação Annual de Infomações Sociais (RAIS), which is conducted by the Ministerio do Trabalho e Emprego, or the Ministry of Work and Business. Rather than go door-to-door, the Ministerio do Trabalho e Emprego interviews employers about their employment practices. Due to the two different sources of data, the numbers cannot be compared. Workers and employers have differing points of view and they have their own interests to protect when reporting information to the government.

In the following two sections, I will analyze the labor consequences of mechanization by identifying the groups most vulnerable to displacement. The first section will address the age of workers within the labor force and distinguish which age groups are retaining employment and which groups are shrinking in their employment. The second section will address level of education in a similar fashion, determining which workers are being laid off more than others. Both sections will utilize graphs and charts to illuminate the analysis.

*How age influences patterns of displacement*

Sugarcane workers between the ages of 10-20 years experienced the single greatest decrease in employment between 1992 and 2005. At the beginning of the study period, this group comprised about thirty percent of the total Brazilian sugarcane labor force. That portion decreased to less than twenty percent of the total labor force by the end of the study period.
Although the rest of the age groups are presented in ten-year increments (see Figure 1), this group needs to be broken down into two subgroups. The first sub-group is made up of workers from 10-15 years old, which was reduced by 93% during the study period, from 4,108. The reason that employment for this age group has diminished so much is because of Brazilian efforts to end child labor in their country. Many steps were taken in the 1990s toward this goal. For example, in 1996, President Fernando Henrique Cardoso established the *bolsa* program in which the government pays families with school-age children a small stipend for each child. This stipend is only given if the child’s attendance in school is officially verified, thereby encouraging parents to send their children to school. The Cardoso government also increased labor inspections to identify child labor violations and to remedy them. The current Brazilian president, Luis Inacio "Lula" da Silva, has retained this program. The second subgroup consists of the 15-20-year-old workers. This group decreased by half, from 130,501 to 63,472. These are not illegal child laborers, but rather legal adolescent workers who do not fall under the *bolsa* program, but have been affected by other Brazilian programs that seek to keep young adults in school (Moraes 200&). As a result, the findings about 10-20-year-olds will not be treated as evidence of displacement.
Another age group stands out in this analysis. Older workers, those above sixty years of age, saw a huge reduction in numbers between 1992 and 2005. This segment decreased by more than half, from 25,671 people to 12,395.

While employment changes in the youngest group can be explained by efforts to end child labor, there have been no such interventions on the part of older workers. This group appears to be the most vulnerable to displacement. It is, however, the smallest group of workers in the sugarcane industry (see figure 2).
The two sections of middle-aged workers, the 30-40 and the 40-50 age groups, appear to be the most resistant to displacement from mechanization. The 30-40-year-olds saw a tiny decrease of about a thousand workers, while the employment of 40-50-year-olds actually increased slightly, from 82,659 to 84,917, or by about 3%. One advantage that middle-aged workers may have over younger workers is experience, which may be proving valuable enough to keep these workers on.

Finally, the 20-30 group and the 50-60 group both saw decreases in their employment by about ten thousand workers or 5% and 17% respectively during the study period. While these two groups contributed equally to the overall displacement trends, the proportion of older workers lost was higher than the younger workers. Younger workers may be less valuable to firms because they lack experience,
or these workers may be leaving voluntarily to seek out other employment. The older workers, however, are not likely seeking out new employment.

Figures 3 and 4:

Data Source: PNAD as compiled by Moraes 2007

From this analysis I suggest that the middle-aged workers are least vulnerable to mechanization because they represent an ideal balance of experience and physical stamina. The younger workers are likely physically fit, having not yet accumulated the injuries that eventually befall cane cutters, but they may lack the experience of the middle-aged workers. It is also possible that these younger workers are choosing to find work elsewhere. The older workers, aged 50-60 and those over 60 years of age, are less likely to have voluntarily left industry. I suggest that these older workers are unable to keep up with the increased harvesting pace brought about by mechanization. Of course, these are merely hypotheses; they must be verified through interviews with the sugarcane workers. The scope of this project only
seeks to identify which portions of the labor force are bearing the brunt of the layoffs, and here we see that older workers are particularly vulnerable to displacement.

