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Assessing the Effectiveness of Executive Order 12898: Environmental Justice for All?

This article examines several federal and state laws, such as the Worker Protection Standards and the Florida Pesticide Law, to determine whether the goals of these laws are being achieved in the State of Florida. A survey based on questions pertaining to various laws was used to gather data on farm workers in three South Florida counties. Face-to-face interviews were conducted with farm workers in Palm Beach and Indian River counties, Florida, in 1997 and in Collier County, Florida, in 1999.

Overall, the findings indicate that farm workers in South Florida have been exposed to pesticides through direct or indirect spraying. The findings of the study reveal that federal and state laws—currently in place to protect the workers from pesticide exposure—are not effectively implemented, and farm workers are uninformed of the laws that exist to protect them from pesticide exposure.

The study concludes with policy recommendations that will improve the implementation and enforcement of the current laws, which are designed to protect farm workers from pesticide exposure.

Introduction

During the past 30 years, public policy focusing on the protection of workers has expanded. The passage of the Civil Rights Act of 1964 represented a major advancement for minority groups by protecting them from discrimination in the workplace and in federally funded programs. Similarly, the 1994 signing of Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations," represented a major step in addressing environmental justice for minority and low-income communities. The purpose of the executive order was to require federal agencies to make environmental justice a part of their mission. Agencies are to accomplish this by identifying and addressing (as appropriate) disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and in its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Mariana Islands.

Environmental justice is now addressed in the public policy arena, and scholars have focused mainly on the location and impact of hazardous waste in minority and low-income communities—this is referred to as the *location perspective*. Robert Bullard (1992, 1994), a leading environmental justice scholar, has focused on the location of hazardous waste sites in minority communities.

The *occupation perspective* pertains to environmental hazards that an occupational group encounters. One occu-

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pational group that continuously faces environmental hazards due to pesticide exposure is farm workers. Although there are numerous laws that are supposed to protect farm workers, very few studies of the effects of these laws have been completed. The main research question for this study is this: Are the efforts of government agencies that implement and enforce the laws pertaining to farm workers actually protecting the workers from the environmental hazards caused by pesticide exposure? The purpose of this study is to determine whether the goals of federal and Florida state laws are being achieved. This will be done by presenting a case study on farm workers in South Florida that focuses on the level of environmental protection provided to farm workers. This study contributes to the literature on environmental justice by providing a better understanding of the government infrastructure, the protective laws, and the current hazards that farm workers may encounter.

Literature Review

In their study of migrant farm workers and health protection, Bechtel, Shepherd, and Rogers (1995) assert that farm workers lack the necessary level of health protection because state and federal agencies are severely understaffed and unable to adequately enforce health regulations and labor laws. The authors note that because of the migratory nature of farm workers, they reside in their state of legal residence fewer than four months out of the year, thus having little voice and limited power to influence the local decision-making process. As a result, few avenues are available for farm workers to change their working and living conditions, which the authors compare to those in third-world countries.

An important problem regarding pesticides and farm workers is that pesticides drift from the site of application. According to one study, as little as 10 percent–15 percent of applied pesticides actually reach the target pest, while the remaining 85 percent–90 percent is dispersed off target to air, soil, water, and runoff (Moses et al. 1989). The authors contend that significant concentrations of pesticides applied by aerial or ground-rig sprayers can drift one mile or more from the site of application, even under the best of wind conditions, depending on particle size and the method of application.

Approximately 90 percent of farm workers in the United States are Hispanic, yet there are few studies on this ethnic occupational group (Moses 1989). The main reason studies have not been conducted is that it is very difficult to obtain data on Hispanic farm workers. The research that does exist on the Hispanic population as a whole indicates this population typically suffers from poor air quality, pesticides, dump sites, and contaminated drinking water (Nieves and Wernette 1992). Metzger, Delgado, and Herrell (1995) determine that the environmental health status of Hispanics and their children is poor. Hispanic populations have an elevated chance of health risks caused by worker exposure to chemicals and to indoor and outdoor pollution. The authors point out that significant inadequacies in the collection of data on Hispanics—especially ascertaining large enough data samples—make it difficult to improve Hispanic environmental health status. They charge the U.S. Environmental Protection Agency (EPA) with addressing these environmental problems and use a health-based approach to reach environmental justice (Metzger, Delgado, and Herrell 1995).

