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Title: Teaching Pesticide Safety Techniques to farmers and their families in Cahuasqui: A rural farming community in the Ecuadorian Andes.

Abstract: Cahuasqui is the community where a volunteer service of two years was conducted from 2006 to 2008 as an agricultural extension agent with the US Peace Corps. The primary points of interests the community was seeking were organic agriculture, small business skills, and crop diversification. As the two years unfolded, a deeper understanding of traditional farming meshed with industrialized farming was seen. Projects initiated were in the areas of organic agriculture and small business as the community wanted. Large amounts of pesticides are applied with zero to minimal protective clothing and apparent disregard to the dangers of these chemicals. Many reasons might support this such as a lack of Integrated Pest Management concepts or full understanding of the agrochemicals they are applying. This study is to look at a group of 41 farm owners and 12 farmworkers to evaluate their understanding of pesticides at a basic level and if their knowledge can be increased to help protect their health along with their family by giving them basic pesticide safety awareness classes modeled after the Environmental Protection Agencies curriculum for farmworkers in the US.

Objectives:

- Interview farmers/farmworkers and give the Environmental Protection Agency's (EPAs) pesticide safety training
- Evaluate scores to see if farmers understood and learned about pesticide safety through the use of pre and post-tests.
- Talk with local health clinic to see if they can assist in training or further dissemination of safety material

Hypothesis

- Working with small groups and individual farmers to teach about pesticide safety can reduce pesticide exposure and health problems.

Introduction to Ecuador and the community of Cahuasqui

Ecuador's population is very diverse and is characterized by a high percentage of mixed race and indigenous people: mestizo (mixed Amerindian and white) 65%, Amerindian 25%, Spanish and others 7%, black 3%. The majority lives in the inter-Andean central highlands ("Sierra"), many of which do not speak Spanish but only the native Quechua. They are largely farmers, and in many cases practice old agricultural traditions as in the community of Cahuasqui as noted in photo one. The number one economic option in Cahuasqui is agriculture.



Photo 1: Three generations creating furrows

Ecuador is predominantly agricultural (Ecuador, 2010), despite oil having become its main source of revenue and industry having expanded substantially. Agriculture employs over 26 percent of the workforce and provides 6.5 percent of the gross national product (CIA World Fact Book). However, rural Ecuadorians are predominately still working the land with the associated risks that farming employs. Hazardous conditions, risk associated with heavy machinery, toxic chemicals, and the financial risks associated with agriculture in Ecuador where market values can be profitable one day then drop significantly the next hamper the life of a rural farmer.

Land ownership history in Ecuador was an unfair system built by the Spaniards. Current land ownership throughout the country evolved from a land reform law and expanded farm ownership to many rural farmworkers. The older agricultural system was based on Spanish colonial feudal systems and was first implemented in the Sierra where the Spanish encountered large native populations that gave rise to a predominance of small plots and farms (Thiesenhusen, 1989b)

Large-scale agriculture developed later in the Coast where rice and banana are grown on large-scale industrial farms. This land reform law, enacted in 1964, outlawed systems inherited from colonial times and set up the Ecuadorian Institute of Agrarian

Reform and Settlement to administer the law and to allow for land redistribution to farmers (Peek P, 1980).

In Ecuador at that time there were estimated to be 749,000 peasant families and 78,088 benefitted from land reform, a 10.4 percent change. Land reform history in the community of Cahuasqui cannot be found by talking to local elders so it will be assumed that present day ownership was not acquired by the land reform laws that occurred only 40 years ago. If this community did not go through this reform one reason could be its topographic properties, which isolate the community from acquiring expansive amounts of land that could have been used to create the large haciendas of the past.

Farm Size in Ecuador and Cahuasqui

Forero and Galeano (2010) estimated the distribution of smallholdings of less than 10 ha and of 20 ha in Ecuador, with data from the 2000 Agricultural Census. They conclude that there are 635,000 family farms in the country, of which 84% are of less than 10 ha. (Forero, J., and Galeano, J. 2010).

Based on the census data of 1964 and 1974, IERAC handed over a total of 2,280,000 hectares of territory in Ecuador, about 500,000 hectares of which came from haciendas. In 1954 1,400 families (0.4% of all farms) owned farms larger than 500 hectares, which represented about 45 percent of all cultivated land in the country. Meanwhile, about 90 percent of farm families cultivated small farms (areas of less than 20 hectares). By 1974, the number of landholdings over 500 hectares had dropped to just over 100 families, with about 500,000 hectares being distributed in the favor of smaller holders.

The three northern provinces of Carchi, Pichincha, and Imbabura were the greatest beneficiaries of land reform. Carchi led the way, with 92 percent of *campesino* groups receiving about 41 percent of all arable land, followed by Pichincha (30% receiving 27% of land) and Imbabura (24% receiving 24%). Reference

Farm size in Ecuador tends to be small under 5 hectares represented by 63 percent of all holdings, but occupied only 6.3 percent of the agricultural land in Ecuador. Cahuasqui community members represent this statistic as property size ranges from very small areas of a few hundred squared meters to around five hectares (Benavides conversation). German Benavides is a local farm owner in Cahuasqui. Possible reasons for this distribution of land size could be based on its population size (1200) and the topographic properties of Cahuasqui. Cahuasqui is surrounded by two rivers, the Pala Cara and Rio Mira, which have eroded river beds deep enough to create a land plateau that roughly consists of 350 hectares. This does not allow for expansion into new lands thus creating a farmed territory comparable to

an island.



Photo 2: Community of Cahuasqui.

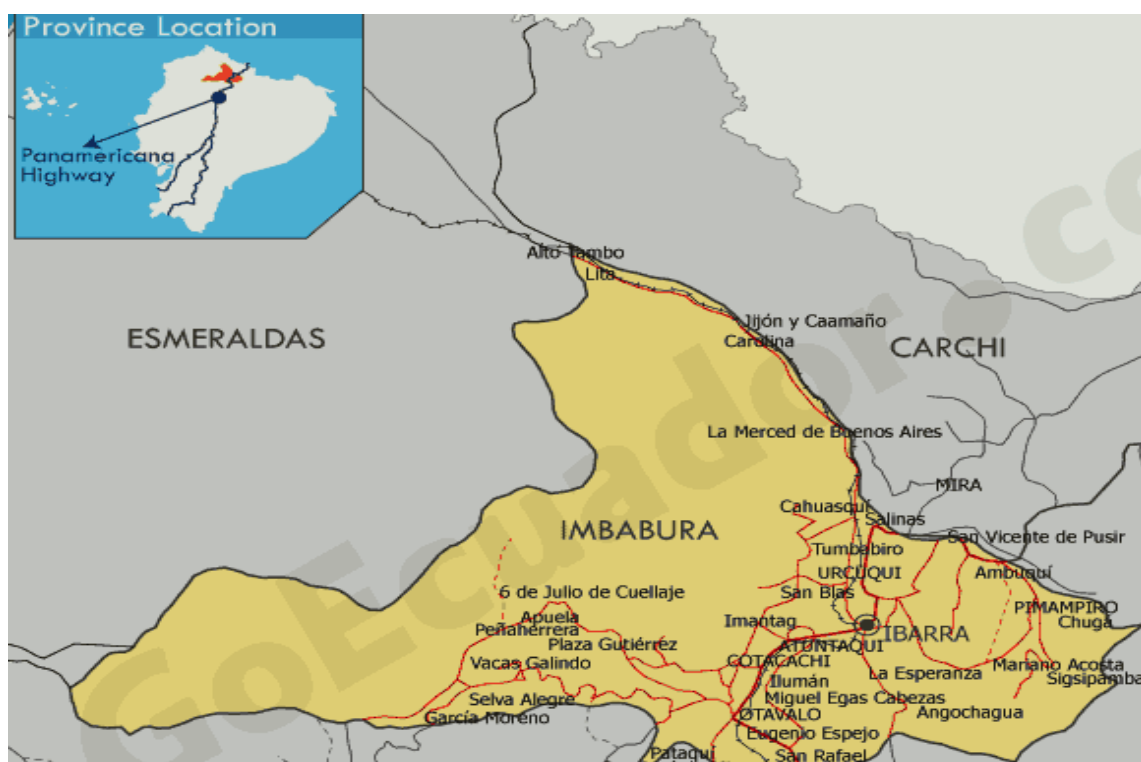
History and Social Economics of Cahuasqui:

Cahuasqui is a rural agricultural community located in the province of Imbabura, Ecuador in the northern Andes. The population relies on agriculture for their primary income. Cahuasqui is a vibrant small town with the main economic activity being driven by agriculture but is slowly changing to accommodate for the demands of the younger generations that do not want to continue in agriculture when presented with other opportunities. As a result small retail businesses have taken advantage of the new economic interests the younger generation seeks.

Internet cafes are in operation in the community along with small shops that sell clothing to the young teenage generation along with music. In addition, two shops are now selling agrochemicals in town and recently a small hardware store has opened within the past two years. Upon arrival in April of 2006 only a couple of dining options existed outside the home but present day offers numerous options throughout the week and with more restaurants opening up just on the weekends to cater to the influx of visitors coming from the adjacent communities located higher in the surrounding mountains.

The community's focal point is a large catholic church in the center of the

community, which is very common in much of Latin America stemming from the Spanish introduction. This tends to be the focal area for people to gather for religious festivals, town festivals, and weekend leisure activities. A preschool, kindergarten, elementary school, and high school are all located in the community creating a place to study in addition to the various levels of economic activity. Cahuasqui is a small community but large and vibrant enough that these services exist. Many smaller communities are not large enough to support high schools or elementary schools and these communities seem to be stagnant without many options available for the residents.



Map 1: Province of Imbabura and Cahuasqui located north of Ibarra.

The history of Cahuasqui dates to Pre-Incan times with the past indigenous inhabitants farming year round in a system that could have included more sustainable agricultural practices for soil health as no chemical fertilizers or pesticides were available. Current local residents are not indigenous but mestizos who speak Spanish. They describe the indigenous who lived here as “poor Indians”, as they did not have the gold or wealth as other Indians have had. Similarly, many in the community live with and face similar challenges compared to the ancestor’s of Cahuasqui in terms of poverty and ensuring a harvest that can sustain the family while

providing for other possibilities to their children. Most of the young community members who finish high school do not want to remain in the community as the only options for work remain in agriculture at the present time. The common trend occurring is to leave town and head to the city in search of an alternative lifestyle not connected in agriculture. This is due to the reality and perception that agriculture is dirty and dangerous along with the idea that the city offers better options.

The current non-indigenous population does not share the language and culture of the past people but they do share the connection to the same land to extract their livelihood. Current agricultural practices are very different and the majority of farmers are applying agrochemicals to ensure a harvest large enough to sustain their family, however they are at risk for pesticide exposure or the entry of pesticides into their bodies, which can cause a wide spectrum of symptoms and conditions.

Two years of living in Cahuasqui and working with farmers as a Peace Corps volunteer has enabled me to understand and discuss their farming practices. A quote from a local farmer was,

- “If you don’t spray you won’t have a harvest.”

This attitude about pesticides is very common in Cahuasqui as no other form of agriculture was practiced upon my arrival. It has been described that pesticide dependency is one unexpected and undesired outcome of science and development policy, with health consequences globally (Dasgupta et al., 2002; Eddleston et al., 2002).

Integrated production-health analysis studies conducted by Antle et al. (1994) found that pesticides caused serious health consequences that undermine the economic value of industrial agriculture or the benefits of modern agriculture, especially with the use of toxic pesticides.

Serious incidences have occurred in this community with the application of pesticides as I questioned farmers about their pesticide use throughout my volunteer time and upon subsequent visits in 2010 and 2012. An example is Juan Tapia a local farmer who shared his story of being hospitalized due to pesticide exposure while being exposed to pesticides spraying with a backpack sprayer. Most residents do not wear personal protection equipment (PPE) and often pay for the consequences economically by time away from work or with adverse bodily reactions due to the symptoms of pesticides exposure. These range from headaches, dizziness, excessive sweating, vomiting, cramps, and rashes, and even death in the short term. Long-term hazards of pesticides have been connected to birth defects while some studies suggest a link with Parkinson’s disease.

Poverty in Ecuador and Cahuasqui

The poverty rate in Ecuador (according to the ENEMDU's national poverty line, which is published by the INEC) declined from 37.6% in 2006 to 28.6% in 2011 whereas extreme poverty fell from 16.9% in 2006 to 11.6% in 2011 (World Bank). The GNI (Gross National Income) in 2010 was \$3,850, which is significantly higher than rural landless farmworkers who earns \$2640 a year based on the ten dollar a day wage and a six-day workweek with Saturdays usually consisting of half a work day.

There are very few families that totally depend upon working for other families, as only a few families do not own any land in Cahuasqui (Benavides conversation). The community of Cahuasqui tends to have higher rates of poverty compared to urban dwellers based on their agricultural economy along with landowners tending to have smaller farms, which limits production.

On-farm activities generally provide 40-90 percent of household income (Candill, Bremner and Vohman, 2001), and this is especially true for the community of Cahuasqui. Very few farmers are skilled in other professions that allow them to receive income from another trade.

A local farmer named Ubaldo Almeida describes agriculture as;

- "...playing the lottery, sometimes you win with a good price, and other times you earn nothing".

Education levels of Farmers/Farmworkers in Cahuasqui

The educational background of the 53 agricultural workers in this study was limited to a grade school education, which stops at the sixth grade. Not one had a high school diploma but all were literate at a basic level. The lower educational levels most likely hampers the understanding of the dangers of applying pesticides and might be linked to higher pesticide exposure rates. Pesticide exposure is contact with pesticides and the entering of them through the body via nose, mouth, skin, or eyes.

If a harvest is smaller than expected due to insect damage or low market price, the family will be in a precarious financial state, which might be a contributing factor in farmers applying large amounts pesticides. Many farmers and their families' worldwide have suffered adverse health effects as a result of their continual exposure to chemicals (Cole et al., 1997a and b; Cole et al. 2002), which negatively influenced the economy of farm management (Antle et al., 1994; Antle et al., 2003). While agricultural modernization brought increased production and wealth in the short-term, ultimately it undermined the stability of agro-ecosystems and worked against the economic interests of rural families, leading to collapse.

Farm Organization and Farming Practices

With the modernization of agriculture reaching far corners of the world, the common growing practices of the past have been traded for the convenience of applying chemical fertilizers and pesticides at the expense of human and environmental health. Most farmers work small plots consisting of less than an acre to five acres and are mono-cropping to earn their income. Farm size and habits were understood by working and living with the community of Cahuasqui for two years. Studies by Forero have shown that in Imbabura landholdings of less than 10 Hectares is 78% while farms of 10-20 Ha is at 8% Source: Agricultural census (2000)

Their reliance on a mono-crop for their income increases their likelihood that they will continue to use agrochemicals to ensure a productive crop with minimal insect or pest damage, which the market demands. Based on research in the American Midwest, Cochrane (1958) coined the metaphor of the “agricultural treadmill” to describe the self-defeating process of innovation and debt associated with modern agriculture, especially when a large number of farmers produce the same undifferentiated commodity. Under such conditions, no individual can influence prices (i.e., farmers are “price takers”), so competitiveness depends on improved productivity through on-farm innovations that increase production per area or decrease costs.

This occurs in Cahuasqui because everybody is planting the staple crops of beans and corn at the same time as other farmers in neighboring communities and provinces. Their crops go to the large regional market and are not solely used for feeding the family. This puts them into this “agricultural treadmill” and they are continuously looking for new technologies, fertilizers, or chemicals, to use to gain an advantage.

Climate in Cahuasqui

Temperatures in Cahuasqui do not vary greatly with the hottest temperature reaching 21 °C and the coolest temperature at night with 10 °C. Temperatures can be quite different from early morning to afternoon with the intense sun and thus allows for a cultivation of a large variety of crops. The almost vertical sun in the higher Sierra region allows the land to warm quickly during the day and lose heat quickly at night. This inter-Andean region has a rainy season that extends from October to May, and the driest months are June through September with maximums of 1,500 to 2,000 mm along the mountains.

The climate of Cahuasqui located in the Sierra is divided into levels based on altitude. The tropical level--400 to 1,800 meters--has temperatures ranging from 20 °C to 25 °C and heavy precipitation. The subtropical level-- 1,800 to 2,500 meters--has temperatures from 10 °C to 21 °C and moderate precipitation and this includes the community of study of Cahuasqui which has an elevation of 2400 meters. The rainy ("winter") season, lasts from January through June, and the dry season or summer from July through December. Most rain falls in April.