*Worker education and its influence on displacement patterns*

Having identified older workers as disproportionately bearing the brunt of layoffs, we will now turn to another variable: education. Education also correlates with employment. In 1993, there was not a single member of the sugarcane labor force who had completed their fourteenth year of school (see Figures 5, 6, and 7). By 2005, however, the sugarcane industry employed nearly six thousand of those workers. The industry needs workers who can operate and repair the machinery being used in the fields today, where a single mechanical harvester can perform the work of one hundred laborers (Gordon 2009). Production is shifting away from labor-intensity and towards capital-intensity. Although labor is still needed, the skill requirements are different, leaving many people behind.
Figure 5:

Distribution of Employees by Years of Schooling - Various Years

Data Source: PNAD as compiled by Moraes 2007

Figures 6 and 7:

1992 Workforce by Years of Schooling

2005 Workforce by Years of Schooling

Data Source: PNAD as compiled by Moraes 2007
Unsurprisingly, the vast increase in educated workers has been coupled with a decrease in uneducated ones (see Figure 8). As industry employment decreases overall, workers with no education are hit hardest. Their numbers decreased by half in the study period, from about thirty thousand in 1992 to about fifteen thousand in 2005. The proportion of workers in this group also changed dramatically, from nearly half of the labor force to less than a third.

Figure 8: Employee Education Level Distribution at Beginning and End of Study Period

![Education Level of Employees in Brazilian Sugarcane Labor Force](image)

Data Source: PNAD as compiled by Moraes 2007

Workers with three years of schooling or less generally lack an important skill, which is literacy.

In the past, cane cutters did not have to compete with machines. These days, the laborers are often
accused of underperforming, and those who are illiterate have a difficult time documenting how much cane they bring in each day (Gordon 2009).

Those who had completed year 4 of schooling and those who had completed years 5-7 saw slight proportional increases as well as absolute ones. The real turning point in terms of education levels is the completion of the eighth year of schooling. This group doubled its employment during the course of the study period, from about fifteen thousand to about thirty thousand. The *Ensino Fundamental*, or Fundamental Education, is the level being reached by these workers. Coursework goes beyond basic literacy to include analytical mathematics, sciences, and other skills (Schepers-Hughes 1992).

My findings suggest that there are two critical points for education as it relates to layoffs among Brazilian sugarcane workers. Those who are most vulnerable to displacement have finished three or less years of schooling. These individuals are likely to be illiterate or have very poor reading and writing skills. The second turning point, where sugarcane employment actually begins to grow, is after the eighth year of schooling. Most research should be done to determine why exactly this is the case; a statistical analysis cannot determine causality. The skill sets required to reach this level of education, however, suggest that analytical math and problem-solving may be useful as well as advanced reading and writing skills.

In this chapter, I have demonstrated that the labor force in the Brazilian sugarcane industry is decreasing in size as mechanization and production are increasing. Certain groups are suffering more than others. In particular, older workers and less educated workers are being laid off at alarming rates, leaving hundreds of thousands of people stranded with no employment prospects and no transferrable skills. It is now time to turn to other sources of information in order to discuss possible solutions to this problem.
Chapter Three: Ethnographic Review

The previous chapter established a general outline of the consequences of the mechanization of the Brazilian sugar industry. In general, the workforce is shrinking, but some segments of the labor force are bearing the brunt of this displacement far worse than others. Specifically, these are older workers and workers with less education. In this chapter, I wish to focus on these two groups in more detail to identify the reasons that these workers are being displaced at a higher rate than other groups and to offer solutions that are tailored to their needs.

The Brazilian Sugarcane Growers Association has offered to fund retraining for displaced workers. How should these valuable resources be allocated in order to help those that need it most? Older and less educated displaced workers – those who are more likely to be displaced – offer particular challenges for retraining, as they are often less willing or able to develop new skills. In the following sections, I will address the challenges and barriers for these two groups of workers, discussing older workers first and then less educated workers.

