

day before did not read that. But it was and it is a fact of life. It is a shocking fact of life.

I have just given you a few statistics that I think indicate the importance of your getting together today for this conference. Let me turn our attention to the big issue of rural health care and rural health care delivery.

RURAL POVERTY

Many of you are undoubtedly familiar with the agricultural, occupational, and environmental health conference that was held here in Des Moines a couple of years ago. That conference report was called *Agriculture at Risk*.

It described the need for occupational health and safety services. It discussed the challenges facing the rural health care system, challenges like failing rural hospitals, pay disparities between urban and rural physicians, difficulties in retaining both rural health providers and patients, and the need for a strong emergency medical services system. Although the public's image of rural America is one of picturesque countrysides and healthy lifestyles, this image belies the reality of life in much of rural America. These are hard times for many rural communities, the result of both economic and demographic trends.

For example, the rural poverty rate increased steadily during the 1980's and for the first time is now higher than the urban rate. Rural residents are much more likely than urban residents to have no health insurance coverage at all—public or private.

Rural residents are plagued by chronic disease, higher rates of infant mortality, and dramatically higher rates of injury-

related mortality. Some of these figures reflect the corn prices of the 1980's. You probably are not surprised to hear that the number of farm foreclosures reached 650,000 between 1981 and 1987.

You may not know that rural America also lost over 500,000 manufacturing jobs at the same time. It is estimated that for every seven farms that have been lost, one rural business has closed.

The rural population increased in the 1970's. The 1980's saw a dramatic shift. Growth was stagnant at best and some midwestern communities lost population, Iowa being one of them. All of you know we are going to lose a Congressman. We do not want to lose that Congressman; we have no choice.

These economic and demographic trends together with changes in the delivery and financing of health care have taken a huge toll on the rural health care systems, especially the rural hospitals. Ten percent of all U.S. rural hospitals closed during the 1980's, and it was estimated that about 25 percent of those still serving patients were in serious trouble.

With greater rural poverty has also come a rise in uncompensated care provided at rural hospitals. Under Medicare's prospective payment system, rural hospitals, since 1983, have been paid at a lower rate than urban hospitals, as much as 25 percent lower. This has been devastating to many rural hospitals because Medicare patients represent an exceptionally high percentage of their patients.

One of the first recommendations that the National Advisory Committee on Rural Health made to Secretary Sullivan was to establish a single national standardized

payment for Medicare hospital reimbursements. I am pleased to be able to say that Secretary Sullivan has been successful in seeking a higher annual update for rural hospitals. The Congress has now legislated a phase-out of the rural-urban differential in Medicare payments.

In 1989, the Federal Government implemented the Rural Hospital Transition Grant Program to address rural hospital vitality. Under this program about 180 new grants were made to rural hospitals each year for the past two years. Hospitals can receive up to \$50,000 a year to help them with strategic planning and implementation of programs to help them with that change in rural health care needs and practices.

Iowa has fared very well under this program. Twenty-three of these grants were awarded to Iowa hospitals in 1990. That totals \$819,000 and represents 10 percent of all the federal funds awarded.

The second program that the Federal Government is implementing right now is the EACH/PEACH Program. EACH means Essential Access to Community Hospitals. PEACH means Primary Care Hospitals. The Congress authorized this program in 1989 to provide financial incentives for rural hospitals to downsize and to focus on providing primary care and limited inpatient services and emergency care.

The program also encourages these primary care hospitals to form networks anchored by larger full-service, essential-access community hospitals. Seven states will receive funding this year to develop networks in primary care in essential-access community hospitals.

RURAL HEALTH PERSONNEL

Another rural health issue receiving a lot of attention is the shortage of rural health personnel. To maintain a rural health system, we have to have physicians, nurses, emergency medical service helpers, and other health personnel.

Rural counties have only one-third as many physicians per capita as the nation at large. In these counties, 20 percent of physicians are over the age of 65 and, obviously, are going to retire very soon. Communities also have problems recruiting and retaining physicians. Right now 165 Iowa communities are looking for doctors. Rural communities particularly find it difficult to recruit and retain registered nurses, physical therapists, occupational therapists, x-ray technologists, and other health professionals critical to health care systems.

Some recent federal efforts may help address a few of these problems. The National Health Service Corps was re-authorized last year. Its funding was increased. This program places physicians, nurse practitioners and physician assistants in the underserved areas. In recent years, about 70 percent of the placements have been in rural areas.

A Medicare bonus was implemented two years ago for physicians practicing in rural underserved areas. The bonus was increased just recently to 10 percent.

That represents just a very small incentive, but given the substantially lower rate that many rural physicians receive as compared to urban physicians, it is at least a step in the right direction. Both of these provi-

sions, I might add, were recommended by the National Advisory Committee for Rural Health.

Congress has also mandated a new Medicare physician payment system. Under this payment system, primary care physicians are going to be reimbursed at higher levels than they currently receive, and that ought to help.

At the same time, we should not overlook the issue of rural emergency medical services. In Iowa there are more than 400 ambulance services and approximately 10,000 trained personnel. Seventy percent of these people are unpaid volunteers, and most all of them are in the rural areas. The difficulties of recruiting and retaining these dedicated individuals who have other jobs, spend long hours in training, and donate their time free to an important health service are, I think, rather obvious.

Rural volunteer ambulance services also struggle to purchase equipment. An ambulance, fully stocked, is going to cost \$70,000 and rarely is there money from government to pay for that.

So they have their chili suppers and their chicken barbecues just to raise the money for an ambulance. That, actually, is where most of the money comes from. It seems kind of strange to think that the emergency services upon which we depend so heavily, particularly in rural areas—services that treat farm injuries, heart attacks, highway traffic accidents—are actually provided by volunteers.

RURAL MENTAL HEALTH

Now, the third and last rural health issue I want to mention is rural mental health. As I said a moment ago, the farm crisis of the

1980's caused incredible stress for rural individuals and families, but the accompanying drop in land values and tax bases made it increasingly difficult for rural communities to finance mental health services.

As we look at ways to strengthen our rural health care system, we have to make sure that mental health services are a part of that system. Mental health personnel are also trained for rural practice. Iowa State University, for example, has recently been awarded a \$4.5 million grant to establish a center for family research in rural mental health.

Right now Iowa has about \$24 million in rural health related federal grants, employing a variety of programs.

Mercy Hospital here in Des Moines, for example, has received \$750,000 for a cancer screening and control program for farm families in 35 Iowa counties.

CONCLUSION

Well, what is the sum and substance of it all? I think, notwithstanding the problems and all the difficulties, we can be somewhat encouraged by the recent progress in both rural health and in agricultural health and safety. Make no doubt about it, we have a long, long way to go.

Public policy items all have their life span on the national agenda. The challenge that we face is to keep rural health and agricultural health and safety issues on that agenda long enough so that we can make and see a very substantial difference.

If we can do that, we are going to see that the time and the effort and the money were all well spent to ensure a future for our rural areas. This conference is unique

Medical Intervention Problems and Opportunities

because of the range of the players that it has brought together.

I would suggest that we have a second conference; in fact, I already did before the Surgeon General left. I think I am not speaking out of school—she said she agrees. We really ought to have one.

