

Implementation of Air Quality Laws and the Effects On Cultivation and Weed Management in Agronomic Crops

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The San Joaquin Valley has become one of the poorest air quality regions in the nation. The valley becomes a collecting basin for poor air because of its natural mountain barriers, inflow of air from cities further up the valley and San Francisco Bay area, and from its own local sources. With our rapidly expanding population and ever increasing numbers of cars and trucks on valley roads, the valley is not meeting air quality standards. Because of this poor air quality, health experts relate air pollution to increasing respiratory problems. Automobiles are the cause for the bulk of the valleys pollution but the district has little power over regulation which comes under Federal authority. Air officials suggest the farming plays a significant role in contributing to air pollution. Agriculture is not given proper credit for what it contributes such as the effect that crop production plays on filtering dust and carbon dioxide. Nevertheless the agriculture industry has worked with local air officials in compiling a list of cleanup ideas that farmers can use soon.

Senator Dean Flores from Shafter introduced the SB700 bill that will cause hardships and some changes in production agriculture. The perceived benefits from SB700 include some of the following:

- Less tillage, compaction, P.M. emissions
- Reductions in Nox, VOCs, CO₂, erosion, and fuel usage
- Maintains residue
- Increases organic matter and fuel efficiency
- Improves soil and water conservation
- Enhances nutrient management
- Improves vegetation for wildlife and creates beneficial insect habitat
- Public benefit of electricity and soil structure
- Power efficient water delivery

A “Conservation Management Plan” will be required by the Air Pollution Control District for farms greater than 100 acres As part an effort to reduce PM10 emissions, California Cotton Growers and Ginners Association Roger Isom said “new air quality district rules will go into effect July 1 which requires that farmers adopt at least 5 conservation mgt. practices to reduce emissions and file these plans with the local Air Quality Control office”. “Two of these practices must involve field operations and harvesting; two involving unpaved and equipment yards and one to reduce burning of agricultural residue”.

The following is a list of many practices that will qualify under this bill.

I. Land Prep/Cultivation

Category

Examples

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| 1. Equipment changes | Increased size, modified equipment including combines, cotton pickers, tilling and harvesting equipment, landplaning/land leveling |
| 2. Combined operations | Multiple cultivation, operations/pass |
| 3. Conservation tillage/non-till | Reduced/eliminate soil disturbance/passes |
| 4. Precision farming | Fertilizer management, selective area treatment, using satellite navigation to calculate position in the field |
| 5. Land set aside | Temporary/permanent removal of land from cultivation |
| 6. Row spacing | Used in combination with other practices |
| 7. Night farming | Where practical, utilize increased humidity/decreased wind velocity through night operations |
| 8. Shuttle system | Multiple bin/trailer transportation, e.g. Cotton Module Builder |

II. Cultural Activities

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| 1. Technological Improvements | Innovative farming practices |
| 2. Integrated Pest Management | Utilizing all available resources including organic, conventional, biological farming practices |
| 3. Irrigation conservation
Drip/sprinkler/flood
Buried line/lateral move system | Using appropriate techniques for water management |

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| 4. Row spacing and overhead system | Increasing plant density/canopy through row width reduction, overhead vineyard production systems |
| 5. Compact, low volume, Concentrate spray equipment | Micro-heads, infrared spot-sprayer (image recognition) Aerial applications |
| 6. Field crop rotation | When possible, rotating to low till crop |

III. Agriculture Burning

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| 1. Biomass | Utilize grindings, chips and crop residue for generating electricity |
| 2. Grain/Corn/Safflower
Non-burning | Incorporation of stubble residue |

IV. Road Maintenance

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| 1. Approved practices for unpaved roads, staging areas, equipment yards | Water, oil, other approved control methods, limit access, speed reduction, commuting program |
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V. Organic Farming Practices

Biological control methods

VII. Irrigation Power Units

Cleaner burning engines, new electric motors, pumping efficiency

Agricultural producers have implemented many of these practices in an effort to control high labor costs and to reduce energy costs. A few examples include using larger plantings, tillage, and harvesting equipment which uses less passes across the field. Several growers already are using one pass tillage systems that contain several tillage operations in one pass.

