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California Strawberry Production and Methyl Bromide

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Abstract

California strawberry growers were faced with the possibility of losing one of their most important chemicals, methyl bromide. Methyl bromide was believed to be involved in the depletion of the ozone layer and 162 countries had signed the Montreal Protocol, which would lead to an eventual ban of the chemical. The US EPA had scheduled the complete phaseout of methyl bromide by 2001. The case is ideal for teaching the application of stakeholder analysis to both undergraduate and graduate classes.

Key Words: stakeholder analysis, strawberries, methyl bromide

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Introduction

In late 1997, Dave Riggs, President of the California Strawberry Commission, prepared for next week's meeting of the Commission. Many growers believed that the industry was on the verge of crisis as it faced the loss of one of its most important chemicals, methyl bromide. Riggs felt compelled to provide the leadership that the industry needed.

Methyl Bromide

Methyl bromide is one of the most widely used pesticides in the world and is the most commonly used chemical fumigant. It is used as a pre-plant soil fumigant for agricultural crops, a post-harvest fumigant for fruits, vegetables and nuts, and a fumigant for buildings. Although there is not total agreement among the scientific community, most scientists agree that methyl bromide is an ozone depleter.

Awareness of the environmental effects of methyl bromide use began in the 1970s and 1980s when scientists discovered that chlorofluorocarbons (CFCs) and other chemicals, including methyl bromide, contribute to depletion of the ozone layer. Unlike, CFCs, which are produced entirely by human activity, it is estimated that about half of methyl bromide is naturally occurring. While most CFCs and methyl bromide fall back to earth, a small portion reaches the stratosphere. There, CFCs and methyl bromide molecules break down into chlorine and bromine atoms. These chlorine and bromine atoms react with ozone (O_3) and convert it into oxygen (O_2 or O). Methyl bromide is estimated to have an ozone depletion potential of about 70% of the reference chemical, CFC-11. A United Nations scientific panel estimated that 5% to 10% of worldwide ozone depletion is caused by methyl bromide. Furthermore, ozone depletion has been linked to rising rates of skin cancer, cataracts and damage to ecosystems. For these reasons, methyl bromide usage became a top target of environmental activists.

Concern over the use of methyl bromide was heightened because of the extremely poisonous nature of the chemical. It is classified by the US Environmental Protection Agency (EPA) as a Category I acute toxin and is known to cause acute and chronic health effects. Pesticide applicators, farmworkers, and people living or working near where methyl bromide is used may suffer poisonings, neurological damage, and harm to their reproductive systems. Some members of communities where methyl bromide is used claim that chronic headaches, severe asthma attacks, nausea, sore throats, and dry cough are common during the season when methyl bromide is applied. According to State of California records, there is a relatively low incidence of injury due to methyl bromide poisoning. In most cases, injury results from workers not following established protocols. All deaths attributed to methyl bromide have been due to illegal or premature entry into structures being fumigated with the chemical.

Environmental concerns over ozone depletion caused by CFCs resulted in the Montreal Protocol agreement of 1987, which had 162 signatory countries. In 1992, the Montreal Protocol was amended at the Copenhagen Conference and methyl bromide was added to the list of ozone depleters. Industrialized countries agreed to freeze consumption of methyl bromide at 1991 levels beginning in 1995 and to phaseout usage by 2005. Developing countries agreed to freeze consumption of methyl bromide at the average of 1995 to 1998 consumption levels starting in 2002, followed by a 20% reduction in usage in 2005, and a complete phaseout in 2015. In the US, the EPA mandated the complete phaseout of methyl bromide by 2001 under provisions of the Clean Air Act.

Methyl bromide is especially important to agriculture. Approximately 65 million pounds of the active ingredient of methyl bromide are used in the US each year (about 40% of worldwide consumption). Roughly 80% of methyl bromide use is in agriculture and approximately 90% of agricultural use is as a pre-plant soil fumigant. Approximately 25% of US methyl bromide use occurs in California. Methyl bromide is an important chemical pesticide for tomatoes, strawberries, peppers, ornamental and nursery products, tobacco, grapes, and melons. It is used to control insects, diseases, nematodes, and weeds.

In strawberries, methyl bromide is used to fumigate (disinfect) the soil before planting to reduce or eliminate soil-borne pests and diseases. Virtually all commercial strawberries grown in the state of California are grown using methyl bromide and there are currently no good substitutes for the chemical. Most chemical substitutes for methyl bromide are either less effective, more expensive, or both. Furthermore, there are no good, non-chemical alternatives available at this time.

Strawberries are an important agricultural crop in California. Production of strawberries accounts for approximately 3% of agricultural revenues in the state. However, the strawberry industry is extremely important in some counties, including Monterey, Santa Barbara, Santa Cruz, and Ventura counties, where strawberry production typically accounts for between 10% and 40% of agricultural revenues. The following table provides information on strawberry production in the top producing areas in the US.

Methyl bromide is extremely important in the production of strawberries. Approximately 40% of methyl bromide use in the state of California is attributed to strawberry production. The elimination of methyl bromide would result in yield reductions of 20 to 40% for strawberries, with grower losses expected to exceed \$100,000,000, according to a study conducted by the University of California. Total losses to California agriculture resulting from a ban on methyl bromide are estimated to exceed \$240,000,000. In many cases, growers would be able to plant other crops. However, farmers' alternatives are limited because many alternative

Table 1: Production Statistics for Strawberries, US and Top Four Producing States, 1997 (USDA/NASS)

	Acres Planted	Yield Per Acre (tons)	Price Per Ton (US\$)	Value of Production (US\$1,000) ^a
California	22,600	29.5	1030	686,418
Florida	6,100	14.5	1652	146,119
North Carolina	1,700	6.0	1400	12,600
Oregon	5,500	5.0	790	19,750
US	45,670	18.4	1110	903,350

^a Because the acres harvested is sometimes less than the acres planted, the value of production does not always equal acres planted multiplied by the yield per acre multiplied by the price per ton.

crops are also commonly treated with methyl bromide. Furthermore, a large increase in the production of other crops would result in significant price decreases for those crops. Growers also argue that a ban in the US alone would be unfair since growers in other countries would still be allowed to use the chemical. In particular, growers are concerned that strawberry production would simply shift to Mexico.

Environmentalists dispute the claims of extremely high losses, arguing that the studies do not take into account anticipated technological advances. They argue that if potential technological advances were considered, expected losses would be much lower. Environmental and worker rights activists assert that the extreme toxicity of methyl bromide and the potential for harming large numbers of people constitute an unacceptable risk. They argue that the health risks associated with long-term damage to the environment coupled with the health risks of direct exposure to the chemical make a compelling case for eliminating the use of methyl bromide altogether.

Most consumers are unaware of the controversy surrounding methyl bromide. However, environmental activists had targeted the strawberry industry in their effort to build awareness of the issue.

The Challenge

Faced with the very real possibility of a 2001 ban on methyl bromide use in the US, Dave Riggs ponders the alternatives available to the industry. Should they fight the ban? Should they attempt to compromise with environmentalists and other activist groups? Should they admit defeat and move on?

References

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