California Has Not Yet Reduced Methyl Bromide Use: Implications for Research and Extension Policy

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Introduction

In the early 1990s, methyl bromide was identified as a depleter of stratospheric ozone, and in 1993 methyl bromide was officially listed as a Class 1 ozone depleter under the Clean Air Act. California is a major world user of methyl bromide and has been at the center of both the debate on the phaseout of this pesticide and the search for alternatives.

Phaseouts can be achieved suddenly at the onset of mandatory legal deadlines, or gradually as deadlines approach. Ozone depleting chlorofluorocarbons, for example, have been largely phased out well ahead of required timelines. Phaseouts generally are less economically disruptive when they are achieved gradually.

As the phaseout date for methyl bromide draws near, we sought to determine if California agriculture is making progress in phasing out methyl bromide, and if so at what rate. The results indicate we are not yet moving toward our stated national policy goal of reducing use of methyl bromide and protecting the Earth's ozone layer.

Materials and Methods

California has a unique Pesticide Use Reporting (PUR) database. Full use reporting began in 1990, and requires that all commercial pesticide applications be reported to the state. The PUR database is an invaluable tool for tracking pesticide use over time, on particular crops, by county or other geographical unit, etc., and for determining the impact of pest management policies and pesticide regulations. The data is available to the public and is widely used by production agriculture researchers, commodity trade associations, regulators, food processors, and agricultural and environmental activists. We drew on this database to analyze changes in the use of methyl bromide and chemicals proposed as alternatives to methyl bromide between 1990 and 1995, the most recent year for which data is available.

Results

From 1990 to 1995, total use of methyl bromide in California varied from year to year but generally held steady; use is not decreasing over time as the 2001 phaseout approaches (Figure 1).

Pre-plant soil fumigation is the major use (approximately 90%) in California, followed by post-harvest commodity (approximately 5%) and structural (approximately 5%) fumigations; this represents a somewhat higher proportion used for soil and a lower proportion used for commodities than is reported for other parts of the world. Use of methyl bromide for structural fumigation, while a small part of total use, has dropped significantly; it appears that sulfuryl fluoride is being widely adopted as an alternative for -termite control (Figure 2). In contrast, use of methyl bromide for commodity and soil fumigation is not decreasing (Figure 1).

The volume of methyl bromide applied to the major pre-plant crop uses (almonds, grapes, nursery crops, and strawberries) has varied from year to year, but overall has remained heavy; use in these crops has not decreased (Figure 3). In addition, several categories of use which were minimal in the early 1990s have grown significantly; these include lettuce, peppers, watermelons, and soil treatments of unspecified crops (Figure 4).

Use of metam sodium - a proposed alternative for certain uses of methyl bromide even though it is a U.S. EPA "probable carcinogen" - rose three-fold from 1990 to 1995. Use increased on many crops which also had high or increasing use of methyl bromide, including lettuce, peppers, sweet potatoes, and soil treatments for unspecified crops.

Discussion and Conclusions

Despite the impending international and U.S. phaseouts of methyl bromide, and a significant research effort to find alternatives, California agriculture has not yet shifted away from use of this pesticide. Thus, rather than a gradual phase-out, it appears there will be a sudden phase-out starting in 2001, the year the U.S. Clean Air Act mandates no further manufacture or importation of methyl bromide.

The lack of a gradual phase-out suggests the following:

* Research and extension efforts appear to be unsuccessful at encouraging farmers to adopt alternatives in advance of the legally required phase-out date. To the contrary, use of methyl bromide in many crops is rising.
* Damage to the stratospheric ozone layer caused by methyl bromide may not be reduced as much as required by law.
* Many growers apparently are not experimenting with alternatives to methyl bromide and will have to make dramatic changes in their production technology in 2001.
* National and international science policy is not being implemented in California. Research and extension have failed to move California agriculture toward a more sustainable future; only absolute regulatory restrictions can be expected to reduce use of this hazardous pesticide.

