Healthy Workplaces and Healthy Communities are Central to Sustainable Agriculture

Large-scale, resource-intensive enterprises, often based on a single crop, now represent much of modern farming in the United States. Such farms tend toward increased production per unit area, reduction in biodiversity, dependence on fertilizers and pesticides not found locally, and production of wastes not easily absorbed by the local ecosystem. These practices fail to incorporate the true costs of production, treating human health and ecological impacts as “externalities” within current economic models. This approach implies that producers are not responsible for such impacts, and that other entities (government agencies) will take on this burden.

The Pacific Northwest Agricultural Safety and Health Center has worked to bring health and safety issues to the forefront in discussions of sustainable agriculture (SA). A very successful 2004 conference in Portland, Oregon, “Cultivating a Sustainable Agricultural Workplace” brought occupational health and safety professionals face-to-face with SA practitioners, highlighting the need to develop sustainability metrics that include the health and safety of workers. In our view, the need for SA workplaces extends beyond the boundaries of the farm, and into the rural communities that are themselves the sustenance of the agricultural economy.

Neither the 1990 farm bill (Food, Agriculture, Conservation, and Trade Act), nor the President’s 1997 Sustainable Agriculture Task Force Report mentions occupational health and safety as a part of SA production processes. The National Sustainable Agriculture Information Service (www.attra.ncat.org) identifies profitable markets, soil fertility, water quality, minimal use of pesticides, and maximizing biodiversity as the core elements of sustainable agricultural practice. There is clearly a need to make prevention of injuries on the farm, and promotion of agricultural worker health a part of the current sustainable agriculture formula.

Workers face a number of hazards in modern agricultural production, yet our knowledge of health effects for this population remains sketchy. A high risk for fatal and non-fatal injuries and ergonomic risks are common to many jobs in agriculture. Pesticides are perhaps the most frequently identified health hazard in the agricultural workplace. Yet, only two states in the U.S. have reporting systems for pesticide-related illness, so incidence rates and long-term health effects are generally not being monitored. Tractor safety is another key issue to consider within a sustainability framework. A death or disabling injury of a farmer, aside from bringing a lifetime of sorrow to his or her family, can profoundly destabilize agricultural production. The consequences of such an injury or fatality to the family of a hired agricultural worker are no less tragic; the family’s well being is shattered by the loss of income and either the bereavement for a loved one or the burden of caring for them in disability.

How might we best integrate health and safety into agricultural production systems? First, SA practitioners often talk about the three “Es”: economics, ecology, and equity. There is a great opportunity to develop measurable social standards that include worker health and safety as a

continued on page 2
Research Addresses Special Populations

**SW Center, Jeffrey L. Levin, M.D., M.S.P.H.**

Three projects undertaken by the SW Center during the last five years made important contributions to understanding and interacting effectively with special agricultural work populations.

In *A Study of Work Injuries Among Migrant Farmworker Youth*, Sharon Cooper, Ph.D., Texas A&M University School of Rural Public Health enrolled a dynamic cohort of high school students in a South Texas county populated primarily by migrant farmworker families. Data were collected using a self-administered, web-based survey during the school day. The study involved describing work patterns, injury rates, and risk factors for injury in farmworker youth, and comparing farmworker students to non-farmworker students on key indicators. All three high schools in the target county were surveyed in Year 1 while students from a single high school were followed prospectively in Years 2 and 3. This study is the first cohort study of injury among predominantly migrant farmworker adolescents, wherein data were collected directly from the adolescents. It is also the first large study that examined back pain among adolescent workers in the United States.

Deborah Helitzer, Sc.D., the University of New Mexico School of Medicine confirmed in her project, *Preventing Agricultural Work Injuries on the Navajo Nation*, that effective partnerships can be established between researchers and a community to identify issues of importance, design interventions grounded in theory, implement evidence-based interventions using a logic model, and evaluate process and outcome measures. The Navajo community selected three priority issues, developed an intervention plan using a logic model design, and implemented the plans for cattle handling safety, flash flooding safety, and pesticide safety. The evaluation documented their confidence in the ability to apply the process to other needed interventions.