I think it would be nice if we had it before 50 years, because I would like to come back. I would like to see what we have done between now and next year or the next year or whatever time that conference is set for.

The last Surgeon General's Occupational Health Conference resulted in something maybe very important, the elimination of mercurial poisoning in the hatting industry. We do not have much hatting industry anymore. In contrast, this conference has the potential to lead to dramatic decreases in agricultural deaths as well as advances in preventing and treating agriculturally related diseases and injuries.

To wrap it up, I would like to just share a quotation from the newsletter of the Center of Rural Affairs, Walthill, Nebraska. It puts what you are doing here in a broader context of rural development and, in a sense, summarizes what I think this conference is about. I am going to quote:

"Good rural development conserves the best in people; the resources they live from, the values that nourish them, and the institutions that sustain them. We need not try to prevent change but to shape it in ways that conserve our future."

I would add to that, the health and future of our rural farmers, farmworkers, and the farm community. If we succeed at doing that, every one of us will benefit. I appreciate so much you being here, because that is what you are here for, to do exactly what that quote says. Thank you very much.□

INTRODUCTORY REMARKS

By Ronald D. Eckoff, M.D.
Director, Division of Family and Community Health
Iowa Department of Public Health

Dr. Richard A. Lemen: To lead this panel this morning is Dr. Ronald Eckoff, a physician who is currently the Director of the Division of Family and Community Health with the Iowa Department of Public Health. Dr. Eckoff is a native of Michigan, having trained in both undergraduate and medical school at the University of Michigan. He holds a Master in Public Health degree from Harvard University. He has been active within the Iowa State Health Department, and I was looking at his resumé and noticed that somewhat—like locusts, I suppose—every 20 years he has been asked to be the Acting Director or Acting Commissioner of the Iowa Department of Public Health. He has a very good background in public health, and he will be leading the discussion today. I would like, at this time, to present to you Dr. Ronald Eckoff of the Iowa State Department of Public Health. Dr. Eckoff:

Thank you. I want to add my welcome to Iowa to the welcomes you have already heard from others in Iowa. I should give you a little warning. Some people have come to Iowa and said what a nice state it is, what a pretty state it is.

My warning is, I came here in the Commission Corps of the Public Health Service 26 years ago, on a two-year assignment with no intention of staying, and I am still here. So, we do not want you to leave the conference early, but if you do not want to get trapped into staying here, maybe as soon as the conference is over, you will want to get out of the state.

Chris Atchison talked the day before yesterday about some of the things that are going on in the Iowa Department of Public Health in relation to agricultural safety and health. So I will not repeat those things. But I would mention that when you go to the poster sessions this afternoon, if my counting is somewhere near correct, there are 101 posters there.

Five are from the Iowa Department of Public Health about our activities. There

are another 22 or 23 from other agencies and organizations in Iowa: Iowa State University, the University of Iowa, the Lung Association, the Easter Seal Society, county extension, and others. So I would certainly encourage you to view those sessions this afternoon.

As I have listened to other people and as I have talked to people here, I have come to the conclusion that everybody at this conference either is currently engaged in farming, grew up on a farm, spent a lot of time visiting their grandparents' farm when they were kids, or at least liked to visit farms or go to the petting zoo section of the zoo.

I did grow up on a farm, but I am here to tell you that I did not do any of those dangerous things that some of the other speakers have talked about. I did not drive a combine at a young age, or a grain truck, or anything like that.

Of course the fact that I grew up on a fruit farm in Michigan, and we raised apples and pears and that sort of thing, not corn and soybeans, might have had something

Issues That Affect the National Agenda

to do with that. I will not mention to you the kinds of things that I might have done that were dangerous.

This morning's session we shift gears just a little bit and talk about some issues that affect agricultural health and safety. We have been talking more specifically about some of the dangers and the activities, and now we are going to talk about issues that affect agricultural safety and health.

Our first two speakers will address the agricultural work force and the behavior of its members. Then the second two speakers will reveal changes in the agricultural work place as it is affected by new and different crops and by biotechnology. Biotechnology is certainly a word we hear used a great deal these days.□

THE AGRICULTURAL WORK FORCE: PATTERNS AND TRENDS

By Leslie A. Whitener, Ph.D.
Economic Research Service
U.S. Department of Agriculture

Dr. Ronald D. Eckoff: Dr. Leslie Whitener is a sociologist and Head of the Agricultural Labor Section, Economic Research Service, U.S. Department of Agriculture. Dr. Whitener holds M.A. and Ph.D. degrees in Sociology from The American University in Washington, D.C., with specializations in the sociology of work and advanced statistics. She has over 15 years of experience in farm labor research and has authored or co-authored more than 50 papers, monographs, book chapters, and journal articles relating to the agricultural and rural labor force. Specific studies have focused on the problems and needs of migrant farmworkers, the effects of Food Stamp and Federal employment programs on hired farmworkers, and labor market conditions facing farmers who seek off-farm jobs. Dr. Whitener's presentation focuses on patterns and trends in the U.S. agricultural work force and their implications for farm safety issues. Dr. Whitener:

INTRODUCTION

Major changes have occurred in American agriculture during the last 40 years, which have affected the way we think about farms and the nation's farmworkers. Farms have become fewer and larger and agricultural production has become increasingly concentrated on the bigger farms.

The greater availability of machinery, chemicals, water, improved seed and live-stock, and public financing have led to a greater substitution of capital for labor. As a result, the number of agricultural workers has declined by over 70 percent since 1950 and the activities and working conditions of U.S. farm workers have changed dramatically.

Some of these changes have raised serious questions about the health and safety of agricultural workers. Agriculture continues

to have one of the highest "accident" rates of any major industry group—a fact you will undoubtedly hear repeated throughout this conference. According to the Bureau of Labor Statistics, for example, the incidence rate of workplace injuries and illnesses for agricultural production workers (12.2 injuries per 100 full-time workers in 1989) is exceeded only by construction and some manufacturing industries.*¹

Other data sources show even higher injury and illness rates for agriculture. My comments today will help to provide a context for understanding some of the farm safety and health issues raised in this conference. To that end, my presentation focuses on the changing structure of American farms and on the demographic and employment characteristics of the people who work on those farms.

I will concentrate on three major points that have important implications for cur-

*The incidence rates for agricultural production workers do not include workers on farms with less than 11 employees.