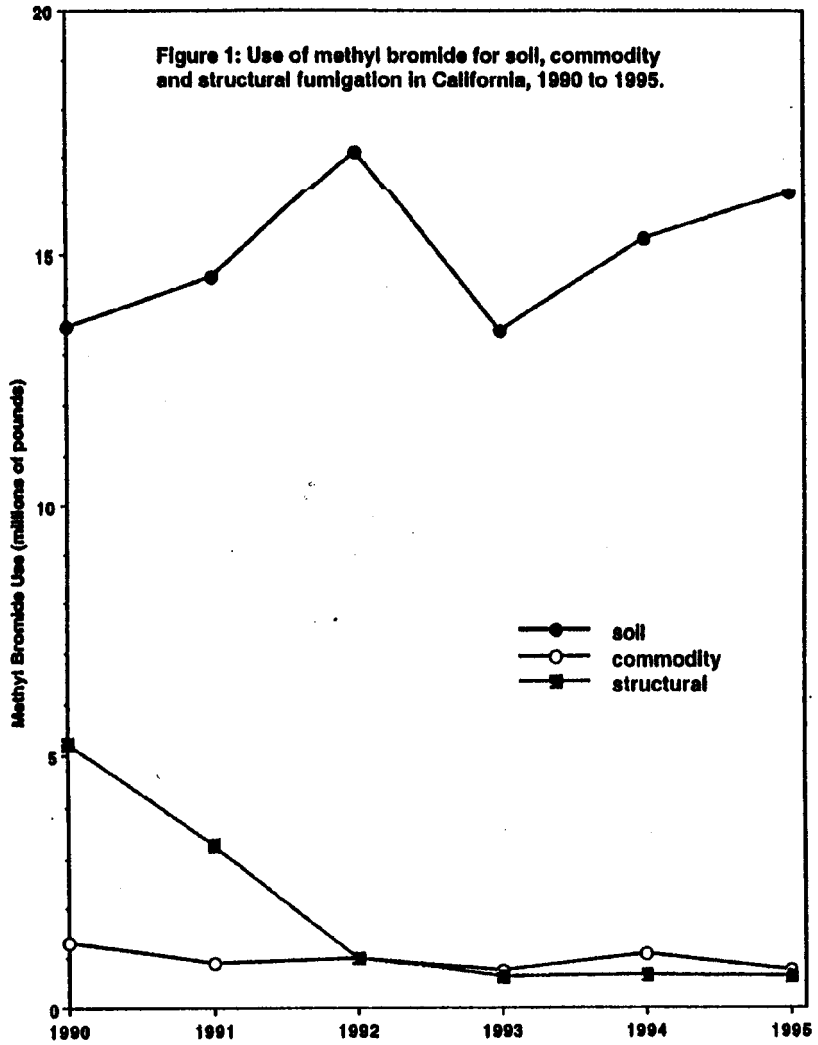
Figure 1: Use of methyl bromide for soil, commodity and structural fumigation in California, 1990 to 1995.
Methyl Bromide Use (millions of pounds)
20
15
10
5
0
1990
1991
1992
1993
1994
1995
soil
commodity
structural

