

EFFECTS ON EMPLOYMENT, WAGES, AND LABOR STANDARDS OF NON-TRADITIONAL EXPORT CROPS IN NORTHEAST BRAZIL

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Abstract: This article analyzes the effects on employment, wages, and labor standards of the growth of non-traditional, export-oriented, high-value crops in the Petrolina–Juazeiro region in Northeast Brazil. It focuses on understanding why these crops were accompanied by job creation, upskilling of labor, and improvements in wages and labor standards among rural wage workers. These labor effects can be explained by: (1) the type of crops involved and their high demand for skilled workers to meet high quality demands from consumers; (2) the limited supply of skilled workers in the region involved; (3) the consumer concerns for the labor conditions of production; (4) the characteristics of labor institutions, including laws and regulations, government agencies, and rural workers' unions; and (5) how labor institutions, crop and technology characteristics, and consumer concerns affected the balance of power between growers and rural wage workers and their respective organizations.

Most of the literature analyzing the distributional impacts of the growth of non-traditional export crops (NTECs)¹ in Latin America have focused on the ability of small farmers to adopt these crops and the consequent impacts on their access to land.² Most of these analysts have not addressed the effects of NTECs on landless agricultural laborers, and when they

1. Non-traditional export crops (NTECs) include crops that were not exported in the past, even though farmers frequently grew them for selling in the domestic market. In contrast to traditional export crops like sugar, cotton, cocoa, and coffee, NTECs comprise crops like fruits, vegetables, and organically grown crops characterized by their high value and quality. For example, Chile has turned into a successful exporter of fresh and processed food products, such as grapes, wines, and apples, Ecuador has become a major exporter of flowers, and Costa Rica and Guatemala have developed their production of vegetables and tropical fruits for export, including among others broccoli, mangoes, pineapples, and melon.

2. Most analysts have offered critical views of the distributional impacts of agroexport strategies in general. For example, de Janvry (1981) argued that agroexport booms contributed to reinforcing the traditionally dualistic agrarian structure that characterized Latin American societies. Williams (1986) showed that the cattle boom in Central America during the 1960s and 1970s displaced tens of thousands of peasants from land previously farmed without official titles. Barham et al (1992) argued that the leading actors in the NTEC's sector in countries like Costa Rica and Chile were predominantly foreign

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have looked at labor effects, they have focused mainly on the number of jobs created, usually not paying enough attention to changes in rural wages, skills, and labor standards and the factors that explain them. In addition, most authors who have considered the effects on labor of NTECs have often stressed their negative effects on wage workers.³ Some analysts have argued that some of the tasks of NTECs are mechanized, so they only demand substantial amounts of labor during certain times of the year. Thus, although they may increase the demand for labor, NTECs may be associated with a high seasonality of employment. In addition, many critics of NTECs argue that workers in these crops often receive low wages and enjoy poor working conditions. Furthermore, NTECs have been frequently associated with policies to promote exports that focused on maintaining low wages, including limiting the influence of unions, dismantling measures protecting labor, and eliminating the government agencies that traditionally mediate labor negotiations. These policies are supported by arguments from neoclassical views, which portray labor market institutions, such as unions, measures protecting labor, and government agencies mediating in labor negotiations, as damaging the capacity of exporting firms to compete in foreign markets.

This article focuses on the case of Petrolina–Juazeiro, an area located in the states of Bahia and Pernambuco with 53,000 km² and 510,000 inhabitants, part of the São Francisco River Basin in Northeast Brazil.⁴ It focuses on the labor effects of the recent emergence and rapid growth of

firms or large entrepreneurs, and that small farmers were facing enormous problems to cultivate NTECs. Barham, Carter, and Sigelko (1994) showed that while the agroexport boom in the highlands of Guatemala had favored smaller rather than larger units, there had been a differentiation within the peasantry, and longer-term market dynamics were unfavorable for small farmers.

3. For example, see Conroy, Murray, and Rosset (1994), Schurman (1993), Stanley (1994), Twomey and Helwege (1991), Cruz (1987), and Falabella (1988). For analyses of the Brazilian case, see Assirati (1994), Marsden, Cavalcanti, and Ferreira (1996), and Salete (1997). For more positive views of the distributive effects of NTECs, see Damiani (1999, 2000) and Jaffee (1993). Meanwhile, Carter and Mesbah (1993) and Carter, Barham, and Mesbah (1996) argue that the effects of agricultural export booms on rural poverty depend on specific crop characteristics and on government policies that affect the microeconomics of the specific crops involved.

4. This paper is based on dissertation field work that I carried out in Brazil during sixteen months between May 1996 and September 1997. During this period, I was affiliated with the Technical Office of Northeast Economic Studies (*Escritório Técnico de Estudos Econômicos do Nordeste*, ETENE) of the Northeast Brazil Bank (BNB), as part of a larger joint research project of MIT and the Northeast Brazil Bank, and I also maintained close links with the Post-Graduate Program in Economics (PIMES) at the Federal University of Pernambuco (UFPE). The core arguments emerge from interviews that I had with producers (owners of most of the exporting firms and a sample of small farmers in all government irrigation projects) and landless wage workers involved in the cultivation of crops for export and for domestic market; firm managers and agronomists; represen-

NTECs, arguing that the growth of NTECs has brought widespread benefits for rural wage workers.⁵ In contrast to the rest of the Northeast of Brazil, a region of 1.5 million km² with poor soils, semiarid climate, and periodic droughts that has long been viewed as Brazil's foremost "problem area," Petrolina–Juazeiro is a great contrast of dynamic irrigated agriculture, agro-processing industries (tomato and fruit-processing) and services (mainly input supplying, banking, and consulting), well known in Brazil as the most important producer and exporter of high quality fruits and vegetables in the country. In the late 1960s, the Petrolina–Juazeiro region was no different than most of the rural areas in Northeast Brazil. Characterized by the same poor natural resources and low standards of living as the rest of the Northeast, the economy of Petrolina–Juazeiro was based on a backward agriculture, dominated by the production of cotton, livestock, and subsistence crops (mainly corn and beans).⁶ In the early 1990s, Petrolina–Juazeiro had turned into a producer of a wide range of irrigated high-value crops, including table grapes and mango that are sold fresh to Europe and the United States, and other crops for the domestic market, including banana, coconut, guava, passion fruit, melon, industrial tomatoes, watermelon, and onions, among others (see Table 1).⁷

tatives of firm and workers' associations; planners at government agencies; and politicians at the municipal, state, and federal levels. The interviews were open-ended and usually lasted about two hours, being based on an outline of questions that depended on the specific informant. In most firms, my interviews included field visits to the crops and to post-harvest facilities. In all cases, my visits to firms to interview wage workers were separate from interviews with owners or managers, agronomists, and small farmers, so that I could interview workers without the presence of supervisors and managers. During the writing period back in Cambridge between September 1997 and December 1998, I benefited greatly from feedback mainly from Judith Tandler (my thesis supervisor), Peter Timmer, Paul Smoke, Richard Locke, and Mick Moore.

5. The Petrolina–Juazeiro region defined here includes the municipalities of Petrolina, Santa Maria da Boa Vista, and Lagoa Grande of the state of Pernambuco and Juazeiro, Casa Nova, and Curaçá of the state of Bahia.