The literature indicates that, as an occupational group, Hispanic farm workers in the United States do suffer from pesticide-related environmental hazards. Because most of the literature has focused on health problems related to pesticide exposure, there is a void in the literature about the link between the implementation and enforcement of federal and state laws and the actual protection that farm workers receive. This study fills that void by using a case study approach.

Federal Protective Laws

Title VI of the Civil Rights Act of 1964 states, "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." In 1994, President Clinton signed Executive Order 12898, which applied the terminology of the Civil Rights Act to environmental health by requiring all federal agencies and departments to "... make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States" (Foreman 1998). Both the Civil Rights Act of 1964 and Executive Order 12898 focus on the equal treatment of individuals, with the 1964 law laying the groundwork for the 1994 executive order, which focuses specifically on human and environmental health.

Nondiscrimination Laws

Table 1 highlights the protective laws pertaining to nondiscrimination and equal protection. Two of the major laws that focus on equal treatment for individuals are Title VI of the Civil Rights Act of 1964 and Executive Order 12898. Whereas Title VI focuses on nondiscrimination in federally funded programs and activities, Executive Order 12898 carries the issue a step further by ensuring that the practices of federal agencies do not dispropor-

Table 1 Protective Laws

Law	Function	Exclusions
Title VI, Civil Rights Act of 1964	Bans discrimination based on race, color, or national origin for anyone participating in or benefiting from any activity receiving federal funding.	Excludes non-federally funded programs or activities and employers of 15 or fewer employees.
Occupational Health and Safety Act of 1970	Requires field sanitation facilities (toilets, drinking water, and hand-washing facilities). Covers toxic substance disclosure and anhydrous ammonia safety by requiring hazardous chemical lists, labeling, material safety data sheets, employee information, and employee training.	Facilities are only enforced on farms that employ 11 or more workers.
Executive Order 12898—Federal Actions to Address Environmental Justice in Minority and Low-Income Populations	Requires all federal agencies to make achieving environmental justice part of their mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.	Heads of agencies may petition the president for exemptions on the grounds that all or some of the petitioning agency's programs or activities should not be subject to the requirements of the order. No penalty for noncompliance.
Federal Worker Protection Standards of 1992 (amended in 1996)	Requires mandatory pesticide training of farm workers and the general reduction of farm worker exposure to pesticides through the use of protective clothing and hand-washing facilities. Requires notification of pesticide applications, decontamination, and restricts field reentry intervals after pesticide applications.	1996 amendments require pesticide training only every five years, and decontamination material (water) is required for only seven days after application of certain pesticides (reduced from 30 days). There is also a five-day grace period for the training of new workers.
Florida Statute, Chapter 487, Part I—Florida Pesticide Law	Regulates the distribution, sale, and use of pesticides to protect workers, citizens, and the environment from the adverse effects of pesticides.	Includes the same exemptions as the Federal Worker Protection Standards.
Florida Statute, 1996 Supplement	To assure that the application of any pesticide is not directly sprayed onto, or in any manner cause any pesticide to drift onto, any person or area not intended to receive the pesticide.	
Florida Statute, Chapter 487, Part II—Florida Agricultural Worker Safety Act (Repealed January 1998)	To ensure that agricultural workers employed in the state receive protection from agricultural pesticides and assure that workers receive information concerning pesticides. Assures that any worker who has been retaliated against for exercising any right under the EPA Worker Protection Standards by any agricultural employer may seek relief under ss 448.102-448.104.	

tionately affect the environmental health of minority and low-income populations.

Worker Protection Standards

The most recent protective law for addressing environmental problems related to pesticides is the Worker Protection Standards. In August 1992, the EPA promulgated the Worker Protection Standards for Agricultural Pesticides, its main method of implementing environmental justice for farm workers. As the EPA has noted, the purpose of these standards is "... to reduce the risks of illness or injury resulting from workers' and handlers' occupational exposures to pesticides used in the production of agricultural plants on farms or in nurseries, greenhouses, and forests and also from the accidental exposure of workers and other persons to such pesticides. It requires workplace practices designed to reduce or eliminate exposure to pesticides and establishes procedures for responding to exposure-related emergencies" (EPA 1996, 38151).

