

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

**BEFORE THE ADMINISTRATOR**

In re FIFRA Section 3(c)(2)(B) )  
Notice of Intent to Suspend ) Docket No. FIFRA-HQ-2022-0002  
Dimethyl Tetrachloroterephthalate )  
(DCPA) Technical Registration )  
\_\_\_\_\_ )

**OBJECTION AND REQUEST FOR HEARING BY  
GROWER-SHIPPER ASSOCIATION OF CENTRAL CALIFORNIA,  
SUNHEAVEN FARMS, LLC, J&D PRODUCE,  
RATTO BROS., INC., AND HUNTINGTON FARMS**

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## **INTRODUCTION**

The Grower-Shipper Association of Central California, Sunheaven Farms, LLC, J&D Produce, Ratto Bros., Inc., and Huntington Farms (hereinafter, the “Grower Group”) respectfully object and request a hearing pursuant to Section 6 of the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. §§ 136-136y, “FIFRA”) on the Notice of Intent to Suspend Dimethyl Tetrachloroterephthalate (“DCPA”) Technical Registration (EPA Reg. No. 5481-495), Docket No. EPA–HQ–OPP–2011–0374, FRL–9758–01–OCSPP (“NOITS”). In connection therewith, the Grower Group submits this objection and related information for purposes of its hearing request pursuant to 40 C.F.R. Part 164.

## **THE GROWER GROUP**

The Grower-Shipper Association of Central California (“GSA”) is a regional trade association based in California’s Salinas Valley. Its mission is to advance families, food and farming in the region. Founded in 1930, it now represents approximately 300 members consisting of farmers, shippers and processors of fruits and vegetables produced in Monterey, Santa Cruz, San Benito and Santa Clara Counties. Implementing effective disease and pest management strategies is a continual challenge for farmers, and the GSA works collaboratively with local farm advisors and experts, universities and its members on crop protection issues. These issues are critical not only to farmers, but also the farmers’ ability to provide affordable and healthy produce to consumers. DCPA is a vital tool for GSA members, and it is used extensively in the production of vegetable crops on the Central Coast of California.

The remaining members of the Grower Group are family-owned businesses that operate farms in Washington State and Oregon (Sunheaven), the Rio Grande Valley of Texas (J&D) and California (Ratto Bros. and Huntington Farms). They grow a variety of fruits and vegetables,

including onions, brassica vegetable and other specialty crops, and rely on DCPA for critical weed control.

Collectively, the Grower Group estimates that it represents in excess of 300,000 acres on which leafy vegetables, cucurbits and onions are grown.

### **THE NOITS**

The NOITS was published in the Federal Register on April 28, 2022. EPA, Notice of Intent to Suspend Dimethyl Tetrachloroterephthalate (DCPA) Technical Registration, 87 Fed. Reg. 25,262 (Apr. 28, 2022). Its basis is the alleged failure of the registrant AMVAC Chemical Corporation (“AMVAC”) to comply fully with the Data Call-In Notice GDCI-078701-1140 concerning the pesticide active ingredient DCPA (EPA Reg. No. 5481-495).

The Grower Group is not the registrant of DCPA, and they incorporate by reference the Request for a Hearing and Statement of Objections submitted by AMVAC concerning the steps it has taken to respond to the DCI. The Grower Group – and ultimately American consumers – will suffer significant adverse impacts if the registration for DCPA is suspended. Therefore, as permitted by the NOITS, the Grower Group submits this Objections and Request for a Hearing on the NOITS. At the hearing, the Grower Group is prepared to submit evidence substantiating the facts herein.

### **OBJECTIONS TO THE NOITS**

#### **1. DCPA is a Vital Crop Protection Tool**

Suspension of the registration of DCPA would impose significant adverse impacts on the Grower Group by depriving them of access to Dacthal Flowable Herbicide (EPA Reg. No. 5481-487), which contains DCPA and is a critical tool in the onion and brassica vegetable crop families. Weeds control for these crops is complex and multiple tools are required, including

herbicides. Herbicides to be used must be safe to the crops *and* rotational crops, control key weeds and have short-lived residue in the soil.