6. Among others, see Barreira (1992); Barros, Pastore, and Rizzieri (1977); Goodman (1990); Hirschman (1963); Kutcher and Scandizzo (1981); Martine (1987); Martine and Beskow (1987); Melo (1980); Robock (1957); Sampaio, Sampaio, and Maranhão (1987); Silva and Medeiros (1982); Schuh (1970); Smith (1969); and World Bank (1994) for a review of economic and social features of agricultural production in Northeast Brazil and analyses of the evolution of the agricultural sector. For analysis of its land tenure problems, see Barros et al (1977), Bursztyn (1984), Carvalho (1988), Cline (1970), Hall (1990), Kutcher and Scandizzo (1981), Leite (1994), and Sampaio (1985 and 1988). See Tandler (1982, 1991) for analyses of World Bank rural development programs, and Tandler (1997) for a study of successful state government interventions. For analysis of poverty in Brazil's Northeast, see Fox and Morley (1990), Hoffman (1987), Knight and Moran (1983).

7. The term *high value* refers to their high prices in relation to volume if compared to other products like wheat, corn, and soybean. See table 1 for key indicators on Petrolina–Juazeiro.

TABLE 1. *Changes in Agriculture and Labor Indicators in the Petrolina–Juazeiro Region*

<i>Indicators</i>	1970	1995
<i>Areas of main non-traditional irrigated crops (in Hectares)</i>		
<u>Export crops</u>		
Grapes	0	6,000
Mango	0	8,500
<u>Domestic market</u>		
Watermelon*	0	4,200
Tomatoes	0	4,000
Onions*	0	4,000
Bananas	0	3,500
Melon	0	1,100
Coconut	0	700
Population	N/A	510,000
Rural labor force	58,500	119,000
Number of rural wage workers	3,452	40,000
Percent of wage workers/rural labor force	5.9	37.8
Percent of permanent workers/ total wage workers	1.0	60.0

Source: Based on data from Agricultural Census

*Onions and watermelon had already been grown in Petrolina–Juazeiro since the early 1960s, but farmers did not use irrigation, growing them in the river waterbeds during the dry season.

The success of irrigated agriculture in Petrolina–Juazeiro relates partly to heavy investments in irrigation infrastructure carried out since the late 1960s by the São Francisco River Development Agency (*Companhia de Desenvolvimento do Vale do São Francisco*—CODEVASF), a federal government agency created to promote the economic development of the São Francisco River Basin. CODEVASF not only built water reservoirs, pumping systems, and delivery canals, but also expropriated lands appropriate for irrigated agriculture and created “irrigation perimeters,” each of which serve to irrigate between 3,000 and 20,000 hectares of land. These projects irrigated more than 40,000 hectares in Petrolina–Juazeiro and had attracted private investments in irrigation that led to a total of 80,000 hectares of irrigated lands in 1997, 23 percent of the land in the Northeast, for an area and a population that represented only 3.2 percent and 1.1 percent of the entire region. In this area, growers in Petrolina–Juazeiro produced 90 percent of the country’s exports of mango and 30 percent of table grapes, displacing the much more technologically

developed states of São Paulo and Rio Grande do Sul as the most important exporters of these products.⁸

In contrast to what is argued by a great deal of the literature on NTECs, the growth of irrigated NTECs in Petrolina–Juazeiro was accompanied by widespread positive effects on the creation of jobs, the increase in wages, the upskilling of labor, and the improvement of labor standards, including the enforcement of prohibitions on child labor and better safety and health standards. In addition, the same positive effects on labor had spread to rural workers in the irrigated crops that small farmers grew for the domestic market. By 1996, irrigated agriculture in Petrolina–Juazeiro employed nearly 40,000 wage workers (30 percent of the rural labor force in the region), out of which 29,000 (72 percent) worked in the two main NTECs, namely table grapes and mango, and the rest in crops produced mainly for the domestic market. An unusually high proportion of the labor force (60 percent) directly involved in agricultural production was permanent and 40 percent were women. These rural workers (both in crops for export and the domestic market) received wages substantially higher than the legal minimum wage in Brazil (21.7 percent higher by January 1998) and the average wage of most Northeast rural workers. In addition, most workers received higher wages for overtime and night work (50 percent and 80 percent, respectively) and, in contrast to most Northeast rural workers, were registered and received fringe benefits (social security and medical insurance), which represented about 50 percent on top of the wage.⁹ Two-thirds of the workers were trained in a variety of skills, including managing irrigation equipment, fruit packing, pruning trees, among other tasks, and they received premiums for productivity. Lastly, rural wage workers in Petrolina–Juazeiro gained a number of important improvements in labor conditions, such as the right to have bathroom facilities and clean drinking water in the workplace and transportation within the farm and from the workplace to their homes. For reasons explained later, improvements in wages and labor conditions neither led growers to mechanize their crops, nor jeopardized their capacity to compete in the domestic and export markets, suggesting that returns on these costs in terms of increased production were greater than costs. Such favorable conditions in employment, wages, and labor conditions attracted workers from all over the Northeast of Brazil to

8. See Damiani (1999) for an analysis of the role of irrigation in the economic transformation of Petrolina–Juazeiro. For additional information on irrigation in Northeast Brazil, see Banco do Nordeste do Brasil (1990a, 1990b) and CODEVASF (1991).

9. Rural workers' unions in Petrolina–Juazeiro have been able to negotiate wage increases that have been raising their minimum wage above the Brazil's legal minimum every year since 1994, the year in which they obtained a minimum wage 10 percent higher than the legal minimum.

Petrolina–Juazeiro, turning it into one of the few regions in the Northeast with a net rate of in-migration rather than out-migration.¹⁰

This paper argues that some features of the NTECs grown in Petrolina–Juazeiro led to changes in the labor market that affected the balance of power between workers' and growers' organizations in favor of the former. First, the establishment of medium-size and large agricultural firms in government irrigation projects based on wage-labor led to a great rise in the demand for labor with specific skills that were in short supply in the Northeast, thus creating a large mass of wage laborers that previously did not exist. Second, because the climate of Petrolina–Juazeiro allowed growers to obtain products from some of the NTECs all-year round, the relative weight and number of permanent workers increased dramatically, thus facilitating their unionization. Third, NTECs involved several tasks that had to be performed at specific times in the year, with delays in performing them greatly affecting quality. Thus, any strike could cause delays and potentially generate significant losses, giving workers greater power in wage negotiations with their employers. Fourth, the export-oriented nature of the crops and the links of the rural unions with the International Labour Office (ILO) made it possible for them to present complaints that could affect the international image of Petrolina–Juazeiro and thus affect the access of firms to foreign markets.

These factors had great effects on local labor unions' composition and strategies and on the balance of power between rural unions and firms. Local rural union membership—traditionally comprised predominantly of small farmers—changed substantially, with an increasing relative weight of permanent wage workers. Upper-level organizations in the union structure who were more experienced at organizing wage workers and negotiation—notably the union in the state of Pernambuco—started to play a dominant role in the strategies of the local rural unions in Petrolina–Juazeiro and to get heavily involved in wage negotiations. In addition, the local rural unions became stronger in negotiations due to the potential damages of strikes on the quality of products and complaints before the ILO on the image of the region. Lastly, the positive outcomes for labor in Petrolina–Juazeiro stem from the important role of government agencies (state and municipal offices of the federal Ministry of Labor). These agencies mediated the relationship between growers and workers, participating as mediators in contract negotiations and monitoring growers' compliance with labor contracts.

10. While the population in the states of Pernambuco and Bahia as a whole increased by 50.1 percent between 1970 and 1990, it more than doubled in Petrolina–Juazeiro. See Camarano (1986 and 1987), Martine and Camargo (1984), and Moura and de Freitas (1986) for analysis of the population dynamics in Northeast Brazil.

