‘Mania of zero risk’: How environmentalists inflame concerns about farm chemicals, increasing anti-GM food rejectionism and the degradation of waterways

ood Watch warns, wrongly, that trace amounts of mineral oil can get into our food and seriously endanger consumers, calling for “zero tolerance”

Mars’ Skittles are under legal assault based on claims, rejected by government reviews in Britain and Canada, that the candy poses “significant health risk to unsuspecting consumers.”

The Environmental Working Group falsely claims that eating Honey Nut Cheerios could kill you because of the presence of trace chemicals in the parts per trillion — claims mimicked by dozens of anti-chemical NGOs.

Credit: Mamavation

Chemophobic mania, which inflames consumers worldwide, has become endemic — and despite the well-meaning goals of some environmental groups that spread exaggerated and out-of-context data, create more harm than good.

In recent decades, many industrial societies have become increasingly obsessed with what is called “uncertain risk” — the notion that zero risk is possible and should be the goal of regulators and policy makers.

Is that a reasonable expectation grounded in science and risk analysis?

Key is how each of us calibrates the amount of risk we are willing to endure. Many people embrace the notion that if others want to incur risk in their daily routine, that is their choice, but my own preference is to avoid risk.

As explained by The Decision, researchers Kip Viscusi, Wesley Magat, and Joel Hubert found that “people were willing to pay up to three times as much to reduce the risk of side effects from 5/15,000 cases to 0/15,000, as they were for a risk reduction from 15/15,000 to 10/15,000, despite the reductions in risk essentially being statistically negligible.”

What changes between these two options is the individual perceives zero risk (0/15,000) as being far superior to 10/15,000. While both cases face the same reduction of 5/15,0000, with the option of zero risk they would sacrifice significant financial resources to integrate zero risk into their lives.

This ‘zero risk mentality’ has similarities with the NIMBY concept in which people support innovation and growth, as long as it is ‘not in my backyard’. This applies to a wide range of infrastructure, ranging from recycling facilities to increasing social housing, or building wind farms as many communities, particularly in California, have rejected them yet overwhelming support ‘green energy’.

Credit: Renewable Energy Magazine

While industry and science have been very successful at reducing the rates or incidences of risk, risks are never completely or fully removed from our daily lives. Routine things, such as driving, have higher risk probabilities. If we drive daily, the probability of being in a traffic accident increases, which would be a medium to high risk. In comparison to the probability of being struck by a meteor, the risk is statistically close to zero, but can never be zero, as there is a chance it could occur. The risk of being hit by a meteor is 1 in 840,000,000. As the global population has just passed 8 billion, today 9.5 people are at risk of being struck by a meteor.

Success in the reduction of risks has increased life expectancy by more than 30 years between 1900 and 2013. Certainly, part of this increase in life expectancy is due to innovations in medicine and health care, as well as the improvements in food and water safety have strong contributions.

Conservationists demand zero risk while promoting policies that increase it

Water quality and purity are important and concerning topics for everyone. No one wants to learn about potential contaminants in water samples of their local community water sources. However, this happens from time to time. To ensure that chemicals don't end up in watersheds, strict regulations have been enacted. In the USA, the first water quality regulations to address water contamination came into effect in 1948 in the Water Pollution Control Act. Significant amendments were made in 1972 following the creation of the Environmental Protection Agency in 1970, resulting in the implementation of the Clean Water Act.

In most instances, the detection of contaminants is well below the level of harm to humans. Occasionally, the rates are high enough that the water supply is turned off until the problem is resolved. Public concern is focused on the presence of the risk, rather than the magnitude. People expect there to be zero contaminants in their water supply. Learning that a contaminant detection is present at a level of a few parts per billion, far below unsafe levels, provides little to no emotional comfort.

Evaluating risks from pesticides in farming

Water quality testing of some watersheds has confirmed the presence of agricultural chemicals. Agricultural chemicals can run-off of a field if there is a heavy rain within a short period of time following application, and chemicals can wash off plants and into the soil. As well, chemical residues are present in the soil following each application as a portion of the chemical being applied directly enters the soil. Heavy rains also cause soil erosion, which results in the soil and any chemical residues ending up in a watershed. This is unfortunate and the agriculture industry has been working to find solutions that contribute to reducing the run-off of farm chemicals.

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Scientists with the U.S. Geological Survey sample water in Goodwater Creek, Mo., for pesticides and other chemicals that may have run off from the surrounding land. Credit: Abbie Fentress Swanson/Harvest Public Media

One agricultural crop that previously had problems with chemical run-off was potato production. With their frequent insecticide applications, heavy rains afterwards led to reports of ‘fish kills’ in nearby waterways. In the instance of potato production, awareness and innovation have improved the situation such that fewer instances of dead fish are now being reported.