Common Crops in Cahuasqui

Cahuasqui continues to plant the traditional crops that the previous indigenous population planted for survival. Corn and beans are the two most prominent crops still planted today in this community as in many parts of the world. Seed is saved from one harvest to the next and has been enhanced through generations from this seed saving process. Corn is planted in the rainy season and beans follow the corn planting.

In the province of Carchi situated to the near north of Imbabura, potato farmers invest more money in potato than they do on any other crop (Crissman et al., 1998). This was a huge mono-cropping region of potato. Potato is still grown in the region but with less toxic pesticides due to the ban on red-labeled pesticides by Ecuadorian agencies which will be explained later. The most recent 2004 census showed that only 6,179 hectares in Carchi were planted under potato. Carchi is Ecuador's most productive province, producing about 40 percent of the country's potato harvest on only 25 percent of the land dedicated the crop.

Cahuasqui does plant potatoes but more for home consumption and not as a cash crop. Tomato is being planted in large areas and is similar to potato as it is fumigated highly. Tomato farmers who were asked about spray regimes said they sprayed at least every eight days or sometimes every five days if the pest or pathogen is bad. The Carchi region experienced serious problems with pesticide exposure to the average farmworker during the 90s and early 2000s and has been a region that has received international support in understanding why exposure rates are so high and what alternatives exist to limit spraying (Sherwood 2009). Most potato farmers were applying with backpack sprayers, which is the most common method of spraying used in Cahuasqui. This tends to increase exposure rates due to application of overhead branches while spraying fruit trees or the spraying of corn and beans. I have seen many backpack sprayers that leak onto the backs of the sprayer increasing exposure time to the pesticides.

Roughly 15 years ago an agronomist introduced the crop asparagus and many have switched from the traditional corn and bean rotation to this long-term crop. For many it has been promising. See Table 1 for crop list.

Rather than relying on fluctuating market prices for their corn or beans, asparagus growers have grouped together and sell directly to an intermediary who exports the asparagus. The growers receive a fixed price per kilogram, which averages around \$1.20. Asparagus has helped many families increase their income and many have been able to send their kids off to the city to study at a better high school or to attend university. One draw back of planting asparagus is the initial waiting time of at least one year before a harvest can be sold and income earned.

Principal Crops:	Secondary Crops
Beans	Tomatoes
Corn	Calla Lilly—since 2012—one grower
Asparagus	Avocadoes
Tree tomatoes	Citrus fruits
	Potatoes
	Green Peppers
	Cherimoya fruit
	Various vegetables (carrots, cucumbers)
	Various fruit from trees: Babacos, peaches

Table 1.



Photo three: Workers processing asparagus.

Roles of Men and Women on the Farm

Men and women in Cahuasqui perform separate farm tasks in the function of the family farm. Men are the only persons to spray the pesticides and are the primary workers who do the weeding, watering, and creating furrows for planting using animals. Men also drive the tractors to till the land. Women in Cahuasqui tend to assist in planting the seeds, harvesting, and crop management such as stringing beans or tomatoes. Hand tools are still predominately used for all tasks. The azadon or hoe is the most common tool, which is a flat spade like tool used for weeding and directing the flow of water during irrigation through manipulation of the furrows. The role of women in farming in indigenous cultures is different compared to the mestizo culture.

Roles on the Farm

- **Men:** Spraying of Pesticides, Weed, Water, Plow, Sell produce
- **Women:** Plant, Harvest, small amounts of weeding with azadon

The Roles of Pesticides in Ecuador and Cahuasqui

During the 1980 and 1990s Ecuador's exchange rate policies acted as subsidies to the importation of pesticides, which included the highly toxic carbofuran and methamidophos at least by 30 percent (Lee and Espinosa, 1998). This made many chemicals more widely available and thus created a farmer that is more reliant upon them compared to the past thus creating more hazardous risks associated with farming.

Pesticide use is determined not only by the collective decisions of individual farmers, but also reflects national economic and environmental policy. The price and availability of pesticides, which in Ecuador are almost entirely imported products, was highly subsidized until the late 1980s and early 1990s via a number policy instruments, including:

- Tariff rates much lower than those applied to other imported goods;
- Preferential access to foreign exchange for imported pesticides when the official exchange rate of Ecuadorian currency, the *sucre*, was maintained above its effective value;
- Subsidized credit, usually available only to larger agricultural operations which typically make greater use of pesticides;
- Exemptions or reductions of taxes;
- Government-supported research, training and extension programs favoring chemical control (Lee and Espinosa 1998, p. 130).

Some policies noted above remain in effect, such as exemption from some taxes, but overall pesticide subsidies have been significantly reduced (Lee and Espinosa 1998).

In a previous community visit during January 2011, some of the male farmers were questioned about pesticide usage and illness. The majority of farmers questioned have experienced negative reactions through pesticide exposure, with some serious enough for hospitalization.

Past studies have shown that IPM approaches and education in the northern province of Carchi, which is near Imbabura, have reduced pesticide usage without affecting yields (Sherwood S. 2009). The interesting part of Sherwood's research is

that Farmer Field Schools or FFS have proven to be effective when applied but did not reduce the usage of the most toxic pesticides. Farmer Field School methodology – a higher order interactive learning approach that employs well-established principles of adult education, in-depth knowledge of agroecology, and social organization – has won recognition as state of the art for enabling the transformation of agricultural practice, especially with regard to pesticide use reduction (Van den Berg and Jiggins, 2007). One of his conclusions is that the use of highly toxic pesticides will only stop once the government imposes restrictions on them.

In 2010, after years of concern from different health groups, Ecuador banned the use of red labeled pesticides therefore removing a class of toxic pesticides out of reach for the common farmer who was previously mishandling them. Announced as an act of support for its constitutional commitment to food sovereignty, the Ecuadorian Congress banned an entire category of highly toxic pesticides, slated to take effect September 30, 2010. Ecuador cancelled the registration of all pesticides assessed by the World Health Organization to be extremely or highly hazardous, including many familiar and controversial pesticides that continue to be used in the U.S, such as the *organophosphates* and *carbamates*. This is a decision that has given many farmers I have spoken to encouragement that there is less poison in their communities. During a visit in 2010 I recall a conversation with a young man from Cahuasqui studying agronomy at a University in Carchi about pesticides and he reiterated that all red-labeled pesticides were banned from Ecuador. He was glad these chemicals were not going to be imported in Ecuador and used in his community of Cahuasqui.

Shared History between Volunteer and Community

From the years of 2006 to 2008, a volunteer service was completed as a member of the Peace Corps working in sustainable agriculture in the community of Cahuasqui. Pesticide safety and its seriousness was not something local government or other entities were focusing on to promote awareness, despite health related incidences due to pesticide exposure. The standard practice of spraying pesticides in Cahuasqui is one of disregard to personal health but with awareness that these chemicals are dangerous. I have never witnessed a farmer spraying with adequate protective gear. Unfortunately just the opposite occurs; most commonly a backpack sprayer is used along with a t-shirt wrapped around the head and face to mimic protection or to offer the user a sense of some protection.

The experiences throughout the two years of working with small farmers and seeing their health hazards and farming practices has prompted the initiative that in order to increase overall health of farmworkers in Cahuasqui, pesticide safety education could play an important role in benefitting the health of the farmworker and family.

Pesticides are not only left in the field but reach homes as well, increasing the chances of cross contamination (Antle et al., 1995). All farmers in this community use pesticides based on my observations and conversations and many hold the notion that without these chemicals and fertilizers, one could not produce. This use of applying copious amounts of pesticides without proper knowledge has disrupted natural mechanisms of control, thus increasing insect pests and disease and can create opportunity for secondary pests (Pumisacho and Sherwood, 2002). Chemical modes-of-action and insect resistant are areas not well understood or not at all in Cahuasqui as most men in agriculture have a grade school education.

Sustainable Agriculture in Cahuasqui

Demonstrations of sustainable agriculture on a small scale were conducted and incorporated the common principles of this type of agriculture to show the community that farming without the use of dangerous chemicals is possible. Compost production, crop rotation, companion planting, correct identification of insects, green manures, and scouting were topics covered in hands on practices and through informal classes conducted at night in the community. A community garden was created at the Kindergarten, which incorporated all of the above principles and showed parents how to produce without these agrochemicals. The majority of farmers cultivate using methods of industrial agriculture and their belief is that they are necessary and there are not other options for them. However, only a few generations back, the farmer's of Cahuasqui were cultivating without these chemicals and the older farmers talk about how harvests were good and there were less threats from insects or pathogens. They also mention that the rains were more reliable and one could plant on exact dates as compared to current times being described as less predictable and with many more pests than before.

The introduction of sustainable agriculture throughout the two years of volunteer service was a way to convince and change the opinion that agrochemicals are not the only options to cultivate. Many farmers mono-crop their land and with their earnings purchase vegetables and fruits at market instead of growing them for themselves on their land. The idea of sustainable agriculture was not only to better the health of the agricultural worker but also a way to reduce input costs from the agrochemical side and a way to reduce food costs.



Photo 4: Volunteer and kids at community garden.



Photo 5: Industrial shredder bought with grant money to increase compost production.



Photo 6: Organic garden at local Kindergarten.



Photo 7: Compost made with local organic materials and special bacteria that reduces composition time to one month.



Photo 8: Local parent displaying organically produced cabbage at Kindergarten.

Upon revisiting the community in December 2010, farmers were questioned about their pesticide use and experiences with regard to health and safety. Most farmers were aware that pesticides are toxic but did not show adequate knowledge about correct pesticide awareness and proper application. Past studies and common knowledge show that the costs of personal protective equipment (PPE) and the lack of an agronomist working in the field is limiting the transfer of knowledge that rural farmers need to know when applying pesticides (Crissman et al., 2003).

A potential available resource to help with the transfer of knowledge is the local health clinic, which is staffed with a doctor, nurse, and a dentist, offering community members' medical treatment for many conditions and could be a way to distribute information on pesticide safety and symptoms of pesticide exposure.

Methods

The best way to evaluate the farmer's knowledge in Cahuasqui about pesticide safety would have been to interview and test every farm owner and farmworker that resides in Cahuasqui. As time was limited due to a one-month stay I was able to test and interview a total of 53 male agricultural workers. I have separated them into two groups with the larger group consisting of farm owners who can rely solely upon working their land to make a living, while the other group needs to rely on working other farms for the daily wage due to their land holdings not being large enough to sustain the family.

Before beginning the training session along with the pre and post-tests each person was questioned on basic background information along with any previous training experience in pesticide safety. See annex 1 for list.

Due to having spent two years in this community and having nearly every community member recognize me and conscientious of what was accomplished during the period, I had the confidence of the farmers when I saw them in the streets or fields to set up a time to do a training session in their home. Once invited to a farmer or farmworker's home I would talk about their current crop and other agricultural topics before beginning the training. All of these sessions were in the evening after the workday and the session always included the rest of the family centered around the kitchen table area to participate or to just listen. All questions were read to the farmers, as education skills were low and this allowed for the satisfaction that the farmer understood each question. Each farmer recorded his own answers on their question sheet.



Photo 9: Farm owner in kitchen with pesticide safety manual.

- 53 farmers were interviewed and selected randomly by casual encounter throughout the community via walking or conducting a house visit
- 53 farmers were given EPA's training on basic pesticide safety along with Pre and Post-tests, which were put in a true and false format
- Basic background information was gathered on each farmer
- All farmers were asked if they have experienced pesticide symptoms
- Two sprayings were witnessed to verify pesticide application and errors in safety against pesticide exposure
- Farmworkers who owned motorized pumps were targeted for training

Environmental Protection Agency's Pesticide Safety Education Curriculum

The Environmental Protection Agency has created a regulation that ensures that all farmworkers are trained on pesticide safety since 1992 in the United States. Additional instructional material is available to educators to gauge farmworker's knowledge such as pre and post-tests, which test the worker's knowledge before and after and can be used to gauge the effectiveness of the training material. The survey questions are based on the EPA's Worker Protection Safety regulation and can be used to evaluate the worker's knowledge. Refer to annex two for questions.

The EPA's Worker Protection Standard (WPS) for Agricultural Pesticides is a regulation aimed at reducing the risk of pesticide poisonings and injuries among agricultural workers and pesticide handlers. The WPS contains requirements for pesticide safety training, notification of pesticide applications, use of personal protective equipment, restricted-entry intervals after pesticide application, decontamination supplies, and emergency medical assistance. Many of these categories are not relevant in Ecuador and some of the EPA's questions have been eliminated or worded differently. Ecuador does not obligate farm owners to train farmworkers and any PPE or training given is a decision the farm owner can choose without oversight or repercussions. The rationale behind using EPA's model was due to the knowledge that most farmworkers in the US and in Cahuasqui have a very limited education with most just finishing grade school. The topics covered are basic but should be the foundation upon which additional learning should be built upon.

Participants were chosen random amongst the agricultural workers through random encounters as mentioned above and some were targeted if they owned motorized pumps that they use to spray other farmers fields to earn income. These farmworkers have a higher pesticide exposure rate compared to other farmworkers. Only two actually had motorized pumps.

I conducted each training by myself due to the lack of cooperation from the local health clinic because of their job duties, which did not allow for collaborated efforts. No cooperative extension service exists in this area and could not be integrated into trainings. In a previous position I trained over 2000 farmworkers in the United States following the EPA's training and each training was given in a similar fashion.

Each training session was given in the farmer's home and each farmer was questioned on his farming practices and history before given the training. I have noticed that this helps the farmer to open up about his experiences and not to be intimidated by taking a test since most farmers in this community do not have a high education level. Average training times ranged from 45 minutes to one hour, which included the preliminary test taken first, then followed by the instructional training portion, and finished with the post-test. See attached EPA pesticide safety manual for content. Each farmer had his own experiences to share about his pesticide usage and understanding of pesticides, along with pesticide reactions if they occurred. Of all 53 agricultural workers, 29 have said that they have experienced pesticide reactions with the symptoms ranging from rashes, dizziness, and headaches.

Results

Information was gathered from February 12-March 16th 2012 in Ecuador.

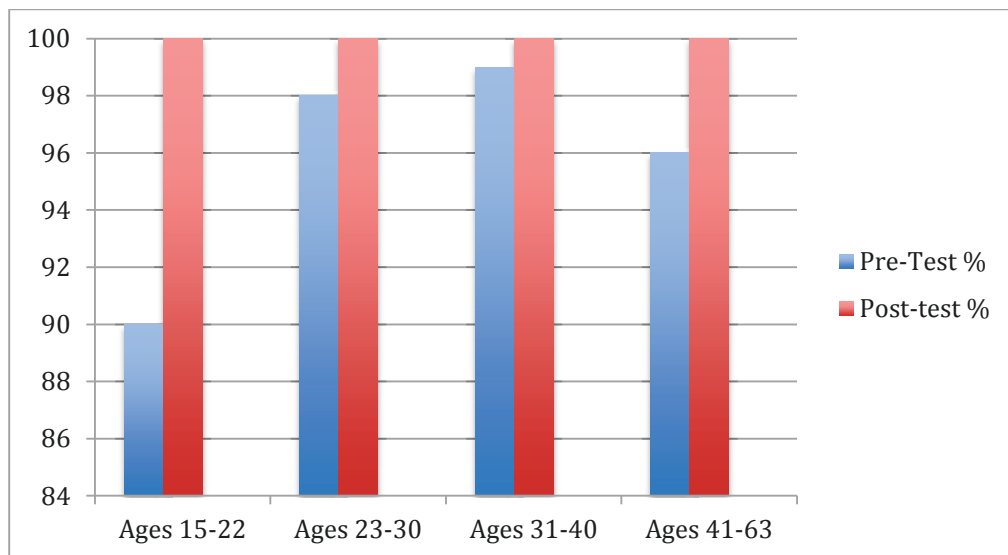


Figure 1: Scores of participants taking preliminary and post tests

Misconceptions of Pesticides in the Community

I have witnessed throughout my time in this community and in recent visits that PPE is used very minimally. Farmers' opinions of PPE use were surprising as I was

expecting to hear that the costs are prohibitive for continual use. However, this was not the case as most were discussing the restrictive movement wearing PPE, a belief that pesticides labeled other than red were safe to use, and one did not need to use PPE with these chemicals. However, test scores indicate that basic safety information is understood based on the Pre and Post-tests. Refer to figure 1.



Photo 10: Snail killer being poured into old

soda bottle.

Pre-tests and Post-tests Results

A total of 53 agricultural workers with 41 being farm owners who work their land and 12 working on farms not owned were given the tests and trained on pesticide safety.