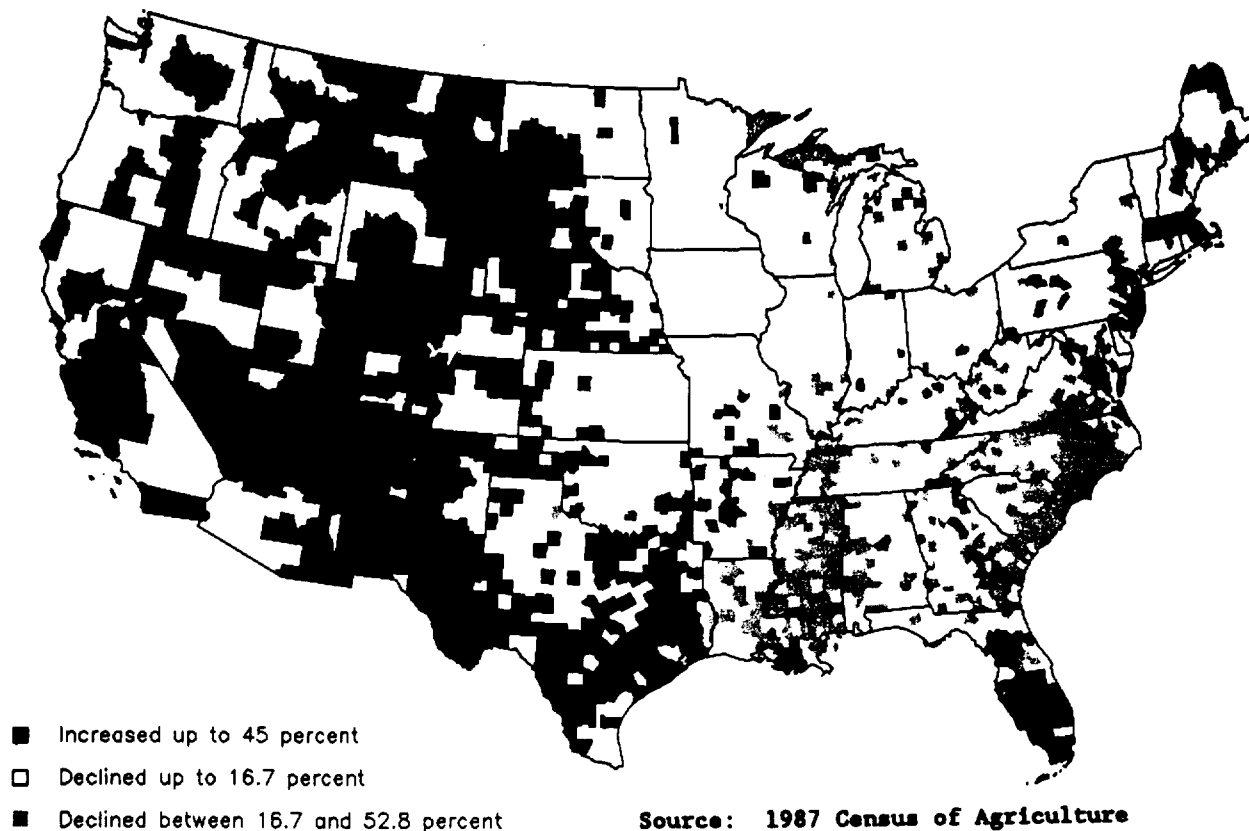


Figure 1. Change in Farm Numbers, 1982-87. *Two-thirds of the Nation's counties lost farms; the heaviest losses were in the eastern half of the Nation.*

rent and future agricultural safety and health issues.

- ▶ First, U.S. agriculture has changed dramatically over time; farming and the nature of farmwork are very different today than they were in the 1950's.
- ▶ Second, the agricultural work force is a diverse group of workers who perform a wide variety of activities on the farm. This diversity complicates generalizations about farm safety problems and solutions.
- ▶ Third, all is not what it seems, and many of our long-held tenets about farming and

farmworkers are no longer relevant or have been based on stereotypic images that were never true. These new ideas and patterns suggest caution when projecting farm labor trends to the future.

CHANGES IN FARM STRUCTURE

Perhaps the most notable change in agriculture over the last four decades has been the decrease in the number of farms. Farm numbers declined by over 3 million between 1950 and 1987, falling to about 2.1 million farms in 1987.² Yet, these declines have not occurred consistently across the country (Figure 1).

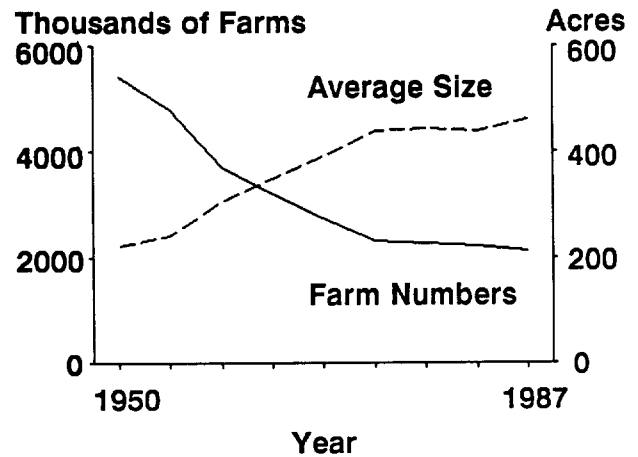
Between 1982 and 1987, for example, the largest declines in farm numbers occurred along the South Atlantic coast and the Mississippi Delta. During this period, the slow-growing economy of the rural South encouraged many poor, part-time farmers to leave farming for higher-paying non-farm jobs. Many small farms were consolidated into larger operations.

The Corn Belt, Lake States, and most of the Northeast also showed declines in farm numbers but at slower rates of loss. While the farm recession of the early 1980's undoubtedly affected major farm production states, the effects appear to be less serious than expected.

During 1982-87, the period immediately following the farm recession, much more change occurred in regions not usually associated with major agricultural production. Figure 1 shows little shading in the midwest, and there is little indication of severe decline in these states.³ The recession apparently resulted more in financial restructuring than in farm loss in these areas.

In contrast to these patterns of decline, farm numbers increased in many parts of the United States, particularly in the Western States and in southern Florida. The increase in farms may be a reflection of rapid population and employment growth in these areas during the mid-to late 1980's. Farm increases, particularly in the West, were also due to division of farms into smaller units as partnerships dissolved or as older operators retired and divided their farms among heirs.

Farm numbers will continue to decline in the 1990's, but at a slower rate than was experienced during much of the post-World War II period. By the year 2000, the number is expected to drop by about 6 percent—substantially below the 11 percent decline seen during the 1980's.⁴



Source: Census of Agriculture, selected years.

Figure 2. Change in Farm Numbers and Size, 1950-87.

As the number of farms decreased, average farm size increased, forming what some have called the "Iron Cross of Agriculture" (Figure 2).⁵ Farm size averaged 216 acres in 1950 but increased to over twice that size (462 acres) by 1987.^{**} There will be more large farms at the turn of the century than there are today, and by the year 2000 the largest 1 percent of farms is expected to account for half of all farm production.⁶

As the number of farms decreased, average farm size increased, forming what some have called the "Iron Cross of Agriculture."

