



Possible Ban on Certain Pesticide Chemicals Could Negatively Affect TN Agriculture

Without taking possible crop price increases, production adjustments or the impacts of technological change in the form of new chemicals and pest control techniques into account, an analysis of the effects of a ban on organophosphates and carbamates - two chemicals widely used in crop production - shows that net farm income in Tennessee could be reduced by about \$83 million the first year following the ban and \$132 million in the fifth year, compared to 1997 Tennessee farm revenue. The crops most vulnerable to the ban on organophosphates and carbamates are tobacco, cotton, apples, peaches, and greens.

The banning of these two chemicals could result as part of the proposed implementation of the Food Quality Protection Act (FQPA). Thirty pesticide active ingredients belonging to these two classes are widely used as pesticides, and in Tennessee these pesticides are presently used on many of the leading cash crops such as cotton, tobacco, soybeans, and

corn. They are also a vital part of the pest management strategies for many producers of fruits and vegetables in the state.

The Analysis

At the suggestion of the Tennessee Farm Bureau Federation, the University of Tennessee Institute of Agriculture conducted a study to identify the crops in Tennessee that are vulnerable to a ban on organophosphates and carbamates and to quantify this "vulnerability." Twenty-one crops in 13 crop groups - cotton, tobacco, soybeans, corn, wheat, sorghum, apples, peaches, greens, beans, sweet corn, tomatoes, and cucurbits - are included in the analysis.

Fifteen crop specialists from the University of Tennessee were asked to identify current pesticide strategies used to control target pests for each of the crops in the study. The crop experts then provided information on alternative pesticides that could replace the use of organophosphates and carbamates if

these two chemicals are banned. Using this information, analysts estimated current expenditures on insecticide materials for each crop and such expenditures if organophosphates and carbamates are banned.

From the information gathered, the expected changes in expenditures for insecticide chemicals are estimated following the ban, using 1997 as a base from which to measure the changes. Furthermore, the changes in expected crop yields are estimated for the first year following the ban. To account for development of insect resistance to the alternative chemicals (indicating higher yield losses), changes in expected crop yields were also estimated for the fifth year following the ban on organophosphates and carbamates. Changes in net returns are then estimated as a result of changes in expenditures for chemicals and changes in revenues due to yield reductions.

Results

The combined loss in revenue and increased chemical expenditures from the ban on organophosphates and carbamates across all crops is found to be about \$83 million for the first year after the ban. Of this \$83 million, \$66 million is from revenue losses due to yield reductions and approximately \$18 million is from higher costs of alternative insecticide materials. The

total decrease in net returns represents a 16 percent decline in 1997 Tennessee net farm income. The greatest losses are in cotton and tobacco, and all other crops considered register losses except for soybeans and greens, where lower expenditures under the ban - due to a lack of chemical substitutes - offset yield and revenue reductions in the first year. Table 1 shows total and crop first-year losses in Tennessee.

In the fifth year following the ban, total reductions in net returns are estimated to be about \$132 million, representing nearly a 25 percent reduction in 1997 net farm income in Tennessee. This drop in net returns is attributable to a substantial reduction in crop yields due to the buildup of pest resistance to the

Table 1. Total and Crop First-Year Losses Under an FQPA Ban of Organophosphates and Carbamates.

Crop	Revenue Change <i>Mil. \$</i>	Expenditure Change <i>Mil. \$</i>	Net Returns Change <i>Mil. \$</i>
Cotton	-17.811	15.288	-33.099
Tobacco	-24.079	2.447	-26.526
Soybeans	0.000	-0.082	0.082
Corn	-2.214	0.179	-2.394
Wheat	-0.127	0.010	-0.137
Sorghum	-0.005	0.027	-0.033
Apples	-1.235	0.127	-1.362
Peaches	-1.329	0.017	-1.345
Greens	-0.070	-0.097	0.027
Beans	-0.548	-0.171	-0.378
Sweet Corn	-1.020	0.015	-1.035
Tomatoes	-5.081	-0.174	-4.907
Cucurbits	-12.765	-0.005	-12.760
Total	-66.285	17.582	-83.867

Estimates of the impacts of a ban on organophosphates and carbamates on Tennessee agriculture do not include (1) increased crop prices due to lower yields and production or lesser quality; (2) changes in crop acreage or acreage shifts; (3) changes in prices for replacement insecticides or insecticide application costs; and (4) changes in environmental and health risks of alternative pesticides.

alternative insecticides. Crops most affected by the building of pest resistance are apples, peaches, and greens - all of which are expected to lose their entire crop. Tobacco and cotton are also severely affected by pest resistance, resulting in significant yield losses. All other crops also suffer abundant crop losses except for soybeans, where changes in pesticide material expenditures are not accompanied by significant yield impact. Table 2 presents these findings.

Table 2. Total and Crop Fifth-Year Losses Under an FQPA Ban of Organophosphates and Carbamates.

Crop	Revenue Change <i>Mil. \$</i>	Expenditure Change <i>Mil. \$</i>	Net Returns Change <i>Mil. \$</i>
Cotton	-17.811	15.288	-33.099
Tobacco	-33.445	2.447	-35.892
Soybeans	0.000	-0.082	0.082
Corn	-18.429	0.179	-18.608
Wheat	-1.352	0.010	-1.362
Sorghum	-0.005	0.027	-0.033
Apples	-2.469	0.127	-2.596
Peaches	-1.329	0.017	-1.345
Greens	-1.619	-0.097	-1.522
Beans	-8.570	-0.171	-8.400
Sweet Corn	-3.773	0.015	-3.788
Tomatoes	-11.500	-0.174	-11.326
Cucurbits	-14.463	0.005	-14.458
Total	-114.765	17.582	-132.347

Conclusions

This analysis cannot include changes in health risks or environmental risks associated with alternative chemicals to organophosphates and carbamates. Furthermore, this study cannot consider likely price impacts resulting from changes in yields and production. Other factors not included in the study are the potential impacts on investments made in developing integrated pest resistance management programs, the use of organophosphates and carbamates in household, nursery, and landscape industries, possible acreage shifts, changes in prices for replacement insecticides, and changes in insecticide application costs.

These factors aside, the study sheds light on possible impacts of a ban on organophosphates and carbamates on Tennessee agriculture. The analysis suggests that replacing these two chemicals with alternative pesticides would greatly reduce crop yields and increase insecticide expenditures, resulting in lowered net farm revenues across the state.