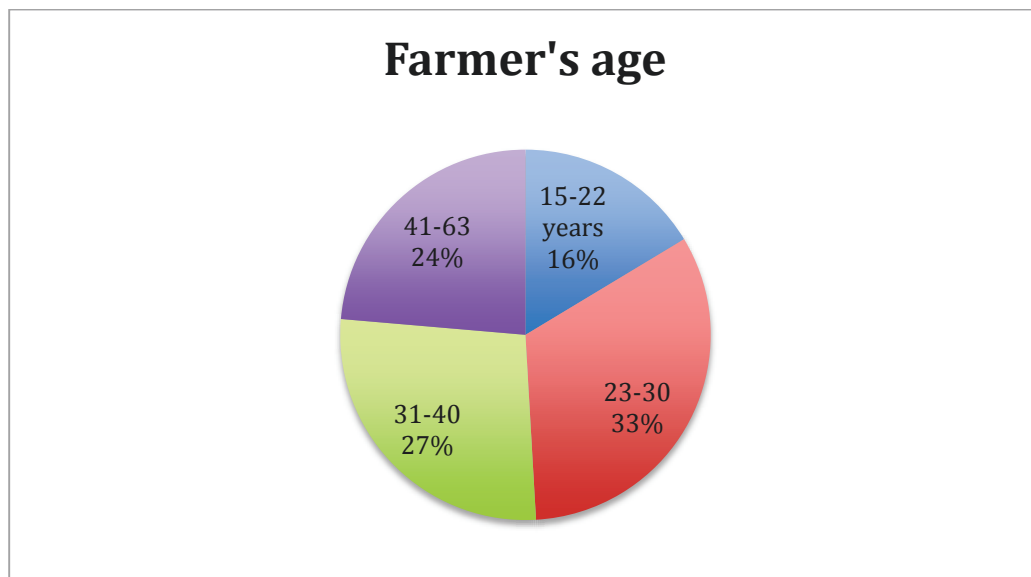


Figure 2: Participants age in relation to total tested.

Test scores indicate they are well aware of the safety issues and concerns but no farmer I have met uses the proper safety clothing or has great knowledge of what they are spraying and how it affects human or environmental health. Of the 53 farmworkers 29 have said they experienced some sort of reaction such as; rashes, headaches and dizziness, shortness of breath, and nose, throat, and eye irritation. One farmworker was hospitalized for intoxication of pesticides. In many situations the better-protected farmers would have one protective garment such as a rubber jacket but would not have protective lenses, pants, or a respirator mask. Labeling is in Spanish but the farmer does not generally read the label and instead will rely upon testimonials from other farmers, instructions given by the agrochemical store, or through personal experimentation. A sense of bravery or *machismo* still exists and it is a hindering part of relaying the information that all pesticides are dangerous and do accumulate throughout your lifetime. Test scores indicate that the youngest group scored the lowest from the ages of 15-22 years, which could be based on lack of experience or the *machismo* effect. Refer to figure 2.

A young local farmer who I witnessed spraying avocados showed a perfect example of machismo. He sprayed a small orchard of avocados with a motorized sprayer wearing a rubber jacket plus hood but not respirator or eye protection. He was drenched in pesticides afterwards and his facial skin was exposed along with breathing in the pesticides and fungicides. He was looking a little pale and he said he was a little light-headed but was ok afterwards. He was preparing to clean up the pump and roll up the hoses but I told him to go home and shower. Upon his returning he still had a pale color and he said he was fine. Before spraying he also mentioned that the mixture of pesticides and fungicides were not that bad as none were a red-labeled pesticide. Knowing this young man I would describe him as one of the better-educated young men in the community but his machismo played a part in him not wanting to accept how dangerous the chemicals really were.

All farmers improved scores after the training showing that some of the basic safety principles were not understood. The most common question missed was number one (annex 2). Not all farmers were aware that the label states in picture and words what PPE is required to spray. The second question most commonly missed is question four. Not all farmers were aware that the skin is the most likely entry into the body.

Farmworker Data: 53 workers

- Zero have high school diplomas
- 53 own land or family has land

With the high exposure rates of pesticides for many years, intoxication has resulted with some farmworkers throughout the community of Cahuasqui. This has not been beneficial to human health but it has alarmed the community members that these chemicals are more dangerous than previously thought. The testing of agricultural workers has shown that they are aware of the risks but do not apply the steps to insure their safety when applying pesticides. The initial reason I suspected were the costs of PPE. A pricing of PPE at a large hardware store was presented to community members during each training to show what the actual costs would be to the farming community. Most farmers were unaware of the PPE that already exists and they did not feel the prices were over their budget once the connection between human health and economic productivity were understood.

Table 1: Prices of PPE at local Hardware store KYWI in Ibarra
Costs of PPE Safety Equipment

<ul style="list-style-type: none"> • Safety Glasses: \$2.63 • Respirator for organic vapors and pesticides: \$6.27 • Replacement Cartridges: \$1.92 • Plastic Gloves: \$4.56 • Rubber Pants: \$9.89 • Rubber jacket: \$9.89



Photo 11: Respirator with cartridge.

Community members were shown how to correctly don the respirators and the additional PPE along with an explanation of when to exchange the organic vapor cartridges. Community members do not have experience in maintaining PPE or using respirators. Once shown the prices and how to properly wear PPE, many farmers were in agreement to purchase the safety equipment.

Farmers in Cahuasqui talk about the investments they put forth into their land, the fertilizer costs, chemical sprays, and the rental of tractor but do not readily make the connection that protecting one's health is the best investment for future economic stability and gain. Health is inextricably linked to the productivity and therefore the economic viability of individuals, populations and nations (Loeppke R., 2008).

This community is rural and of lower income but most families do have the purchasing power to buy the PPE listed in the above chart.



Photo 12:

Installing house and preparing fungicide mixture without PPE



Photo 13: Spraying pepper plants with fungicide.



Photo 14: Leg skin exposed to fungicides along with pants absorbing chemical.



Photo 15: Sprayer's mother handling contaminated hose line.

Conclusion

My initial assumption was that most farmworkers in Cahuasqui did not fully understand how to protect themselves from pesticides. This was proven partially incorrect based on the sample group of 53 farmers and the scores from the pre-test. Most farmers knew the correct answers but in the field did not apply the correct methods to limit exposure. PPE was virtually non-existent and this was found to be for many reasons. One such reason is that most farmers did not know how to read a pesticide label and what PPE is required for safe application of that chemical. Pesticides are categorized into toxicity groups just as in the US and PPE varies differently among them. Other reasons were found to be that they did not know what PPE products exist, the costs of the products, and where exactly to buy them. This all comes from the lack of priority of wearing PPE and the misconception that they will not become sick from pesticides. In addition, this logic could be due to a lack of educational programs or extension service promoting the use and effective donning of PPE.

The scores indicate that this group understood basic pesticide safety but many of the wives of the farmers have told stories of their husbands returning from the fields drenched in pesticides. Cross contamination can easily occur if the women are not aware of how this occurs. High-test scores are misleading, as farmers do not practice safety in the fields. It's possible the questions were too simple and a more direct and

targeted approach to their farming practices with pesticides should be given compared to basic safety. Questions in a scenario form where the farmer must comprehend the situation can be explored to help gain more insight into their understanding of pesticides. In addition, more hands-on approaches of how to mix and store pesticides along with best spraying practices would be more beneficial to this group of farmers.

The question of economics being the limiting factor in PPE purchases seemed not to be a major factor. Most farmers simply do not incorporate a high priority of personal safety into their routine, along with not having an understanding of the importance of PPE, and where to buy it. All of this knowledge can be passed through education and practice but as in many small rural agricultural communities, they often get overlooked. Just as red-labeled pesticides were banned and benefited the farmworkers through this government decision. Pesticide safety and related issues will only become second nature to farmers if more is done from a regulatory stance to ensure farmworkers are knowledgeable on how to protect themselves and their families.

Various advantages have allowed me to enter into this community to gauge the knowledge the farmers possess on pesticide safety. This community and many other like it needs somebody to tell them the hazards of pesticides, and show the importance of wearing PPE along with proper integrated pest management techniques. I am hoping that this report can be of importance to a new volunteer or another interested party on how to protect a very vulnerable group of people.

Annex 1. Background information and Training Experience

1. Age:
2. Education: Primary Secondary University
3. Have you been trained on pesticide safety before? No Yes
4. Do you own land? Yes No

Annex 2: Survey Questions True and False Format

1. The pesticide label explains what protective clothing to wear and basic safety procedures.
2. Not all pesticides are equal as some pesticides are more toxic than others.
3. Pesticide residues from your clothing can contaminate your family's health.
4. Your skin is the most common entry for pesticides as it acts as a sponge.
5. Cloth wrapped around your nose and mouth doesn't offer pesticide protection.
6. Pesticides can be found on the leaves, on the ground, in the air, and on produce, even after they've dried.
7. It can sometimes take many years to get sick after being exposed to pesticides.
8. Sweating, vomiting, dizziness, headache, muscle pain, and skin rashes are all signs of pesticide exposure.
9. If you get pesticides on your skin, you should keep working and shower when you get home.
10. It is important to bring the pesticide label with you when you go to the doctor.

11. You should always wash your hands before eating, drinking, smoking or using the bathroom at work.
12. If pesticide drift blows into the field where you are working, you must leave the field immediately.
13. You should always wash your work clothes separately from your other clothes.
14. It is safe to use an empty pesticide container to hold drinking water if you wash it thoroughly with soap and hot water.
15. Women and children are more sensitive to pesticides.

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**Protect Yourself from
Pesticides– Guide for
Agricultural Workers (Spanish)**

**Protéjase de los Pesticidas
– Guía para los Trabajadores
Agrícolas**

The Environmental Protection Agency revised the Worker Protection Standard for agricultural pesticides in August 1992. The revised Worker Protection Standard requires that agricultural workers be given training in basic pesticide safety.

Protect Yourself from Pesticides: Guide for Agricultural Workers was developed by the Environmental Protection Agency; it presents all of the information required for training under the Worker Protection Standard. Some States and Tribes have additional requirements for pesticide safety training for agricultural workers. Contact the State or Tribal agency responsible for pesticide enforcement in your area to obtain information needed to comply with all State or Tribal training requirements.

There are other materials about the Worker Protection Standard that are being developed by EPA. They include a safety poster, a handbook on pesticide safety for pesticide handlers, and a manual for agricultural employers. For more information about safety training and about the revised Worker Protection Standard, contact

Occupational Safety Branch (H7506C)
Office of Pesticide Programs
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460
(703) 305-7666

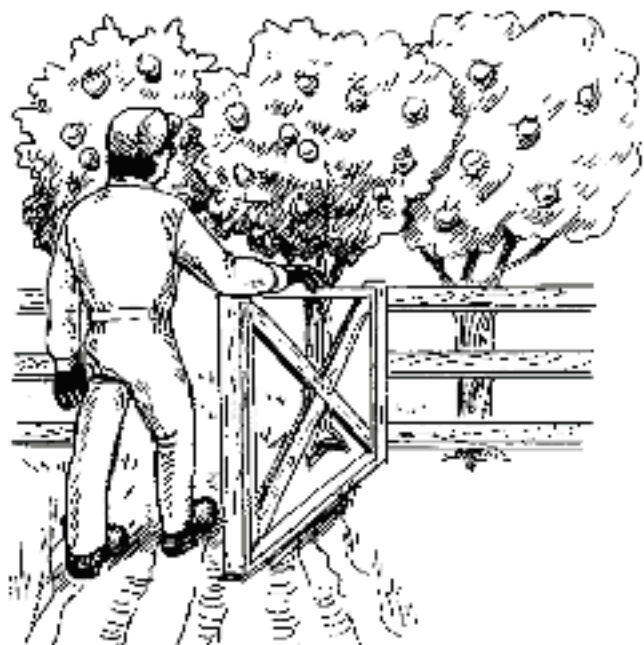
La Agencia para la Protección del Medio Ambiente (EPA) revisó el Estandar Para la Protección de Trabajadores Agrícolas en agosto de 1992. La enmienda al Estandar Para la Protección de Trabajadores Agrícolas exige la capacitación de los trabajadores agrícolas en la seguridad básica con los pesticidas.

La EPA desarrolló *Protégase de los Pesticidas: Guía Para los Trabajadores Agrícolas* con el fin de proveer toda la información necesaria para cumplir con la capacitación del trabajador agrícola como lo exige el Estandar Para la Protección de Trabajadores Agrícolas. Algunos Estados y regiones de Tribus indígenas tienen requisitos adicionales para el adiestramiento de trabajadores agrícolas sobre la seguridad con pesticidas. Comuníquese con su agencia Estatal o Tribu para obtener la información necesaria para cumplir con todas las regulaciones estatales o requisitos de la Tribu sobre el adiestramiento de trabajadores agrícolas.

La EPA actualmente está desarrollando otra materia relacionada con el Estandar Para la Protección de Trabajadores Agrícolas. Esta incluye un aviso de seguridad, un manual sobre seguridad con los pesticidas para los que manejan los pesticidas, y un manual para los patronos. Si requiere más información sobre los requisitos de capacitación y detalles del Estandar Para la Protección de Trabajadores Agrícolas, comuníquese con

Occupational Safety Branch (H7506C)
Office of Pesticide Programs
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460
(703) 305-7666

Project Coordinator
Coordinador del Proyecto
John Leahy, EPA



- **Pesticides help control pests, but they can also hurt—even kill—people.**

Pesticides control pests such as insects and weeds. Pesticides can also hurt—even kill—people. The law helps protect you from pesticide poisoning. You can also help protect yourself.

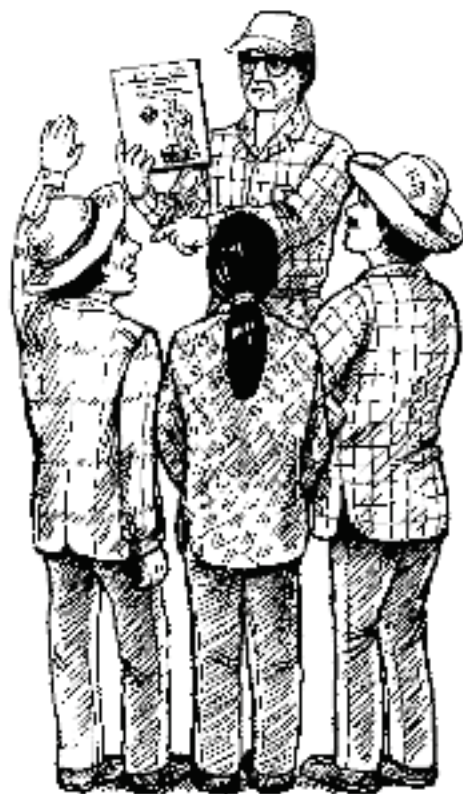
- **Los pesticidas ayudan en el control de las plagas, pero pueden también causar daño—inclusive la muerte—a las personas.**

Los pesticidas controlan plagas tales como insectos y malas hierbas. Los pesticidas pueden también causar daño—inclusive la muerte—a las personas. La ley le ayuda a protegerse del envenenamiento a causa de pesticidas. Usted también puede ayudar a protegerse.

■ **Learn how to protect yourself. If you don't understand, ask for help.**

If pesticides are used where you work, your boss must make sure you are trained in pesticide safety.

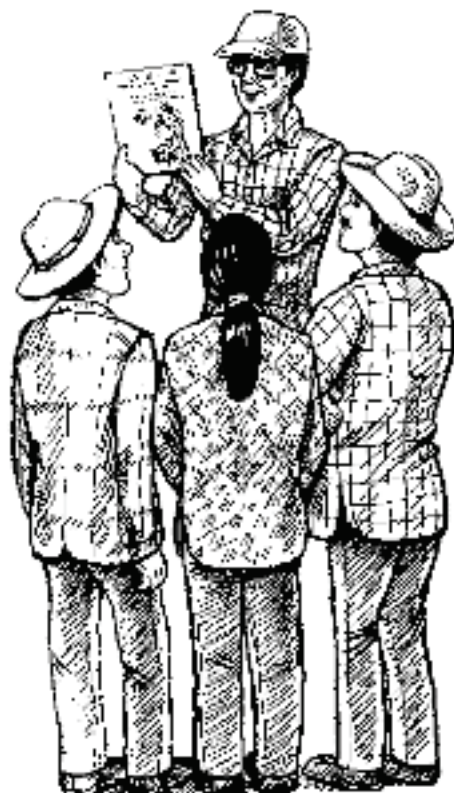
This book has facts about pesticide safety. If you do not understand this book or your safety training, ask for help.