These standards require employers to adhere to strict regulations designed to ensure the safety of agricultural workers. These regulations require farmers to (1) provide written and/or oral information to agricultural workers stating the type of pesticide used on the crops being harvested; (2) provide personal protective equipment—that is, devices and apparel that protect the body from contact with pesticides or pesticide residues, including but not limited to coveralls, chemical-resistant gloves, chemical-resistant footwear, respiratory protection devices, chemical-resistant aprons, chemical-resistant headgear, and protective eyewear—for each farm worker; (3) restrict reentry of the workers into the fields after pesticides have been sprayed and advise each worker about spraying; and (4) provide facilities for the farm workers near to their work where they can wash their hands to clean them of pesticide residue and to use for emergency rinsing of the eyes and mouth. The Worker Protection Standards also prohibit farmers from exposing farm workers to pesticides through direct spraying or drift spray by airplanes or tractors.

In 1996, the EPA amended the Worker Protection Standards after receiving comments from farm worker and grower associations (Wilk 1996). In the new amendment, the EPA decided to maintain the five-year pesticide-retraining interval for farm workers and handlers, but created a five-day grace period for the training of new workers. That is, workers who had not received pesticide training within five years could work for five days without any training. The EPA cited the need for flexibility to address the practical concerns of growers with regard to the timing and cost of training. Additionally, the EPA indicated the costs

associated with retraining workers annually could be too burdensome for small farmers, who would pay a significant amount for trainers and interpreters.

The new standards also reduced the number of days for decontamination material (one gallon of water per person) from 30 days to seven days for pesticides, which have reentry intervals of four hours or less. The reentry interval is based on pesticides that require a minimum waiting period after application before individuals are allowed to reenter the fields. Thus, the new amendment does not require any decontamination material after seven days for pesticides with reentry interval of four hours or less.

Occupational Health and Safety Laws

The Occupational Health and Safety Act of 1970 provides farm workers who labor on farms with 11 or more workers with basic field sanitation facilities. This law was passed to ensure that American workers are not subjected to unsanitary or potentially unhealthy working conditions. However, the loopholes in the law allow some workers to slip through the regulatory cracks.

Although these laws have protection components, the exclusions contained in the laws limit the effectiveness of protection. The exclusion of farm workers from the federal laws highlights the lack of legal protection farm workers receive in the United States. The exclusion of workers from existing federal laws leaves farm workers at risk for many health and safety hazards, making it likely that some farm workers are being exposed to pesticides.

All of these protective laws illustrate the distinctiveness of pesticide-related policies because of their multifaceted, scientific nature. In order for these laws to have the intended effects, each policy must be implemented, monitored, and enforced according to the original intentions.

Florida Protective Laws

In compliance with the Worker Protection Standards, states must adopt policies to enforce the federal laws. Florida Statute Chapter 487, Section I (the Florida Pesticide Law) and Section II (the Florida Agricultural Worker Safety Act), are the key state laws pertaining to the Worker Protection Standards. Effective January 1, 1998, Section II was repealed and is no longer being enforced by the State of Florida. The statute had a sunset clause when first introduced, meaning that if it is not reintroduced, the law is no longer enforced. Florida will continue to enforce the Federal Worker Protection Standards. According to a 1998 interview with Dr. Marion Fuller, a former chief of the Florida Bureau of Pesticides, the purpose of the Florida Worker Protection Standards is to ensure that agricultural workers employed in the state are protected from agricultural pesticides and to assure that agricultural workers receive information concerning agricultural pesticides. She indicated that there are only two differences between the Florida law and the federal law: (1) the Florida law requires pesticide trainers to give workers copies of pesticide information brochures at pesticide training sessions; and (2) language included in the law on where workers should go for help in filing a grievance against an employer. In a 1997 interview, she stated that she does not feel that repealing the Florida law significantly weakened the Worker Protection Standards.

According to Chapter 487, Section 205 of the Florida Statutes, employers are required to make agricultural pesticide information available to any worker who meets certain criteria. These criteria cover workers who enter an agricultural-pesticide-treated area where a pesticide has been applied within the last 30 days, or workers who may be exposed to the pesticide during normal conditions. The 1996 supplement to Chapter 487 made it unlawful "to apply any pesticide directly to, or in any manner cause any pesticide to drift onto, any person or area not intended to receive the pesticide."

