



UPDATE

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Regulations on Methyl Bromide Fumigation Thrown Out by the Court

by

Colin Carter, James Chalfant, Rachael Goodhue and Tian Xia

In 2001, California implemented use regulations for methyl bromide, an important agricultural fumigant. The economic costs of these regulations were significant and unevenly distributed across growers. A recent court ruling makes it unclear whether these regulations will apply in 2002.

In January, 2001, the California Department of Pesticide Regulation (DPR) implemented state-level guidelines regarding methyl bromide fumigation. The purpose of these regulations was to reduce human health effects on applicators and others in the area of the fumigated field due to acute short-term exposure to methyl bromide. The regulations were enacted in response to a 1999 court order by a San Francisco Superior Court judge, who ordered DPR to adopt more specific use regulations for methyl bromide.

Last month, Superior Court Judge A. James Robertson set aside the DPR guidelines. He ruled that the DPR improperly set up the regulations and should have consulted with the California Department of Food and Agriculture (CDFA) before implementing the regulations. Under the Court ruling, the DPR and CDFA must consider the economic impacts of the regulations before re-writing them.

We discuss some of the economic effects of the January, 2001 regulations as implemented by DPR. Although they have been set aside, the January 2001 guidelines were in effect for one season and they will likely serve as a starting point for the development of new regulations. Overall,

such regulations are potentially quite costly for growers, and the effects are distributed unevenly across growers.

Methyl Bromide Use Regulations

As implemented in 2001, the methyl bromide use regulations had significant economic costs. In addition to a loss in acres that could be fumigated, growers' fumigation practices were limited. The regulations increased the time necessary for fumigation for many fields, and increased the time spent by most growers in complying with the regulations. Further, many of the economic costs of the use regulations were unequally distributed across growers. Growers with small fields faced a proportionately larger acreage loss than growers with large fields, holding other factors constant. Growers in areas of high population densities faced higher costs associated with permission, notification and buffer zone requirements.

Due to regulatory specifications of emissions ratios, buffer zone requirements were much more onerous for "bed" fumigation, where only the raised beds are fumigated. Some growers had little choice but to switch to "flat" fumigation, where the

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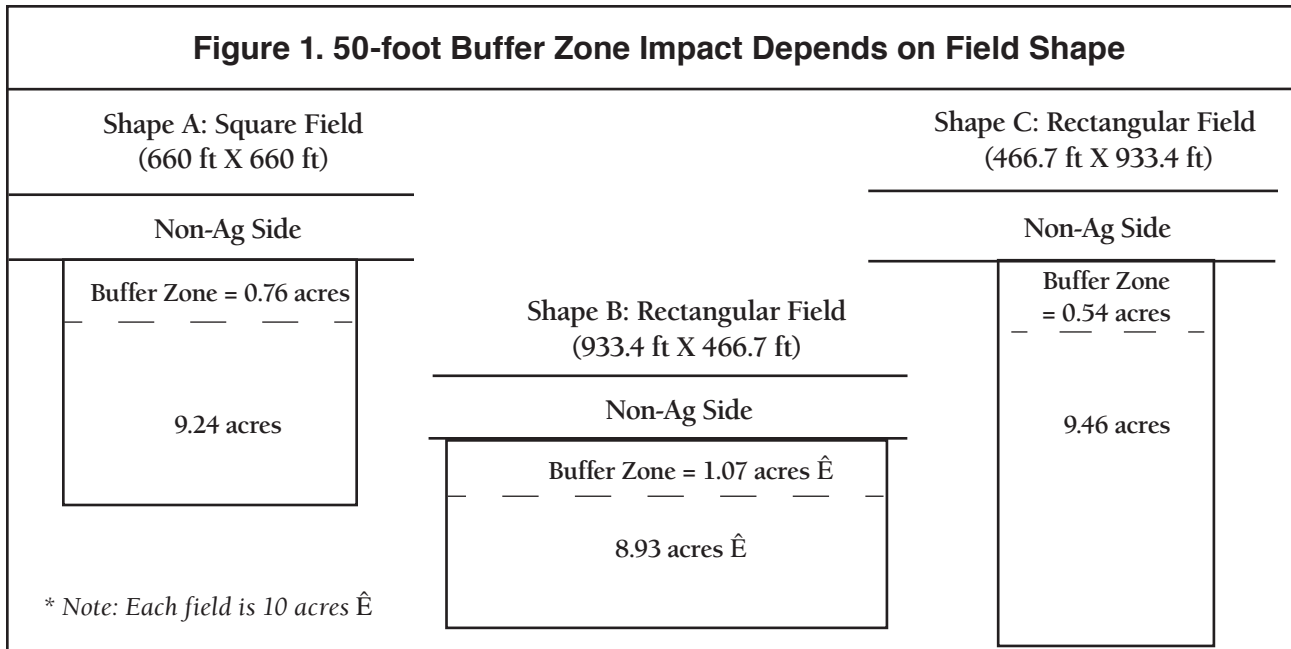
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entire field is fumigated. Flat fumigation is much more expensive.