Analysis of worker and vessel fatality data collected by the U.S. Coast Guard District 8 office and leadership from the USCG Marine Safety Unit-Galveston fostered a partnership for the project *Culturally Appropriate Safety Training for Vietnamese Shrimpers*...under the direction of Jeffrey Levin, M.D., M.S.P.H. A survey of work risk perception was administered to Vietnamese shrimp fishermen in the Galveston port area. Focus groups provided valuable insights about content, format, and acceptable trainers that informed the development and successful implementation of a pilot training program with twelve commercial shrimp boat captains. The USCG district office requested three more training sessions at Gulf Coast ports.

Each project underscores the need to establish a collaborative relationship with key community leaders - a process that takes time, requires research team integrity, and results in a real partnership between the community and the research team.

---

**Healthy Workplaces, from page 1**

part of social equity. Second, many companies have adopted new environmental management practices under the rubric of ISO 14000. The success of such voluntary programs requires evaluation. Finally, the United Nations Commission on Sustainable Development formally endorsed the concept of “sustainable agriculture and rural development” that includes the goal of sustainable employment. The International Labor Organization (ILO) concept of “decent work” places a high priority on worker health and safety standards within a sustainable development framework.

Implementation of any or all of these approaches will require the combined efforts of many disciplines — natural and social sciences, law, engineering, and economics. Without a more integrative framework, it is likely that health and safety impacts of agricultural production will continue to be mitigated on an ad hoc basis, and that long-term solutions to these problems will remain elusive.
A high prevalence of occupational lung disease resulting from exposure to organic dusts in many agricultural environments has been well documented by researchers associated with the Great Plains Center for Agricultural Health and others.

Much of this work has been conducted using traditional gravimetric methods for measurement of total and respirable dust fractions. The importance of accurately measuring the inhalable (<100 mm cut-point) and thoracic (<10 mm) components of aerosols has recently lead to the development of devices such as the IOM that are becoming more accepted as relevant for establishing exposure-response relationships. Since the bulk of dose-response work has been conducted using 37-mm cassettes, it is imperative to know how these inhalable methods compare to the total and respirable methods.

Furthermore, endotoxins and glucans/ergosterols are important respiratory disease agents as well as being markers of bacterial and fungal components of organic dusts. It is, therefore, also important to evaluate the performance of these devices for sampling endotoxin and glucans/ergosterols. Results from this five-year study conducted in four different agricultural buildings (swine, dairy, chicken, and turkey) allow us to make connections between results obtained by different sampler types as well as to predict the amount of endotoxin and glucan present relative to the mass of dust collected in each setting. Such relationships will be important when conducting retrospective epidemiological studies of agricultural worker exposures.

With these results we will also be able to further our goal of recommending threshold limit values (TLVs) for dust and endotoxin in agricultural buildings. Much prior work by Center investigators has gone into this effort. We now have the information needed to establish TLVs and also adjust their level based on the sampling device used in the field.

Currently funded work will expand on this goal by identifying specific tasks conducted in swine buildings and specific building management practices that cause an exceedance of the recommended TLVs and, therefore, require the implementation of personal or engineering controls.

Additional projects focus on gathering input from stakeholders to guide development of acceptable interventions; 1) Documentation of Acceptability and Procedures for Financial Incentives for ROPS Retrofitting, 2) Designing Community-based Social Marketing Programs for Tractor Safety and 3) Communication and Partners to Promote Tractor Safety address this priority. Each of the ten centers is in the process of identifying partners to guide the development of interventions and assist with the dissemination and implementation of programs to improve tractor safety practices. These individuals will be invited to serve as stakeholder representatives. For more information about becoming a tractor safety partner contact kgalvin@u.washington.edu
In 2005, the Northeast Center for Occupational and Agricultural Health launched a social marketing feasibility study to tackle the issue of rollover fatalities and injuries in New York State. Initial study research indicated that although many of New York’s farmers believed ROPS were important safety features (82%), relatively few had ever considered installing one on their unprotected tractors (17%). These data appear to reinforce the popular consensus amongst health and safety researchers that education is doing little to motivate farmers to retrofit. Because Social Marketing focuses on making behaviors more accessible, as opposed to educating individuals, this intervention strategy appeared ideally suited to the task.