Recent research from Wisconsin has identified the promising finding of reduced chemical detection in watersheds. Through surveying farmers, researchers discovered that regulations that restricted the use of one chemical resulted in farmers adopting genetically modified (GM), herbicide tolerant (HT) corn. Commonly, restrictions on the use of one chemical reduce weed control options, potentially leading to an increase in herbicide resistant weeds, as farmers would use the same chemical for weed control year after year. If weed control is ineffective, the result would be a return to tillage. Tilling a field results in higher rates of soil erosion and a higher potential for chemical run-off into watersheds.

The chemical atrazine was approved in 1958 and has been the main pesticide used in the production of non-herbicide tolerant corn in the USA. It's a target of some environmental groups which claim it causes cancer. An assessment of atrazine use for corn production in Wisconsin examined what impact atrazine use restrictions had on the range of weed management practices.

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Atrazine levels in soils. Credit: University of Florida

A survey of farmers in areas where atrazine restrictions had been implemented and areas that had no restrictions found that restricting the use of atrazine increased the adoption of HT corn varieties tolerant to glyphosate. This then contributed to an increase of conservation tillage practices. The combination of

atrazine restrictions and increased HT corn production contributed to a reduction in the different types of herbicides available to farmers to control weeds. They concluded that the reduction in the diversity of weed control options — banning atrazine, for example — leads to an increase in herbicide resistance within weeds, as farmers switched from relying on atrazine to glyphosate.

There are other likely effects from restrictions or bans. The authors conclude that the regulatory efforts to restrict atrazine in groundwater might have the knock-on effect of leading to more herbicide resistant weeds. Given the reduced chemical options available to control weeds, farmers could choose to control these weeds through tillage. More tillage increases the potential for soil erosion — chemicals transfer from fields to the watershed through erosion — which results in a deterioration in water quality. The study found that atrazine restrictions led to greater adoption of genetically modified herbicide resistant corn. This reduced the use of tillage, which limited soil erosion, resulting in lower levels of chemical detection in local watersheds.

What can we learn from this study?

The study highlights the tradeoffs that exist between food production and environmental impacts. Many consumers and environmental organizations embrace a contradiction: they are not in favor of GM crops, yet are in favor of reducing agricultural chemicals, as well as their presence in watersheds (ironically, they reject the best way to achieve that — GM crops). The research quantifies the connection between the two extremes. Their conclusion challenges the common wisdom. The adoption of GM corn reduces soil erosion and chemical residues in watersheds because fields needed less tilling.

The dilemma arises from the competing desires for zero risk. Consumers and environmental organizations may believe there is a lot of risk from GM crops, even though numerous studies indicate they pose no unique health or safety threat; they claim to demand ‘zero risk’, which of course is impossible whether using organic or conventional chemicals —so they support banning GM crop production. From a sustainability perspective, that would perilous. Doing this would actually increase the use of tillage, leading to greater soil erosion and levels of chemicals in watersheds.

GM opponents face a dilemma: you cannot expect to dramatically limit the presence of chemicals in watersheds if you ban the only scientifically-accepted way to achieve that. GM crops and chemicals in watersheds cannot both be zero at the same time. If we prohibit GM crops, then chemicals in watersheds will be higher; by allowing GM crops, chemical detection in watersheds should diminish.

Zero risk GM opponents have backed themselves into a corner. They continue to insist on no GM crops and almost no chemical presence in watersheds — which is impossible. The ‘zero risk concept’ has been a central tenet of more extreme environmental groups, such as Pesticide Action Network, Environmental Working Group or Center for Food Safety. Although these groups are demanding scientifically impossible standards, their views have become mainstream. Much of society believes that simultaneously accomplishing both objectives is possible.

Risks need to be assessed and choices made that reflect a careful cost-benefit analysis. That would allow for more informed choices and improved risk tradeoffs. There is good news about the total use of pesticides. As the journal Nature Communications has documented, pesticide use by toxicity and volume on most crops

has been going down for decades — even as environmental groups distort the issue by promoting that use by volume — a far less meaningful fact — is increasing. That's deceptive.

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Source: Nature Communications

Organizations and governments have an obligation to correct misinformation regarding the impossibility of achieving zero risk. If societies continue to believe that zero risk is feasible, this will result in the loss of safe, beneficial technologies, leading to higher economic and environmental costs. The pursuit of zero risk, leads to worse outcomes than would exist with minimal and safe levels of risk.

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