These sections are based upon case studies in comparable industries. The case studies will be used because they offer concrete evidence of the challenges and solutions for people in the real world. Unfortunately, there exist few case studies on retraining efforts for displaced Brazilian sugar workers. Instead, I have selected studies from other related low-skill sectors in Brazil and beyond because they offer an analysis of similar situations. Displacement is a problem for labor all over the world, especially for industries where skills are not easily transferrable to another sector. Logging and garment production are two examples in which this happens; they are also similar to sugarcane production in that the work is physically demanding. In the following sections I will draw upon case studies to provide insights on retraining workers.
First for older workers and then for less educated workers, each section will address the reasons that these groups are disproportionately impacted by displacement, drawing on examples from case studies. I will also address the challenges that each group faces when retraining. At the end of each section I will relate the findings back to the Brazilian sugarcane industry and discuss their implications.

**Reaching Out to Older Displaced Workers: Overcoming Negative Self-Perceptions**

The case studies indicate that there are a few reasons why older workers are more likely to be displaced. In addition to generally having lower levels of education and reduced capacity for hard physical labor, older workers are more likely to experience discrimination in the workplace (McMullin and Marshall 2001, Carroll et al. 2000, Daniels et al. 2000). There are a number of reasons why employers should not lay off workers in this group. For example, older workers have much more experience than younger ones, and it stands to reason that employers might want to retain that valuable experience. Unfortunately, many people have the false impression that aged employees are less capable even though “cognitive decline is minimal during the normal working ages and rarely so great as to fall below levels required for performance (McMullin and Marshall 2001). In a study of garment workers, employers were found to use threats, intimidation, and outright discriminatory practices against aged workers (McMullin and Marshall 2001).

In addition to an increased likelihood of being displaced, older workers feel the pains of displacement more acutely, according to case studies about similar industries. This age group is more likely than other age groups to drop out of the labor force entirely when displaced (Morse 2005, McMullin and Marshall 2001). They also spend longer periods of time searching for new jobs after being laid off (Morse 2005). The duration of unemployment for older men is longer than their younger
counterparts’ by one third, and older women experience an unemployment period half again as long as younger displaced female workers. Wages at a workers new job decrease with the age of the worker (Morse 2005). Because they are both more likely suffer displacement and they also have a harder time recovering from displacement, older workers merit special attention when it comes to retraining.

Unfortunately, older workers are more likely to dismiss the option of retraining as they see themselves as incapable of learning new skills or a new trade. They have internalized the discrimination of their employers and this self-perception still limits their opportunities after they have been laid off. This seems to be a constant across industries. For example, displaced loggers in the higher age groups were dead set against new areas of employment: “the workers in the 50-59 year age group chose logging above all other strategies. None of the individuals in this group chose retraining” (Carroll et al. 2000:107).

It is important to note that these workers may indeed be unable to adapt their skills to another industry for a number of reasons. Sugarcane harvesting, like woodworking and similar professions, is physically demanding. Evidence from case studies suggests that a subset of displaced workers from these professions often retire from the labor force permanently due to medical problems incurred on the job. At the same time, some studies show that many loggers, whose work is as physically demanding as that of sugarcane harvesters, returned to work in their profession despite injuries or illnesses. For example, one worker had been in an accident where part of his foot was severed and yet he decided to continue working (Daniels et al 2000). Examples such as these suggest that rather than being unable to continue working due to physical challenges, older displaced employees are less able to get new placements because they are often less willing or able to retrain. The ethnographic case studies suggest that while “older workers are quite receptive to technological and organizational changes,“
often self-perception and the perception of trainers inhibits their retraining efforts (McMullin and Marshall 2001:117).

The case studies suggest that self-perception is the greatest barrier for retraining older workers, and this finding has important implications for UNICA-sponsored retraining programs. A first step for these programs should be reaching out to older displaced workers and assuring them that they are capable of finding new employment. One way to do this could be to have older former sugarcane workers running the retraining programs. This would demonstrate that retraining is in fact possible for this group. Another way to bolster confidence and improve self-perception may be to begin retraining by building upon the skills that these older workers possess. If training for a new field replies upon repeated reference to skills and experience that trainees are confident in, then these displaced sugarcane workers may be less likely to get discouraged. Finally, I suggest that training programs work with trainees on a team basis. That way, displaced workers can rely on each other for support and encouragement, thereby reducing the dropout rate.