The article is organized as follows. The first section explains how the growth of irrigated agriculture, and in particular of NTECs, in Petrolina–Juazeiro brought changes in the demand for labor, creating a large number of jobs and increasing the demand for workers with specific skills. The second section shows that firms growing NTECs in Petrolina–Juazeiro faced a short supply of workers skilled in certain tasks common in the production of fruits and vegetables, so they ended up making changes in the organization of production so as to retain their skilled workers with more permanent employment. The third section focuses on how the growth of NTECs created possibilities for rural workers' unions to organize labor and how it affected the strategies of unions and firm associations. This section also analyzes the role of unions, firm associations, and government agencies in wage negotiations. The fourth section explains how the gains for labor in NTECs had spillover effects on labor involved in crops grown in Petrolina–Juazeiro for the domestic market. Finally, I present some concluding remarks concerning the policy implications of the findings.

CHANGES IN THE DEMAND FOR LABOR

Many cases of the expansion of irrigated agriculture elsewhere have led to an increase in the demand for labor.¹¹ Although not all irrigated crops grown in Petrolina–Juazeiro had the same land productivity and demanded the same amount of labor, all of them had a higher output and productivity and required substantially more labor than the type of traditional beef cattle production and dryland agriculture dominant before CODEVASF built its irrigation projects. Unlike the United States and European countries, where farmers often use technology to raise highly productive dairy and beef cattle and employ high numbers of workers to feed and take care of the animals, most landowners in Brazil's Northeast, until the early 1990s, raised beef cattle in large farms, feeding them with natural pastures of poor quality and using little labor to take

11. Some critics of government-sponsored irrigation investments in Brazil's Northeast (Hall 1978a, 1978b, 1983, and 1990) have argued that irrigation projects displaced a large number of rural workers because the rural population previously living in the expropriated lands was often larger than the number of families established in the irrigation projects. However, these negative effects only took place in the Baixo São Francisco, where irrigation projects established farmers who were previously tenants displaced from the change in the regime of the São Francisco River due to the construction of the Sobradinho Dam. However, the Baixo São Francisco case was an exception, as the other government-sponsored irrigation investments in Northeast Brazil, including those in Petrolina–Juazeiro and the North of Minas Gerais, led to the substitution of crops for livestock. For articles showing positive effects of irrigation in Northeast Brazil, see Carvalho (1988), Maffei and Ramos de Souza (1986), and Ramos de Souza (1990).

TABLE 2. *Labor Required by Livestock and Different Crops per Year (in working days)*

<i>Number of working days/hectare</i>				
Livestock	6			
Annual crops				
<u>Dryland farming</u>				
Manioc	83			
Beans	38			
Corn	36			
<u>Irrigated crops</u>				
Onions	140			
Tomatoes	129			
Melon	113			
Watermelon	67			
	<i>Number of working days/hectare</i>			
	<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>	<i>Year 4 and +</i>
Perennial crops				
Grapes	654	689	1,135	1,265
Banana	295	245	245	245
Guava	160	200	273	333
Mango	111	105	146	202
Coconut	80	70	104	110

Source: Based on information from the Bank of Northeast Brazil, EMBRAPA, Distrito de Irrigação Nilo Coelho, and interviews with agricultural firms and small farmers.

* Note: Values for all crops assume sprinkler irrigation. Employment only at the farm level, not including packing (though it is sometimes carried out at the farm level), transportation, and other service activities—all very important in terms of employment.

care of the animals.¹² In contrast to beef cattle and to dryland production of crops like manioc, beans, and corn, irrigated crops in Petrolina–Juazeiro were labor intensive because they involved a technology that required workers to perform a large variety of tasks, such as handling irrigation equipment, plowing the lands with tractors, making treatments against pests and diseases, and harvesting production. In addition, irrigation not only allowed farmers to increase yields, but also to grow crops in the dry season, when the land was idle under dryland agriculture, thus obtaining several harvests per year, and to substitute high-value

12. Dairy production has become important in the semiarid Northeast since the early 1990s, as a large proportion of medium-size and large landowners have turned toward double-purpose (beef and dairy) livestock and made investments in improving natural pastures.

for low-value crops. Table 2 shows the amounts of labor required by livestock and different irrigated crops (only at the agricultural stage, not including packing and related service activities) in Petrolina–Juazeiro.

Labor costs were an important component of the production costs of irrigated crops, ranging between a minimum of 45 percent in tomatoes and a maximum of 60 percent in grapes.¹³ If worried about the increasing costs of labor, a grower had two main options. First, he/she could introduce labor-saving technologies, basically mechanizing some tasks. For example, a mango grower could apply pesticides by using sprays connected to tractors rather than doing it manually. Second, a grower could shift to a crop in which it was more feasible to mechanize tasks, as some crops had more possibilities of using machines than others. For example, while a grower of pineapple could mechanize almost all tasks, a grower of grapes could not mechanize some tasks like pruning or picking. Third, several crops gave growers the choice of producing with different technologies, depending on the market which the growers wanted to sell and the quality that they aimed to obtain, with low quality often being associated with lower labor requirements. For example, growers of table grapes could shift to wine grapes, a choice that would save them up to 75 percent of the costs of labor because wine grapes did not require labor-intensive care of the bunches. Likewise, growers of low-quality table grapes needed to employ an average of one worker per hectare, compared with six workers per hectare if they produced high-quality table grapes.

Firms in Petrolina–Juazeiro often introduced the use of machinery for tasks in which it was possible to do so, such as soil preparation. However, most of the crops that became popular in the region had few opportunities to mechanize tasks because their production involved a variety of activities that required a lot of care and had an important influence in the quality of the product, including harvest, weeding, disease treatment, and irrigation. These tasks involved the application of manual skills for which no machine had been available. One of the main tasks that employed a large number of people, required a lot of care, and could not be mechanized was the harvesting of crops like industrial tomatoes, grapes, and mango, totaling 28 percent of the total labor costs in industrial tomatoes, between 13.4 percent and 22.5 percent in grapes, and between 12 percent and 18 percent in mango. Other specialized tasks of high-quality table grapes that could not be mechanized were pruning and bunch picking, totaling between 34 percent and 40 percent of all labor costs.

In addition to generating employment, NTECs in Petrolina–Juazeiro demanded higher skills from workers. Workers in NTECs not only

13. The figure for grapes corresponds to the third year after plantation. The first two years required less labor (35 percent of total costs) because the crop was not yet under production.

needed more complicated skills than in traditional cattle raising, but also more than dryland crops like manioc, corn, and beans. Necessary skills could be divided into four main categories: (a) operation and maintenance of machinery and irrigation equipment, such as driving tractors to prepare the land, and operating and maintaining irrigation equipment; (b) application of pesticides and herbicides; (c) implementation of tasks designed to improve the appearance of the fruit, such as careful picking; and (d) harvesting and packing of the fruit. While some of these tasks—for example careful picking—required less time to learn than other more complicated tasks like driving tractors, workers still needed a substantial amount of time, often several months, to reach the levels of productivity considered acceptable in performing such tasks. In contrast, crops for the domestic market required less quality and thus needed less of the above mentioned tasks.

Firms producing NTECs in Petrolina–Juazeiro had to face the problem that the Northeast region offered a short supply of workers with the required skills. The next section will explain how firms had to train workers to perform the tasks needed in producing NTECs and why and how they had to implement changes in their production schedules in order to provide more permanent employment to their skilled labor.

THE SHORT SUPPLY OF SKILLED LABOR AND CHANGES IN THE ORGANIZATION OF PRODUCTION

The introduction of irrigation in Petrolina–Juazeiro led to a higher demand for workers with specific skills that were not common among rural workers in the Northeast. This section focuses on how government agencies and firms dealt with this shortage of skilled workers, showing that while the former focused on training small farmers in government-sponsored irrigation projects, firms were the ones that trained their workers. In addition, because training workers was costly to firms, they had to implement changes in their production organization to keep their trained workers and avoid additional training costs every year.