One of the weaknesses of the Florida statute is the pesticide-exposure-reporting requirement. The Florida Pesticide Law (Chapter 487.159 (2)) requires physicians to report all cases of illness or injury that result from exposure to pesticides to the local county Public Health Department within 48 hours. Chapter 487.175(1)(e) specifically states that an administrative fine of up to $10,000 will be imposed on individuals who fail to comply with the Florida Pesticide Law. However, within seven years of the implementation of the Pesticide Incidence Monitoring System, only two cases of pesticide-related illness have been confirmed in Florida. Davis and Schleifer (1998) contend the number of reported pesticide-related illnesses does not accurately reflect the number of farm workers harmed by the pesticides. The authors argue that California and Washington have much higher ratios of confirmed pesticide-related illness per number of cases reported in comparison to Florida.

In summary, there are a variety of federal, regional, and state agencies that must coordinate their efforts at the macro and micro level in order to implement, monitor compliance, and enforce three federal laws and the Florida state statutes. To achieve environmental justice for farm workers, this heterogeneous system must administer all of these policies while coping with the dynamic process that surrounds implementation, monitoring, and enforcement.

The Infrastructure of Environmental Agencies

The development of the infrastructure to deal with environmental protective laws and environmental justice illustrates the EPA's commitment in assuming a leadership

role to enhance environmental quality for all U.S. residents. Since the EPA was created in 1970, offices and divisions have been established to address enforcement and compliance issues. By 1992, more offices and divisions were assembled to deal specifically with environmental justice. The infrastructure includes the federal offices in the EPA, federal councils and working groups, 10 regional offices, and state and tribal pesticide regulatory and enforcement agencies, divisions, and bureaus. The purpose of this section is to explain this complex infrastructure.

Enforcement and Compliance Agencies

There are two main offices within the EPA that deal with pesticide-related issues. The Office of Pesticide Programs (OPP) was established to protect the public health and the environment from the risks posed by pesticides, to promote safer means of pest control, and to ensure that pesticides are fairly and efficiently regulated (EPA 1998). The OPP relies heavily on cooperative relationships with regional offices, state and tribal regulatory agencies, and other public and private organizations for the implementation of the Worker Protection Standards (EPA 1995a). It is important to note that the OPP is not responsible for the enforcement and compliance of the Worker Protection Standards.

The Office of Enforcement and Compliance Assurance (OECA) is the second office that deals with pesticide-related issues. The OECA is responsible for ensuring compliance with federal environmental statutes, which is achieved by regulatory enforcement, compliance assistance, and compliance incentives (EPA 1997a). The OECA's Office of Regulatory Enforcement provides environmental leadership to deter and correct noncompliance with environmental laws and oversees the Toxics and Pesticides Enforcement Division and regional enforcement programs (EPA 1997b). The Toxics and Pesticides Enforcement Division specifically enforces the Federal Insecticide, Fungicide, and Rodenticide Act, and, when violations occur, its works with the EPA's Office of Criminal Enforcement to take action against the violators (EPA 1997c).

Employees in the OPP and OECA work closely with employees in the 10 regional offices around the United States. The State of Florida is in region four, and the main office is in Atlanta, Georgia. The regional administrator oversees eight offices and divisions, one of which is the Air, Pesticides, and Toxics Management Division , which includes the Pesticides and Toxic Substance Branch and the Air Enforcement Branch. These branches work primarily with the various states in region four to develop enforcement and compliance policies and guidelines that are based on federal and individual state statutes.

The Florida state agency structure for enforcement and compliance for pesticide-related laws begins with the Department of Agriculture and Consumer Services. The commissioner of this department oversees the Division of Agricultural Environmental Services, which includes the Bureau of Pesticides. The chief of the Bureau of Pesticides is primarily responsible for monitoring pesticide use in Florida, and the Agriculture and Consumer Services Department is primarily responsible for enforcement of the state statutes. If a violation is identified, the state attorney's office is contacted, and the appropriate jurisdiction office is responsible for prosecuting the offender.