In order to launch a social marketing initiative, formative qualitative research was conducted to assess farmer’s perceived barriers and motivators relative to retrofitting. Because not all segments of a community are likely to have the same motivators and barriers, small crop and livestock farmers were selected as the target for the campaign. These farmers account for 90% of New York farms lacking any or having only one ROPS protected tractor.

Data from this research were used to develop a media and incentive campaign that 1) makes retrofitting more financially accessible ($600 rebates), 2) makes the process easier (toll-free hotline with facilitators who will research and arrange retrofitting) and 3) utilizes messages that would trigger farmers stated motivators (Figure below).

Already this intervention, which was launched in November 2006, has been extremely successful. 205 farmers have contacted the hotline, 47 have ordered ROPS, and 25 have been installed. In addition, national supplies of several John Deere ROPS models have been exhausted. It is possible that rebate funds that have been set aside for the first year of the program will have been exhausted in five months. Several farm organizations in New York have also joined the initiative. The National Equipment Dealers Association, Farm Bureau, and Farm Family Insurance are currently giving financial or logistical support to ensure the continued success of this program.

In the coming months, program coordinators will continue to work with farmers, program collaborators and legislators to help ensure continued state funding for the rebate program. Other program targets will be to work with manufacturers to insure adequate supplies and to stem ROPS price increases, which appear to have been triggered by the increased demand.
A coalition of organizations and individuals, led by the National Children’s Center for Rural and Agricultural Health and Safety, has launched a multi-faceted social marketing effort with a simple message: children younger than 12 years old should not be on or near tractors.

"Burying a child is one of the most awful experiences anyone could have, especially when we know that saying, ‘No, you can’t be on or near this tractor,’ is a very simple way to protect a child," said campaign coordinator Regina Fisher, agricultural youth safety specialist at the National Children’s Center.

On average, a child dies on a farm once every 3.5 days. The biggest single cause of those deaths is something that’s on practically every farm: a tractor.

The initiative is funded through the National Children’s Center and is supported by the Childhood Agricultural Safety Network (CASN), which includes organizations such as Farm Safety 4 Just Kids, Migrant Clinicians Network, Progressive Agricultural Foundation, National Center for Farmworker Health and Safe Kids Worldwide.

"Keep Kids Away From Tractors" public service announcements were recorded by country singer Michael Peterson, named the 1999 “Star of Tomorrow” by The Nashville Network. Three new downloadable print ads (one in Spanish) have also been added.

Questions? Contact Fisher at 1-800-662-6900 or email at fisher.regina@mcrf.mfldclin.edu.
Aquaculture Safety & Health: A 5-Year Study Launched

Southeast Center, Melvin L. Myers, MPA

Aquaculture is a growing sector of U.S. agriculture and had annual sales of more than $1 billion in 2005. Fish farming has many of the same hazards as other types of farming, but has the added circumstances of water impoundments and night-time work. For example, fish ponds pose potential drowning, electrocution, vehicle overturn, and slip (mud and slime) hazards. Other possible hazards include punctures or cuts from fish teeth or spines, exposure to low temperatures, and bacterial and parasitic infections.

The Southeast Center has launched a new 5-year study entitled *Aquaculture Safety and Health*, led by Melvin L. Myers, MPA. Myers is a retired Captain of the U.S. Public Health Service and an Associate Professor at the University of Kentucky College of Public Health. The transdisciplinary team assembled for this study includes Drs. Terrill Hanson and Gregory Idendahl, who are agricultural economists at Mississippi State University, and Dr. Robert Durborow, a fishery biologist at the Kentucky State University Aquaculture Research Center.