Firms established in Petrolina–Juazeiro faced the problem of hiring a large number of workers without the skills required to work in irrigated agriculture. When the first firms arrived in Petrolina–Juazeiro, they found a scarcity of rural wage workers; the region was dominated by large landowners raising beef cattle and was characterized by low population density. While workers could migrate from other areas with a labor surplus in the rural Northeast, they did not have the skills required for irrigated agriculture. Because land distribution in the Northeast has been traditionally highly unequal, a high proportion of the rural population in the Northeast included landless tenants without regular titles. Sharecroppers, renters, and occupants without legal titles composed altogether

44 percent of total farmers by 1985. These tenants traditionally grew subsistence crops (mainly corn and beans), cotton (the main cash crop in the Northeast until the late 1980s), or both. Cotton was grown usually under sharecropping relations, with sharecroppers usually receiving from the landowner the land already prepared and taking care of the crop until the harvest, turning over to the landowner half the production. At the same time, landowners raised beef cattle in natural pastures.¹⁴ Irrigated agriculture was limited to small farmers in the margins of the São Francisco River who had started to grow crops with small-scale irrigation equipment during the late 1950s as a result of the advice from the extension services provided by the Superintendency for the São Francisco River Basin (Superintendência do Vale do Rio São Francisco—SUVALE), a federal agency created in 1948 to promote the development of the São Francisco River Basin. However, these farmers concentrated on crops like onions and corn, which required much less care than fresh fruits and vegetables. Producers did not use conventional irrigation methods, growing the crops in the waterbeds of the rivers during the dry season. In addition, these farmers sold their products in nearby towns and cities, markets that were less demanding of quality than those of fresh fruits and vegetables in European countries or in cities like São Paulo and Rio de Janeiro.

In order to solve the problem of the lack of workers' experience with irrigation, firms had to train them. Thus, they hired agronomists from the south of Brazil with experience in the production of irrigated fruits and vegetables as well as local agricultural professionals. These agronomists often were in charge of planning production tasks and of training the firm's agricultural professionals. After an initial period of a few months, the best workers became supervisors and started helping technicians train new workers.

Training was expensive in terms of time and money because even though a worker could learn a particular task in a few days or weeks, it could take him/her a whole season to reach an average level of productivity. For example, it took about a week for a worker to learn tasks related to taking care of the grape bunches, and at least four months to achieve average levels of productivity. In addition, employers stressed that searching for workers was also difficult because the selected worker could turn out not to meet employers' expectations in terms of the productivity levels eventually obtained, so he/she would have to be laid off after months of training. One grape grower whom I interviewed offered an explanation that clearly showed the problems faced by most growers when hiring new workers:

14. For a description of sharecropping relations in Northeast Brazil, see Johnson (1971).

Only one out of seven or eight workers turns out to be good for specialized tasks, working carefully at a reasonable speed. In the other cases, you have to lay them off or use them for something else, trying with another worker. (Curaça, 3 March 1997)

Because the supply of workers in Petrolina–Juazeiro with the skills required by the NTECs was scarce and the costs of searching and training workers were high, firms tried not to lose their skilled workers. Thus, firms often gave skilled workers higher wages, incentives for higher productivity than the average, and additional benefits like free housing on the farm. While these measures decreased turnover among workers, they were not enough to maintain a high proportion of their workers. Growers complained that after spending time and money teaching their workers how to carry out specific tasks, they lost them because employment was not permanent. Meanwhile, trained workers complained that agricultural production only provided a job during a short period of the year, so they had to search for jobs in urban areas to obtain an income during the rest. As a result, firms had to train new workers every year. This was not only costly, but it also affected the quality of those products exported.

Thus, firms ended up introducing substantial changes in production organization in order to provide their workers with more permanent employment. Grape producers, for example, started to export in the late 1980s. At that time, they scheduled harvesting to take advantage of higher export prices, i.e., when their production faced the least competition from producers from other countries (between May and July). However, they lost workers for whom they had invested heavily in training for the reasons I explained above. In order to provide workers with more permanent employment, in the mid-1990s firms started to program their production to harvest all-year-round rather than concentrating it in two or three months of the year. By changing their production schedules, firms not only were able to provide permanent employment to most workers, but also to obtain revenues throughout the year by selling in the domestic market.

These changes in production were possible for two additional reasons: (1) In mid-1994, the federal government started a successful economic stabilization program (the “Real Plan”), which led to a substantial increase in domestic food demand and to better prices for products like grapes and mango. (2) Unlike other regions, Petrolina–Juazeiro had a climate that allowed farmers to grow year-round various crops rather than during a particular season. For example, because of the greater seasonal variation, farmers in the North of Minas Gerais, Chile, or California grew grapes during a four-month cycle and obtained one harvest per year from each plant at the end of the summer. Thus, production in these places had a fixed schedule each year. In contrast, farmers in Petrolina–Juazeiro could obtain between two and three harvests yearly

from each plant and could program their production tasks to harvest almost every week during the year. Thus, at any given time, there was a part of the crop that needed to be pruned, another one that needed to be harvested, and so on.

As a result of these changes, a great proportion of the workers in NTECs (close to 60 percent) became both skilled and permanent. The next section will show that the scarce supply of skilled labor, along with the strategy that firms employed in Petrolina–Juazeiro, played in favor of the capacity of rural labor unions to organize workers and negotiate improvements in wages and labor conditions.

THE ROLE OF THE RURAL WORKERS' UNIONS

The changes in the labor market brought by NTECs do not explain by themselves an increase in wages and the improvement in working conditions. This section shows that the dramatic changes in the demand for labor brought by the growth of NTECs led to great changes in the views and organizing strategies of rural labor unions. Rural worker federations at the state level, notably the Pernambuco Rural Workers' Federation (Federação de Trabalhadores Agrícolas de Pernambuco—FETAPE), played the dominant role in changing the strategies of the local rural workers' unions in the Petrolina–Juazeiro region.

As in most of the Northeast's semiarid region, the rural workers' unions in Petrolina–Juazeiro had traditionally not worked with wage workers, but mainly with small landowners and landless tenants who worked as sharecroppers. Unions concentrated on issues that interested these members, such as intervening in conflicts over land or the distribution of the product in sharecropping, and in helping small farmers to collect the documents necessary for retirement. As is characteristic in most of the semiarid Northeast, the rural workers' unions in the three regions were also weak and had few financial resources.

In contrast to the rural workers' unions as well as the rural workers' federations (the second-tier, state-level rural workers' organizations to which all municipal-level rural workers' unions are affiliated) in other states, FETAPE did not focus on small farmers but on organizing wage workers. However, FETAPE had focused its work not in Petrolina–Juazeiro but in the sugarcane zone, where most of the wage workers lived and most leaders of FETAPE came from. Sugarcane growers in Pernambuco have often been considered tough employers, having used slave work extensively until the abolition of slavery in 1888 and having paid low wages long afterwards. Thus, FETAPE had long concentrated efforts on organizing wage workers, struggling for higher wages, and better working conditions for sugarcane wage workers. In the late 1970s, FETAPE had become one of the strongest rural unions in Brazil, having

a large membership, a capable leadership, and experience with organizing wage workers and negotiating with tough employers. Among other achievements, FETAPE had organized the first strike in rural Brazil in 1978 (i.e., during the repressive conditions of a military government), when it negotiated agreements with growers that increased wages, and had played a dominant role in the founding of an umbrella organization of all state-level federations in Brazil, the National Confederation of Rural Workers (*Confederação Nacional de Trabalhadores na Agricultura*–CONTAG).

