

**CHANGING AGRICULTURAL TRENDS IN  
WISCONSIN AND BEYOND  
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**Abstract**

As agricultural practices transform the countryside with new trends in work, workforce, and products, it is important to understand the change that is occurring in order to examine potentially adverse effects on the health and safety of agriculture's human resources. New exposures, with unknown consequences, are coupled with changing technology, new crop treatment practices and agents, animal raising activities, and specialty crop production requirements. Aging populations of farm and ranch operators, increased participation and ownership of agricultural operations by women, and dependency on hired and migrant or seasonal workforces are but a few of the effects of change. In Wisconsin alone, the number of farm operators, as listed by principal occupation, decreased over 13% between 1987 and 1992, while the number of farms with 1000 or more acres increased over 11% during that same period. Consolidation and vertical integration of operations is expected to continue in the future as multi-family corporate farms and mega-farms evolve. National emphasis on food safety, environmental impact, and consumer-driven specialty products pushes the agricultural landscape into new frontiers. Understanding the current trends and future conceptual visions related to the changing practice of agriculture provides us with insight to develop preventive interventions at the onset of change, rather than responding to the stimuli of subsequent disease and injury.

**Introduction**

*"For many farm families the defining characteristic of their lives is adapting to constant change..."* (Garkovich *et al.*, 1995). Today's agricultural enterprise is markedly different than that found one hundred or even fifty or twenty years ago. Production is changing. Equipment is larger, faster, and more efficient. Farms are larger, more business-oriented, and technology-dependent. Animals are increasingly bred through genetic selection for production, be it milk volume, leaner meat, uniformity, or more rapid growth to market weight. With such rapid change comes new stressors to the health and safety of the agricultural owner-operator, the working family members, and the hired workforce. The purpose of this paper is to examine the changing trends in agriculture, not only in Wisconsin, but also throughout the United States. The emphasis on this examination is to anticipate what new health risks may

develop for the human component in agriculture. Thus, early recognition of potential health and safety hazards could avoid the traditional reactive response to the resulting disease and injury and lead to proactive and preventive action before harm comes to the agricultural population.

**Changing Size and Production**

In the United States, the top 3% of farms now account for the sale of 45% of the nation's agricultural products (McHone-Pierce, 1995). In part, this is due to the picture of the farm that is changing dramatically. In 1960, the average size of a farm in the United States was 297 acres, while the average size grew to 473 acres in 1993 (Kiplinger, 1994). During the same time frame, the number of farms decreased from 3.96 million to 2.07 million. During the 10-year period from 1982-1992, while the total number of farms in the State of Wisconsin decreased from 82,199 to 67,959, the number of farms with 1000 or more acres actually increased from 950 farms to 1218 farms (Government Information Sharing Project, 1996). Thus, the number of farms is decreasing, while the size of the farms is increasing.

With such change comes inevitable adaptation and stressors to the health and safety of the owner/operator, the agricultural family, hired workers, and others who interface with agricultural environments. Table 1 lists some of the potentially adverse effects of larger and fewer farms. Limited liability companies, farm partnerships, and corporate farms present new management demands on the owner/operator. Previous activities have to give way to new work styles (Morrow, 1996) as the family operation now becomes treated as a production facility (McHone-Pierce, 1996).

Concomitant with the increase in size of operations is the increase in the number of animals per farm. From 1959 to 1992 the number of milk cows per farm increased from an average of 9.2 to 61.1 while the number of hogs and pigs per operation increased from 36.8 to 300.8 per farm (Census of Agriculture, 1992). As listed on Table 1, excess nutrients in the form of manure and waste products, odor and pollution control become concerns, not only for the agricultural operation, but for the community as well. Along with excess nitrogen and other components, zoonotic pathogens can enter the ground and surface waters and adversely affect the worker/family and the surrounding community (Letson and Gollehon, 1996). Likewise, longer hours of exposure to animals and the increased repetitive motion of such activities as three times-a-day milking of large numbers of animals can result in fatigue and ergonomic problems that beg for engineering and preventive solutions.