DCPA is a preemergent herbicide that controls annual grasses and certain broadleaf weeds and reduces labor and the need for hand weeding. It stops these difficult-to-control broadleaf and grass weeds before they emerge, has excellent selectivity, provides residual activity, season long foundation control, and has excellent crop safety. In particular, DCPA is an essential foundational tool for effective and economical control of yield-robbing grasses and broadleaf weeds in onions, leeks and small acreage brassica crops such as bok choy, Brussels sprouts, broccoli, cauliflower, cabbages, radish, kale, rapini, mustards, collards, gai lon and kohlrabi. Further, for many growers, the brassica crops are critical components in their cropping systems in which crops must be rotated with unrelated crops to maintain soil health. They are very effective in adding organic matter to the soil, reducing inoculum levels of several soilborne diseases that would otherwise severely impact lettuce yields. As demonstrated below, DCPA is a vital tool for the crops on which it may be used and there are not alternative herbicides that provide the same selectivity, efficacy and uses as DCPA.

## **2. Existing Crop Protection Products Lack the Uses and Benefits of DCPA**

There are no replacement products for certain critical uses of DCPA. As noted, DCPA is the foundation for weed control in direct seeded onion. For onion and leeks, there is not another herbicide that can be applied from the time of seeding to 1-2 leaf onion. Other herbicides that can be used on onion and leeks cannot be applied until after crop establishment (and have additional, significant limitations as noted below). Bromoxynil, for example, can be used for allium crops but, its use pattern is much later in the growth cycle than DCPA. Similarly,

dimethenamid-P can only be applied after the two-leaf stage of onion. Thus, neither bromoxynil nor dimethenamid-P can provide the same control as DCPA or replace its uses.

Other herbicides lack the same uses and benefits as DCPA and have additional limitations. Oxyfluorfen lacks the breadth of uses, as it is not registered for use on green onion, leeks, Brussels sprouts, bok choy, gai lon and other brassica vegetables. It also is less effective in controlling grass weeds. In contrast to DCPA, oxyfluorfen also cannot be used for weed control during onion emergence and establishment. Bensulide provides weaker weed control, and the spectrum of weeds it controls is more limited than DCPA. Clethodim does not control broadleaf weeds and therefore also is not a candidate to replace DCPA.

Other products have additional limitations on top of limited uses and/or limited weed control that preclude their use as replacements for DCPA. Ethofumesate has a narrow weed spectrum and it tends to cause crop injury to onion. Pendimethalin controls fewer broadleaf weeds than DCPA and has rotational crop restrictions that limit its ability to replace DCPA. Clomazone and clopyralid are not suitable replacements to DCPA because they have long-lived soil residues and potential carryover to rotational crops. Clopyralid can cause injury to rotational crops years after application, and it also is not registered on onion. Napropamide also has rotational crop issues for celery and onion. Trifluralin has a more limited weed spectrum than DCPA, must be mechanically incorporated in the soil and, once there, remains stable. As a result, it has a long residual period that can harm sensitive crops. Due to the high probability of injury to sensitive rotational crops, these products cannot serve as replacements to DCPA making it a critical product for use on short term and other crops.

It also is worth noting that timely application of DCPA on onions, cucurbits, and leafy vegetables reduces the volume of pesticides used in comparison to other less effective herbicides.

### **3. Mechanical and Hand Weeds are Not Viable Alternatives to Replace DCPA**

Cultural and mechanical weed control also cannot replace DCPA. Mechanical weeding is not yet fully mature and would impose significant hardships on the agronomic and economic livelihood of growers. To date, development and early stage trials of mechanical and robotic weeding systems provide only incomplete and expensive results. Further, current technology for mechanical weeding does not allow removal of weeds when they cover the commercial crop during a time of critical growth. In contrast, during that critical period, DCPA provides residual benefits for weed control.

Hand weeding likewise is neither a viable nor an economic option. In some areas, hand weeding and use of hand tools is limited or prohibited by regulation. Availability of labor to weed by hand also is sporadic and in short supply. In the production regions where the Grower Group produces fresh market crops, there is insufficient labor available so many operations must attempt to import foreign labor to fulfill their needs. Thus, if hand labor is available, it is a much more expensive labor solution. These supply challenges are real and substantial, and growers cannot count on being able to obtain hand labor when it is needed. If it is not available when needed, the impact can be devastating and result in crop loss, decreased yields and increased prices to the American consumer.