^{**} Note that the rates of increase in farm size have consistently declined since the 1950's, and the trend toward larger farm size may be stabilizing.³

The current trend toward fewer and larger farms is due to many factors, including technological development, economies of scale, tax laws, price instability, differences in operators' managerial ability, capital requirements, credit availability, foreign trade arrangements, and Government programs and regulations.⁷

PATTERNS OF LABOR USE ON U.S. FARMS

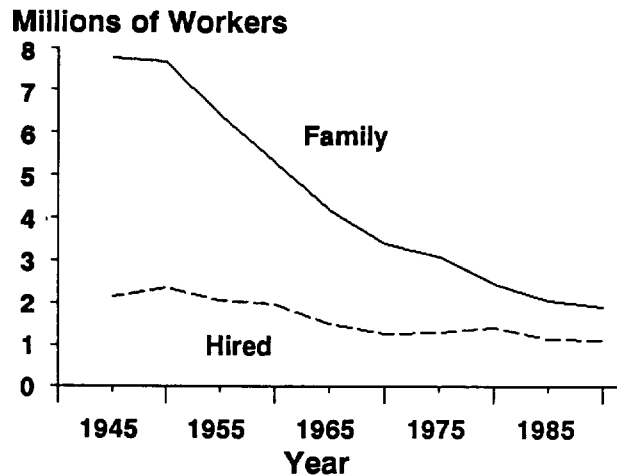
What do these structural changes mean for labor use on U.S. farms? Changing farm structure has transformed labor requirements on U.S. farms. Capital substitutions of machinery, chemicals, water, and fertilizer for labor resulted in a substantial drop in the need for the number of workers in agriculture. In 1989, the number of hours of labor required in agriculture was about one-third of its 1950 level.⁸

Feed, seed, and livestock purchases increased over 80 percent since 1950. The use of agricultural chemicals, including fertilizer, lime, and pesticides, increased by over 500 percent. During the same period, farm output and worker productivity increased dramatically. In 1950, the average farmworker supplied farm products for about 16 people; by 1989, the number had risen to 98 people.⁸

As a result, the agricultural work force, including both family and hired workers, declined by over 70 percent between 1950 and 1989 (Figure 3). Farm operators and their unpaid family members continue to provide the major portion of labor in agriculture.

However, hired workers have gradually replaced some family workers on farms. In 1950, hired workers comprised about 23

percent of annual average employment; by 1989, the proportion had increased to 35 percent.



Source: USDA, NASS Farm Survey.

Figure 3. Farm Employment Trends, 1945-90.

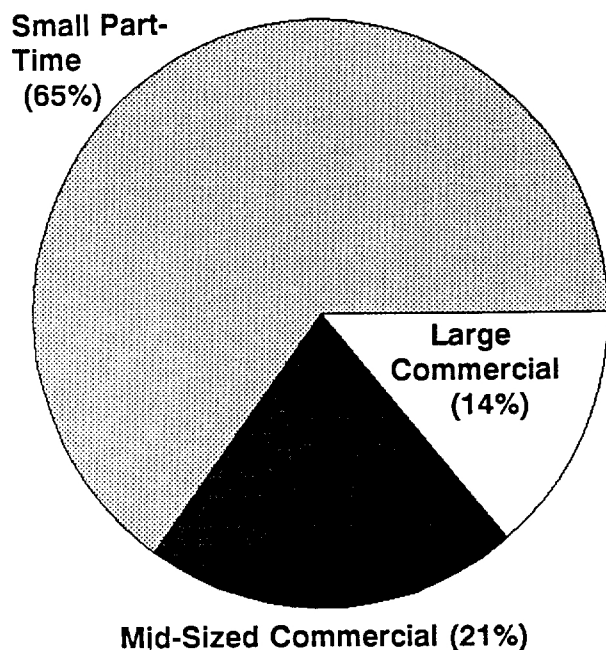
The amount and type of labor used on farms is related to the size of the farm operation, the commodities produced, and the geographic location of farms.⁹ Less than half (about 954,000) of the nation's 2 million farms employed hired or contract workers in 1987.²

Small part-time farms, particularly those involved in grain or livestock production, are more likely to rely on family labor. Larger farms, especially those producing fruits and vegetables, tend to have labor needs in excess of the capacities of the families who farm them. A closer examination of farms by three size categories provides a useful perspective on patterns of farm labor use (Figure 4).

Small Part-Time Farms

Almost two-thirds of the nation's farms are small, part-time operations with annual product sales of less than \$25,000. For

most of these farmers, farming is a secondary occupation, and off-farm income has become increasingly important to their economic survival.



Source: 1987 Census of Agriculture.

Figure 4. Farm Size Based on Cash Value of Sales, 1987.

These farms are generally small, owner-operated farms, largely dependent on family members for labor supply. Over two-thirds did not use any hired or contract labor in 1987, and the remainder averaged less than \$5,000 in labor expenses per farm.⁹ Most are involved in grain and livestock production and are disproportionately located in the southern half of the United States. Between 1982 and 1987, these small part-time farms accounted for half of the national loss in farms.

Mid-Size Commercial Farms

About one-fifth of U.S. farms are mid-size commercial farms with annual product

sales of \$25,000-99,999. Mid-size commercial farms are largely producers of cash grains, cotton, and cattle—agricultural products, which do not require large amounts of hired labor per farm. The 1982-87 loss in the number of farms was heavily concentrated among mid-size commercial farms.

This group suffered the largest rate of decline all the farm size categories, losing 12.5 percent of its farms. Operators of mid-size farms are under considerable financial pressure to either enlarge their farming operations to a more viable commercial size or to scale back to a smaller part-time size of operation. Consolidation of mid-size farms into larger units has been a major source of the growth of large commercial farms over the two past decades.

Large Commercial Farms

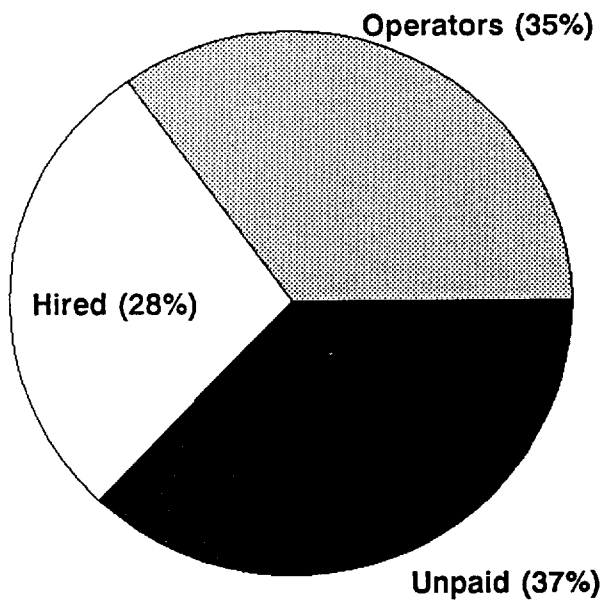
Large commercial farms, those with annual sales over \$100,000, have grown in number over time and comprised about 14 percent of all U.S. farms in 1987. Agricultural production and hired farm labor use are becoming increasingly concentrated on these larger farms.

The largest 2 percent of commercial farms (with cash sales of \$500,000 and over) accounted for over half (54 percent) of the total expenditures for hired labor in 1987. These farms tend to specialize in vegetables, melons, fruits, tree nuts, and specialty crops. The production and harvest of these crops has not been widely mechanized and continues to require large amounts of hired labor during critical periods.

These large farms are concentrated geographically. California, Texas, and

Florida, together with four other states (Washington, Wisconsin, North Carolina, and Pennsylvania) accounted for almost half of all hired labor expenditures in 1987. Hired farmworkers will become increasingly important to agricultural production as these labor-intensive farms continue to grow in number.

Patterns of change by farm sales class suggest continued movement toward a bifurcated or dual structure of agriculture. One group represents a small number of large, capital and labor-intensive commercial farms that produce a growing share of the nation's food and fiber.



Source: Agricultural Work Force Survey.

Figure 5. Components of the Agricultural Work Force, 1987.