With the emergence of irrigation, the rural workers' unions in Petrolina–Juazeiro experienced important changes in their membership during the 1980s. Small farmers established in the irrigation projects built by CODEVASF, the agency that replaced SUVALE to promote the development of the São Francisco River Basin, started to take over from small farmers outside the irrigated areas (i.e., farmers producing in dryland conditions) the unions in municipalities of the Petrolina–Juazeiro region. Most small farmers in irrigation projects signed up as members of the unions, becoming the majority of membership in all three regions by the early 1980s. At the same time, several of these small farmers became union leaders and brought with them a number of new issues. For example, union negotiations with CODEVASF for lower water fees or for extensions in the payment of these fees in years of poor harvests became commonplace by the late 1980s.

During the second half of the 1980s, further changes occurred in the composition of the rural workers' unions in Petrolina–Juazeiro. These changes took place as a result of the establishment of commercial firms engaged in irrigated agriculture, which hired large numbers of wage workers. As a result, union membership in Petrolina–Juazeiro started to change as wage workers were becoming an increasingly higher proportion of the membership.

According to the interviews that I had with FETAPE leaders, the presence of a large number of firms hiring rural wage workers and the changes in the membership of the rural workers' unions in Petrolina–Juazeiro since the mid-1980s made FETAPE interested in working more actively in the region. In 1988 the organization participated in a congress of rural unions all over Brazil that CONTAG organized in Brasília. Some of the leaders of FETAPE and CONTAG whom I interviewed had participated actively in the discussions and decisions taken in this congress. These leaders explained that the congress discussed future strategies of the labor movement, and arrived, among other things, at the conclusion that rural unions needed to start organizing workers in areas of dynamic agriculture that were emerging in Brazil in the 1980s, rather than focusing exclusively on issues related to small farmers, such as obtaining from public banks

credit lines for crops at low interest rates.¹⁵ FETAPE leaders were some of the proponents of this position, as they were convinced that FETAPE itself needed to expand its work to organizing wage workers in irrigated crops in Petrolina–Juazeiro for two reasons. First, irrigated crops were dynamic, with expanding production areas and exports, new firms establishing in the region, and a rural population migrating to work as wage workers in those crops. Thus, they could provide new opportunities to increase membership, collect fees, and strengthen the local unions. Second, although FETAPE's new president elected in 1988 had been a sugarcane worker, he wanted to leave his "mark" by doing something new and different.

In 1991 FETAPE started to make an effort to provide organizational skills to Petrolina's rural workers' union by sending two important persons permanently employed and paying their salaries. One was a leader from the sugarcane zone with a long experience in organizing sugarcane wage workers, the other, a lawyer specializing in labor legislation who had also worked in the sugarcane zone. They started to organize daily radio programs in Petrolina–Juazeiro that provided information about workers' rights and labor problems in different firms, to arrange weekend meetings in Petrolina's neighborhoods where large numbers of rural workers lived, and to provide legal advice on labor-related problems to workers. At the same time, they started to train leaders in the Petrolina union and to promote discussions with them about the importance of working not only with small farmers, but also with wage workers.

The attention to issues related to wage workers, such as wages and working conditions, promoted by FETAPE initially created conflicts in the local unions in Petrolina–Juazeiro because several of the leaders were small farmers from the irrigation projects who themselves hired wage workers, so they did not strongly support the new agenda. To avoid this opposition, the organizers sent by FETAPE started to push for a less conflictive agenda at the same time that they worked on the problems of wage workers. One of the most important issues that arose as a result of that strategy was the need to eradicate the use of child labor. At that time, child labor was widespread both among small farmers and firms, mainly during the harvest time. CONTAG was initiating in 1992 a program with the ILO to eradicate the use of child labor in rural areas of several Brazilian regions.¹⁶

15. Petrolina–Juazeiro was the most important region producing non-traditional export crops. Two other important cases were Vale do Assú/Mossoró in the state of Rio Grande do Norte, which focused on the production of melon, and the Barreiras region in the state of Bahia, which produced tropical fruits.

16. The program initiated in Brazil was part of a larger ILO program, the International Programme on the Elimination of Child Labor, which the organization had started to implement in several countries at the close of 1991.

The main program consisted of providing a monthly contribution (US\$20 per child) to families who took their children out of work and sent them to a specialized school which provided meals, primary education, and horticulture training. FETAPE was able to convince CONTAG and ILO representatives to include the sugarcane zone in Pernambuco and Petrolina–Juazeiro as two of the regions that would participate in the program.

In addition, FETAPE was able to bring ILO representatives to Petrolina and to elicit great attention from the public to the problems associated with child labor. In 1993 ILO and FETAPE representatives met with Petrolina's mayor and firm representatives, asking for their cooperation in the implementation of the program and at the same time warning them that the ILO would start singling out Petrolina–Juazeiro as a "problematic" region in the use of child labor in its international public campaigns. Firms feared that such a campaign could jeopardize their access to export markets. Recalling these meetings, a firm owner interviewed said:

We were ashamed that these people were pointing to us as employers who hired child labor. Even though the use of children in the fields was not widespread, they sometimes helped their parents during the harvest of several crops. We felt terrified about the possibility of an international campaign that mentioned our region. (Petrolina, 14 March 1997)

According to the interviews that I carried out in Petrolina–Juazeiro, these views reflected the feelings of most firm owners with respect to child labor.

In addition, the implementation of the ILO program in several regions of Brazil made the Ministry of Labor more eager to enforce already existing legal prohibitions against child labor, increasing the inspections by both its municipal and state offices. As a result, firms involved in irrigated agriculture in Petrolina–Juazeiro eliminated the use of child labor. One employer said: "It became much cheaper not to use child labor, as the fines were big and losing lucrative markets could have led to heavy losses." All the interviews that I had with union leaders and Ministry of Labor officials from local and regional offices confirmed that they had not seen any cases of firms using child labor since 1993. However, they recognized that the use of child labor was still common among small farmers in irrigated agriculture, though it had decreased since the implementation of the stipend program. These small farmers usually made their children work in periods in which crops required a lot of labor, such as the harvest season.

In 1993 FETAPE also decided that it was time to start organizing workers for a possible strike for wage negotiations. With the active help of FETAPE, leaders of the unions in Petrolina–Juazeiro started to mobilize workers in the larger firms growing NTECs, which employed on average 300 to 400 permanent workers, starting strikes in several of them.

The mobilization was limited to these larger firms partly because union leaders did not want to create conflicts with small farmers, many of whom were still members and even leaders of the rural workers' unions of the region. In addition, organizing workers in larger firms was easier than in smaller ones, especially in rural areas, where farms (and workers) were dispersed. Because most of the larger firms grew NTECs, they employed increasingly higher proportions of skilled and permanent workers. The presence of permanent and skilled workers facilitated the organizing work for many reasons. First, firms had to register their permanent workers but not their temporary workers. Thus, union organizers found it easier to obtain through local Ministry of Labor offices lists with the names of permanent workers to visit and convince them of becoming members of the unions. Second, as it was explained earlier, most workers involved in NTECs worked in tasks in which delays in performing them could greatly affect the quality of production. Crops like beans, corn, and onions could survive unattended for short periods of time. In contrast, most NTECs required constant care and a short strike could lead to great losses. For example, a delay of only one week in pruning or picking grape bunches would have had such devastating effects in the quality of the table grapes that the resulting harvest could not be exported and would have to be sold in local markets at substantially lower prices.

