Air Quality and Agriculture

California is home to some of the worst air quality in the nation. The costs associated with air pollution have long been recognized, and abatement efforts have been underway for decades in California, with some success and yet with air quality still too low in some regions.

As shown in Figure 1, much of California fails to meet federal standards for air quality. In fact, Los Angeles and the San Joaquin Valley are the only two districts in the country to be classified by the Environmental Protection Agency (EPA) as "extreme nonattainment" areas for ozone. The San Joaquin Valley failed to meet the standard on 104 days (Cowan 2005). In the San Joaquin Valley, the number of days exceeding ozone limits has barely changed since the early 1950s. The San Joaquin Valley is also one of only nine area in the country to be designated as a "serious nonattainment" area for particulate matter which contributes to asthma, emphysema, bronchitis, and pneumonia. To meet the maximum 24-hour standard set by the EPA for particulate matter, particulate levels must fall by more than 50 percent, and annual average concentrations must fall by nearly 30 percent.

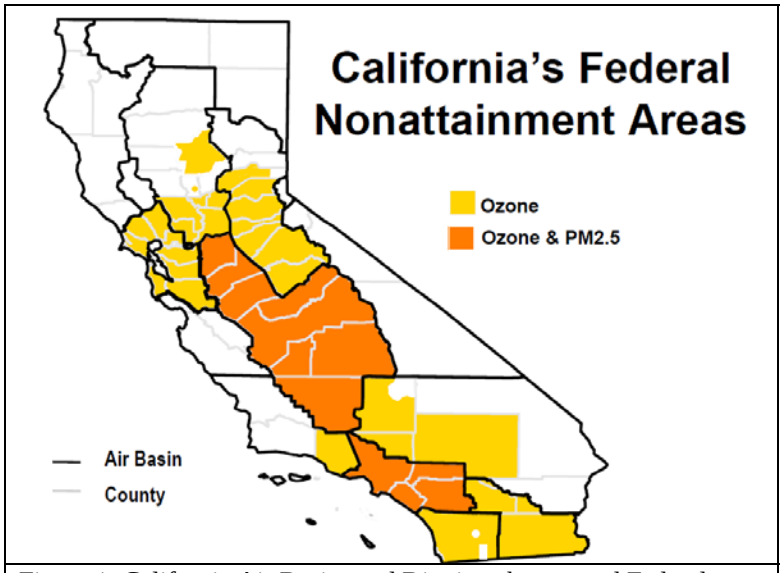

Figure 1: California Air Basins and Districts that exceed Federal Ozone and Particulate Limits. Source: Livingston 2009.

Cars and trucks, account for the largest source of ozone emissions. Ozone forms in the atmosphere from volatile organic compounds and nitrogen oxides. Like in Los Angeles, ozone is trapped in the San Joaquin Valley by the surrounding mountains. While population growth and increased road traffic are central, the role of agriculture in the San Joaquin Valley also plays a role in why the region has not improved its air quality. The Air Resources Board reports that farm activities directly emit 21 percent of ozone-forming gases in the San Joaquin Valley (ARB 2008). Farm activities account for more than half of direct emissions of particulate in San Joaquin Valley (Cowan 2005).

It is estimated that between 14,000 and 24,000 Californians die prematurely every year due to the state's air pollution (Cal/EPA, ARB 2008). According to the California Environmental Protection Agency, air pollution also contributes to over 200,000 cases of asthma, and respiratory and cardiac disease every year. The annual health-related costs attributable to air pollution are estimated to be about $70 billion. Ozone also damages crops by interfering with the photosynthesis process, resulting in lower yields (ARS 2009; Heagle 1989). Crow notes that ozone has reduced yields of some crops in the

Central Valley by up to 20 percent, including grapes, cotton, oranges, alfalfa, and tomatoes (Crow 2003).

The U.S. Environmental Protection Agency administers the Clean Air Act at the federal level, determining maximum acceptable levels or air pollutants. California has its own Clean Air Act that is administered by the California Air Resources Board, part of the California Environmental Protection Agency. The Air Resources Board focuses on reducing air pollutants by regulating the emissions from passenger vehicles and commercial transportation, including trucks and ocean freighters. Currently, the agency intends to achieve a significant reduction in the Central Valley's air pollution by adapting older diesel fuel trucks to use diesel particulate filters or by replacing their engines with newer, cleaner burning engines.

Under California air pollution laws, farms had been exempt until 2004 from the permit requirements that applied to other industries. A series of new regulations include regulating "concentrated animal feeding operations," that must now apply for pollution permits from the state. Other sources of ozone that facing regulation include agricultural water pumps, open burning, wine fermentation and the use of commercial dryers. Since primary sources of particulate matter pollution in the San Joaquin Valley are carbon particles and ammonium nitrate from fertilizer, reduced fertilizer application and paving rural roads are targeted.

Regulation imposes costs and the consequence of higher regulatory costs for California agriculture will be a shift in technologies, changes to the crop mix and likely a shift in some farming activities to other regions. Since cropland is not mobile, the dairy industry is the most likely major farm industry to respond by shifting to regions without such severe air quality issues and regulations. Regulations can reduce unwanted emissions by changing practices on currently operating farms and by discouraging economic activity and thus limiting employment and population growth. Both types of impacts seem to be underway in agricultural areas of California.

– University of California Agricultural Issues Center, July 2009

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