

Developing Worker Health Standards in Sustainable Agriculture

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Many ecolabel organizations promote ecologically friendly farming systems and most include worker safety and health among their core program goals. I will address how ecolabel programs are striving to promote worker safety in the case of pesticide use and risks.

I also want to highlight the importance of decisively identifying the most pressing worker safety and health problems to focus on in a given region and crop. Last, I offer a few thoughts on the most important areas for research in order to develop a science base in support of standards that might help “cultivate a sustainable workplace.”

How Selected Ecolabel Programs Address Worker Pesticide Risks

The attached handout summarizes how three existing and two future ecolabel programs address pesticide worker exposure risks. None of the existing programs do a very good job of preventing worker exposure risks, except to the extent “Do not use” lists prohibit applications of OPs and carbamates with very low acute LD₅₀s. Programs under development have the potential to do a better job, but a meaningful program will require periodic monitoring of worker exposure and health indicators, as currently the case in a few states that are now tracking OP and carbamate exposures.

Targeting the Most Consequential Risks and Risk Factors

The first and perhaps most important challenge for those developing ecolabel programs are to craft solid answers to four sets of questions --

1. What aspects of farmer/worker health related to a given type of farming operation are most important to target? What are the most worrisome risks in a given farming operation that arise via occupational exposures or work activities?
2. Are there scientifically credible, economically feasible measures of farmer/worker health, or harm, that can be used to differentiate between those technologies, practices, and farming systems not causing or leading to problems in contrast to those that are or may be?
3. Assuming that there are feasible measures of health or adverse impacts, how might those be incorporated in "performance standards" or certification criteria?
4. Are there methods to monitor and verify that adherence to the standards results in a significant reduction in risk and adverse health outcomes?

Based on these criteria, a number of priorities immediately jump to the forefront. On conventional fruit and vegetable farms, worker exposure to pesticides is undoubtedly one of the most likely candidates for priority focus. Even on organic farms, use of botanicals, sulfur, and copper fungicides can lead to worker exposures and risk. The increasing reliance on farm-brewed compost teas for foliar plant disease management raises a whole new category of bacterial-based worker risks.

On the livestock side of agriculture, confinement operations and large feedlots pose serious worker risks and deserve a bigger share of the spotlight that remains focused almost exclusively on animal welfare and manure management/water quality issues. In particular, a growing body of evidence suggests that workers are at risk following exposures to antibiotic resistant pathogens in the air and dust inside confinement facilities. Once a worker is exposed, if they become sick or are treated with an antibiotic for an unrelated health problem, the resistant bacteria can take off and then move from the worker into the surrounding community. This is a particularly serious threat in confinement operations where subtherapeutic antibiotic use is routine and where animals are periodically subjected to unhealthy and/or stressful conditions.

The emergence in 2003 and consequences of a highly pathogenic new strain of H5N1 avian influenza virus in Asia highlights the enormous stakes for society in managing and responding to potential new pandemics. Dozens of people have died and millions of chickens and ducks have been slaughtered, yet the virus now appears deeply entrenched in both domestic and wild bird populations (for a chilling account of this pathogen's evolution, see Li et al., July 8, 2004 *Nature*). SARs is another example. Stories are now commonly found in the scientific literature warning, in so many words, that the world is just one or two common mutations away from the next pandemic. In addition, most experts expect that the pathogen triggering the next pandemic will have roots on the farm. I see this area as a ticking time bomb that regrettably will explode some day. After it does, there will be major changes in how livestock are managed in the U.S. and those changes will be driven by a combination of regulatory interventions and private sector standards. Unfortunately, we are now ill equipped to intervene effectively.

Research Challenges and Needs

Better methods are needed to monitor worker health and risks in the field and on the job. If a priority, simple biosensors could be developed that can be worn by workers on the job and checked for exposure to either chemicals or pathogens.

Automated air quality monitoring systems are urgently needed in confinement livestock operations to promote both animal and worker health. Methods should also be developed to routinely monitor the respiratory and immune system status of workers in confinement livestock operations, as well as whether they harbor antibiotic resistant enteric pathogens.

Cultivating a Sustainable Workplace, Sept. 12-14, 2004 Pesticide Exposure Example of Worker Health Standards

Ecolabel Program Elements Impacting Pesticide Selection, Use, and Worker Risks							
Program	Pesticide Risk-Worker Health Goals	How Baseline Worker Pesticide Risks and/or Health Impacts are Measured	Does the Program Place Limits on Pesticide Use Beyond Label Requirements?	What Limits Beyond Labels are Placed on Pesticide Use?	Does Program Include a "Do Not Use" List?	Are Worker Risks a Factor in Establishing the "Do Not Use" List?	How are Worker Risks or Impacts Used to Select "Do Not Use" Pesticides?
Food Alliance	Reduce exposure to highly toxic pesticides	Not measured	Yes: safe storage, application; some focus on IPM and resistance management	"Do not use" list; Scoring criteria emphasize lower risk materials and reduced rates	Yes	Yes	LD ₅₀ for acute mammalian toxicity is 30 mg/kg or lower
NOP Certified Organic	Prohibit use of most synthetic chemicals	Not measured	Yes	Restricts uses to only when "last resort"	Yes, nearly all synthetic pesticides	No	Not used
Healthy Growth Potatoes -- Protected Harvest	Eliminate use of high-risk pesticides; reduce overall use and risks	Toxicity units = Inverse LD50s x Pounds applied	Yes: heavy focus on resistance management	"Do not use" list, plus cap on tox units per acre	Yes	Yes -- but one of four component indices in calculating tox units	WHO Acute Toxicity Class Ia and 1b pesticides prohibited (LD ₅₀ less than 50 mg/kg)
Second-Generation Toxicity Unit Based Programs (several under development)	Eliminate use of high-risk pesticides; reduce worker and overall risks	Use Pattern Adjusted Toxicity Units per Acre	Yes	"Do not use" list; cap on tox units per acre; potential to retain uses with exposure-reducing use pattern	Yes	Yes, will establish worker-risk driven "do not use" list	Use pattern adjusted toxicity units per acre, tied to assuring minimum MOEs
Advanced Program	Eliminate use of high-risk pesticides; reduce worker and overall risks	Monitoring worker exposure and health indicators; limits on Use Pattern Adjusted toxicity units	Yes	"Do not use" list; restrictions on allowed uses to expand MOEs to at least 200	Yes	Yes	If MOE of 200 (or more) cannot be attained with acceptable use pattern, place on "Do not use"