Under the U.S. Clean Air Act and international agreements, methyl bromide will be banned for fumigation purposes in the United States in 2005. Methyl bromide was applied to over 75,000 acres of California farmland in 2000, according to the DPR's preliminary product use reporting data; crops that rely on methyl bromide for pre-planting fumigation include strawberries, melons, sweet potatoes, peppers, tomatoes, lettuce, grapes, nursery plants, and orchard crops such as almonds and walnuts.

The DPR use restrictions were quite complex. Two types of buffer zones were specified: an inner buffer zone and an outer buffer zone. Both were designed to protect members of the public from acute short-term exposure to methyl bromide. Only individuals involved in the fumigation process were allowed into the inner buffer zone. These individuals were subject to additional requirements regarding the maximum exposure times for various fumigation tasks. The inner buffer zone had to be on agricultural land, or a public roadway.

People were allowed into the outer buffer zone for transit purposes, or to "conduct activities approved by the county agricultural commissioner." Here, individual exposure was limited to no more than twelve hours out of any twenty-four. The outer buffer zone was not limited to agricultural land, but could extend into other property, with the exception of occupied housing, schools, and other sensitive sites. For both

types of buffer zones, the operator had to obtain permission from the landowner to extend the buffer zone onto his property. Total acreage for a single fumigation block was limited to 40 acres in any 24-hour period. Since the minimum buffer zone requirement increased with the total acreage fumigated, in many cases the effective fumigation block was much smaller.

Overall, these requirements increased the number of days required to complete fumigation of a field. There were substantial notification requirements included in the regulations, and restrictions on work hours for applicators. These regulations lengthened and otherwise complicated the fumigation process.

Acreage Loss Due to Inner Buffer Regulations

A major impact of the DPR regulations on growers was that some acreage could no longer be fumigated with methyl bromide. Inner buffer zones could not extend onto adjacent non-agricultural properties, and could extend onto adjacent agricultural properties only with the permission of the property owner. If a neighboring property was non-agricultural, or if permission was not granted, then part of the field could not be fumigated. This impact varied by field. The differential effects of the regulations for a fixed number of acres but for three different shapes are illustrated in Figure 1, for a 10-acre field. The acreage calculations are for an application of pure methyl bromide of 200 pounds per acre, using flat fumigation. 200 pounds of pure methyl bromide is equivalent to roughly 350 pounds of

a 57:43 methyl bromide/ chloropicrin application mix. Each field loses the 50 feet bordering the non-agricultural side. The effects of the 50-foot buffer are greatest for field shape B, with the longer side bordering a non-agricultural use. As a result of this loss, over 10% of field shape B's acreage could not be fumigated with methyl bromide, roughly twice the loss of field shape C. The square field shape A represents the intermediate case.

An additional set of calculations shows the combined effects of acreage and field shape. Table 1 reports the share of total acreage that could not be fumigated with methyl bromide, under the January 2001 use regulations. Table 1 was constructed using the following assumptions: Application rate is 200 pounds/acre. Flat fumigation emission ratio is 0.4. Bed fumigation emission ratio is 0.8. Maximum fumigated acres: 15 acres/day. The table shows the percentage of minimum loss for fields with different acreages, different shapes, and using different fumigation methods. The table was constructed under the assumption that the optimal fumigation plan with the smallest acreage loss was used. Clearly, the impact of the use restrictions depends upon field size. A larger percentage of the acreage of smaller fields could not be fumigated. The longer the side of the field bordering the non-agricultural use, the larger the percentage of total acreage that cannot be fumigated. In Table 1, the rectangular field with the long side bordering the non-agricultural use (Shape B) loses the largest share of acreage.

Bed fumigation results in a larger share of non-fumigated acreage, due to its higher emission ratio. Finally, as the number of sides with a non-agricultural use increases, acreage loss increases as a share of total acreage.

Outer Buffers

In contrast to inner buffer zones, the outer buffer zone could extend into all other property except occupied housing, schools, hospitals, convalescent homes and other sensitive sites if permission was obtained from the landowner, and if worker

notification and other regulatory requirements were met. The restriction on time spent in the outer buffer zone was much less stringent, only limiting an individual to twelve hours in a twenty-four hour period. The minimum inner buffer zone was 50 feet, and the minimum outer buffer zone was 60 feet.

The effect of the outer buffer zone requirement on the acreage losses reported above depended upon the uses of nearby land parcels, and the distance each parcel was from the intended fumigation site. Occupied houses, hospitals, schools and similar sensitive sites must be outside the outer buffer.