*Breaking the Cycle for Less Educated Workers: Providing the Tools to Finally Escape Poverty*

I will now return to the evidence offered by case studies, this time focusing on less educated displaced workers, who also bear the brunt of displacement more than workers with higher levels of education. Again, these case studies depict industries similar to sugarcane production; unsurprisingly, these other industries also disproportionately displace less educated workers.

Like older workers, the literature suggests that less educated individuals are more likely to be displaced than people with more education. According to a study of garment industry workers in Montreal, less educated workers are often employed in industries susceptible to restructuring (McMullin and Marshall 2001). The authors compare workers in the Canadian garment industry to those
in the Canadian labor force as a whole, and find that while 71% of Canadian workers have a high school diploma or the equivalent, only 44% of workers in the garment industry do (2001:115). So the chief reason that less educated workers are more vulnerable to displacement is because they are in the wrong place at the wrong time. This is no coincidence; poor adolescents who drop out of school are doomed to take low-wage and low-skill jobs, ensuring an impoverished and unstable future.

The industries that provide these jobs – like the sugarcane industry – tend to lay people off in greater numbers, with the less educated workers suffering as a result. The lesson here for policy makers trying to aid displaced workers is that the less educated members of a labor force need retraining that allows them to escape this cycle of poverty. Rather than moving into another low-wage, low-skill job, sugarcane workers need technical skills that are transferrable among a number of industries. I suggest that mechanical skills such as automotive repair would be advantageous for displaced sugar workers. Retraining programs should appeal to less educated workers by explaining that these skills offer a permanent improvement in quality of life.

My findings in Chapter Three indicate that the turning points for sugarcane workers are: three years of schooling (basic literacy) and eight years of schooling (analytical thinking and problem solving). Once displaced, it may be too late for these workers to keep their jobs in the sugar industry and less educated workers will suffer more while unemployed. Less education means a longer job search and lower wages once a job is found (Morse 2005). Understandably, it can be difficult for displaced workers to return to the classroom to start job training all over again (Daniels et al. 2000). Mill workers, for example, are “accustomed to year-round employment, [and are] unprepared for the loss of work and interruption to their routine” (Daniels et al. 2000:139). The major difference between these case studies and the situation in Brazil is that impoverished cane cutters don’t have unemployment benefits to fall
back on. Instead, loss of work could mean loss of a household’s livelihood and not having enough food to feed one’s family.

Despite the difficulties of retraining, the case studies show that retraining is often the best option for displaced workers with little education or marketable skills (Carroll et al. 2000, Daniels et al. 2000, McMullin and Marshall 2001, Morse 2000). A study of displaced mill workers found that retraining had the potential to transform workers’ lives. One worker told interviewers, “I started out with 7th grade math when I got out of the mill, and now they call me ‘the fraction king.’” (Daniels et al. 2000:143). Sugarcane workers, like mill workers, generally have lower levels of education. Not only would retraining offer them much-needed skills for reemployment, it would also provide a sense of self-worth and identity that was lost with the job.

Chapter Four: Conclusions and Recommendations

Having discussed the challenges and successes of worker retraining in other industries, I would now like to conclude this project by painting a picture of how policymakers can best aid displaced workers. Around the world, these individuals often have very little power in their society. They likely lack savings to support themselves while unemployed. In the United States and other industrialized nations, these workers might qualify for unemployment benefits. In developing countries, however, unemployed individuals find themselves in a far more precarious situation.

Whatever the consequences of displacement, policymakers are responsible for intervening in the market to mitigate these market forces. Some industries, like the United States automobile manufacturing sector, are struggling to stay in business. Other industries, like Brazilian sugarcane
production, are thriving. In these instances, the capital owners gain while displaced workers lose. Policymakers need to step in and ensure that thousands do not suffer for the profit of a few.