Larger operations require more labor, and the nuclear family may no longer be able to accomplish the work alone. Contracted and hired workers, migrant, seasonal, or permanent, are required for the farming enterprise. With

this change in workforce, worker training becomes an issue as does general worker health and safety along with language and cultural differences. Although the estimates may differ, one estimate of the contribution of hired labor to farm work in the United States suggests an increase from 24% of the total farm labor in 1940 to 35% in the 1980s (Murphy, 1992). In 1992, the number of hired farmworkers, of which migrant farmworkers are a sub-population, was estimated as 1.5-2.5 million persons (United States Government Accounting Office, 1992). The Census of Agriculture, United States Data (1992) counts 3.8 million workers as hired farm labor. Of particular concern to the migrant and seasonal sub-populations are issues related to adolescent workers, children at the work site, worker training, access to health care, and housing and sanitation.

As further noted in Table 1, stress is an issue that brings with it the potential for serious health effects, including domestic abuse, interpersonal violence and suicide. Stressors of job/lifestyle changes may occur as the farm increases in size and production, in the increased demands for management/personnel decisions, and with the urgency of animal/crop handling and harvest. Stress remains a serious issue also for the farmers and families who remain small and on the fringe of failure. Finally, communities may experience reduction in economic well-being as the number of farms decreases and/or the number of young persons choose not to enter farming and leave the rural area. Local/rural churches, schools, and hospitals may reduce services or close (Menke, 1996).

### Changing Demographics

Coupled with the demographic change related to the increased number of hired workers, the numbers and distribution of farm operators in the United States are changing. The overall farm population as a percentage of the total United States population has markedly decreased from 8.7% in 1960 to only 1.9% in 1992 (Kiplinger, 1994). During the 10-year period from 1982-1992, the number of farms with male operators decreased from 2.12 million to 1.87 million farms, a decrease of 11.8% (Census of Agriculture, 1992). During the same period, the numbers of farms with females as farm operators increased from 121,599 to 145,156, an increase of over 18%. Examination of the average age of the farm operators for the years 1982, 1987, and 1992 shows an approximately 5.5% progression of 50.5, 52.0, and 53.3 years old, respectively (Census of Agriculture, 1992). In 1992, the average age of female operators was 57.6 years of age versus 52.9 years of age of male operators.

Table 2 lists some general health and safety concerns related to the aging farm/agricultural operator, including female operators. Machine-related traumatic injuries were reported as substantially higher per 1,000,000 hours worked in individuals 65 years of age and older than in other age

groups in central Wisconsin (Layde *et al.*, 1995). Similarly, the incidence rate of fall-related farm injuries was much higher for individuals in the age group of 65 years and older when compared to other age groups per 1,000,000 hours worked (Nordstrom *et al.*, 1996). With age and continuous exposures, hearing and visual acuities would be expected to be reduced and cumulative trauma, ergonomic-related damage, and chronic diseases and conditions expected to increase. Adverse reproductive outcomes for females on the agricultural enterprise may also be an area of potential concern. Likewise with increased age, the increased demands of maintaining economically successful production may affect stress management skills, resulting in increased stress-related problems.

### Discussion

Changing demographics, the changing size of the agricultural operations, and changes in production practices predict the advent of new health and safety issues relating to the agricultural owner-operator, the family, and hired workers. As production changes, research, education and prevention activities must relate to both the small and large operations, each with their particular needs. Recognition of gender and age-related issues provides the background to anticipate potentially adverse effects on the human element in agricultural production. While health and safety professionals struggle with current, albeit sometimes poorly understood, hazards, changing technology, and agricultural practices bring new potentials for physical, chemical, and biological exposures that could change the preventive strategies used today. "There are good and bad consequences of 'progress' in agriculture" (Garkovich *et al.*, 1995).

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Table 1. Health and safety concerns: Larger and fewer farms

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Business/Personnel Management  
Manure/Waste Disposal  
Odor/Pollution Control  
Zoonoses  
Fatigue  
Ergonomic Problems  
Hired Workers  
Worker Training  
Stress

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Table 2. Health and safety concerns: Aging operators/female operators

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Traumatic Injuries  
Slips/Falls  
Hearing and Vision  
Cumulative Trauma  
Chronic Diseases  
Ergonomic Problems  
Reproductive Outcomes  
Stress

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