□ **Aprenda como protegerse usted mismo. Si no entiende, pida ayuda.**

Si se utilizan pesticidas en el lugar donde usted trabaja, su patrón deberá asegurarse de que usted ha sido entrenado sobre el uso seguro de pesticidas.

Este libro le da información sobre la seguridad en el uso de los pesticidas. Si usted no comprende este libro o el entrenamiento de seguridad, pida ayuda.



**How Can You Protect Yourself from Pesticides?
¿Cómo Puede Protegerse de los Pesticidas?**

2



■ Wear clothes that cover your skin.

You should wear clean work clothes each day that will cover your skin:

- Long pants.
- A long-sleeved shirt.
- Shoes and socks.

□ Vístase con ropa que le cubra la piel.

Todos los días póngase ropa de trabajo que le cubra la piel:

- Pantalones largos.
- Camisa de manga larga.
- Zapatos y calcetines (medias).

■ At work, look for soap and water.

At work, you must be provided with soap, water, and towels if the areas where you work have had pesticides applied in at least the last 30 days. Pesticides dry on crops as a powder—this powder is the residue. A residue can remain on a crop many days after spraying.

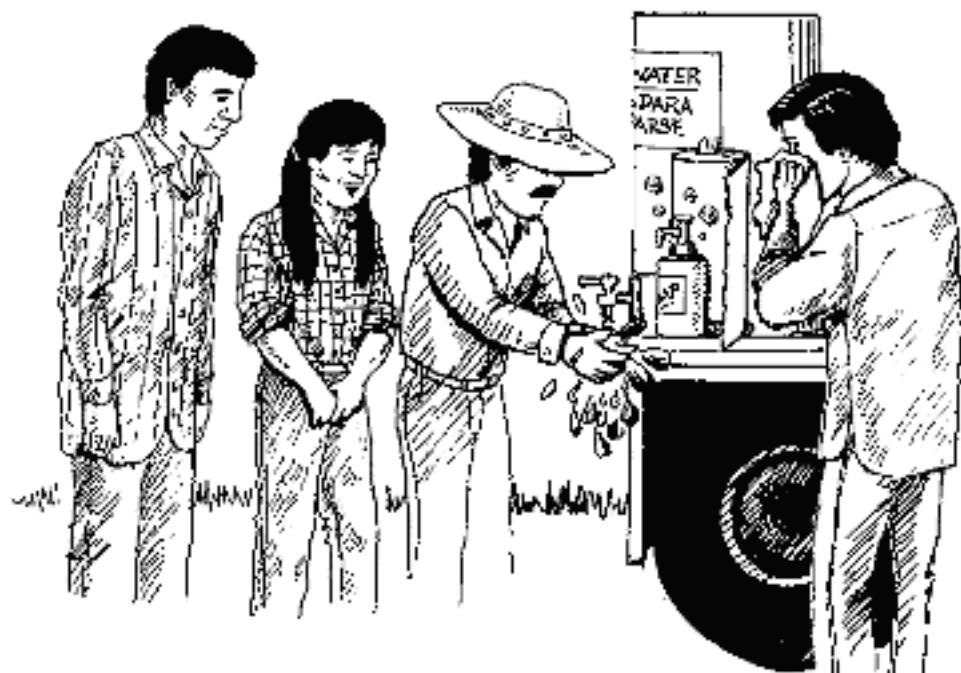
□ En el trabajo, busque agua y jabón.

Le tienen que dar agua, jabón, y toallas si se han usado pesticidas en los últimos 30 días en el área donde usted trabaja. Los pesticidas se secan en las cosechas como un polvo—este polvo es el residuo. El residuo puede estar en la cosecha por muchos días después de haber sido rociado.



How can you protect yourself from pesticides?
¿Cómo puede protegerse de los pesticidas?

2



- Wash your hands and face before you eat, drink, smoke, or chew gum or tobacco.

Your hands and face may get pesticides on them.

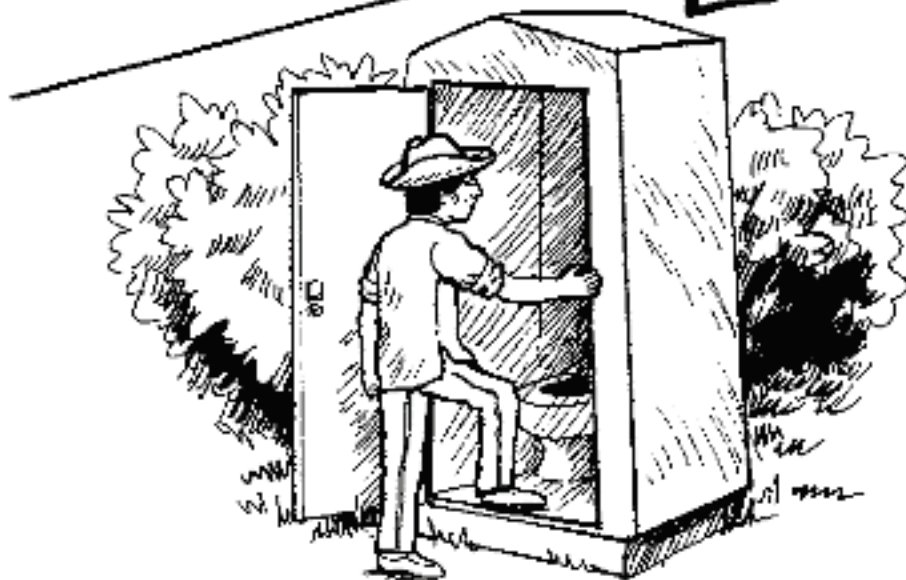
- Lávese las manos y la cara antes de comer, beber, fumar, o masticar chicle o tabaco.

Sus manos y su cara pueden tener pesticidas.



■ Wash your hands before using the toilet at work.

□ Lávese las manos antes de usar el excusado (inodoro) en el trabajo.





- **Stay out of areas where pesticides are being applied. If pesticides drift to where you are working, get out!**

It is against the law for anyone to apply pesticides in an area where you are working, or to let pesticides drift onto you.

- **No entre a lugares donde se estén aplicando pesticidas. ¡Si el viento arrastra los pesticidas hacia donde usted está trabajando, sálgase de allí!**

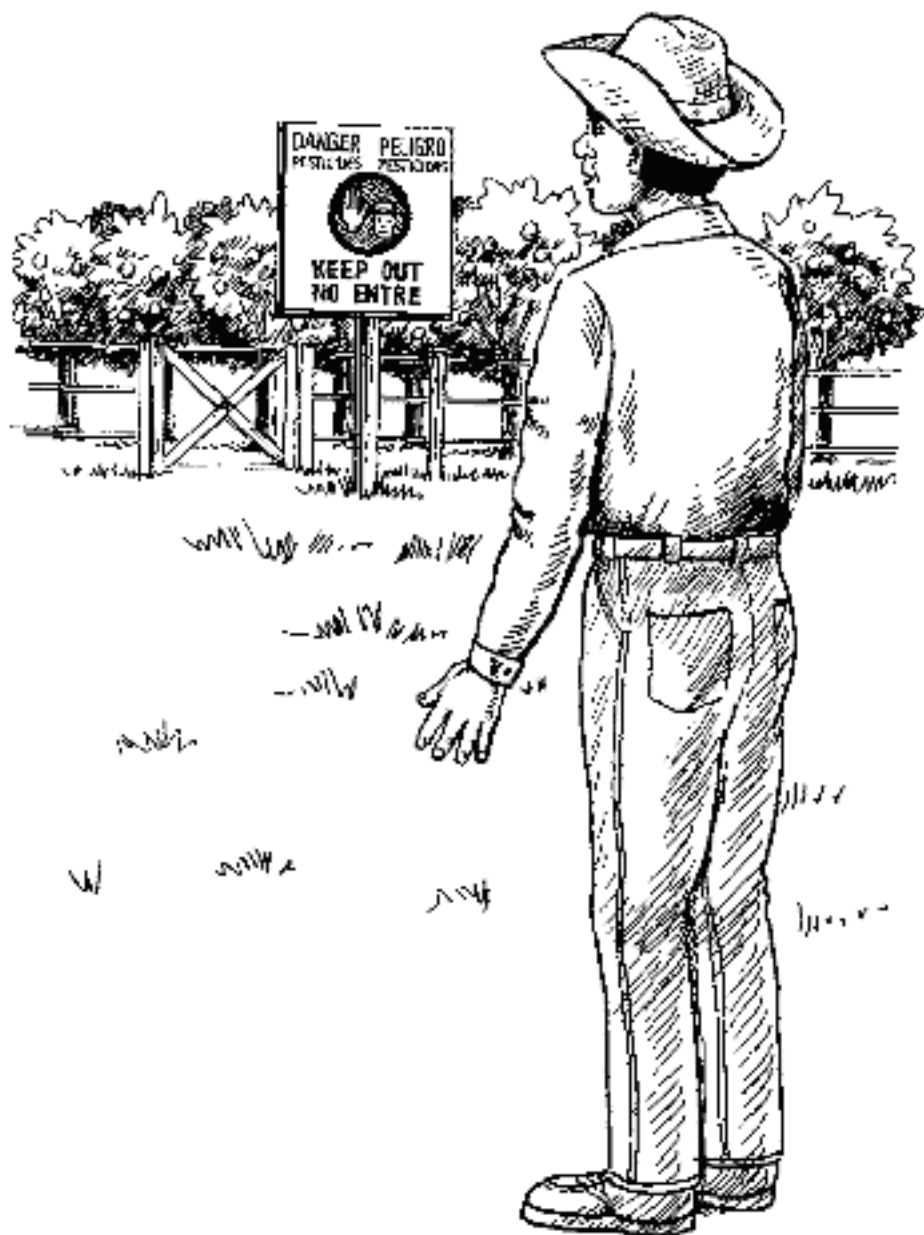
Es contrario a la ley el aplicar pesticidas en lugares donde usted esté trabajando o permitir que los pesticidas sean arrastrados sobre usted por el viento.

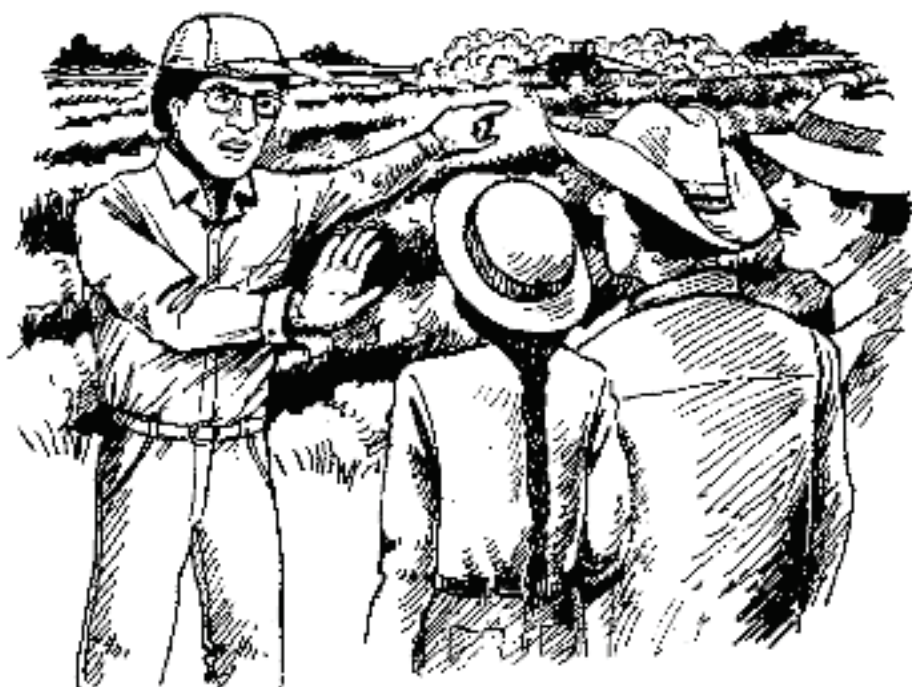
■ **If you see this sign, or ones like it, keep out!**

This sign means that pesticides are in the area. You must have special training and protection to go into the area.

□ **¡Si usted ve este letrero, o uno parecido, no entre!**

Este letrero quiere decir que hay pesticidas en el área. Usted tiene que tener entrenamiento y protección especial para poder entrar al área.





- Stay out of areas your boss tells you not to enter. . .

Even if no sign is posted.

- Manténgase fuera de las áreas donde su patrón le diga que no entre. . .

Aunque no haya letrero.

■ **Never take pesticides or pesticide containers home from work.**

They are not safe for use around the home.

□ **Nunca lleve a la casa pesticidas o sus envases.**

Es peligroso usarlos en la casa.



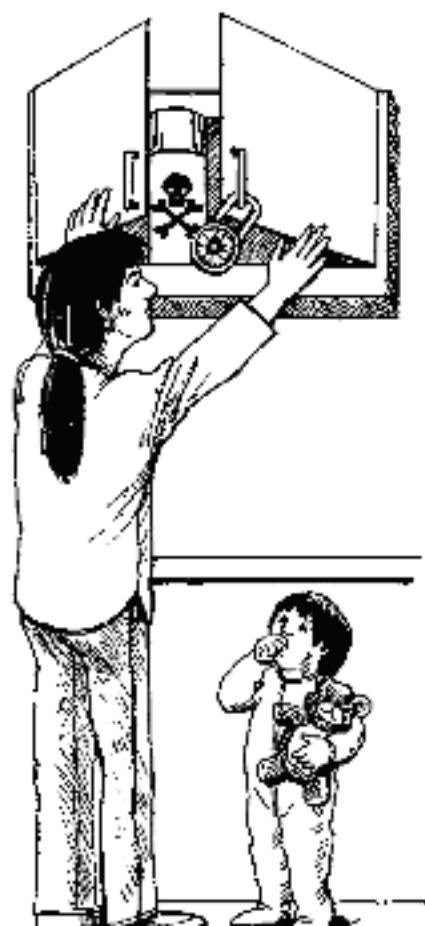


- **Keep children away from areas where pesticides might be.**

At home, keep pesticides away from children.

- **Mantenga a los niños fuera de las áreas donde puedan haber pesticidas.**

En la casa, guarde los pesticidas fuera del alcance de los niños.

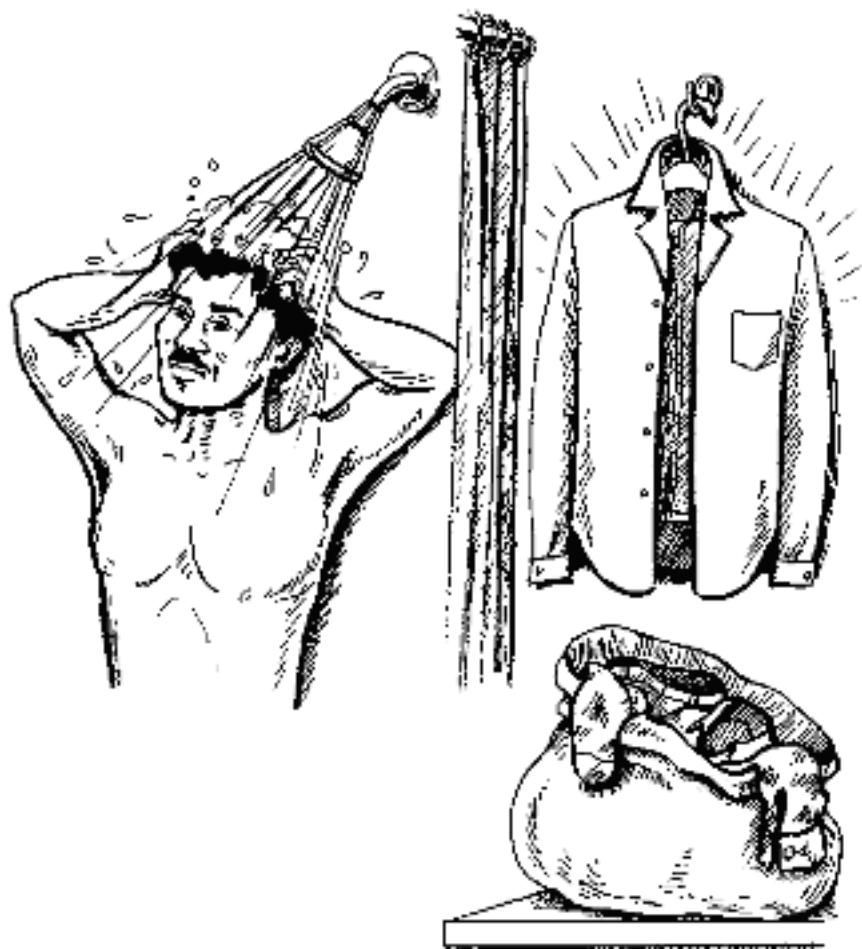
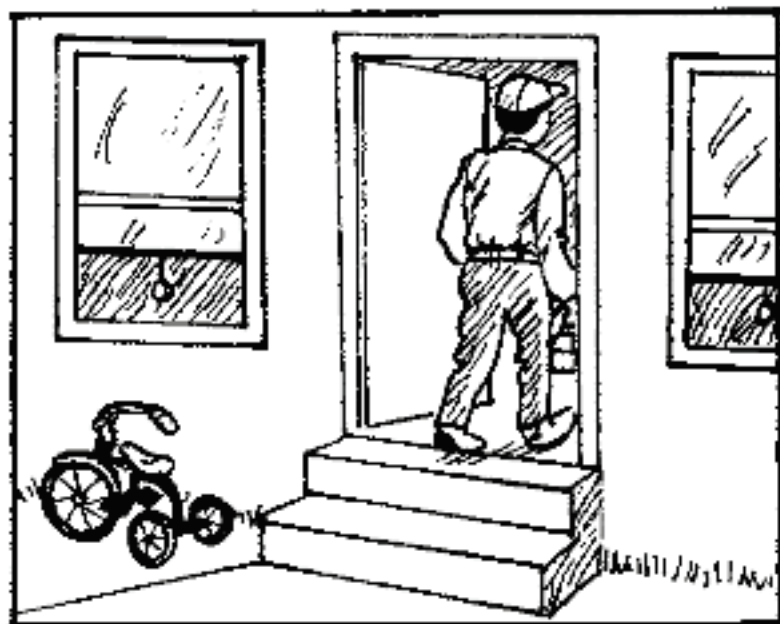


- After work each day, wash your whole body, including your hair.