In contrast, the union had a harder time organizing workers employed by small farmers growing annual crops like tomatoes, beans, and corn. These crops employed mostly temporary and unskilled workers. First, the supply of unskilled workers in Petrolina–Juazeiro was high, and these workers were eager to work even without being registered and accepted lower wages and poor working conditions. Second, these workers were usually migrating from several Northeast states like Ceará, Piauí, Paraíba, Pernambuco, and Rio Grande do Norte, going from one place to another usually to work in the harvest of irrigated crops. Thus, they did not have a permanent residence in Petrolina–Juazeiro, and the union found it difficult to locate and organize them. Although one may argue that these workers were the ones who needed unions the most because their wages were the lowest and their working conditions the worst, they were often not very interested in participating. Because they would leave soon, and often because they came from areas with no tradition of unions, they were afraid of getting involved.

Starting in 1993, the unions in the Petrolina–Juazeiro region started to negotiate and sign contracts valid for one year with VALEXPORT (Associação dos Exportadores de Hortigranjeiros e Derivados do Vale do São Francisco), the association of commercial growers that represented firms in contract negotiations, instead of with individual growers. VALEXPORT had been created in November 1987, initially including

only a small group of four large firms, but rapidly grew to 47 members in the following six months, and reached 201 members by 1997, out of which 134 (66 percent of total) were small farmers and 67 (34 percent) were agricultural firms. Agricultural firms occupied all positions in VALEXPOR's board of directors and strongly influenced the organization's views and activities. Among other things, VALEXPOR established close links with agencies of the federal, state, and municipal governments, signaling them the best way to solve problems that affected NTECs and demanding better performance from them. For example, it joined fruit grower associations from the south of Brazil and created in 1991 the Brazilian Institute of Fruit Exporters (Instituto Brasileiro de Frutas, IBRAF), which became the most important organization of fruit exporters in Brazil and had a great influence in federal government policies that affected fruit producers. In addition, VALEXPOR was able to establish links with the Ministry of Foreign Affairs since the early 1990s, pressuring it on a number of issues concerning trade negotiations with other countries. It also lobbied congressional representatives from federal and state governments to include funds in the national budget for infrastructure investments (railways, airports, and harbors) that were key for growers in Petrolina-Juazeiro, and it participated in organizations like the National Research Council (CNPQ) and the Brazilian Organization of Agricultural Research (EMBRAPA), thus influencing public-funded agricultural research.

FETAPE participated directly in the negotiations with VALEXPOR, often with the presence of its president leading the workers' representation. The contract that year involved the unions of two municipalities (Petrolina and Santa Maria da Boa Vista), but the others in the region (five in total) soon followed them. In addition, wage increases and other benefits obtained, which were already unusual for rural workers in Northeast Brazil in the first contract, improved greatly with each subsequent contract. Some of the most important gains were: (a) By January 1998, the contract set a minimum wage 21.7 percent higher than the legal minimum set by Brazilian laws (equivalent at that time to US\$130);¹⁷ (b) an overtime hourly wage 80 percent higher and an additional 45 percent for night work; (c) a 20 percent higher wage for workers working with pesticides and the obligation for employers to give these workers medical exams every six months; (d) a free transportation provision between workers' homes and the workplace, as well as within the farm; (e) a clean water supply in the workplace, as well as bathrooms; (f) the obligation to have available medical equipment and medicines for emer-

17. The minimum wage agreed in the first contract was 10 percent higher than the legal minimum.

gency care; (g) a free day per month for female workers to attend routine medical exams; (h) a two-month maternity leave and the right for women workers to keep their jobs after giving birth; (i) the obligation for employers to establish day-care centers when they employ more than 20 women; and (j) protection to union leaders from losing their jobs and authorization to work inside the firms.

Leaders of FETAPE whom I interviewed stressed that the agreements in Petrolina–Juazeiro were a great achievement in their struggle. Ironically, these agreements, they said, were better than the ones signed in Pernambuco's sugarcane zone, where the rural workers' unions were stronger and FETAPE had long worked to organize workers. Among other things, the contracts in Petrolina–Juazeiro contained much higher overtime wages and other provisions absent in the sugarcane contracts, such as transportation for workers, provisions favoring women workers, and authorization for the unions to work inside firms.

In addition, leaders of FETAPE stressed that firms in Petrolina–Juazeiro complied with the agreements much more than in any other region in the Northeast, including the sugarcane zone. My interviews with workers and employers showed that firms often complied with wages and premiums. The compliance with improving working conditions had not been as high as with wages, but had been improving substantially every year. Both employers and union leaders recognized that several of the obligations concerning working conditions required investments to construct facilities (bathrooms, cafeterias, day-care centers) and the purchase of equipment for them. Thus, union leaders argued that they had to be flexible enough not to demand full compliance right away. The solution that they found was to negotiate improvements over time with individual firms, often signing written agreements in which the firm committed to meet some deadlines to comply with specific improvements.

Compliance was high partly because the rural unions had played a key role in monitoring the agreements. The unions in the six municipalities of the Petrolina–Juazeiro region actively disseminated information about the terms of the agreements among workers, distributing published materials, having talks on the radio, and addressing workers in the larger firms. In addition, because they were able to increase their collection of union fees, they had organized a system to monitor firms. While the unions normally had difficulties collecting fees, contracts set higher union fees and the firms' obligation to collect monthly union fees from workers' wages and deposit them in the bank account of each union. Thus, the unions were able to purchase cars and pay a salary to several of their leaders to permanently work in a monitoring team. This monitoring team organized weekly visits to firms (about two firms a day), in

which they inspected compliance with labor agreements. If they found a problem, they would complain to the local branches of the Ministry of Labor in Petrolina and Juazeiro.

**THE COLLABORATIVE LINKS BETWEEN UNIONS AND THE MINISTRY OF LABOR:
MEDIATION, MONITORING OF LABOR AGREEMENTS, AND SPILLOVER EFFECTS**

Although Brazilian laws establish negotiations between firm associations and unions as the main mechanism to agree on wages, the relationship between these two actors has often been bitter, making it difficult or even impossible to come to an agreement. Once a contract was signed, although rural unions could pressure firms to respect it, firms frequently did not comply, having unregistered workers or ignoring some of its provisions. In order to deal with these problems, Brazilian laws established that the Ministry of Labor had to participate as a mediator in wage negotiations between unions and firm associations, eventually setting the wage level in case of not reaching an agreement, and to monitor the compliance with contracts signed. However, both mediation and the monitoring of contracts frequently did not work very well. Similarly to other government agencies, local branches of the Ministry of Labor were poorly funded and often lacked staff, vehicles, and even fuel to make inspections. In addition, influential firm associations could pressure officials at the local offices of the Ministry of Labor to be on their side during negotiations, or could use their connections at the federal level to remove local officials who played their monitoring role too seriously.

In contrast to what I expected, the interviews carried out with leaders of FETAPE and VALEXPORT showed that the regional office of the Ministry of Labor located in Recife and the local offices of the agency in Petrolina and Juazeiro played an important role both in wage negotiations and in monitoring the contracts. Petrolina–Juazeiro had already come to the attention of officials of the Ministry of Labor in Brasília in the late 1980s because of the increasing presence of firms with large numbers of wage workers, and especially since 1990, when FETAPE and the Rural Workers' Union in Petrolina addressed the problems of child labor in that region. One top official of the Ministry of Labor in Brasília stressed:

We considered the wage negotiations in Petrolina as very important because they were the first ones in Brazil that included workers in irrigated agriculture, and because the leaders of FETAPE—who had a lot of experience in wage negotiations in the sugarcane zone—were involved in the negotiations. (Brasília, 30 January 1997)

Thus, the Ministry of Labor sent to every wage negotiation in Petrolina–Juazeiro the head of its regional office in Recife to act as mediator. This person was an experienced mediator who had participated

in negotiations in the sugarcane zone for several years. In addition, the central offices in Brasília closely followed every negotiation, and when the first contract was agreed upon, the Minister of Labor himself traveled to Petrolina to witness its signature, an act highlighted by state and local newspapers in Pernambuco at that time.