Putting lack of availability and access, on average, the Grower Group estimates that costs associated with hand labor would be \$900-\$1,000 per acre. Use of hand labor also does not eliminate yield loss. The Grower Group estimates yield losses of *at least* ten percent caused by damage to delicate crop feeder roots during increased cultivation and hand weeding. Further, in winter, yield losses are expected to be larger, as rainy wet fields are impossible to cultivate or hand weed, so weeds will grow and compete. Thus, mechanical and hand weeding cannot

replace the residual benefits of DCPA, which provide protection for weeks after application, even during prolonged rain. In short, growers' use of mechanical or hand weeding cannot replace DCPA but, even if it could, growers simply cannot afford to divert labor to an operation that can be better handled by using an effective herbicide.

**4. Loss of DCPA will Substantially Increase Costs to Growers and Prices for the American Consumer**

A 2018 analysis found the economic benefits of DCPA ranged between \$20-37 million annually in the State of California alone. *Datchal Economic Benefit Analysis*, ERA Economics, LLC (MacEwan, Tumer, Howitt, Noel, Driver) (Aug. 29, 2018) (Exhibit 1) at 15. This same analysis found that acreage in California that may be treated with DCPA generate total annual gross revenues of \$1.7-3.8 billion. Importantly, the benefits of DCPA are concentrated in the high value vegetables such as onions, broccoli and Asian vegetables. If DCPA is not available, production costs on a per acre basis are expected to increase substantially due to yield losses and changes in cultivation and weeding costs:

<b>Crop</b>	<b>Increase in Production Costs</b>
Onions	\$51/acre
Broccoli	\$143/acre
Brussels Sprouts	\$120/acre
Asian Vegetables	\$128/acre
Cauliflower	\$87/acre
Cabbage	\$125/acre

*Id.* at 8, 10, 12, 14.

Another analysis estimated that early season cultivation costs for onion will increase by 70% if DCPA is not available. *Economic Value of the Herbicide Dacthal for Brassica and Allium Crops in California*, ARE Update 22(2) (2018): 5–8, University of California Giannini Foundation of Agricultural Economics (Blecker, Fennimore, Goodhue, Mace, Steggall, Tregeagle, Tolhurst, Wei) (Exhibit 2). Like the Grower Group, this analysis also estimated that hand and mechanical weeding likely would result in yield losses of at least 10%. This would result in a decline of net returns per acre for onion of \$590.

The impact of the yield losses and increased costs from the loss of DCPA will not be limited to growers. The American consumer also will incur the increased costs for crops that rely on DCPA directly, as well as increased costs for crops that are rotated with the crops treated with DCPA. The impact of these costs will be particularly acute given the already present impacts of inflation and rising input costs for growers and consumers. If DCPA is not available, the Grower Group conservatively estimates the change in net returns on crops in the State of California alone will be in excess of \$25 million per year.

### **CONCLUSION**

For these reasons, the Grower Group objects to the NOITS and requests a hearing so they demonstrate that DCPA is vital to the supply of affordable and healthy vegetables for American consumers.



DATED: May 27, 2022

Respectfully submitted,



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# EXHIBIT 1

# Dacthal Economic Benefits Analysis

**ERA Economics, LLC**  
Duncan MacEwan, PhD

Kabir Tumber, MS  
Richard Howitt, PhD  
Jay Noel, PhD  
Miranda Driver, BS

August 29, 2018

# Overview

- The economic analysis quantifies the direct and indirect economic benefits of Dacthal
- Standard economic benefit-cost analysis:
  - Compare net farm income pre/post Dacthal restrictions considering the next best (least cost) alternative to Dacthal
  - Quantify other indirect benefits, including retail supply chain value
- Benefits
  - Avoided cost (labor cost, alternative materials)
  - Gross revenue (minimal yield and/or crop quality losses)
  - Indirect economic effects