Use plenty of soap and water. Then put on clean clothes.

- Todos los días después del trabajo, lávese todo el cuerpo, incluyendo el pelo.

Use bastante agua y jabón. Luego vístase con ropa limpia.





- **Keep dirty work clothes away from non-work clothes and from the family laundry.**

Pesticides may get on your clothes at work. Wash your work clothes, including your cotton gloves before using them again.

- **Mantenga y lave separada la ropa de trabajo sucia. No la junte con su otra ropa sucia o la de su familia.**

Es posible que en el trabajo, la ropa se contamine con pesticidas. Laven la ropa de trabajo antes de usarla de nuevo.

Where Are Pesticides? ¿Dónde Se Encuentran los Pesticidas?

■ Pesticides are applied in different ways:

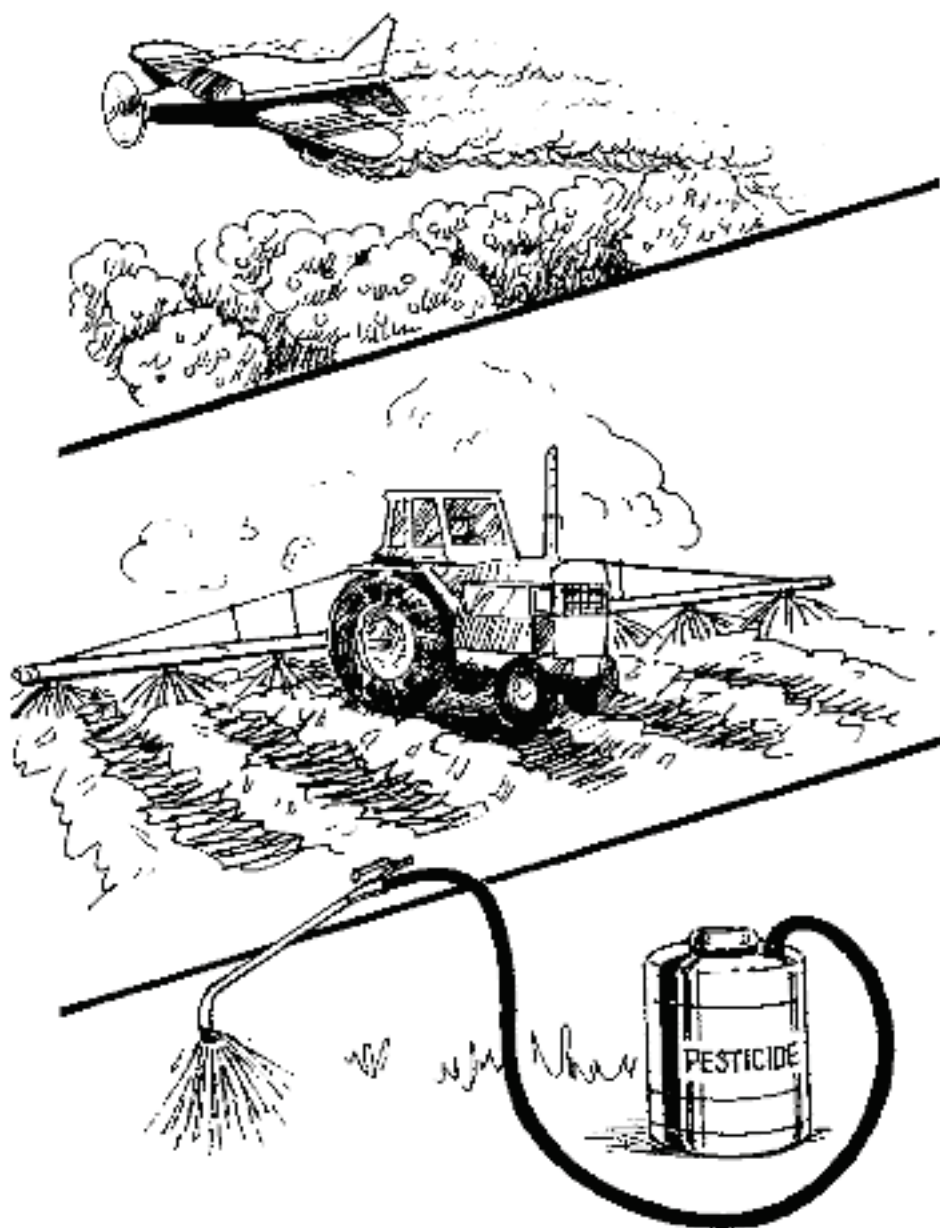
- Liquids or sprays.
- Powders or granules.
- Gases.

Pesticides may be in many places. Pesticides may be on plants and on the soil. Often you can't tell pesticides are there.

□ Los pesticidas se aplican de diferentes maneras:

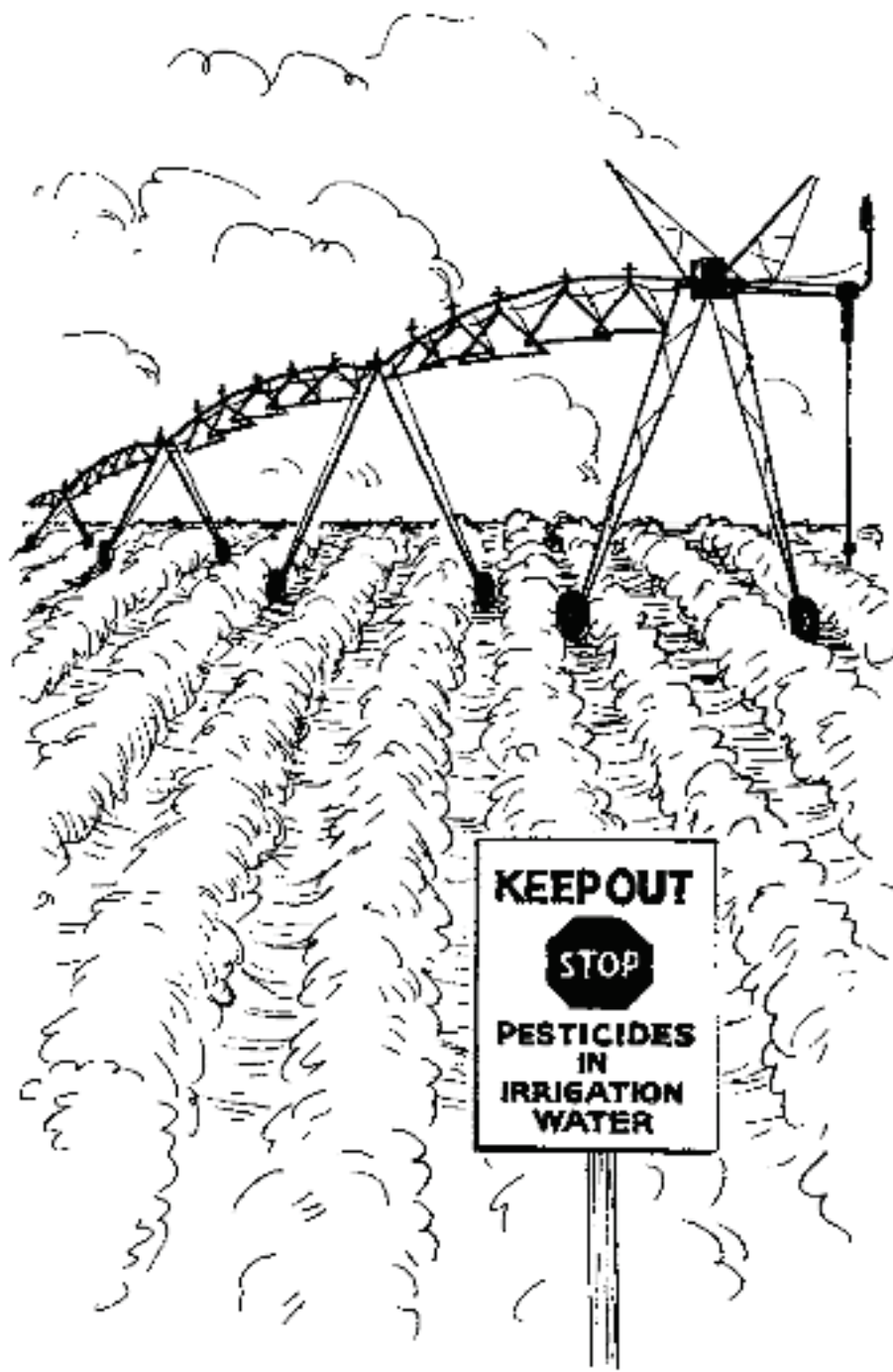
- Líquidos o aspersiones.
- Polvos o gránulos.
- Gases.

Los pesticidas pueden estar en muchos lugares. Los pesticidas se pueden encontrar en las plantas o en el suelo. Muchas veces no se puede notar la presencia de los pesticidas.



Where are pesticides?
¿Donde se encuentran los pesticidas?

3

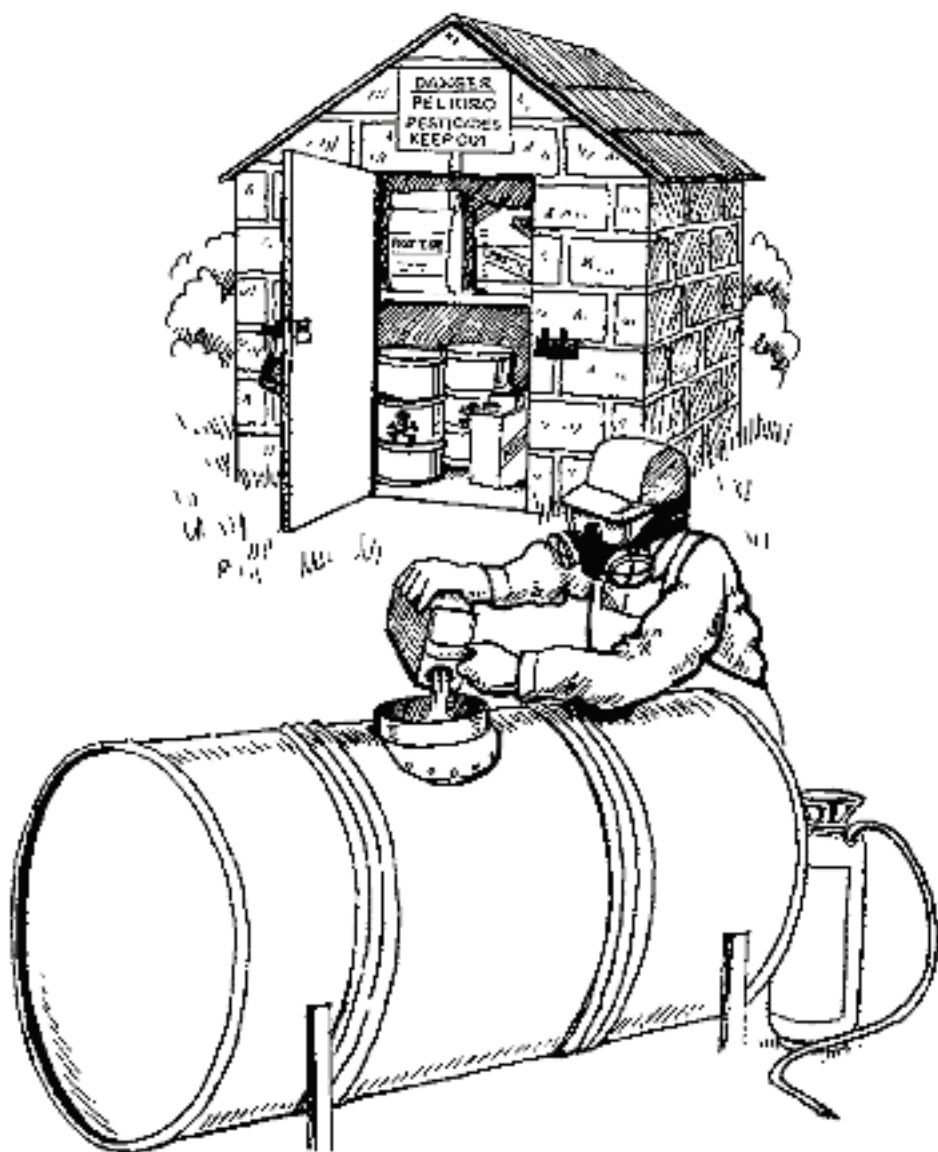


■ Pesticides may be in irrigation water and on irrigation equipment.

□ Los pesticidas pueden estar en el agua de riego o sobre el equipo de riego.

■ Pesticides may be in storage areas and in places where pesticides are mixed and loaded.

□ Los pesticidas pueden estar en las áreas de almacenamiento y en los lugares donde estos se mezclan o se cargan.



Where are pesticides?
¿Donde se encuentran los pesticidas?

3



Move Away!
¡Aléjese!

■ Sometimes pesticides drift from where they are being applied.

□ A veces el viento arrastra los pesticidas desde el sitio donde se están aplicando.

How Can Pesticides Hurt You? ¿Cómo le Pueden Hacer Daño a Usted los Pesticidas?