The second component represents a large number of small, owner-operated farms that are largely dependent on off-farm income and use few hired workers. Although comprising the majority of farms, these small part-time farms account for only a small portion of total production,

and many exist primarily as a means of preserving a rural lifestyle for operators and their families.³

THE AGRICULTURAL WORK FORCE: A PORTRAIT OF DIVERSITY

Who are the nation's farmworkers? Data from the U.S. Department of Agriculture's (USDA) Agricultural Work Force Survey indicate that almost 7.7 million persons 14 years of age and older were employed on U.S. farms as farm operators, hired farmworkers, and unpaid farmworkers in 1987.¹¹ Over 1 million persons performed more than one of these three activities. For example, some farmers operated their own farm but also hired themselves out for wages to other farmers.

To avoid double-counting individuals in more than one category, individuals were grouped by their major farmwork occupation, the activity in which they spent the most time during the year. By this definition, there were approximately 2.7 million farm operators (35 percent), nearly 2.2 million hired farmworkers (28 percent), and almost 2.9 million unpaid farmworkers (37 percent) (Figure 5).

These data help to define an agricultural work force that is subject to potential risk from farm accidents, illnesses, and injuries because they work on farms. However, several groups are excluded from this population at potential risk, including children working on farms. The Fair Labor Standards Act allows children to legally work on farms under certain conditions.***

The Agricultural Work Force Survey did not collect information on the number of children under 14 who worked on the nation's farms. We do know, however,

that about 1.2 million children under 14 years of age resided in farm operator households; it is likely that many of these children helped out with farm chores.

Another 800,000 children lived in households headed by hired farmworkers; some may have worked along with their parents.¹² There is no direct evidence from the survey to suggest how many of these children actually worked on farms.

The Agricultural Work Force Survey also did not count two other groups of hired farmworkers—foreign workers who legally enter the United States to do temporary farmwork and undocumented foreign workers who enter this country illegally to do hired farmwork.

These hired workers were probably not included in the survey data because they returned home before data collection in December or because they tended to avoid contact with Federal enumerators. These two groups are discussed in more detail later in this paper.

A look at the numbers and characteristics of the different components of the agricultural work force reveals the considerable diversity among these workers and points up the difficulties of generalizing farm occupations.

Farm Operators

About 2.8 million people operated a farm that they owned, rented, or leased at some time during 1987, according to USDA's Agricultural Work Force Survey.¹³ Two or more persons (such as a husband and wife or partners) could operate one farm, and both would be included as farm operators under this definition.

Most of the farm operators were white (97 percent), male (77 percent) and middle-aged (median age of 47 years). Farm operators on average had relatively high levels of formal education. Eight out of ten operators had completed high school and three out of ten had some college education.

Farm operators averaged 235 days operating a farm in 1987. About 58 percent worked 250 days or more operating a farm, while only 11 percent worked fewer than 25 days. In addition, almost half did some non-farm work during the year and non-farm work provided an important source of income. Those who did non-farm work averaged 213 days of work in non-farm activities with average annual non-farm earnings of \$15,882.

Unpaid Workers

Unpaid farmworkers are those who do any amount of farmwork without receiving cash

***The Fair Labor Standards Act limits the employment of minors in agriculture according to age and occupational activity. Children 14-15 years old may work on farms outside school hours in non-hazardous occupations in agriculture. Children aged 12-13 years may work outside school hours in any nonhazardous farm job with written parental consent or on the same farm where their parents are employed. Children 10-11 years of age may work outside school hours in any nonhazardous farm job, with written parental consent only on farms where none of the employees are legally entitled to the Federal minimum wage; a special waiver may be obtained from the U.S. Department of Labor. Children of farm owners or operators may be employed by their parents at any time and in any occupation on a farm owned or operated by their parents.¹⁰

wages or salary, or receive only a token cash allowance, or do farmwork for room and board or payment-in-kind. The largest component (46 percent) of the agricultural work force in 1987 was made up of the 3.6 million people who did unpaid farmwork.

The majority of these workers were white (95 percent), male (66 percent), and young (median age of 31 years). They had relatively high levels of education; 77 percent had completed high school and 37 percent had some college.¹³

The largest component (46 percent) of the agricultural work force in 1987 was made up of the 3.6 million people who did unpaid farmwork.

Most of these unpaid workers did not reside in farm operator households. However, the 34 percent of unpaid workers who did live in farm operator households generally worked more days at their farm activities. They averaged 101 days of unpaid farmwork compared to only 30 days for those not living in farm operator households.

Almost 70 percent of unpaid farmworkers did some non-farm work during the year. They averaged 211 days of non-farm work and 40 days of unpaid farmwork and earned an average of \$13,900 from non-farm work during the year.

Hired Workers

The nation's hired farmworkers originate from three different sources of labor: domestic workers (including those hired directly and those employed through crew leaders or farm labor contractors), foreign

nationals brought into the country under the H-2A Program, and undocumented foreign workers.

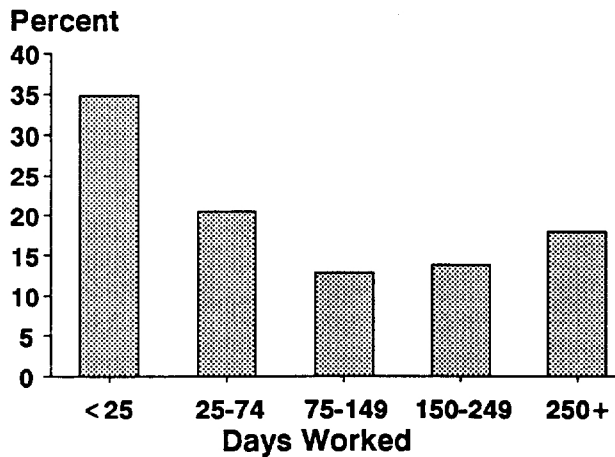
1. Domestic Hired Farmworkers

The number of hired farmworkers has decreased by almost 40 percent, falling from a high of 4.2 million workers in 1950 to about 2.5 million in 1987.¹³ Most of these losses occurred in the 1950's and 1960's, largely as a result of the adoption of new production and marketing technology on farms, including labor-reducing machines and higher-yielding crops and livestock.

During the 1970's, however, hired worker displacement slowed considerably as large-scale mechanization and technological innovations with large labor displacement potential leveled off. Between 1970 and 1987, the number of hired farmworkers stabilized at 2.5 to 2.6 million annually, after years of continuous decline.¹⁴

On average, hired farmworkers are young and male, with relatively low levels of education. More than 40 percent of hired workers 25 years of age and over had not completed high school compared with only 15 percent of the U.S. labor force 25 years and over. The educational disadvantage was even more pronounced for minorities.

Because of the seasonal nature of agriculture, hired farmwork is frequently unstable, sporadic, and of short duration. In 1987, the average hired farmworker spent 112 days doing farmwork. However, there was considerable variation in days worked. More than half (55 percent) worked fewer than 75 days during the year. Only one-fifth were year-round workers who worked more than 250 days during the year (Figure 6).



Source: 1987 Agricultural Work Force Survey.

Figure 6. Hired Farmworkers by Days of Farmwork, 1987.