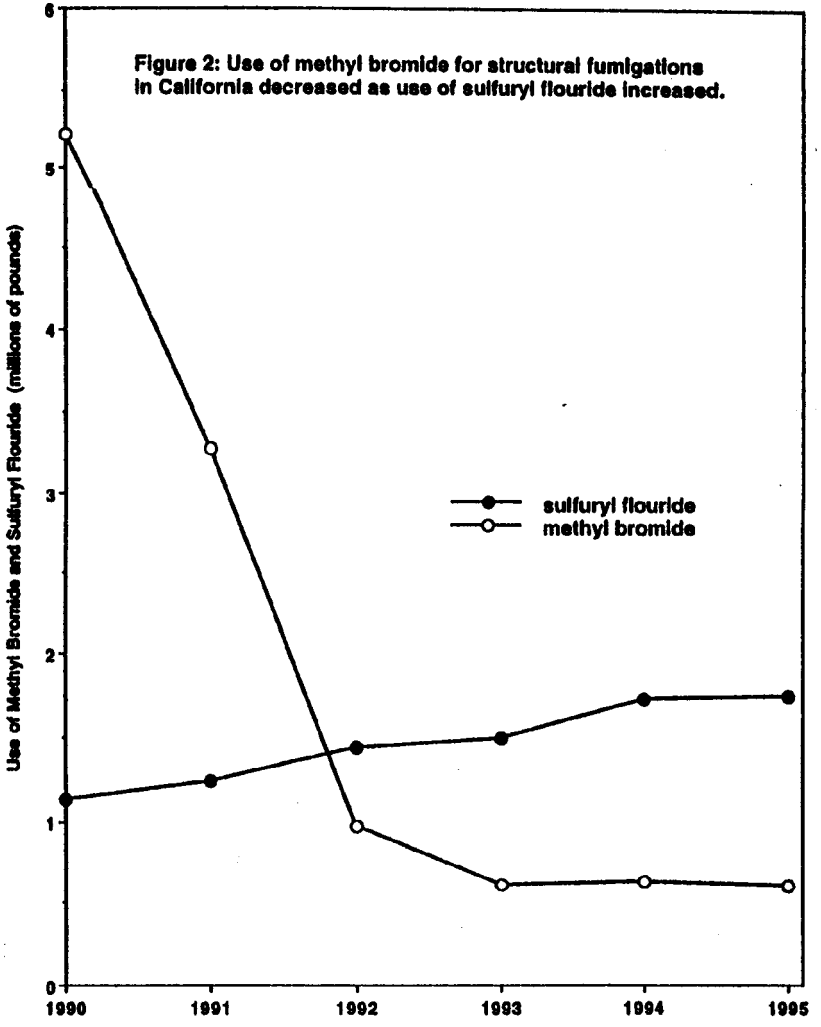
Figure 2: Use of methyl bromide for structural fumigations in California decreased as use of sulfuryl flouride increased.
Use of Methyl Bromide and Sulfuryl Flouride (millions of pounds)
6
5
4
3
2
1
0
1990
1991
1992
1993
1994
1995
sulfuryl flouride
methyl bromide

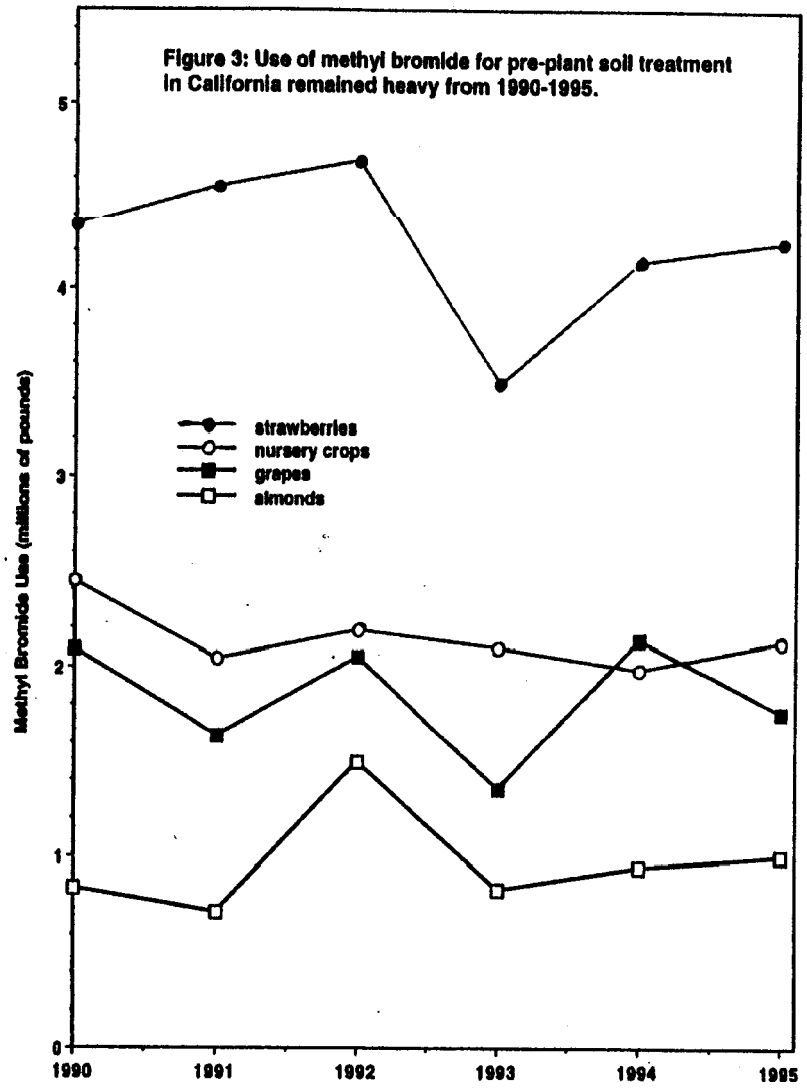
Figure 3: Use of methyl bromide for pre-plant soil treatment in California remained heavy from 1990-1995.
Methyl Bromide Use (millions of pounds)
0
1
2
3
4
5
1990
1991
1992
1993
1994
1995
strawberries
nursery crops
grapes
almonds