■ Pesticides can hurt you if:

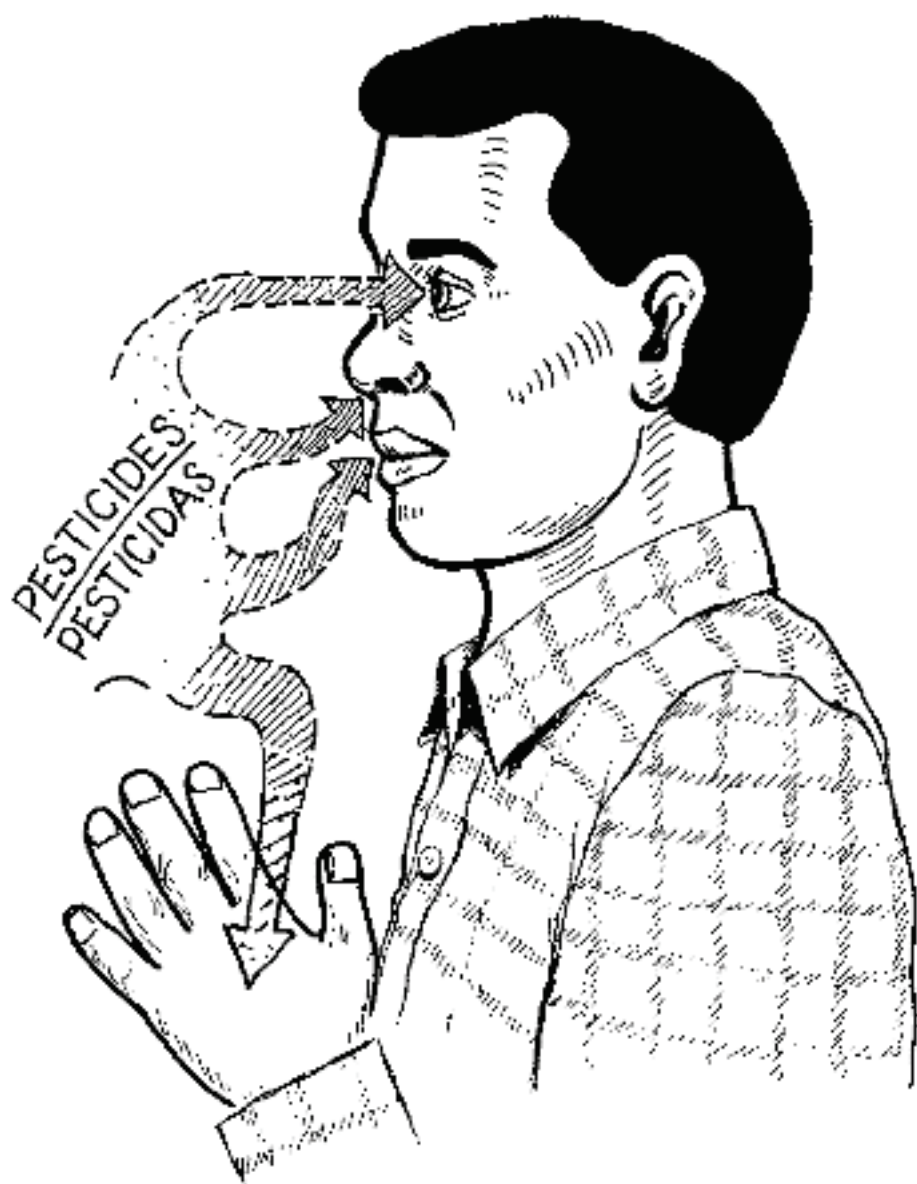
- They get on your skin.
- They get in your eyes.
- You breathe them.
- You swallow them.

Workers are hurt most often by getting pesticides on their skin.

□ Los pesticidas le pueden hacer daño si:

- Hacen contacto con la piel.
- Entran en los ojos.
- Usted los respira.
- Usted los traga.

Los trabajadores son afectados más frecuentemente al dejar que los pesticidas entren en contacto con la piel.





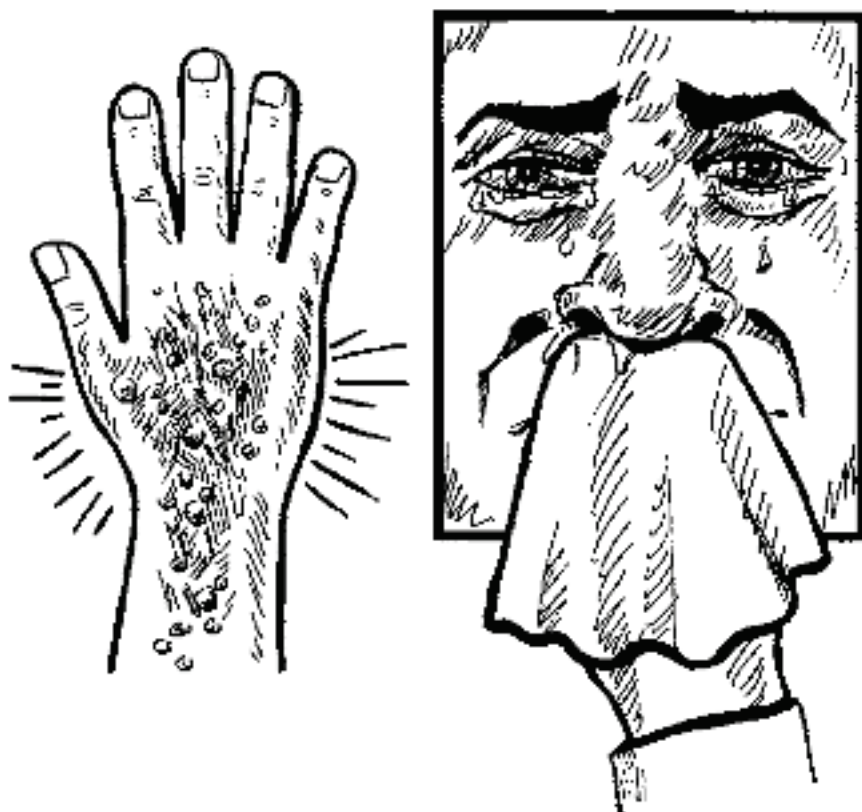
■ Pesticides may hurt you right away.

If pesticides get on or in you, they may make you sick right away, or hours later.

□ Los pesticidas le pueden hacer daño inmediatamente.

Si los pesticidas hacen contacto con la piel o si le entran al cuerpo, le pueden enfermar inmediatamente o después de varias horas.

- Pesticides may cause skin rashes or hurt your nose, throat, or eyes.
- Los pesticidas pueden causar irritación (ronchas) en la piel, o pueden hacer daño a la nariz, a la garganta, o a los ojos.



How can pesticides hurt you?
¿Cómo le pueden hacer daño a usted los pesticidas?

4

Throwing up/Vómito
Tired/Cansancio



Sweaty/Sudoroso



Headache/Dolor de cabeza
Dizziness/Mareo



Muscle
pains and
cramps/
Dolores
musculares
y calambres

■ Pesticides can
make you feel
sick in different
ways.

□ Los pesticidas
pueden
enfermarlo de
diferentes
maneras.

■ Other signs of pesticide poisoning are:

- Drooling.
- Trouble breathing.
- Very small pupils of your eyes.

□ Otros síntomas de envenenamiento por pesticidas son:

- Babeo.
- Dificultad al respirar.
- Se hacen muy pequeñas las pupilas de los ojos.



How can pesticides hurt you?

¿Cómo le pueden hacer daño a usted los pesticidas?

4



■ Pesticides may harm some people more than others.

□ Los pesticidas le pueden hacer daño a unas personas más que a otras.

■ **Getting pesticides on or in you may have effects after months or years have passed.**

Delayed effects may be cancer, or harm to your kidneys, liver, or nervous system.

Another delayed effect may be birth defects, if pregnant women are exposed to pesticides.

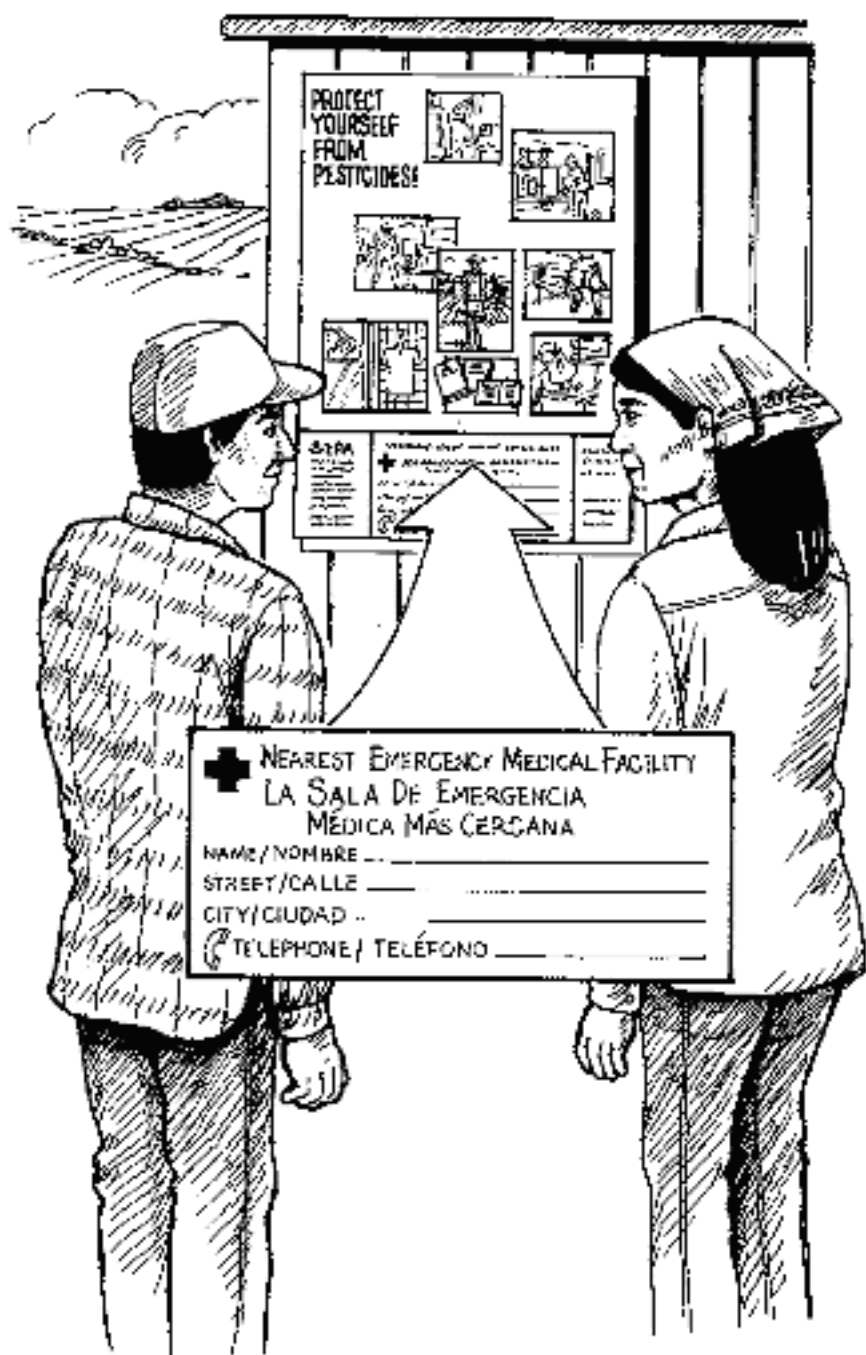
□ **El contacto con los pesticidas o su entrada al cuerpo pueden afectarles después de varios meses o años.**

Los efectos retrasados pueden ser cáncer o daño a los riñones, al hígado, o al sistema nervioso.

Otro efecto retrasado puede ser los defectos de nacimiento, si una mujer embarazada ha sido expuesta a los pesticidas.



What If You Get Sick at Work?
¿Qué Pasa Si Se Enferma en el Trabajo?



- **Medical help is listed on or near a pesticide-safety poster at your work.**

Make sure you know where this and the nearest phone are.

- **El lugar más cercano para obtener ayuda médica se encuentra en, o cerca del aviso (letrero) sobre seguridad en el uso de pesticidas.**

Asegúrese que sabe dónde está este aviso (letrero), así como el teléfono más cercano.

- **If you or someone else gets sick while working, tell your boss right away.**

Your boss must make sure you get to medical help if you think you've been poisoned at work by pesticides.

- └ **Si usted o cualquier otra persona se enferma mientras trabaja, avísele inmediatamente a su patrón.**

Su patrón tiene la obligación de conseguirle ayuda médica si usted cree que ha sido envenenado por los pesticidas en el trabajo.





■ **Your boss will provide information about the pesticide.**

Your boss must give you or your doctor the name and other information about the pesticide that might have made you sick.

□ **Su patrón le dará información sobre el pesticida.**

Su patrón está obligado a darle a usted o a su médico el nombre y otra información sobre el pesticida que le haya provocado enfermedad.

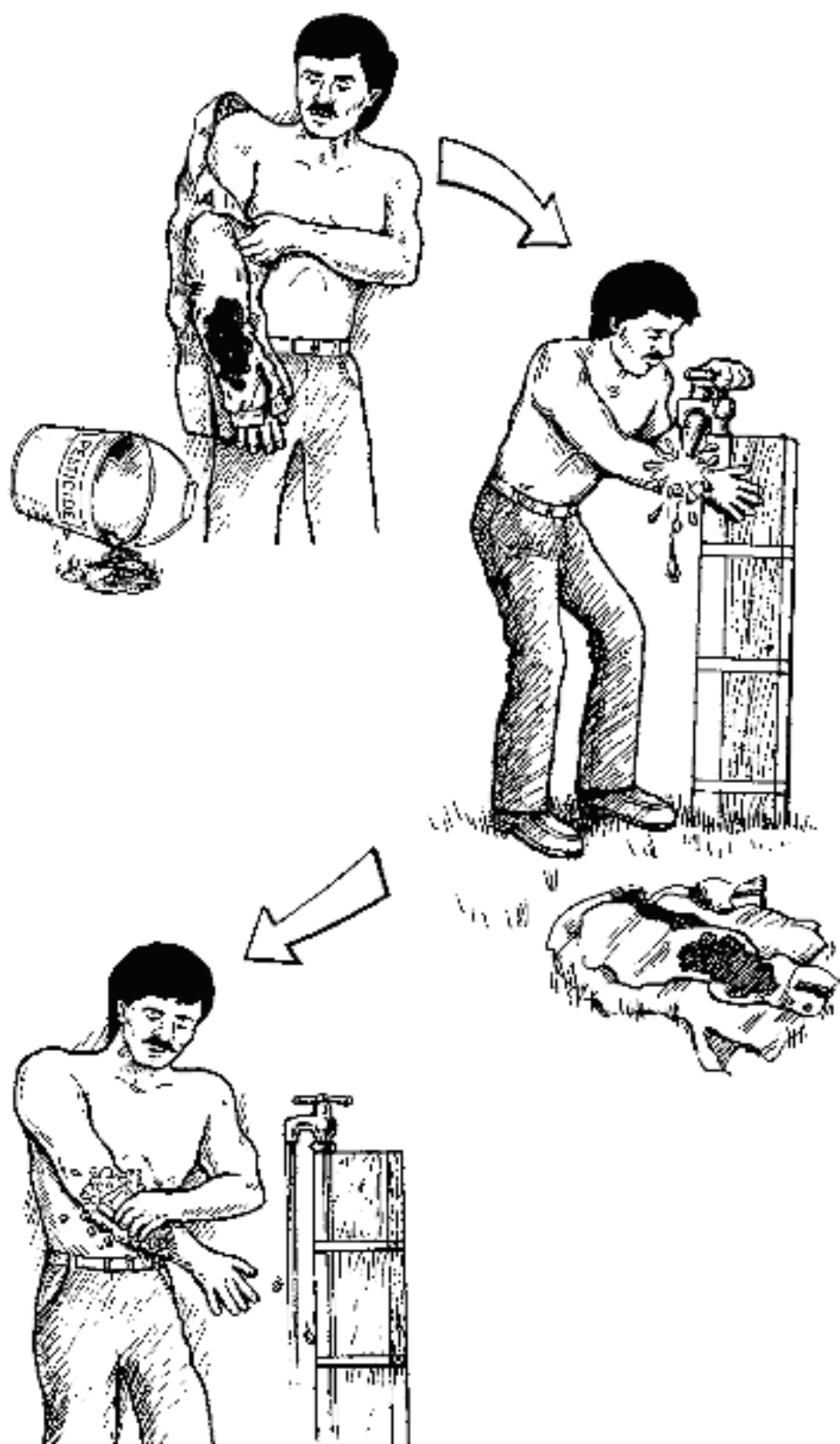
What If Pesticides Get On Or In You? • ¿Qué Pasa Si los Pesticidas Hacen Contacto con Usted o Si le Entran al Cuerpo?

■ If a pesticide gets on you, get it off right away!

1. Take off clothing that has pesticide on it.
2. Rinse skin right away with water.
3. Wash with soap and water as soon as possible.

□ ¡Si le cae encima un pesticida, quíteselo en seguida!