Overall, there are seven federal agencies, four regional agencies, and four state agencies that deal in some way with the implementation, compliance monitoring, or enforcement of federal and state protective laws. There is no single agency that is responsible for implementing, compliance monitoring, and enforcing the laws; therefore, coordinated action has to occur at the macro and micro level in this heterogeneous system.

Environmental Justice Agencies

Added to this system are the departments and divisions that focus on environmental justice, making the infrastructure even more complex. The Office of Environmental Justice was established in 1992 and is housed within the EPA's Office of Enforcement and Compliance Assurance. Its broad mandate is "to serve as a focal point for ensuring that communities comprised predominately of people of color or low-income populations receive protection under environmental laws" (EPA 1997e). The Office of Environmental Justice works with the enforcement divisions in OECA to ensure the enforcement and compliance of environmental justice issues. The EPA regional offices have established environmental justice coordinators. In region four, the environmental justice and community liaison serves in this capacity and is housed in the region's Environmental Accountability Division. The State of Florida does have a Department of Environmental Protection, but there is no specific office that is responsible for environmental justice issues. Although most of these agencies do not have enforcement responsibilities, they do provide information about enforcement-related problems. As a result, these groups have an impact on the implementation of protective laws.

Based on the various federal and state laws and the infrastructure of the agencies that are responsible for implementing environmental pesticide laws, it appears there are good intentions with respect to protecting farm workers. However, the complexity of the laws and the disjointed nature of the federal and state agencies may very well lead to implementation problems. Although an in-depth study of the implementation processes of these agencies may help to understand the implementation tribulations, it is beyond the scope of this study. In order to assess whether the in-

tended purposes of the laws are actually protecting individual farm workers, a case study on this occupational group in South Florida is presented in the next section.

Methodology

Florida is an ideal place to gather data on farm workers because it is one of the top three agricultural states in the United States. However, accessing farm workers to participate in a study of this nature was an intricate problem. Most farm workers are migratory and are only available to be interviewed during the harvest season. The harvest season in South Florida is from January to May. Most farm workers live on the farms where they work, and employers do not allow researchers in the fields or near the homes. Because of the difficulty in gaining access to the farm workers, it was impossible to obtain a random sample. Caution should be paid to generalizations drawn from this study to the larger population of farm workers.

For this study, access to the farm workers was made possible through the collaborative effort of three nonprofit organizations (Redlands Christian Migrant Association, East Coast Migrant Head Start, and the Coalition of Immokalee Workers). Data collection took place during 1997 and 1999 at child care centers and at the Immokalee Farm Worker Coalition headquarters. In February, March, and April of 1997, the first set of interviews took place in Palm Beach and Indian River counties. The survey administration sites were located in Belle Glade, Delray, South Bay, and Pahokee in Palm Beach County and in Fellsmere in Indian River County. In April and June of 1999, the second set of interviews took place in Immokalee in Collier County. Each survey was administered during a face-to-face interview. Because of the low literacy rate of the farm worker population, all questions were read in full to each subject. Surveys were administered orally in three languages—Spanish, Kreyol (the language of Haiti), and English—by interviewers who were proficient in the appropriate language. Ninety-nine percent of the surveys were administered in a language other than English.

At one child care center located on a private farm, the research team was asked by a farm owner to stop the surveys and leave the property. This type of hostile response by farm owners emphasizes the difficulty in gathering data on farm workers. One hundred nine surveys were administered in Southeast Florida in 1997, and 78 were administered in Southwest Florida in 1999.

The requirements of the protective laws were used as the foundation for the survey questions. The first part of the survey included general demographic and occupational information questions. In the second section, questions pertained specifically to the law requirements and to the farm workers' experiences related to pesticide exposure. These questions focused on pesticide exposure through reentering sprayed fields prematurely, farm worker knowledge of pesticides used, being in a nearby field when other fields were sprayed, wearing protective equipment, and the availability of field sanitation facilities.[1] Each question pertained to the farm workers' experience during the last year.