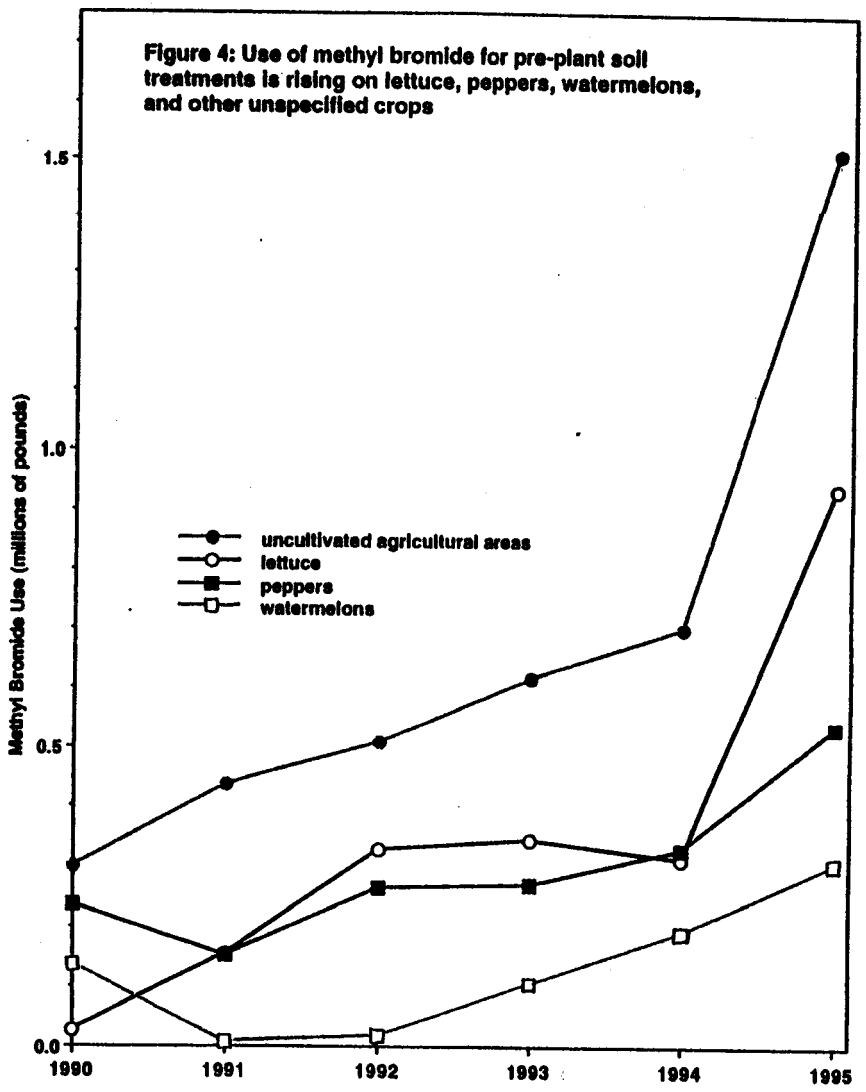
Figure 4: Use of methyl bromide for pre-plant soil treatments is rising on lettuce, peppers, watermelons, and other unspecified crops
Methyl Bromide Use (millions of pounds)
0.0
0.5
1.0
1.5
1990
1991
1992
1993
1994
1995
uncultivated agricultural areas
lettuce
peppers
watermelons