# Acreage and Value Overview

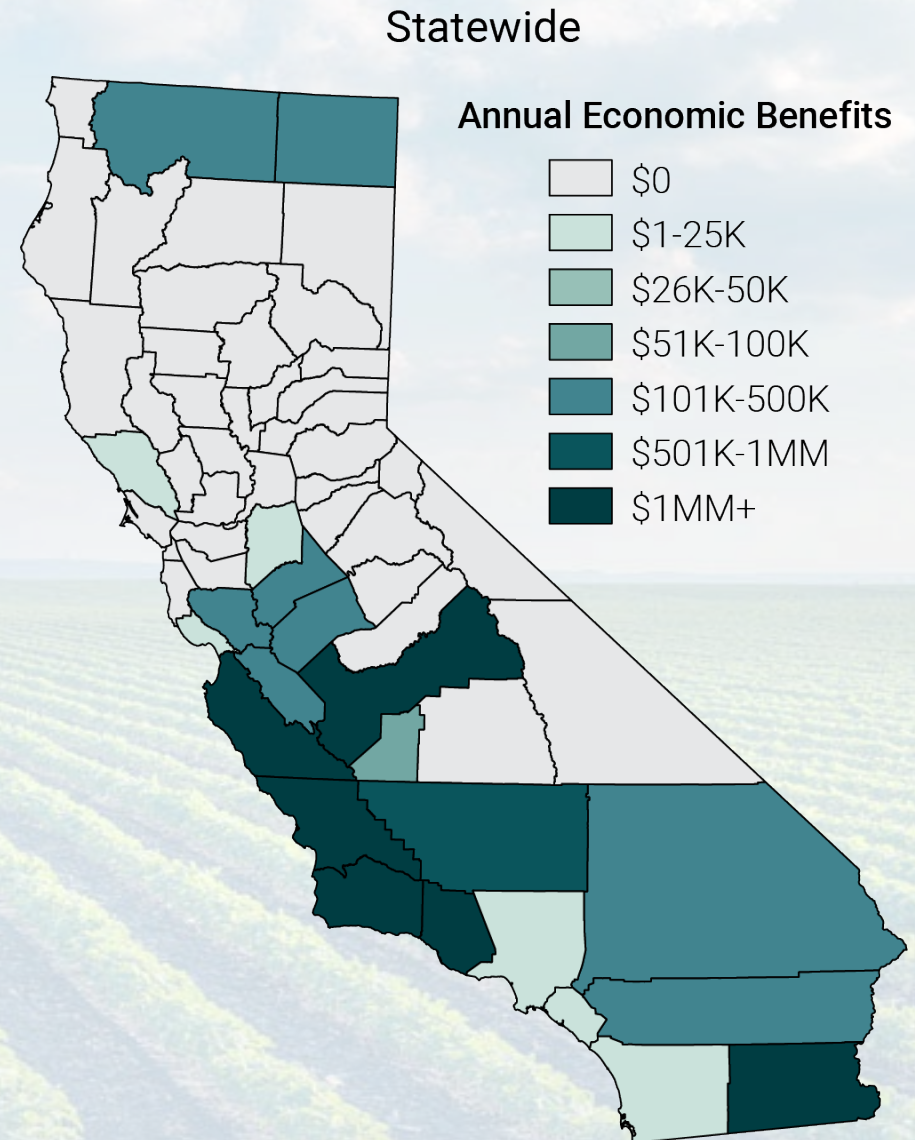
- Acreage typically treated with Dacthal includes:
  - Onions, broccoli, cauliflower, cabbage, Brussels sprouts, and Asian vegetables
- Acreage that could be treated with Dacthal generates total annual gross value of \$1.7 – \$3.8 billion per year
  - The share of acreage treated with Dacthal ranges from 12 to 30 percent
  - Acreage treated with Dacthal generates gross farm value of \$350 - \$800 million per year
- Dacthal sales supply chain generates gross value of \$5 - \$6 million/year