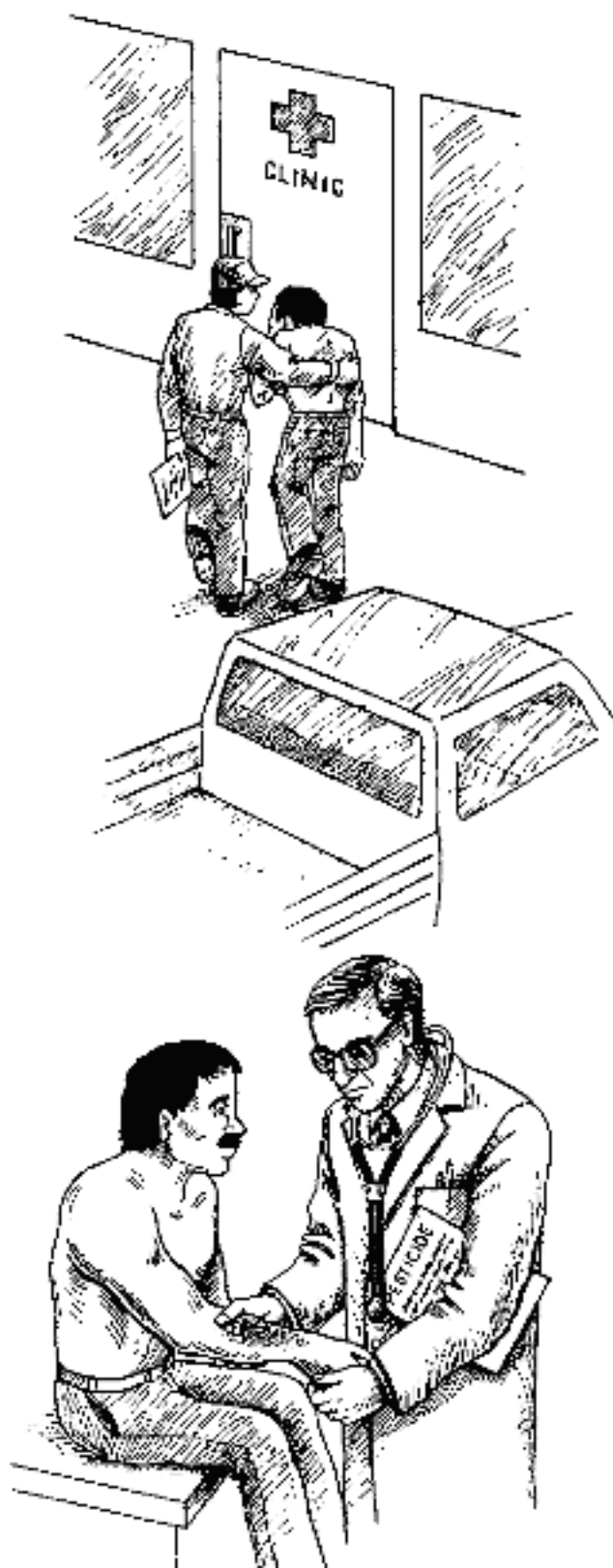
1. Quítese la ropa contaminada.
2. Enjuáguese la piel inmediatamente con agua.
3. Lévese con agua y jabón tan pronto como le sea posible.



What if pesticides get on or in you?

¿Qué pasa si los pesticidas hacen contacto con usted o si le entran al cuerpo?

6



- If you begin to feel sick or your eyes, skin, or throat hurt, go to a doctor right away.

Your boss must make sure you are taken to a clinic or doctor.

- Si empieza a sentirse enfermo, o si le empiezan a doler los ojos, la piel, o la garganta, vaya al médico inmediatamente.

Su patrón tiene la obligación de asegurarse que lo lleven a la clínica o al médico.

■ If you or someone else swallows a pesticide, get medical help right away!

1. Call a poison control center or doctor, or go to the doctor if it's faster. Give the name of the pesticide and the first aid directions from the label.
2. If you can't call for help, or while you wait for help, follow the first aid steps on the label.
3. Get to a doctor as soon as possible! Have the name of the pesticide with you.



What if pesticides get on or in you?

¿Qué pasa si los pesticidas hacen contacto con usted o si le entran al cuerpo?

6



□ **¡Si usted u otra persona traga un pesticida, obtenga ayuda médica inmediatamente!**

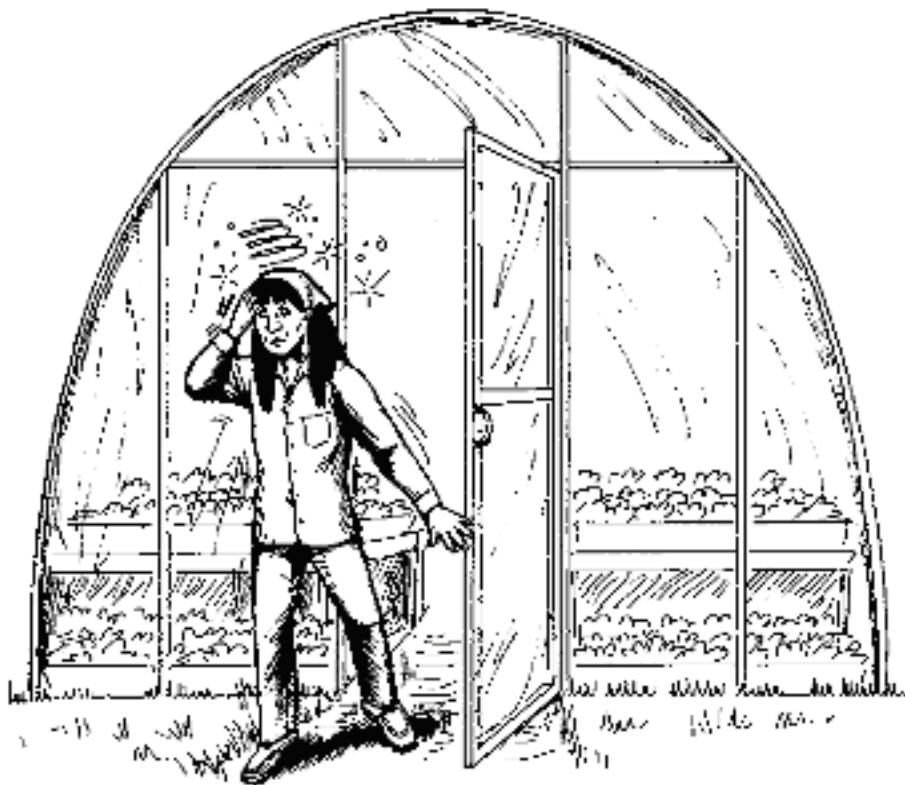
1. Llame al centro de control de envenenamiento o al médico, o si es más rápido, vaya directamente al médico. Dé el nombre del pesticida y los primeros auxilios recomendados en la etiqueta.
2. Si no puede pedir ayuda, o mientras espera que lo ayuden, siga las instrucciones de primeros auxilios de la etiqueta.
3. ¡Vaya al médico tan pronto como sea posible! Lleve el nombre del pesticida consigo.

■ **Leave closed areas right away if you start to feel sick or dizzy.**

If you are working in an enclosed area, like a greenhouse, get to fresh air right away if you begin to feel dizzy or have trouble breathing.

□ **Salga de las áreas encerradas si empieza a sentirse enfermo o mareado.**

Si está trabajando en un lugar encerrado, como un invernadero, salga al aire fresco si empieza a sentirse mareado o si tiene dificultad en respirar.



What if pesticides get on or in you?

¿Qué pasa si los pesticidas hacen contacto con usted o si le entran al cuerpo?

6



■ If someone gets sick from breathing a pesticide...

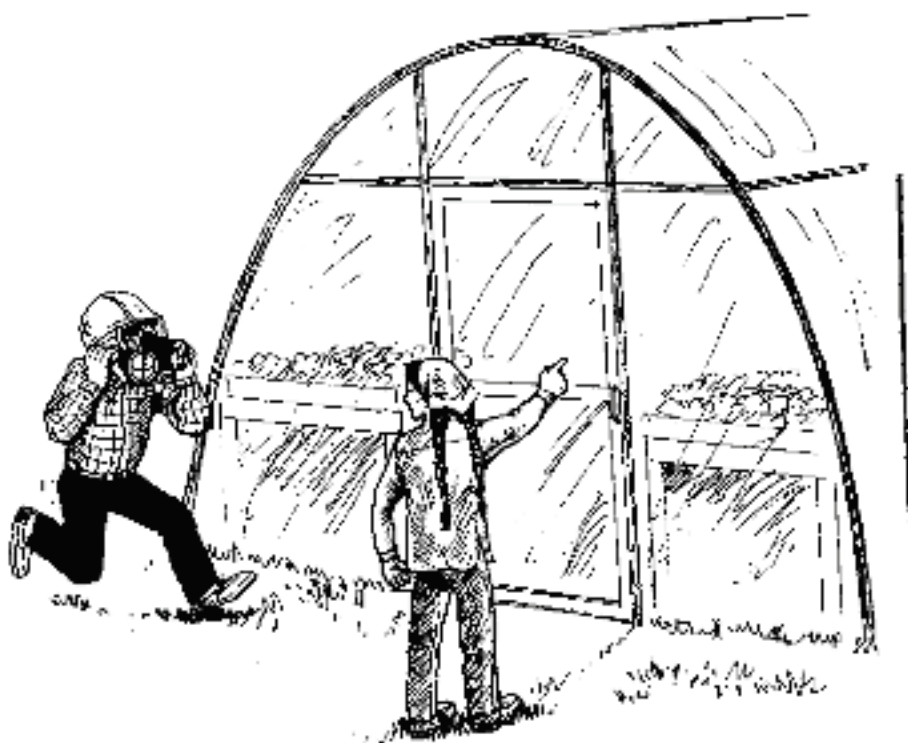
1. Get them to fresh air right away.
2. Loosen their clothing.
3. If not breathing, give mouth-to-mouth (CPR).

□ Si alguien se enferma por haber respirado un pesticida...

1. Sáquelo inmediatamente al aire fresco.
2. Aflojele la ropa.
3. Si no está respirando, déle respiración artificial de boca a boca.

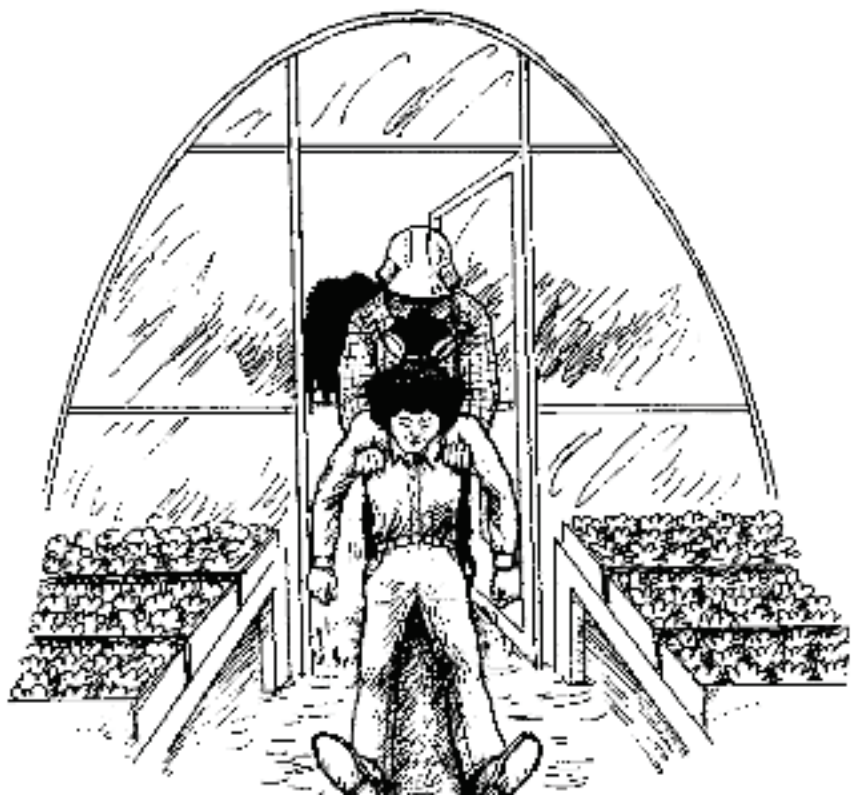
■ **If someone passes out in an enclosed area, get help—don't go in!**

Never try to rescue someone who has passed out in a greenhouse or other enclosed area unless you have special training and breathing equipment. Find someone who can help.



□ **¡Si alguien se desmaya en un área encerrada, busque ayuda—no entre al lugar!**

Nunca trate de rescatar a alguien que se haya desmayado en un vivero o invernadero u otro lugar encerrado, a menos que tenga el entrenamiento especial y el equipo apropiado para respirar. Busque a alguien que pueda ayudarle.



What if pesticides get on or in you?

¿Qué pasa si los pesticidas hacen contacto con usted o si le entran al cuerpo?

6



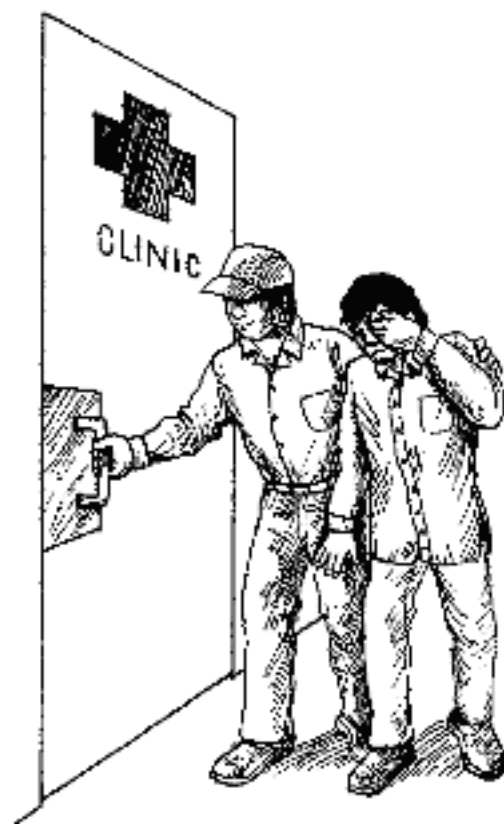
■ **Eye damage can happen fast! Rinse your eyes for 15 minutes.**

If a pesticide gets in your eyes, hold them open and rinse them with a gentle stream of cool water. Rinse for 15 minutes if possible. Then go to a doctor.

□ **¡El daño a los ojos puede ocurrir rápidamente! Enjuáguese los ojos con agua por 15 minutos.**

Si el pesticida le llega a entrar en los ojos, manténgalos abiertos y lávelos con un chorro suave de agua fresca.

Si es posible, enjuáguese los ojos por 15 minutos. Luego vaya a ver al médico.

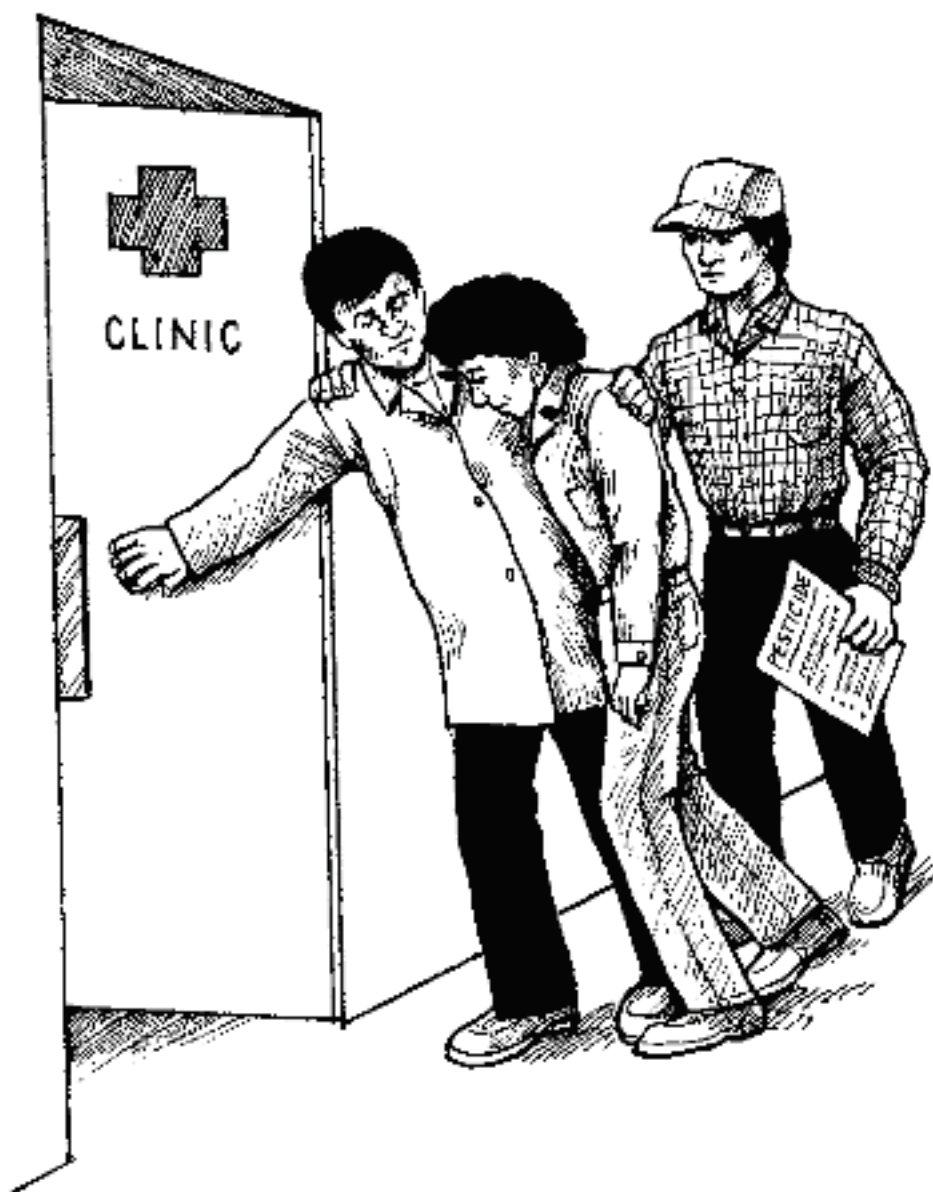


■ Get medical help!