In addition, farmers were required to notify all property owners within 300 feet of the edge of the outer buffer zone. If these individuals requested at the time of the initial notification, the farmer was required to notify them again within 48 hours of the actual fumigation. We collected data that allowed us to estimate the magnitude and distribution of the direct

Table 1. Non-Methyl Bromide Fumigated Acreage as a Percentage of Total

	Shape A (square)	Shape B rectangular (long side non-ag)	Shape C rectangular (short side non-ag)
One Non-Agricultural Border			
Ten-acre Field	7.6	10.7	5.4
Ten-acre Field (bed)	15.2	21.4	10.7
Fifty-acre Field	3.4	4.8	2.4
One hundred-acre Field	2.4	3.4	1.7
Two Contiguous Non-Agricultural Borders			
Ten-acre Field	14.6	15.5	15.5
Ten-acre Field (bed)	28.0	29.8	29.8
Fifty-acre Field	6.7	7.1	7.1
One hundred-acre Field	4.7	5.0	5.0
Two Parallel Non-Agricultural Borders			
Ten-acre Field	15.2	21.4	10.7
Ten-acre Field (bed)	30.3	42.9	21.4
Fifty-acre Field	6.8	9.6	4.8
Three Non-Agricultural Borders			
Ten-acre Field	21.6	20.2	25.8
Ten-acre Field (bed)	40.8	38.3	48.9
Fifty-acre Field	9.9	9.3	11.8
One hundred-acre Field	7.1	6.7	8.4
Four Non-Agricultural Borders			
Ten-acre Field	28.0	29.8	29.8
Ten-acre Field (bed)	51.4	55.1	55.1
Fifty-acre Field	13.1	13.9	13.9
One hundred-acre Field	9.4	9.9	9.9

costs of this requirement. Preliminary analysis suggests that the costs would have been unevenly distributed across fields; producers with fields at the urban-agricultural edge would have paid a disproportionate share of the total cost.

Impacts of the Regulations

The acreage lost due to the DPR methyl bromide use regulations depended upon the size and shape of an individual field, as well as on the use of adjacent parcels. Smaller fields lost a larger percentage of total acreage, holding other factors constant. Fields with more non-agricultural borders lost a larger percentage of total acreage, again, holding other factors constant. It is important to emphasize that these losses presumed that owners of adjacent parcels would always give permission for buffers to extend onto their property, when this was allowed by the regulation; in practice, there is no guarantee that this would have been the case.

The regulations imposed a number of other costs on agricultural producers. Designing a fumigation plan that complied with regulatory requirements was much more time-consuming than was the case prior to these regulations. The total time required to fumigate increased for many fields, which affected production planning and profitability. In the case of strawberries, for example, lengthening fumigation time shortens the harvest period for the previous year's crop, since it must be removed earlier in order to complete fumigation prior to the planting season. Notification requirements are quite time consuming, and can negatively impact neighbors' perceptions of agricultural activities. This perception may ultimately limit producers' freedom to operate according to best agricultural practices in still unforeseen ways.

The impact of the DPR use regulations on producers was unequal. Growers in areas with higher population densities were much more likely to be heavily impacted by the buffer zone, permission, and notification requirements. Growers with smaller fields faced a proportionately greater loss of fumigated acreage than growers with large fields. Growers who had to discontinue bed fumigation saw their costs rise dramatically.

These potential effects have troubling implications regarding the impact of the use regulations across different population groups. To the extent that it is the small growers who farm small fields, small growers were disproportionately affected by the regulations. Further,

the complexity of the regulations disproportionately increased the burden of regulatory compliance for less educated growers, or growers who are less than fluent in English. Language differences may also limit the ability of some growers and neighboring landowners and residents to communicate effectively. In turn, this may reduce the acreage that growers can fumigate, if they are unable to secure permission to extend buffer zones into neighboring properties. Conversely, some neighbors may not understand fully their rights regarding notification and buffer zone permissions.

One of the crops most affected by the 2001 methyl bromide regulations was strawberries. The methyl bromide use regulations increased the costs of producing strawberries in California. The effect on the retail price of fresh strawberries depends on the extent to which imports compensate for any reduction in domestic production. Producers in Mexico, Chile, and elsewhere are not subject to the same environmental regulations as are California producers. An increase in imports will make it difficult for California producers to recoup cost increases from complying with the regulations. Potentially, consumers could be unaffected; the only change would be the location where the strawberries are grown.

Was the recent Court decision to invalidate the DPR restrictions a clear victory for growers? We do not know for certain. It is too early to determine if the Court decision will help growers. The state could simply impose emergency rules for the 2002 fumigation season that duplicate the 2001 regulations.

Alternatively, the DPR may re-introduce identical regulations and follow procedures that are acceptable to the courts. Whatever the outcome, the judge has determined that the economic effects of the regulations must be given more attention than in the past.

Colin Carter (colin@primal.ucdavis.edu) and James Chalfant (jim@primal.ucdavis.edu) are professors, Rachael Goodhue (goodhue@primal.ucdavis.edu) is an assistant professor, and Tian Xia (xia@primal.ucdavis.edu) is a Ph.D. candidate, all in the Department of Agricultural and Resource Economics at UC Davis.