Results

Descriptive

A total of 178 farm workers were included in the analysis. The majority (89 percent) were Hispanic, 9 percent were black, 1 percent were Asian, and 1 percent were white. The majority (56 percent) were born in Mexico, 24 percent were born in Guatemala, 10 percent were born in the United States, 6 percent were born in Haiti, and the remaining 4 percent were born in other countries. Eight percent were age 11–20, 47 percent were age 21–30, 30 percent were age 31–40, 13 percent were age 41–50, and the remaining 2 percent were age 51 or older. Thirty-six percent were female, and 64 percent were male. Twenty-six percent reported annual incomes of less than $7,000, 27 percent had incomes of $7,001–$14,000, 24 percent had incomes of $14,001–$21,000, and the remainder of the sample had annual incomes of more than $21,001. The majority of the sample (48 percent) worked on one farm, 24 percent worked on two farms, and the remainder worked on three or more farms.

Results for Federal and State Laws

Executive Order 12898 requires all federal agencies to make achieving environmental justice part of their mission by identifying and addressing disproportionately high and adverse human health or environmental effects of programs, policies, and activities on minority and low-income populations. The Worker Protection Standards, implemented by the EPA, focus specifically on the general reduction of farm worker exposure to pesticides. The main purpose is to eliminate direct spraying as well as "drifting," which occurs when pesticides are applied on nearby fields. In addition, the Worker Protection Standards require farm workers to be informed about the last time the fields were sprayed before they reenter the fields. Based on the sample of Florida farm workers, 10 percent were directly sprayed with pesticides while they worked in the fields, and 64 percent reported that an airplane or tractor had applied pesticides on the crops next to the fields in which they were working. The results for the entire sample reveal that 82 percent did not know when the fields were last sprayed with pesticides before they reentered the fields.

The Worker Protection Standards also require employers to provide training to workers about the specific types of

protective clothing that should be worn while working in the fields. Training was provided in a variety of formats, including an information booklet, video, sign, and oral information. When asked if the subjects had received pesticide training, 53 percent responded they had received pesticide training, and 45 percent responded they had not. The most widely used form of training was the video, with 36 percent of the subjects responding they had received training in this format. Eleven percent received training orally, and 28 percent did not know how they received training.

Protective gear is important for subjects to wear when working in the fields. The best protective gear for the head is a cap and a mask or scarf; however, only 6 percent of the sample indicated they wore both a cap and mask or scarf. Seventy percent indicated they wore a cap only. An alarming 18 percent indicated they did not wear any protective headgear. The best protective gear for the body is long sleeves and long pants, and 36 percent of the sample said they did wear these items. However, the remainder of the sample indicated they wore either a short-sleeved shirt, short pants, or both.

The Occupational Health and Safety Act of 1970 requires employers to provide basic field sanitation for workers. Basic field sanitation includes toilets, drinking water, and hand-washing facilities. Nearly 28 percent of the farm workers were not provided hand-washing facilities, indicating a possible route of exposure to pesticides. Without a place to wash their hands, farm workers are likely to expose themselves to pesticides when eating or smoking. Twelve percent of the subjects were not provided restrooms when working in the fields. When farm workers are not provided bathroom facilities while working in the fields, they have no other option than to urinate and/or defecate in the fields. Clearly, this can lead to unhealthy working conditions.

Chapter 487 of the Florida Statutes requires employers to make agricultural pesticide information available to workers by providing information about the types of pesticides that were used on the crops they harvested. Of the entire sample, 95 percent did not know what type of pesticide was used on the crops they harvested.

Overall, the findings indicate the majority of federal and state laws are not having their intended effect in the State of Florida, and, as a result, farm workers are not being protected from pesticide exposure. Many farm workers believe they have been exposed to pesticides. The majority of the sample did not have knowledge of when the fields were last sprayed with pesticides or what kinds of pesticides were used on the crops. This study also demonstrates the vulnerability of farm workers in South Florida to pesticide exposure from direct and indirect airplane and tractor applications.

Discussion

The findings of this study reveal that protective laws aimed at reducing environmental hazards for farm workers in South Florida are not being effectively implemented in the State of Florida. As a result, the goals of Executive Order 12898 are not being achieved by the U.S. Environmental Protection Agency. It is evident from this study that the environmental risk of farm workers in Florida is a clear health and safety problem, and the farm workers continue to have a high risk of exposure to pesticides in the fields.