Hired farmworkers were paid an average of \$4.87 per hour for farmwork in 1987. This low wage and the seasonal employment combined to make hired farmworker earnings among the lowest of all occupational groups in the United States. Hired farmworkers earned an average of \$6,663 from both farm and non-farm jobs in 1987, accounting for only 41 percent of the \$16,250¹⁵ earned by the average nonagricultural private sector workers.

However, the nation's hired farmworkers are a diverse labor force, and a picture of the average farmworker can be misleading. Popular image depicts hired farmworkers as a large, undifferentiated group of low-income workers with little education and few skills, who harvest the nation's fruits and vegetables mostly in California and Florida. Yet hired farmwork comprises a wide range of activities performed all over the United States.¹² For example, hired farmworkers:

- Cut sugarcane in Florida.
- Strip and bale tobacco in Kentucky.

- Herd sheep in Idaho.
- Operate a combine in Kansas.
- Milk cows in Vermont.
- Shear Christmas trees in Michigan.
- Stock catfish ponds in Florida.
- Serve as farm managers in Oregon.

Hired farmworkers not only perform widely different activities, but they work for a variety of reasons. Hired farmworkers include household heads, who do hired farmwork on a regular or year-round basis and whose families depend on their farm earnings for economic support, as well as non-farm workers who do seasonal farmwork to supplement their non-farm earnings.

Also included is a large group of students, housekeepers, and others not in the labor force most of the year, but who do a few days or weeks of farmwork during the year. Some of these workers are earning extra spending money while others contribute necessary earnings to the family income.¹⁶

2. Migrant Farmworkers

Migrant farmworkers provide a necessary supplement to local labor when demand exceeds the supply of farmworkers living in a local areas. After almost 50 years of Congressional hearings, countless Federal task forces, poignant documentaries and books, and national media coverage of the socioeconomic problems of migrant farmworkers, we still wrestle not only with the question of how to help these workers, but also how to count them.

Data collection is complicated by the wide variation in definitions and measurement procedures used by Federal agencies and others concerned with migrants, as well as with difficulties in counting a transient population. As a result, population counts

range widely from a low of around 200,000 reported by USDA in the mid-1980's to as many as 1.6 million migrants and their dependents reported.¹⁷

Little statistical information is available on the travel patterns or routes followed by migrants as they harvest the Nation's crops. Common perception suggests the existence of three major migrant streams, one each on the east and west coasts, and one in mid-continent. However, the uniformity of migrant travel patterns has not been well-documented leading one farm labor expert to observe that:

The maps of migratory streams—Atlantic, Pacific, and Mid-continent—which in the past were so prominent and still are to be seen now and again, embodied more flows of imagination than of people.¹⁸

Figure 7 illustrates the commonly perceived image of three major migrant streams. Figure 8 shows the more likely patterns. In 1977, David Lillisand et al. conducted a survey for the Legal Services Corporation across the county to determine the state of origin, last state of employment, and next state of destination for migrants in various states.¹⁹

While the data do show three broad patterns of migratory travel consistent with the common image, they also indicate considerable deviation from three major streams. The study concluded that if patterns of migrant travel existed at all, they were much more complex than

the commonly perceived image of three streams.

3. Foreign Workers

Foreign workers leave their home countries to work in U.S. agriculture because there are more jobs and higher wages here. Lack of education, work experience, or language fluency do not hinder foreign workers as much in agriculture as in many other types of jobs. As a result, many U.S. farm employers have come to rely on foreign workers as a ready source of labor.

► **Temporary Foreign Workers.** Some foreign nationals are legally admitted to the United States to do hired farmwork under the H-2A Temporary Foreign Worker Certification Program. This program, administered by the U.S. Department of Labor, permits foreign workers to enter the United States to do farmwork when there are not enough available qualified domestic workers to do the work and when the employment of

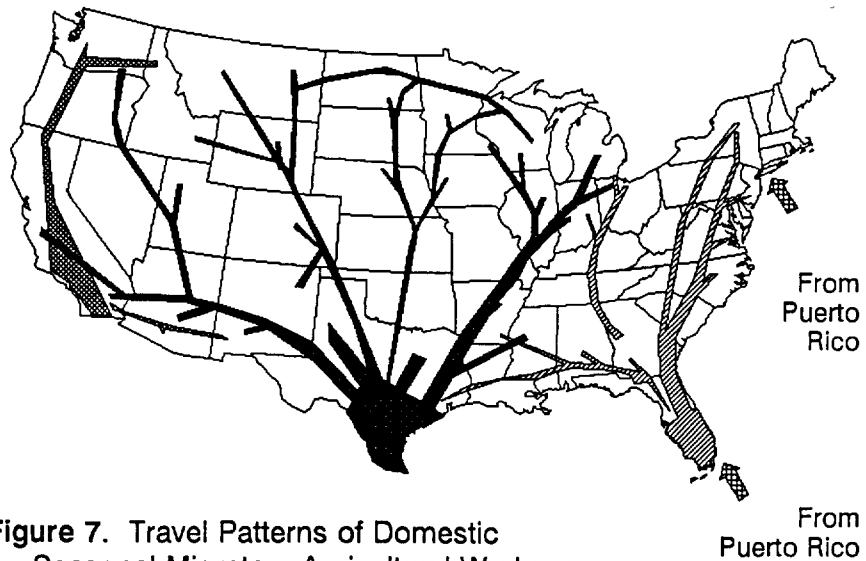


Figure 7. Travel Patterns of Domestic Seasonal Migratory Agricultural Workers.

— Source: Migrant Health Program, U.S. Public Health Service.

foreign workers will not adversely affect the wages or working conditions of similarly employed U.S. farmworkers.

About 26,000 farm jobs were certified for foreign workers under the H-2A program in 1989. Due to their small numbers, H-2A workers have little effect on the national farm labor market. However, they do account for a significant portion of the labor force in some production areas, particularly Florida sugarcane, and eastern and northeastern apples.

► **Undocumented Foreign Workers.** Illegal aliens have a much greater effect on the U.S. farm labor market because of their large numbers than do legally admitted foreign workers. There is little reliable statistical information on the numbers and characteristics of these workers. Deriving a reliable count is problematic because of the migratory nature of this illegal work force and because many of these workers will not participate in surveys for fear of revealing their illegal status.

Experienced observers of the farm labor market during the mid-1980's believed that undocumented workers accounted for about 10-15 percent of all hired farmworkers, with higher proportions in the labor-intensive fruit and vegetable sector.²⁰ Farm labor experts now believe this figure to be much higher.

Concern over the large number of unauthorized workers coming to the United States led to the passage of the Immigration Reform and Control Act (IRCA) of 1986. The Act was designed to reduce the flow of undocumented workers by imposing fines and jail terms on employers who hired them.