# Economic Methodology

- Identify acreage, crops, regions, typically treated with Dacthal
  - DPR Pesticide Use Reports (2005-2016)
- Quantify cultural practices, Dacthal use, alternative herbicides, and costs
  - Literature review, UCCE cost studies
  - Survey/interviews of UCCE Farm Advisors, PCAs, industry experts, growers
  - Identify the least-cost alternatives to Dacthal
- **Direct benefits:** Stochastic farm budget models measure the effect of Dacthal on net farm income and profit risk
  - Dacthal and least cost alternative
- **Indirect benefits:** Changes in economic activity in industries that are linked to agriculture
  - Also called “multiplier” effects
  - Additionally include the retail supply chain economic value

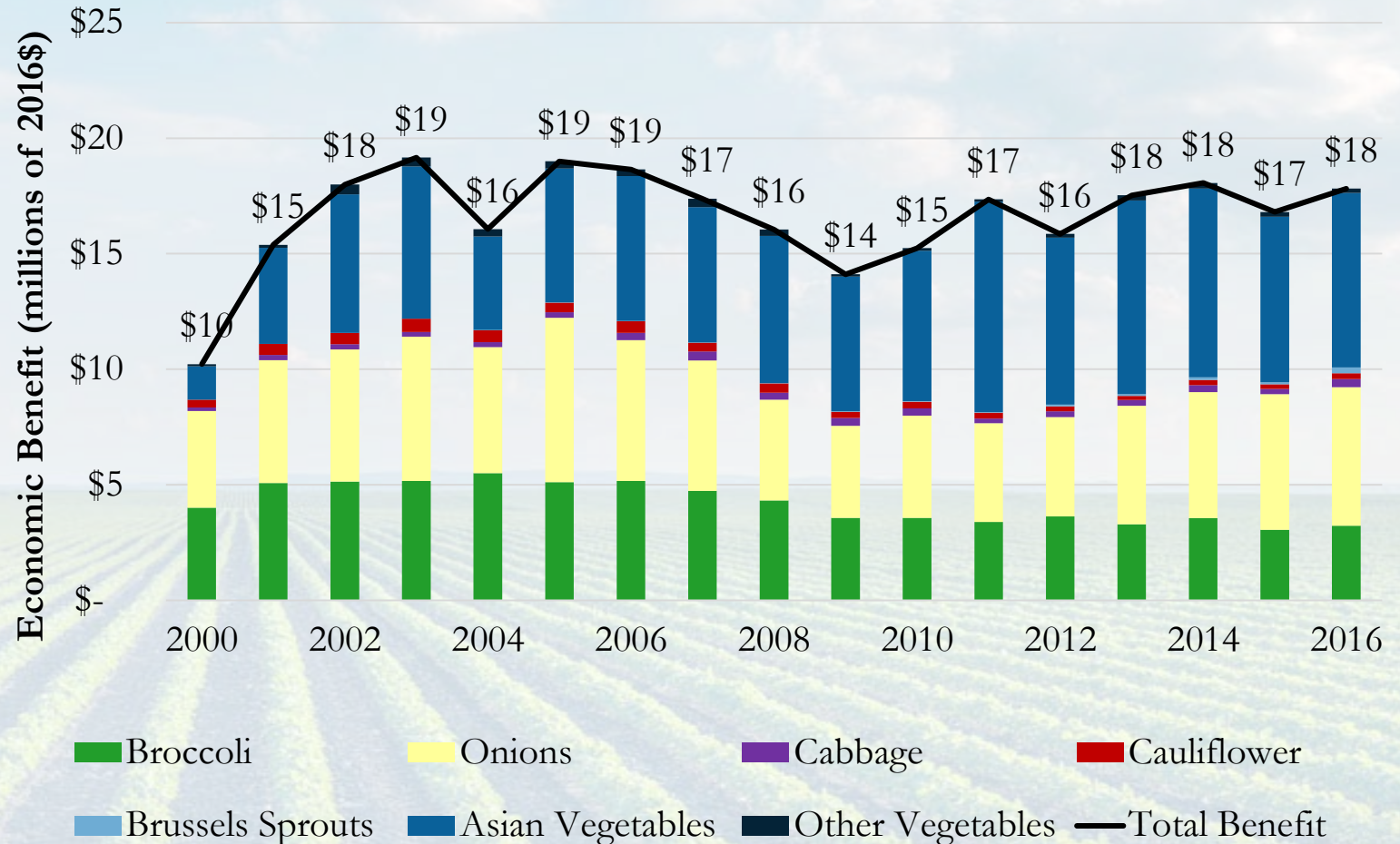
# Statewide Benefits Summary

- Crop benefits: \$10 - \$17.0 million/yr (total including multiplier effects)
  - Labor scarcity
  - Yield and quality losses
- \$5 - \$6 million per year in sales generates \$10 - \$11 million per year in total economic benefits
- Total benefit range of \$20 - \$37 million per year
- Important result
  - There are alternatives to Dacthal, but these require additional labor
  - Labor is scarce and increasingly costly