In this study, occupational risk factors are being identified through the systematic review of nearly 500 OSHA inspections of animal and vegetation aquaculture farms. The results of this systematic analysis will be used to develop a fish farm best-practices and a walk-through survey instrument. In addition to these surveys, the study team will develop and implement a national telephone survey of fish farms to describe the agricultural population at risk and its exposures to hazards, injuries, and illnesses related to aquaculture work. Concurrently, the team will integrate the occupational hazard results into a Farm Planning Tool to help differentiate severe hazards from trivial ones and will aid in the development of engineering controls and other countermeasures to eliminate or reduce occupational hazards in fish farming with an emphasis on simple solutions.

Agricultural Health and Safety Centers Evaluation Project

Vicky Buchan, Ph.D.

In the fall of 2004 NIOSH funded an evaluation contract, submitted by High Plains Intermountain Center for Agricultural Health and Safety (HICAHS), to undertake both program monitoring and outcome assessment on ten research, outreach and education Centers collectively known as the Agricultural Occupational Health and Safety Initiative. The Initiative includes 9 Agricultural Centers and the National Children’s Center which together undertake research, develop prevention programs and provide services across ten public health regions. The mission of these Centers is to reduce injury and disease in one of the most hazardous occupations in the United States, agricultural production.

This contract renewed the Agricultural Center Initiative evaluation effort. Each Center designated a representative to attend workshops which took place in Fort Collins, Colorado during January and June of 2005. The Agricultural Center Evaluation (ACE) team was charged with revising and continuing the program monitoring approach to document Initiative accomplishments. In addition, the contract called for two pilot cross-center outcome areas that each includes at least three similar Center projects. Two project areas have been identified by the team as: 1) High School Agricultural Health and Safety Curriculum and 2) Professional development for those providing health and safety services to agricultural workers and their families. A report documenting the first fiscal year of this evaluation project was published in 2006.

The staff at HICAHS would like to thank each member of the ACE team for their time, travel, ideas and efforts in re-instating the Agricultural Health and Safety Center Evaluation initiative. This project is possible because of a truly dedicated and collaborative team. ACE team members include: Sue Ackerman, Cynthia Brundage, Vicky Buchanan, Angi Buchanan, Ruthie Fairbanks, Regina Fisher, Becky Foster, Karen Gilmore, Sara Shepherd, Marcy Harrington, Stacey Holland, Helen Holmquist-Johnson, Lee Husting, Chris Leck, Ketty Mobed, Teri Palermo, Joe Petrik, Wayne Sanderson, Tim Stock, and Marlene Thompson.
Fourth Western Regional Ag Health and Safety Conference Focuses on Research to Practice

Western Center, Marc Schenker, M.D., M.S.P.H.

As the country responded to an outbreak of E. coli from tainted spinach as well as an accidental pesticide drift that sickened 30 farm workers in Sacramento County, health and safety professionals gathered near Salinas Valley—one of the world’s most productive agricultural regions—to discuss solutions to problems such as these.

The Western Agricultural Health and Safety Conference took place Sept. 20-22 in Pacific Grove, Calif. Titled “Health and Safety in Western Agriculture: Research to Practice (r2p),” the conference was sponsored by WCAHS, PNASH and NIOSH.

Conference participants traveled from Alaska, Arizona, California, Colorado, Hawaii, Idaho, Nevada, New York, North Carolina, Oregon and Washington state, and included producers, industry representatives, private consultants, non-profit organizations, health care providers and agricultural worker advocates.

Five thematic sessions focused on different areas of r2p, including new approaches for many university investigators, to understanding the regulatory process of government agencies and advocate groups in shaping policy. In addition, speakers discussed educational approaches for understanding and promoting education through promotores (community health workers) farmer training sessions, and public education through social marketing and the local and national media.