In addition, the heads of Pernambuco's branch of the Ministry of Labor since the late 1980s acquired experience in mediation. My interviews with these officials showed that they were traditionally progressive professionals, sociologists, and labor specialists who taught at the Federal University of Pernambuco, and they used all their prestige to support workers' rights. For example, one of these officials used his connections with firms to alert them six months in advance that the local union and FETAPE were planning to propose contract negotiations, making the unions' positions appear less confrontational to the firms and making it possible for informal negotiations to start earlier. Another organized inspections using officials from Recife who were not influenced by local politics and did not fear any recrimination for punishing a firm.

The local Ministry of Labor offices in Petrolina and Juazeiro also played an important role in monitoring the labor contracts. I found that field workers from the Ministry of Labor were very committed to their work and employers actually disliked them, complaining that they looked for even minimal faults to fine them heavily. In doing their jobs, they worked in close collaboration with the local rural workers' unions, especially with the monitoring teams that they had put together. As I explained in the previous section, the contracts allowed the local unions to increase substantially the collection of membership fees from workers, so they were able to purchase vehicles and to concentrate a large part of their leaders' time in monitoring firms' compliance of contracts. In fact, each of the unions in the municipalities of the Petrolina–Juazeiro region had organized a monitoring team with three directors. According to union leaders and officials at the Ministry of Labor's offices in Petrolina, these monitoring teams organized weekly visits to firms to find out about worker registration and the firms' contractual compliance with wages and working conditions. Even though firm owners and managers disliked these monitoring teams, they had to allow them to talk with workers and visit facilities because they had agreed to the free entrance of union leaders in the contracts.

When the teams found a problem, the union presented a complaint at the local Ministry of Labor offices in Petrolina or Juazeiro (depending on where the firm was located) with detailed information, including the name of the firm, the problems that they had found, and the names of any unregistered workers. Most inspectors that I interviewed argued that they liked this way of working because the local Ministry of Labor often lacked funds for cars and gasoline, so the complaints presented by

the unions helped them plan carefully their work and visit firms with problems. In the words of one Ministry of Labor inspector:

My work consists basically of visiting firms for which the unions have presented complaints, identifying problems, and eventually fining those that do not comply or working out a compromise to put everything in order in a few days. If I did not count with the complaints from the union, I would have to do the monitoring work that the union does, with the disadvantage that I do not have delegates inside the firms like they do who could pass out information about possible problems. (Petrolina, 16 January 1997)

In addition, the Ministry of Labor facilitated spillover effects of the wage increases from NTECs to irrigated crops grown in the Petrolina–Juazeiro region for the domestic market. In other regions with NTECs in Northeast Brazil, such as the Mossoró–Vale Assú region in the state of Rio Grande do Norte, the largest producer of melon for export in Brazil, wage contracts included only the firms that grew NTECs (melon, in the case of that region) and the wage workers in those crops. Thus, even though the contracts might include most or all of the firms and the workers involved in those crops, the benefits to workers were limited. In addition, contracts included medium-size and large firms, but not small individual farmers and land reform settlements growing melon for the domestic or export markets. In contrast, the contracts in Petrolina–Juazeiro benefited all wage workers employed in irrigated agriculture in the whole region, including crops for export and the domestic market. In addition, they comprised all types of producers engaged in irrigated agriculture, including firms and small farmers in irrigation projects.

This unusual outcome has a lot to do with a peculiar coincidence of interests between different players that participated in the wage negotiations—the firm association, unions, and the regional offices of the Ministry of Labor. The directors of Bahia’s and Pernambuco’s regional Ministry of Labor offices strongly pushed for regional rather than crop negotiations because negotiating a regional contract demanded substantially less time and effort than several contracts for individual crops and, in addition, it was much more “prestigious” for negotiators before the eyes of their superiors in Brasília. Leaders of VALEXPORT and FETAPE agreed with officials of the Ministry of Labor that negotiating one contract was already too complicated to start negotiating around individual crops. In addition, leaders of FETAPE also wanted to represent a whole region rather than just workers involved in a few crops, so a contract encompassing all irrigated crops in Petrolina–Juazeiro was quite an achievement. On the firms’ side, grape and mango growers, who were the most organized and dominated VALEXPORT, strongly opposed negotiations focused on individual crops. The reason was that they felt that by negotiating all crops together, they were able to negotiate lower wages because they were able to argue that small farmers growing crops

like tomatoes or onions could not afford a large wage increase. This means that unions may have obtained wage levels lower than they could have if they had focused only in the NTECs. However, their interests in increasing their presence and power in the whole Petrolina–Juazeiro region, where they had had little presence, justified their strategy. Interestingly, FETAPE's strategy prioritized increasing its territorial influence and membership, while firms focused on wages.

Positive outcomes in wage negotiations not only stemmed from a strong federation (FETAPE) that provided skills to organize workers and negotiate with the local rural workers' unions or from the active mediating role of regional and local offices of the Ministry of Labor, but also because employers did not adopt a hard line in negotiations, in spite of not being completely satisfied with the contracts. The next section will show that firm owners growing NTECs, rather than those growing crops for the domestic market, were the ones who led the negotiations representing the employers, and that they held open views and positions when facing problems with organized labor, partly because they had had previous experience in working with unions in activities other than agriculture.

FIRMS AS "PROGRESSIVE" EMPLOYERS

Recent literature analyzing successful cases of innovation and growth in industries in developed countries stresses the fact that employers and workers in those cases develop collaborative rather than antagonistic relationships. However, unionized workers and employers both in developed and developing countries often have a conflictive relationship. This had traditionally been the case of Northeast Brazil, where the production of sugarcane (the main crop with widespread use of wage labor until the late 1980s) was traditionally dominated by rural elites with a long history of domination over workers. This section shows that CODEVASF implemented a strategy of attracting entrepreneurs from other regions of Brazil to its irrigation projects, many of whom had investments in the industrial sector. This strategy had the unintended effect of creating a substantially less antagonistic worker-employer relationship. Although these entrepreneurs often disliked the unions and tried in many ways to reduce the costs of labor, they were less resistant to negotiate with the unions because they had frequently dealt with them in other regions and in other sectors.