No-till systems have been used for several years in California dryland grain. Several thousand acres are planted in no-till corn in the San Joaquin Valley. Results of this system is mixed. Results vary from grower to grower, with some negative and many positive. One study conducted by Carol Frate in Tulare County compared no-till with strip till, and conventional tillage. Strip tillage worked better than no-till. It reduced the amount of variability, resulted in a more uniform seed bed, allowed for manure applications, and solved the compaction problem. Stand counts were less in no-till, no-till used more water and required more labor for irrigation

during a time of when there is less water available, as pumps are running continuously in the middle of summer when growers are trying to move water from crop to crop. This no-till system required borders which took out an additional 6 acres out of an 80 acre field. Even though there may have been a cost saving due to less tillage with no-till, the grower lost \$50-\$100/A in total crop yields.

Reduced tillage study in silage corn. Carol Frate, Tulare County.

Treatments	Sandy Loam Soil		Clay Loam Soil	
	Tons/A @70% H2O	Tons per field acre	Tons/A @ 70% H2O	Tons per field acre
Conventional	35.9	35.9	34.6	34.6
Strip-till	36.7	33.0	33.2	29.9
Light disk	35.9	31.8	33.5	30.2
No-till	33.8	30.4	33.0	29.7

Many growers are using Global Position Satellite systems with different equipment. With this system you make less passes and eliminate overlaps. There is an opportunity to reduce chemicals and fertilizer in some cases. Since these GPS systems also work at night and in the fog this provides an opportunity to keep tractors and tillage running during periods of higher humidity creating less dust.

Some growers have evaluated narrow row systems. Results are quite variable from farm to farm. Generally about 1/3 of the studies have show a slight loss of yield compared to conventional 30 or 38 inch row systems, 1/3 with the same yield results, and 1/3 with a yield increase from 1 to 10 percent.

One of the reasons that so much tillage is done in cotton is because of “plow down” regulations which destroy over wintering sites for Pink Bollworm. An exemption in the San Joaquin Valley has been made in reduced tillage operations. Permits for reduced tillage system are required in districts 2, 3, and 4 to use this. Native pink bollworm (PBW) cannot have been detected within the described boundary of a government section (township-range) and immediate adjoining sections (a total nine square miles) the current crop year. Cotton stalks and debris shall be shredded by a power driven shredding device. The county Agricultural Commissioner must be notified a minimum of ten (10) days prior. Following shredding as required, cotton plant roots must be dislodged from the soil which ensures that cotton plant regrowth will not occur in the reduced tillage system. Roots, plant stubs, shredding debris, and trash remaining from harvesting or clean-up operations are not required to be mixed with surface soil in this reduced tillage system.

Cost-share assistance is available when applying dust control to unpaved roads, or implementing conservation tillage, which reduces the number of trips a tractor makes across a field. The funds are being offered by U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) through its Environment Quality Incentives Program (EQIP). EQIP is voluntary conservation program that assists agriculture producers install conservation practices that minimize air quality emissions. The deadline to sign up for 2004 EQIP funds in most counties was January 30th. Agricultural producers interested in participating in the EQIP air quality program should contact their local NRCS office. In Fresno County the deadline was January 15, 2004.

In summary this was a poorly written bill. It is obvious from reviewing some of the management options for growers that most of the practices that make both economic and agronomic sense are already being practiced by growers but confusion remains since it appears that this bill does not want to give them credit for it. Eliminating all agricultural burning puts an extreme financial burden on the agricultural community and will dramatically raise costs of farming particularly with the permanent crops.

Implementing this Air Quality Law will have to be done through several changes in production practices. These changes can and must maintain weed control by incorporating resistance management strategies that include all of our weed management approaches that utilize crop rotation, herbicide rotation, and control of weed escapes by tillage or hand. This presentation highlighted the key components of this new law for San Joaquin Valley growers and interested people should look at the website: www.valleyair.org for more complete information.

References:

California Cotton Growers and Ginners Association Roger Isom. Personal conversations and information.

Fresno Bee article by Mark Grossi, August 10, 2003.

Western Farm Press article by Harry Cline, July 5, 2003.

U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) office, Tulare, California. Environment Quality Incentives Program (EQIP) information.

Air quality Control District information. Website: www.valleyair.org.