How should these policymakers allocate resources in order to efficiently aid displaced workers? First of all, it is essential that policy changes be oriented towards those who need it most. In the Brazilian sugarcane industry, these groups are the older workers and the workers with lower levels of education. These two groups suffer disproportionately from layoffs and therefore require special attention from officials.

Therefore, resources should be set aside to target displaced workers who are 50 years old or more. Rather than just pushing all displaced workers back into a public school classroom as if they were schoolchildren, policymakers need to develop training sessions that address older workers as equals. For example, they should establish classrooms where students work together in teams and seek advice from instructors when needed rather than lecture-style classrooms. This is one way that retraining programs can be tailored to meet the needs of displaced sugarcane workers.

Another finding from my project is that separate retraining programs should be established based on level of education. There are two key breaking points for sugar workers in terms of education, basic literacy and advanced skills. Training programs should therefore be divided into two sections. One program would work with those who lack basic literacy, and another program should assist those who seek analytical or problem-solving skills. Both programs should be experienced-based. When at all possible, the instructors should be former sugar workers so that they speak the same language as the students. These programs should address the needs of the displaced workers.

Furthermore, resources should be allocated in accordance to prior, more general research on laid off workers. This means that policymakers should identify prospective jobs that are in the same
region as the jobs that were lost. Brazil is a culturally diverse country, and it would be dangerous to assume that a worker who has lived her entire life in the sugarcane fields would be comfortable working in the jungle of the Amazon or the urban slums of Rio de Janeiro. This is especially true for older workers; they do not want to leave their homes. Policymakers need to understand that by leaving a particular area, these individuals are leaving behind the social support structures and their way of life. Rather than forcing dislocated workers to move to another area, training programs should present this option to the students with an accurate assessment of what they would gain by moving. Ignoring the negative consequences of relocation will create a barrier between the program officials and the students. Instead, officials must offer solutions that are acceptable to the intended recipients.

Finally, it is important to train workers in a field related to the one they left behind whenever possible. Policymakers must acknowledge that workers lose their sense of identity and self-worth when they lose their jobs. They will already be discouraged upon entering a retraining program; they will be more confident if they perceive themselves to be adapting with the industry rather than being left behind. However, it would be a mistake to send workers down a dead-end street. New jobs should not be located in a dying industry. Officials should present trainees with clear and accurate information about the likelihood of reemployment in the sugarcane industry. If workers strongly desire to stay in the industry, I suggest that they achieve the equivalent of eight years of schooling. This is the turning point for employment trends. Perhaps individuals at this level achieve a minimum literacy level or gain vital math or analytical skills. It is also essential that workers are presented with this information as soon as possible (prior notification is key) because it not only helps them find a job sooner, and it leads to higher wages and greater satisfaction in their next job.

This project also points to areas for further study. The roles of gender and race in Brazilian sugarcane displacement should be examined. Data regarding this attributes was not available for this
project, and so I felt that they could not adequately be addressed here. Race and gender have played a role in layoffs in the United States and it stands to reason that Brazil would experience similar trends (Morse 2005). Also, I wonder whether the *Bolsa* program has actually been increasing school attendance, or whether children and young adults are now working in another sector. Further research could verify my assumptions that decreases in employment among these groups are occurring because school attendance is increasing.

Lastly, this study did not use interviews with displaced sugarcane workers nor did it feature case studies of this group. Without face-to-face interaction with displaced workers, it is impossible to accurately assess their needs or to design retraining programs to help them. This study takes the first steps toward retraining by examining trends. These findings must be verified before taking action. In addition to case studies and interviews, a comprehensive review should be done to identify industries that are most likely to hire retrained workers in Brazil.

In conclusion, hundreds of thousands of sugarcane workers in Brazil are facing layoffs. Policymakers can and should intervene to ease the pains of displacement, utilizing UNICA’s offer of funds to retrain displaced workers. These funds should be allocated in the most effective manner possible. Policymakers should target the workers who suffer disproportionately from displacement. Older workers and those with less education need special attention if they are to recover from being laid off and become fully functional, independent members of society. In this way, we can best provide displaced workers with the skills they need.
References


Riveras, Inae. 2008. Sugar harvest advances have social cost in Brazil. Reuters, October 19.