This research project identifies several inadequacies in the policy process. First, the pesticide-application-monitoring system needs to be improved. The study reveals that farm workers are at risk of exposure to pesticides through direct and indirect pesticide application. A better system of record keeping should be implemented to document when pesticide spraying occurs and to ensure that farm workers are not in the fields when pesticides are applied to any fields in the vicinity. The EPA should consider developing a system that restricts farm owners from spraying pesticides on their fields when farm workers are working in nearby fields. Therefore, it is recommended that the EPA develop a monitoring system to determine the time and frequency of pesticide spraying on specific farms in the United States, and farms that violate restricted guidelines set forth by the EPA should be fined. A monitoring system could involve on-site observations by regional EPA officials or through EPA grants to local organizations.

Second, more attention at the federal and state level needs to be given to the language barrier and low literacy rate of farm workers. The high number of farm workers with no knowledge of the types of pesticides used on the fields and the lack of use of protective clothing may be related to the lack of proper pesticide training. The low literacy rates of the farm workers and their lack of English-speaking skills present a problem when trying to communicate important health and safety information.

Third, increased resources are needed to enforce existing laws, such as Executive Order 12898, Title VI of the Civil Rights Act, the Federal Worker Protection Standards, and Florida Statutes Chapter 487. All of these laws lack proper enforcement in South Florida. The results of this study were brought to the attention of the Dale Dubberly, chief of the Bureau of Compliance Monitoring for the Florida Department of Agriculture and Consumer Services, and Kevin Keaney, branch chief for certification and worker protection at the EPA's Office of Pesticide Programs. Mr. Dubberly was asked about the possibility of improving enforcement through increased monitoring efforts. Mr. Dubberly's response was there is not enough funding by the State of Florida or the federal government to hire state officials to monitor the spraying of pesticides on crops in

Florida. Mr. Dubberly acknowledged there are problems with the training of farm workers, but without proper funding little can be done. Mr. Keaney acknowledged the inconsistencies in the way the laws are implemented and enforced. He stated that the EPA is currently in the process of forming a work group made up of various stakeholders, such as workers' advocates, growers, and state and federal officials, to do a major national assessment of the current problems with the implementation of the Worker Protection Standards.

Finally, penalties for noncompliance with the laws need to be more clearly stated. Currently, Executive Order 12898 lacks fines or administrative penalties for noncompliance—thus, there is little incentive to comply. If the protective laws are to be implemented in an effective and fair manner, then more resources are needed for enforcement and compliance.

Conclusion

Farm workers in the United States are one of the least statutorily and constitutionally protected occupational groups in America today. As a result, farm workers are provided unequal protection under the law, which, in turn, leads to environmental injustice. Whether the resultant unequal protection under the law is intentional cannot be determined by this study. However, the results of the study indicate this minority occupational group bears an undue burden of environmental pollution.

Clearly, more research needs to be completed on this occupational group and the protective laws. This study has not determined the actual amount of exposure to pesticides that farm workers experience. A longitudinal study of the workers would be required, which would include cholinestrease testing (testing of blood to determine actual exposure to pesticides). Although this would be difficult to do, it is necessary to fully understand the impact of environmental hazards on farm workers.

In applying Title VI of the Civil Rights Act of 1964 and Executive Order 12898 to the case of farm workers in South Florida, one could argue this occupational group suffers from discrimination due to a lack of equal protection under the law. If more regulatory attention is not given to these hard-working individuals, they will continue to suffer from pesticide exposure and a lack of protection under the law, which keeps them on the periphery of society and continues to allow them to be one of America's most vulnerable occupational groups. This study demonstrates that environmental justice does not exist for those South Florida farm workers interviewed for this study.

Note

1. Sample questions used on the worker survey were:
   (1) In the last year in Florida, have you ever been sprayed directly with pesticides?
   (2) In the last year in Florida, have you ever been working in the fields in Florida while pesticides were being sprayed on a nearby field?
   (3) In the last year, has an airplane or tractor sprayed near to where you were working in the fields in Florida?
   (4) In the last year in Florida, did you know when you entered the fields when they were last sprayed with pesticides?
   (5) In the last year, while working in Florida, did your boss give you any training about pesticides?
   (6) In the last year in Florida, was there a place for you to wash your hands at work?

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