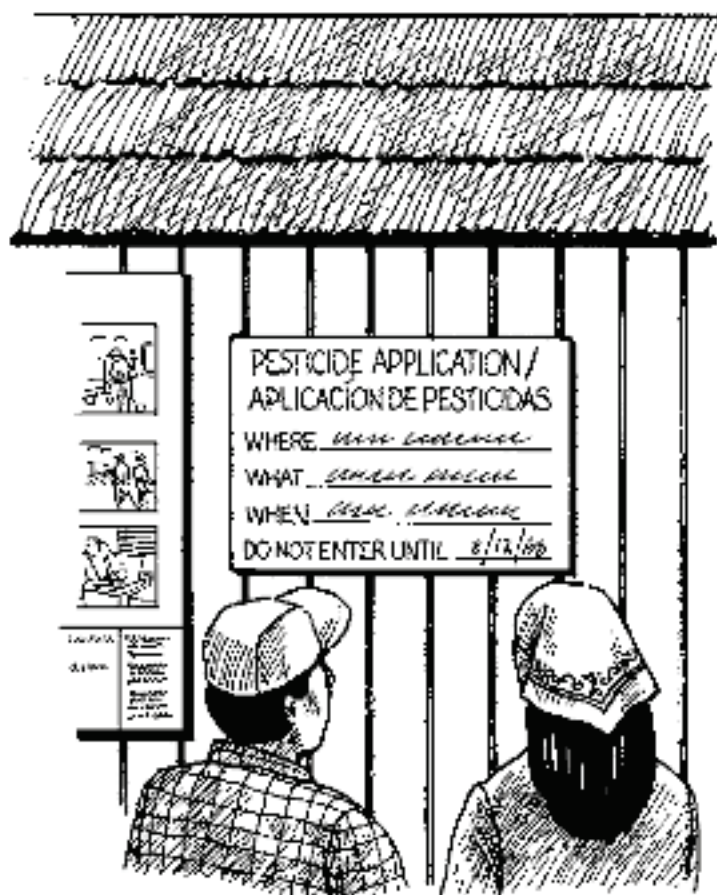
In all cases of pesticide poisoning, get medical help as soon as possible.

□ ¡Consiga ayuda médica!

En todos los casos de envenenamiento por pesticidas, consiga ayuda médica tan pronto como le sea posible.



The Law Helps Protect You!
¡La Ley Ayuda a Protegerle!



■ **Your boss must tell you about pesticide use at work.**

Your boss must: Warn you about areas where pesticides are to be applied and areas you may not enter. Your boss must post: The name of the pesticide, exactly where it was applied, when it was applied, the restricted entry interval, and when the workers may return to the work area. This information has to be written and posted in a central location that is easily accessible to all workers, before the pesticides are applied.

□ **Su patrón tiene que informarle sobre el uso de pesticidas en el trabajo.**

Su patrón tiene que: Advertirle cuando y dónde se aplicarán pesticidas y dónde no se puede entrar. Su patrón está obligado a fijar: El nombre de pesticida, exactamente dónde fue aplicado, cuándo los trabajadores pueden regresar al área para trabajar. La información tiene que ser escrita y puesta en un lugar centralizado de fácil acceso para todos trabajadores, y antes de que se apliquen los pesticidas.

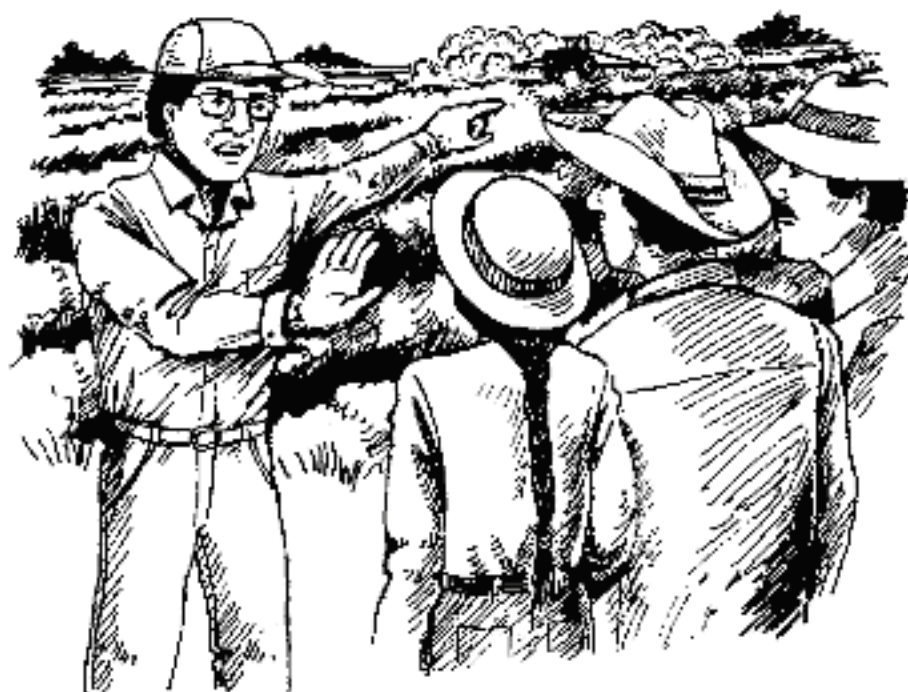
■ Your boss must not let you work in some areas.

Your boss must not let you work in an area where:

- Pesticides are being applied.
- Or pesticides may drift onto you.

After a pesticide is used, you may not enter a field during the Restricted Entry Interval (REI).

The laws set different safety periods or REIs for different pesticides.



□ Su patrón no le puede permitir trabajar en algunos áreas.

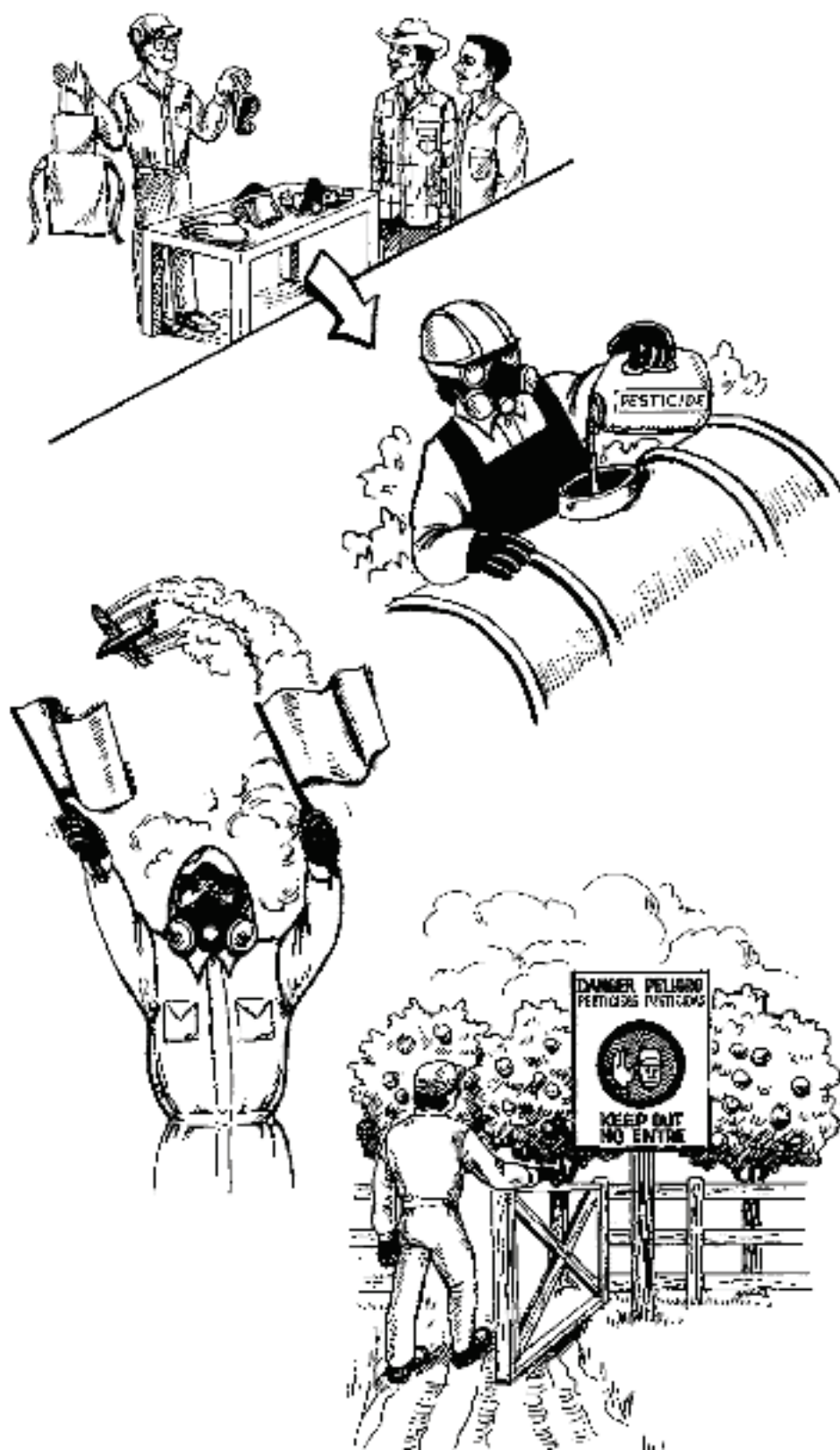
Su patrón no le puede permitir trabajar en un lugar donde:

- Se están aplicando pesticidas.
- O donde pueda tener contacto con pesticidas arrastrados por el viento.

Después de que se use un pesticida, no puede entrar a un área durante el Intervalo Restringido de Re-entrada (REI).

Las leyes establecen diferentes Tiempos de Re-entrada o de seguridad





■ You must have special training and protection for some jobs.

Without extra training and protection, your boss must not let you:

- Mix, load, apply, or handle pesticides.
- Work as a flagger.
- Work in an area where entry is restricted.

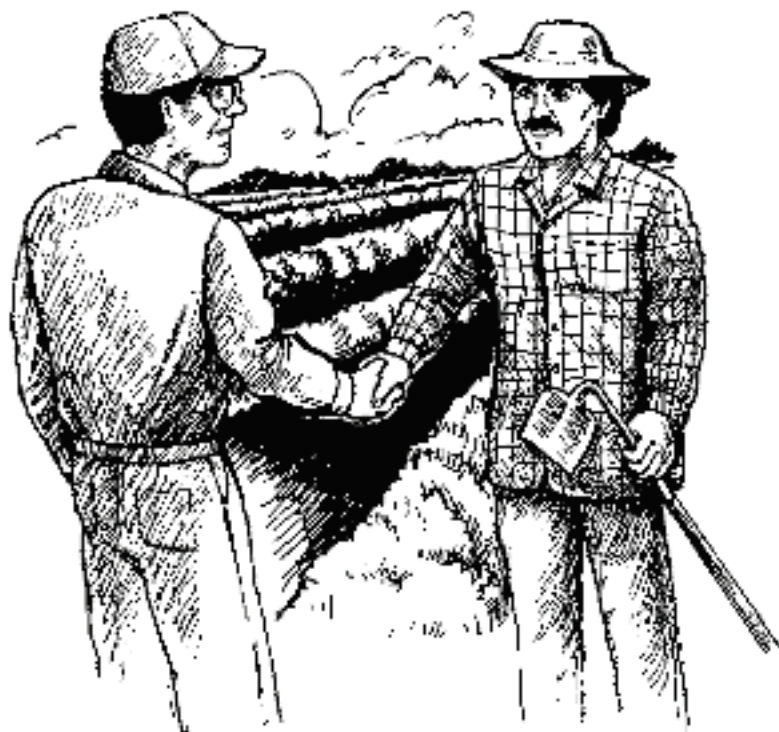
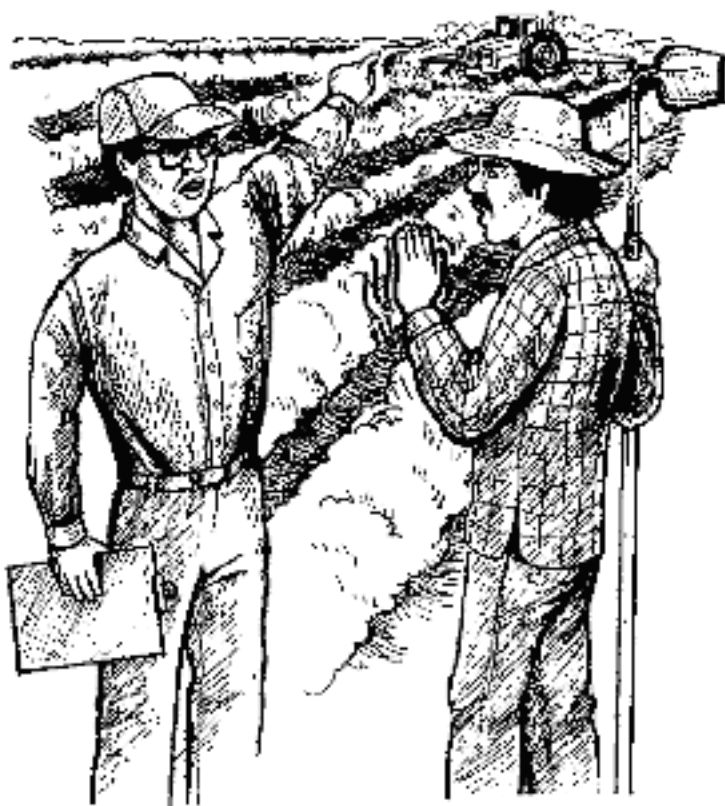
□ Para hacer ciertos trabajos, tiene que tener entrenamiento y protección especial.

Si no tiene el entrenamiento y la protección especial, su patrón no le puede permitir:

- Mezclar, cargar, aplicar, o manejar pesticidas.
- Trabajar como marcador de campo (banderillero).
- Trabajar en un área de entrada

■ Your boss must not punish you for trying to follow these rules.

□ Su patrón no le puede castigar por tratar de seguir estas reglas.



Help protect yourself!
¡Ayude a protegerse!

8



■ Know how to protect yourself!

Your boss must protect you from pesticides, but your safety is your responsibility, too

□ ¡Sepa cómo protegerse usted mismo!

Su patrón tiene que protegerlo de los pesticidas, pero su seguridad es también su propia responsabilidad.



□ Recuerde:

- Póngase ropa que le cubra la piel.
- Manténgase fuera de ciertas áreas, según las instrucciones de su patrón.
- Retírese si hay pesticidas que son atraídos por el viento hacia el área donde usted está trabajando.
- Lávese con agua y jabón después de trabajar y antes de comer, beber, fumar, o usar el excusado (inodoro).

Su patrón tiene que:

- Darle información sobre los pesticidas que se aplican en o cerca de las áreas donde usted trabaja.
- Asegurar que usted esté entrenado sobre el uso seguro de pesticidas.
- Darle jabón, agua y toallas.
- Tiene la obligación de conseguirle ayuda médica si usted cree que ha sido envenenado por los pesticidas en el trabajo.
- Asegurar que reciba entrenamiento especial si usted trabaja en un área de entrada restringida, si trabaja como marcador de campo (banderillero), o si mezcla, carga, aplica, o maneja pesticidas.