At the same time, IRCA offered legal U.S. residence status to qualifying undocumented workers who had resided

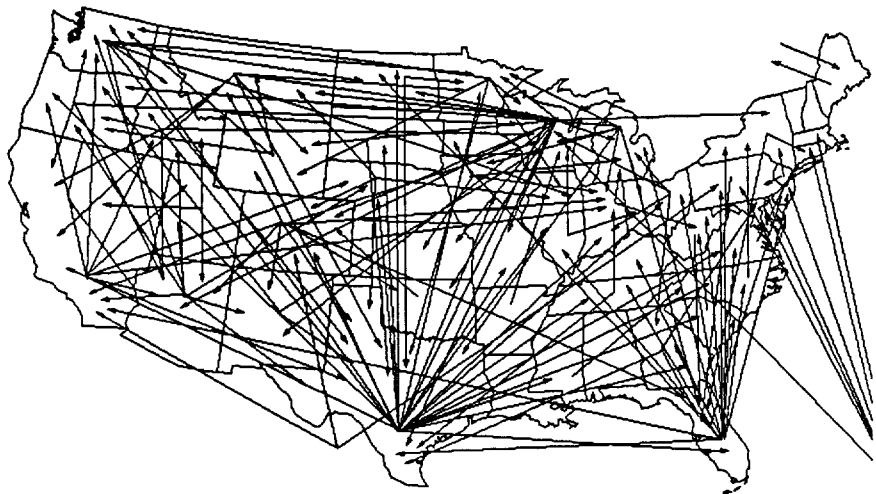


Figure 8. Farm Labor Migration Patterns.¹⁹

— Source: Lillisand et al. in a study prepared in 1977 for the Legal Services Corporation.

continuously in the United States since before January 1, 1982. Over 1.7 million persons were approved for resident status.

Many of these people are experienced farmworkers and may choose to continue to work in agriculture. IRCA also established a Special Agricultural Worker (SAW) program for producers of perishable commodities.

This program allows undocumented workers who previously worked in seasonal agricultural services to apply for legal

resident status. About 1.3 million persons applied, and a high approval rate is expected.

IRCA could have important implications for the supply, demand, working conditions, and wage structure of both illegal and U.S. hired agricultural workers in the future. The absence of reliable statistical information on illegal aliens creates difficulties for estimating the effect of immigration reform on agriculture.

...the hired component of the agricultural work force will continue to grow in importance as hired workers increasingly replace family workers on farms and as the number of large, labor-intensive commercial farms continues to increase.

However, it is likely that many of the farms affected by immigration reform will be those that hire large numbers of seasonal farmworkers. Vegetable, melon, fruit and tree nut, and horticultural specialty farms are generally the least mechanized and require a large number of workers for short periods of time. These farms are generally concentrated on the Pacific Coast, in the Southwest, the Northeast, in Florida, and around the Great Lakes.^{9, 21}

OUTLOOK FOR THE FUTURE

Patterns of farm labor use have changed dramatically over the past four decades and definite employment trends emerged in the seventies and eighties. What do these trends suggest for farm labor requirements in the future?

It is likely that the trend toward fewer and larger farms will continue in the near future, although the rate of change is expected to be slower than during the 1970's and 1980's. Also, the hired component of the agricultural work force will continue to grow in importance as hired workers increasingly replace family workers on farms and as the number of large, labor-intensive commercial farms continues to increase.

If current trends in farm inputs persist, we will see increased use of agricultural pesticides, fertilizers, and pesticides. Mechanization of the harvest of some fruits and vegetables is possible in the near future, but labor reductions are not likely to be as great as those of the 1950's or 1960's.

For tree fruits and nuts, extensive replanting of trees is often required for machine harvesting, and costs for replanting and lost productive years are often difficult to justify. For some fruits and vegetables, such as strawberries and asparagus, the technology needed to machine harvest efficiently with minimal product damage has not yet been developed.¹⁶

The 1990 Food, Agriculture, Conservation, and Trade Act of 1990 directs the Secretary of Commerce to include questions relating to agricultural accidents and farm safety in the 1992 Census of Agriculture.

Several factors will help determine patterns of farm labor use in the future, including technology development, international trade, farm programs, immigration policy, and relative prices of major farm

inputs. Recently enacted immigration reform legislation has not yet been empirically evaluated and could have important effects on farm labor supply, demand, and wages.

Also, negotiations are currently underway between Mexico and the United States concerning removal of trade barriers between the two countries. A Mexican free trade agreement has the potential to affect movement of jobs and workers across the border.

SUMMARY AND IMPLICATIONS

My comments today point to three major conclusions:

► First, changes in the structure of farming have dramatically affected the numbers, activities, and working conditions of the agricultural labor force.

Farming and the nature of farms are very different today. The trend toward fewer and larger farms has reduced the number of family workers but increased the average farm's hired labor requirement.

Operators and hired workers must have a variety of skills to perform farm tasks, ranging from heavy equipment operator to chemical applicator.²² Length and intensity of farm work days exhibit high variation, and the number of hours worked per day is often dictated by weather conditions.

The use of agricultural chemicals on the farm has increased dramatically since the 1950's, and technological developments have placed a wide variety of complex machinery on U.S. farms. The changing nature of agricultural work has led to increased concern about the health and safety of agricultural workers.

► Second, the agricultural work force is comprised of diverse workers with different demographic characteristics, skills, and experience, who work on a variety of farms in a multiplicity of farm activities throughout the country. Components of the agricultural work force include farm operators, unpaid workers, domestic hired farmworkers, legal and illegal foreign workers, migrants, and children. This diversity complicates generalizations about farm safety problems and solutions.

► Third, many of our long-held beliefs about farming and farmworkers are no longer relevant or have been based on stereotypic images that were never true:

1. Despite long-term declining trends in farm numbers, some areas of the country, particularly the West, are experiencing increases in the number of farms.
2. The majority of U.S. farmers are part-time farmers and have a principal occupation other than farming. For whatever reason, farming is a second job, and many work only a few days in farm activities.
3. Employment of hired farm workers is highly concentrated on the large commercial farms, and 2 percent of the biggest farms accounted for over half of all labor expenditures.
4. While the number of hired farmworkers has declined over the last 40 years, most of the decrease was in the early 1950's and 1960's. During the 1970's and 1980's, the number of workers stabilized.
5. While many hired farmworkers are involved in the harvest of fruits and

vegetables, farmworkers also do such diverse activities as shearing sheep, pruning Christmas trees, stocking catfish ponds, and baling tobacco.

These findings suggest that we should not become complacent about long-term patterns and trends in farm employment. However, continued monitoring of farm labor conditions is dependent on adequate data collection on all components of the agricultural work force.

While we collect comprehensive information on agricultural production levels, value of sales, and costs of production, little data are available on the characteristics, wages, and working conditions of agricultural workers. More detailed farm labor information at the local level is needed to help assess the impact of farm labor policies and programs, including those related to agricultural safety and health, on the employment and working conditions of the nation's farmworkers.

Passage of the most recent Farm Bill may help to improve our data collection efforts in this area. The 1990 Food, Agriculture, Conservation, and Trade Act of 1990 directs the Secretary of Commerce to include questions relating to agricultural accidents and farm safety in the 1992 Census of Agriculture. The Bureau of the Census is currently pre-testing a series of questions to collect these data in the next Census.

At the same time, the Farm Bill also authorizes the Secretary of Agriculture to make grants for the establishment of farm safety education programs for farmworkers, timber harvesters, and farm families.

These grants, coordinated with state offices of rural health and the U.S. Department of Health and Human Services, are to provide information on such topics as the reduction of occupational injury and death rates, exposure to farm chemicals, occupational rehabilitation of farmers with physical disabilities, and farm accident rescue procedures.