# Dacthal Statewide Benefits

- Benefits concentrated in high value vegetables:
  - Onions: 31%
  - Broccoli: 23%
  - Asian vegetables: 41%
- Brussels sprouts small, but growing
- Annual benefit range
  - \$10 - \$17 million



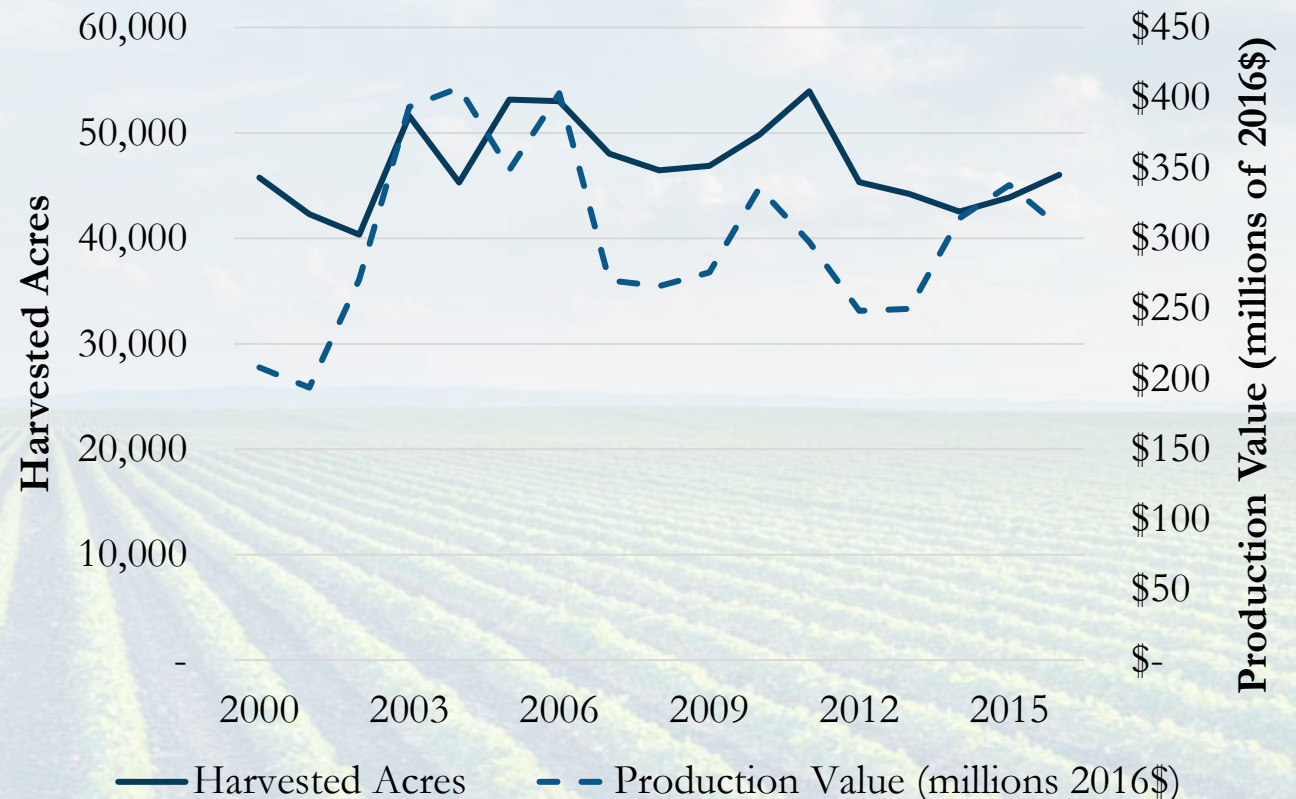
<b>Total Economic Benefit</b>	
<b>2000-16 per acre average</b>	<b>\$340</b>



