

production in 2001 at \$2,643 per acre. According to industry data, the average grower return (value per bearing acre) for 1998–2001 was \$2,619. This average revenue estimate is just below the Extension study's \$2,643 estimate of typical cost. Record evidence indicates that over that 4-year period, the lowest value per bearing acre was \$2,137 in 2001 and the highest was \$3,207 in 2000.

Witnesses supplied an additional set of cost estimates, which ranged from a low-cost operation of \$2,350 per acre to a high of \$3,400 per acre. In their testimony, total costs of production were divided into three categories: the costs of orchard establishment, cultural costs and administrative costs. Establishment costs, or the overall cost to develop an acre of pistachios until revenues exceed growing expenses, were estimated at between \$10,000 and \$15,000, with an average tree maturation period of 7 years. In order to recover these investment costs, the hearing record states that producers generally target an 11% return on investment, estimated at between \$1,100 and \$1,650 per acre. Annual per acre cultural costs average between \$1,100 and \$1,600, once the trees are productive. Administrative costs include the cost of farm management and crop financing, and can vary between \$150 and \$200 per acre. The sum of cultural and administrative costs therefore range from \$1,250 to \$1,800.

Grower price per pound averaged approximately \$1.10 between 1997 and 2001. Given that \$1.10 average grower price and the cost estimates above, a producer would need to harvest an average of at least 2,000 pounds per acre to cover total production costs for the low-cost operation (\$2,350 per acre). A producer would need to harvest at least 1,136 pounds per acre to cover the cultural and administrative costs of \$1,250 per acre (not including a return on investment).

The CPC Annual Report for Crop Year 2001–2002 reveals that 6 out of 26 California counties with pistachio production yielded on average more than 2,000 pounds per acre between 1998 and 2001. These six counties, which together represented over 88 percent of total California pistachio production in 2000, are Colusa, Sutter, Madera, Fresno, Kings and Kern. Glenn, Butte, Placer, Yolo, Contra Costa, San Joaquin, Calaveras, Stanislaus, Merced, Tulare and Santa Barbara counties yield on average between 1,000 to 2,000 pounds per acre and represent roughly 12 percent of total state production. Shasta, Tehama, Yuba, Solano, Sacramento, San Luis Obispo, Los

Angeles, San Bernardino and Riverside counties yield on average less than 1,000 pounds per acre and represent less than one percent of California pistachio production.

Given the assumptions made above, approximately 88 percent of the industry is covering total costs of production. Conversely, roughly 12 percent of the industry is currently covering cultural costs but not generating a return on their investment.

#### *Simulation Model*

Record evidence includes an economic analysis presented by Dr. Daniel Sumner, University of California-Davis on the potential impacts of the proposed marketing order provisions if the program were implemented. Dr. Sumner presented a cost-benefit analysis based on a simulation model, the purpose of which was to provide a framework for comparing costs of compliance to the benefits of improved quality through implementation of the standards.

#### *Cost Estimates*

Dr. Sumner's presentation focused on the regulatory features of the proposed marketing order: (1) Mandatory testing of pistachios for the presence of aflatoxin, with a maximum allowable tolerance of 15 ppb; and (2) mandatory minimum quality standards. The quality standards would specify minimum size and maximum allowable defects.

According to record testimony, the major costs associated with these features are the cost of aflatoxin testing and the cost of USDA presence in the handlers' plant to inspect and sample lots of pistachios. Expected benefits identified by the witnesses would be the increase in consumer confidence in pistachios as a result of aflatoxin regulation, and the combined increases in consumer demand for pistachios due to mandatory USDA regulation and stringent quality standards.

Dr. Sumner's analysis took into account many of the variables presented in testimony by other witnesses describing typical production and processing costs, and presented a weighted average cost computation for marketing order compliance. The average cost of compliance, as identified by several witnesses and reiterated in Dr. Sumner's analysis, is approximately one half cent per pound of domestic pistachio production, or \$0.00525 per pound.

Record evidence suggests that the cost of having a USDA inspector in the plant, including mileage plus the standard fee per hour, is approximately \$291 per day for the largest plants (which process

about 80 percent of total production). Total production for the domestic market that would be processed by the largest plants (those that process over 10 million pounds annually) is estimated at 136 million pounds. If an average lot is 40,000 pounds (the most common lot size for testing cited by the largest handlers), then 3,400 lots would need to be tested to account for all 136 million pounds (166.67 million pounds times 80 per cent). If a USDA official were to test 5.5 lots per day, then 618 person-days would be needed to test all of the lots. Multiplying \$291 per day times 618 person-days yields an annual cost of \$180,000 for testing 136 million pounds. Dividing the \$180,000 annual cost by 136 million pounds yields an estimated cost per pound of \$0.0013 for having USDA personnel in the plant to sample and certify that the pistachios meet minimum quality standards. Testimony suggests that this cost estimate is on the high side, since many handlers would already have USDA personnel in their plants to perform other grading services besides certification of lots for minimum quality.

The cost of aflatoxin testing in the witnesses' simulation analysis is estimated at the current rate charged by a private laboratory (\$75 per test). Given this rate information, the aflatoxin testing cost per pound would be \$0.0019 (\$75 divided by the average lot size of 40,000 pounds).

For the largest handlers, the combined cost of aflatoxin testing and paying for the USDA presence in the plants would be equal to the sum of the quality and aflatoxin cost figures outlined above (\$0.0013 + \$0.0019), or \$0.0032 per pound. To account for imprecision of data and other incidental costs, Dr. Sumner's analysis employs a median cost per pound for marketing order compliance, which is slightly higher, or \$0.005 per pound. The analysis further assumes that per unit costs are somewhat higher for smaller plants. Thus, median costs for two categories of smaller plants are estimated at \$0.006 and \$0.007.

Weighting these cost figures for the three different size categories of plants yields an overall median estimated cost per pound for compliance of \$0.00525. In terms of economic theory, this cost increase is represented by a vertical shift in the supply curve of about one-half cent, as measured along the vertical axis in a supply-demand graph. The total direct cost of compliance is estimated at \$875,000 in the median scenario (\$0.00525 times 166.67 million pounds in the domestic market).