The changing nature of agricultural work has led to increased concern about the health and safety of agricultural workers.

While funding for these grants has not yet been appropriated, the mechanism is in place to improve our farm safety educational efforts. These two legislative components of the 1990 Farm Act recognize growing National concern over agricultural safety and health issues and provide the potential to improve our data collection and expand our educational efforts to help reduce accidents, illnesses, and deaths on the nation's farms.□

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ATTITUDES AND RISK BEHAVIOR

By Pamela D. Elkind, Ph.D.
Professor, Department of Sociology
Eastern Washington University

Dr. Ronald D. Eckoff: Our next presentation will be by Dr. Pamela Elkind on attitudes and risk behavior. Dr. Elkind has a bachelor's degree in sociology from Boston University, a master's degree in sociology from Boston University, and a Ph.D. in sociology from Northeastern University with joint course work at Tufts University. Her special areas of work have been environment and energy, social impact assessment, medical sociology, rural communities, and research methods. Dr. Elkind has held a variety of research and consulting positions and for the past ten years has been at Eastern Washington University in the Department of Sociology where she is a professor of medical sociology, environmental sociology, and a research specialist. Dr. Elkind will be presenting this morning in relation to *Attitudes and Risk Behavior*. Dr. Elkind:

Thank you. Good morning. I have been asked to speak to you today about behavioral attitudes related to hazardous farm activities. To speak to this subject, three questions should be asked.

- ▶ Firstly, why consider agricultural attitudes?
- ▶ Secondly, what are the relevant attitudes?
- ▶ Thirdly, how are these attitudes related to farm health and safety practices?

These are the questions we will consider today.

AGRICULTURAL ATTITUDES

The first question I shall address is, Why consider agricultural attitudes? As in this extraordinary conference, farm health and safety is receiving attention in the early 90's. Coalitions of concerned citizens and organizations are becoming common. OSHA is developing regulations. NIOSH is funding large projects. Kellogg is initiating special innovation projects.

Popular magazines are covering the risks of agriculture. Programs and projects that deal with the safety of farm populations are being conceptualized.

Within the framework of the various projects, there appears to be an important assumption. This assumption, simply stated, is that to make agriculture safe for the farm families and workers, it is necessary to motivate them to protect themselves from health and safety hazards.

The assumption further suggests that the way to accomplish this is to educate them about the dangers and possible negative outcomes of hazards. It is assumed that armed with the statistics and the knowledge of the means of protection, the agriculturalist will change behaviors, ultimately diminishing injuries and casualties. I shall attempt to demonstrate to you that these assumptions lack validity.

Principal persons in 206 farm families were interviewed in the State of Washington, in 1988 and 1989. The data were gathered as one of four subgroups in an analysis of farm hazards sponsored by the University

of Iowa, Institute of Agricultural Health and Occupational Medicine. Many of you have referred to this as the NCASH study.

This assumption, simply stated, is that to make agriculture safe for the farm families and workers, it is necessary to motivate them to protect themselves from health and safety hazards...I shall attempt to demonstrate to you that these assumptions lack validity.

There is a good deal of similarity between the four states, data sets, but today we will speak of Washington State. Respondents were asked to compare farming to other occupations in terms of occupational hazards, including health effects and injuries. In our Washington State sample, 80 percent of those questioned believed that farming is at least as dangerous as other occupations, and there is no significant correlation between perceptions of farm safety and gender, occupational longevity, age, education, or outside occupational status. This leads us to conclude that there is a generalized agreement across all categories in the farm population that agriculture is hazardous.

However, the knowledge that farming is dangerous does not necessarily affect the attitudes of the respondents (Figure 1). When asked if they were more concerned about farm safety and health than economic issues, as, for example, farm product prices, only 21 percent were more concerned about health and safety.

Furthermore, when later in the interview we asked if the health hazards in farming are great enough for them to discourage their children from farming, only 6 percent

of the sample replied yes (Figure 2). In fact, those who felt farming was most dangerous were more likely not to discourage their children from farming.

	Number of Responses	Percent
Yes	43	20.9
No	140	45.5
Equally Concerned	53	25.7

Figure 1. More Concerned About Health and Safety Than Farm Product Prices.

There is the greatest likelihood that a farm family knows agriculture is dangerous in terms of health and injury, yet parents believe it is an appropriate occupation for their children and are more concerned over the economics of agriculture than anything else.

	Number of Responses	Percent
Yes	11	6.3
No	164	93.7

Figure 2. The Health Hazards in Farming Are Great Enough That You Could Discourage Your Children from Farming.

In an interview, it is difficult to evaluate behavior, since only reported behavior is measured. Yet, some elements may be scrutinized. Respondents were asked about the precautions they take when dealing with agri-chemicals, tractors, machinery, or with grains, feed, and bedding material.

They were asked to choose from among lists of choices, which range from staying

downwind and washing one's hands to wearing protective devices and using machine or vehicle safety equipment. Though many of the safety approaches would appear to take little effort, 18 percent did none of these.

Conversely, 82 percent of the sample take some safety precaution, and there is no significant difference in their behavior with respect to the degree they consider agriculture hazardous. Some families practice a good deal of safety. About 40 percent of the sample reported that they regularly practice 5 percent to 10 percent of the safety precautions. Again, there was no significant difference between these behaviors when correlated with diverse perceptions of farm hazards.

This analysis suggests to us that:

- ▶ First, based on the sample of Washington State farm families surveyed, there is a good deal of knowledge about farm hazards in the population. Farmers perceive agriculture as dangerous.
- ▶ Second, we might conclude that the attitudes about the importance of those hazards with respect one's own life differ from the knowledge of the hazards. In fact, when weighed against the family's economic well-being or a child's future in agriculture, the hazards are overlooked.
- ▶ Third, behaviors of taking precautions tend to be unrelated to the knowledge of hazards. Farmers who regularly take many safety precautions do not say that farming is any more or any less dangerous than those who do nothing to protect their families and workers.

Thus, I will argue, based on the Washington State sample, that knowledge

about farm-based safety and health hazards is unrelated to deep-seated values and attitudes about what is important in farm life, and it is ultimately unrelated to the behaviors found in farm families with respect to safety practices. I will further argue that if knowledge is, in fact, not related to the reported attitudes and behaviors, one cannot conclude that change in the knowledge about safety will yield change in safety precautionary behavior. There are, I might add, some number of intervening variables within the attitudinal structures of farm families that require understanding in order to discover in what way behavioral changes might take place to increase farm safety practices.

RELEVANT ATTITUDES

Next, we should discuss what the relevant attitudes are that we might consider. Research since the 1930's has demonstrated a consistent value orientation pervasive in rural farm regions. The value set is known as agrarianism. It appears to partially emanate from Thomas Jefferson's anti-Federalist thinking as appropriated from Aristotle, Locke, and Montesquieu.

The pattern is derived from farmers' backgrounds in the class struggles of the 18th century European estate system.

- Agrarianism suggests that rural life is natural and healthy rather than artificial or evil.
- The ownership of land makes the farmer self-reliant and independent.
- Agriculture is nationally important.
- Thus, farming is a virtuous occupation.