# Onion Overview

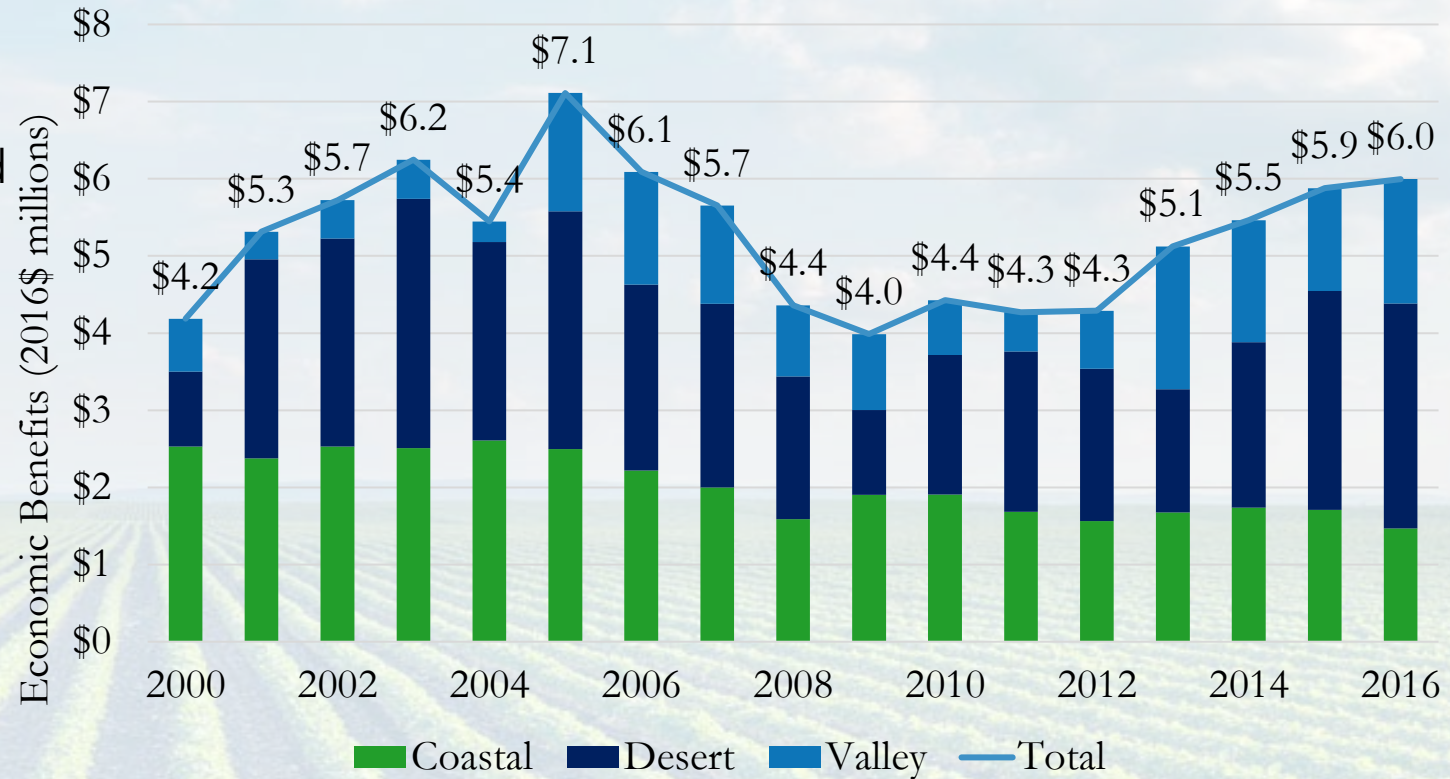
- 47,000 acres; \$301 million value
- 89% of acreage in 4 counties
  - Fresno: 17,000 acres
  - Imperial: 13,700 acres
  - Kern: 7,600 acres
  - Monterey: 2,200 acres
- 45% of crop to fresh market
  - US consumption per capita up 16% since 2000, total consumption up 34%
- Approximately 1/3 of California onions are exported (\$83 m)
- Acreage and total value steady