Ofelio Borges, a farm worker education specialist for the Washington State Department of Agriculture’s Farmworker Education Program, said, agricultural safety and health researchers need to become intimately familiar with the daily tasks of farmers and farm workers as well as finding better ways to disseminate results. If no bridge exists to take research to practice, then all the money, time and efforts invested to conduct studies and obtain results are wasted.

The most important take-home message from the conference was that collaboration, team building and leveraging of multiple resources are critical to facilitate the transfer of research findings into practice for the benefit of the community.

Western Center Director Marc Schenker, M.D., M.P.H., closed the conference by saying, “I am encouraged by this different perspective and conceptualization of ag health and safety. Agricultural health is a small group of individuals in a small discipline, and we will need to work together to achieve our goals.”

View from historic Merrill Hall, where conference attendees convened for the two-day conference. WCAHS researcher Tamara Hennessey-Burt enjoys the perfect weather, sites and sounds on her short walk to Session I. (Inset, left) Donna Fairchild, agricultural consultant with the Arizona Department of Agriculture using handles as arm extensions with the “pot carrier.” (Inset, right) Kit Galvin, research industrial hygienist with the Dept. of Environmental & Occupational Health Sciences, University of Washington, mechanically cutting stock for propagating, eliminating repetitive hand motion and tendinitis.
### Agricultural Center Sites

<table>
<thead>
<tr>
<th>Region</th>
<th>State</th>
<th>Center Name</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western</td>
<td>California</td>
<td>Pacific Northwest Agricultural Safety &amp; Health</td>
<td><a href="http://agcenter.ucdavis.edu/">http://agcenter.ucdavis.edu/</a></td>
</tr>
<tr>
<td>High Plains Intermountain</td>
<td>Colorado</td>
<td>High Plains Intermountain</td>
<td><a href="http://www.hicahs.colostate.edu/">http://www.hicahs.colostate.edu/</a></td>
</tr>
<tr>
<td>Southwest</td>
<td>Texas</td>
<td>Southwest Center for Agricultural Health</td>
<td><a href="http://swagcenter.org/">http://swagcenter.org/</a></td>
</tr>
<tr>
<td>Great Plains</td>
<td>Iowa</td>
<td>Great Plains Center for Agricultural Health</td>
<td><a href="http://www.public-health.uiowa.edu/gpcah/">http://www.public-health.uiowa.edu/gpcah/</a></td>
</tr>
<tr>
<td>National Children</td>
<td>Kentucky</td>
<td>National Children's Center</td>
<td><a href="http://www.ukcph.org/scahip/">http://www.ukcph.org/scahip/</a></td>
</tr>
<tr>
<td>Great Lakes</td>
<td>Ohio</td>
<td>Great Lakes Center for Agricultural Health</td>
<td><a href="http://www.ag.ohio-state.edu/~agsafety/">http://www.ag.ohio-state.edu/~agsafety/</a></td>
</tr>
<tr>
<td>Southern Coastal</td>
<td>North Carolina</td>
<td>Southern Coastal Agromedicine Center</td>
<td><a href="http://www.ncagromedicine.org/acac.htm">http://www.ncagromedicine.org/acac.htm</a></td>
</tr>
</tbody>
</table>

### Other Agricultural Safety Resources:

- NASD: National Ag Safety Database  
  [www.cdc.gov/nasd](http://www.cdc.gov/nasd)
- National Agricultural Library  
- Food Safety Information Center:  
  Home Page  
  [food.safety.nal.usda.gov/nal_display/index](http://food.safety.nal.usda.gov/nal_display/index)
- Agricultural Safety - NSC  
  [www.nsc.org/Issues/agrisafe.htm](http://www.nsc.org/Issues/agrisafe.htm)
- AgSafe  
  [www.agsafe.org/AgSafe.htm](http://www.agsafe.org/AgSafe.htm)
- Injury Prevention Web Links:  
  Reference Material  
  [www.injuryprevention.org](http://www.injuryprevention.org)