As it was explained in the previous section, firms negotiating contracts with unions were represented by VALEXPORT, which often sent a group of the largest employers to the negotiations. The FETAPE leaders whom I interviewed argued that they found it much easier to negotiate with employers in Petrolina–Juazeiro than in the sugarcane zone in Pernambuco. They argued that while sugarcane producers were

traditional rural elites with a long history of domination over workers, employers in Petrolina–Juazeiro were completely different. Most of the employers in NTECs came from states in the southeast and south of Brazil and most of them usually had investments in other sectors like machinery, construction, and transportation. Thus, they already had experience dealing with unions. In the words of a FETAPE leader:

There is no doubt that entrepreneurs in Petrolina–Juazeiro are much more progressive than in the sugarcane zone. Many firms in Petrolina–Juazeiro come from São Paulo, where they have dealt with the unions in the industrial sector for years. Many of them—even coming from Recife and Salvador—had no experience with agriculture, but they also come from the industrial sector, where dealing with unions is also more common than in rural areas. (Recife, 17 September 1996)

In addition, growers often tried to portray through VALEXPORT a “progressive” image of the region in foreign markets—one showing it as modern, where irrigated agriculture produced fresh fruits and vegetables of high quality with the latest technologies, paid good wages, provided good working conditions to workers, and had widespread social impacts in the region. Most growers frequently even contrasted the labor situation in Petrolina–Juazeiro to the sugarcane zone, arguing that they were proud to be much more “progressive.” One of these growers said:

Petrolina is different than the sugarcane zone. We do not fight with workers because we do not feel that we own them, like most sugarcane growers do. We have to negotiate with them and provide decent jobs because we are all in the same boat. (Recife, 6 March 1997)

In addition, most of these growers shared the view that such an image was increasingly important for their buyers in Europe and the United States. Another grower, also one of the top leaders of VALEXPORT, said:

We have to turn the labor contracts to our own advantage. We show our buyers abroad that they not only buy fruits of great quality, but also that they benefit a lot of people who work in the fields. Buyers do care about this and we expect that they will care even more in the future. (Petrolina, 17 February 1997)

FETAPE’s negotiators were able to make these views work to their advantage, warning that if negotiations failed, they would present complaints in international organizations like the ILO about the lack of growers’ respect for workers’ rights and would carry out campaigns targeted to potential buyers. Growers found the warning credible and became very worried about the possibility of attracting national and international attention with negative impacts.

In addition, growers found it easier to accept higher wages and better working conditions because the investments in the crops and their profitability were high. Thus, wage increases and investments that they needed to make to comply with the contracts were relatively low in relation to their fixed capital investment and profits. In contrast, small

farmers growing mainly annual crops for the domestic market were the ones who most opposed the wage increases. The small farmers whom I interviewed argued that they were not able to pay higher wages because their crops were not that profitable.

The presence of these entrepreneurs would not have been possible if CODEVASF had not implemented a strategy that aimed to attract firms from outside Petrolina-Juazeiro. In fact, CODEVASF established in its irrigation projects in Petrolina-Juazeiro a mix of small, previously landless, farmers and of medium-size firms, in contrast to other government agencies working with land settlements, such as the National Department of Works Against Drought (Departamento Nacional de Obras Contra as Secas—DNOCS) and the National Institute for Agrarian Reform (Instituto Nacional de Colonização e Reforma Agrária—INCRA), which only provided land to landless people. In bringing these firms from outside Petrolina-Juazeiro, CODEVASF targeted mainly states from the more developed area of Brazil and selected firms that had know-how about crop technology and marketing, providing them with subsidized land and irrigation infrastructure.

Although CODEVASF's strategy of firms and small farmers received criticism from economists of different schools of thought, this strategy had the additional unexpected positive effect of generating an economic and social structure conducive to a non-antagonistic relationship between employers and their workers. This economic and social structure is characterized by the key role of entrepreneurs with "progressive" views of the world compared with those of the traditional elites in the rural Northeast. In addition, it played a key role in the success of irrigation projects because firms were the ones that brought new crops and technologies as well as connections to foreign and domestic markets.

POLICY IMPLICATIONS

The analysis of the experience of Petrolina-Juazeiro shows that the cultivation of NTECs in that region brought widespread benefits for rural wage workers. This finding contradicts the generalization that these crops in Latin American and other developing countries generate mostly seasonal labor, pay low wages, and provide poor working conditions to their workers. In contrast, it supports the argument presented by Michael Carter, Bradford Barham, and Dina Mesbah (1996) that the impacts of these crops on labor varies markedly. In the case of Petrolina-Juazeiro, these impacts related to the characteristics of the rural labor market, the characteristics and influence of labor institutions, including laws and regulations, government agencies, and rural workers' unions, and the way in which labor institutions, crop and technology characteristics, and consumer concerns for the labor conditions of production affect the

balance of power between growers and rural wage workers and their respective organizations.

The economic transformation of Petrolina–Juazeiro resulted from a combination of factors that makes it highly unusual that it could be replicated. It involved heavy investments in irrigation infrastructure and the very active involvement of the state through federal government agencies—notably CODEVASF—implementing a sequence of innovative practices in several areas. These practices, some of them unintentional, were combined with specific characteristics of the surrounding natural resources and particular local politics, which all came together at a particular historical time. The combination of factors was key in determining the types of producers in Petrolina–Juazeiro’s economy, the types of crops grown, and the government organizations and labor organizations, all of which had an influence on the dynamics of the rural labor market.

In spite of the special conditions that led to the results prevailing in Petrolina–Juazeiro, some relevant lessons for policy design and implementation can be obtained from this experience. The main lessons are the following:

(a) The consumers’ concerns in industrialized countries for the labor standards among workers in NTECs in developing countries may become a powerful instrument to promote gains in wages and labor standards. NGOs and rural unions could take advantage of these consumer concerns and carry out information campaigns among buyers, for example by disseminating information to customers in supermarkets or gaining access to them through the media. This strategy may end up being less costly and confrontational than traditional strikes, which are frequently difficult to organize in rural areas due to the dispersion of firms and workers, and they may lead to more fruitful results.

(b) The key importance of product quality to obtain access to the foreign markets, along with the dramatic negative effects on quality of not performing certain tasks at specific times of the year, may bring a great advantage to rural unions aiming to organize workers and negotiate with firms improvements in wages and labor standards. The experience of Petrolina–Juazeiro shows that the mere possibility of starting a strike in certain times of the year played to the advantage of workers, making owners become more flexible to avoid great losses in quality.

(c) A strategy of attracting firms from outside a region or a country is usually viewed as an instrument to bring outside investments and know-how about technology and marketing. When labor effects are considered, outside firms are often seen by unions in a negative way. However, policy interventions to attract new actors from outside the region may have a positive influence on wages and labor standards in backward regions like Petrolina–Juazeiro. Those business people may have

experience with unions in other sectors and may have more open views of the world than local actors, bringing possibilities for changes resisted by the local firms. However, this is not necessarily true in every case, implying that government interventions to attract outside firms could apply targeting mechanisms that include their prior relationship with labor unions in their originating countries and regions.

(d) The case of Petrolina–Juazeiro shows that NTECs can lead to changes in the labor market that strengthen the possibilities of development of rural workers' unions. Land tenure in rural areas of many developing countries is dominated by small tenants or populations occupying land without regular titles. In these conditions, wage workers are usually low in number and are often highly dispersed, making it difficult for unions to organize them. In contrast, NTECs often involve commercial firms that employ a large number of workers, most of them permanent. Thus, they lead to the creation of a large mass of wage workers, part of them physically concentrated in a limited number of workplaces, thus facilitating the organizing work of unions.

(e) Many developing countries provide little legal protection to workers and their organizations, and even if they do, they lack government agencies with the funding necessary to monitor effectively the compliance with labor laws and regulations and with contracts agreed upon between business and workers' organizations. In these conditions, the effects of NTECs on labor depend mostly on the balance between the demand for and the supply of workers and the influence of the concerns from consumers in industrialized countries, channeled, among other ways, through ILO controls. In contrast, countries and regions like Petrolina–Juazeiro with institutions that protect labor and with active unions can witness more widespread benefits obtained by wage workers engaged in the cultivation of NTECs. In these cases, the effects of NTECs on labor may depend more on the patterns of interaction among local actors and their organizations, mainly those of growers and wage workers. These patterns of interactions are affected by the relative strength of rural workers' and growers' associations, their views and interpretations of the export growth, as well as their views with respect to the region itself.

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