California Onion Harvested Acres and Farmgate Value, 2000-2016



# Dacthal Onion Benefits

- Dacthal alternatives increase production cost by \$51/acre
  - Reduced material cost, increased hand-weeding cost
- Alternative reduces yield by 5%, resulting in loss of \$606/acre
- Annual benefit range
  - \$4 - \$7 million

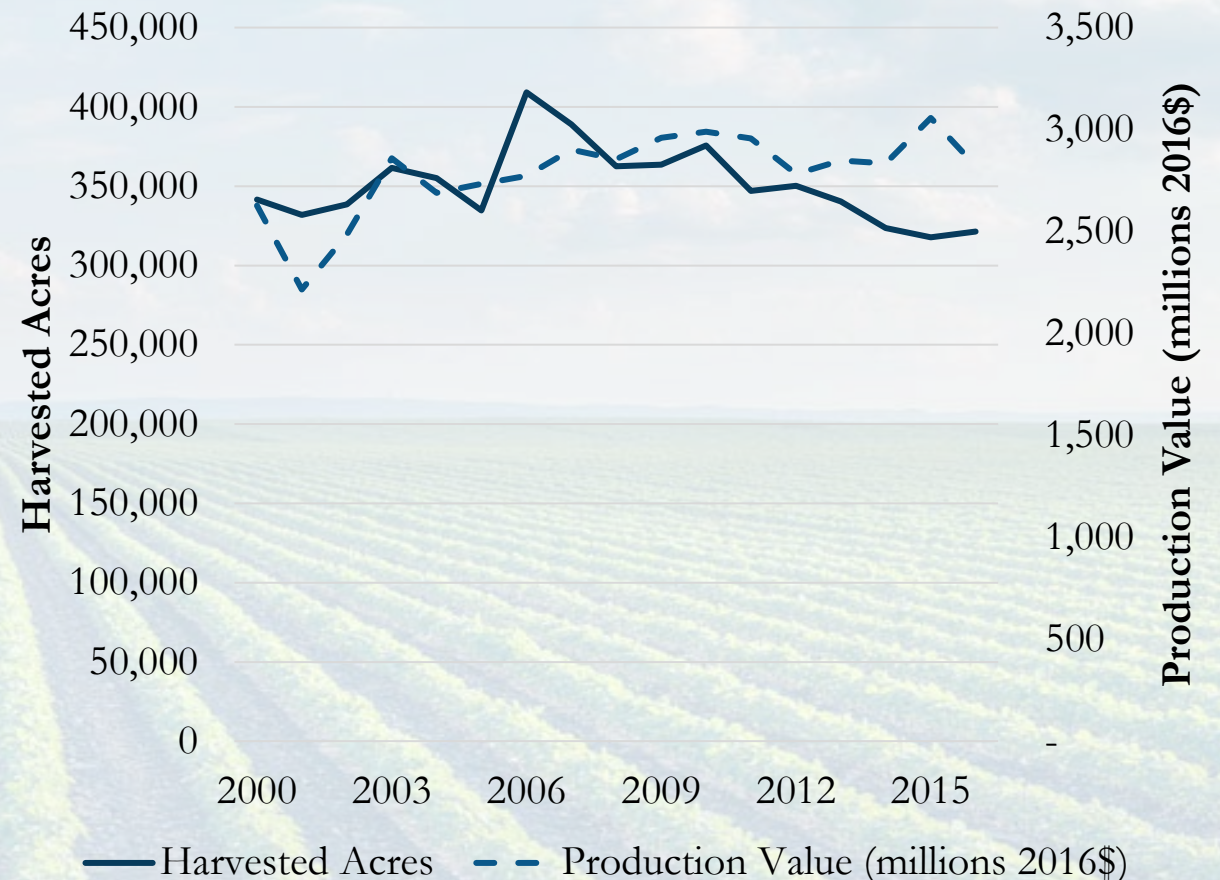


Total Economic Benefit	Onion
2000-16 per acre average	\$657

# Broccoli Overview

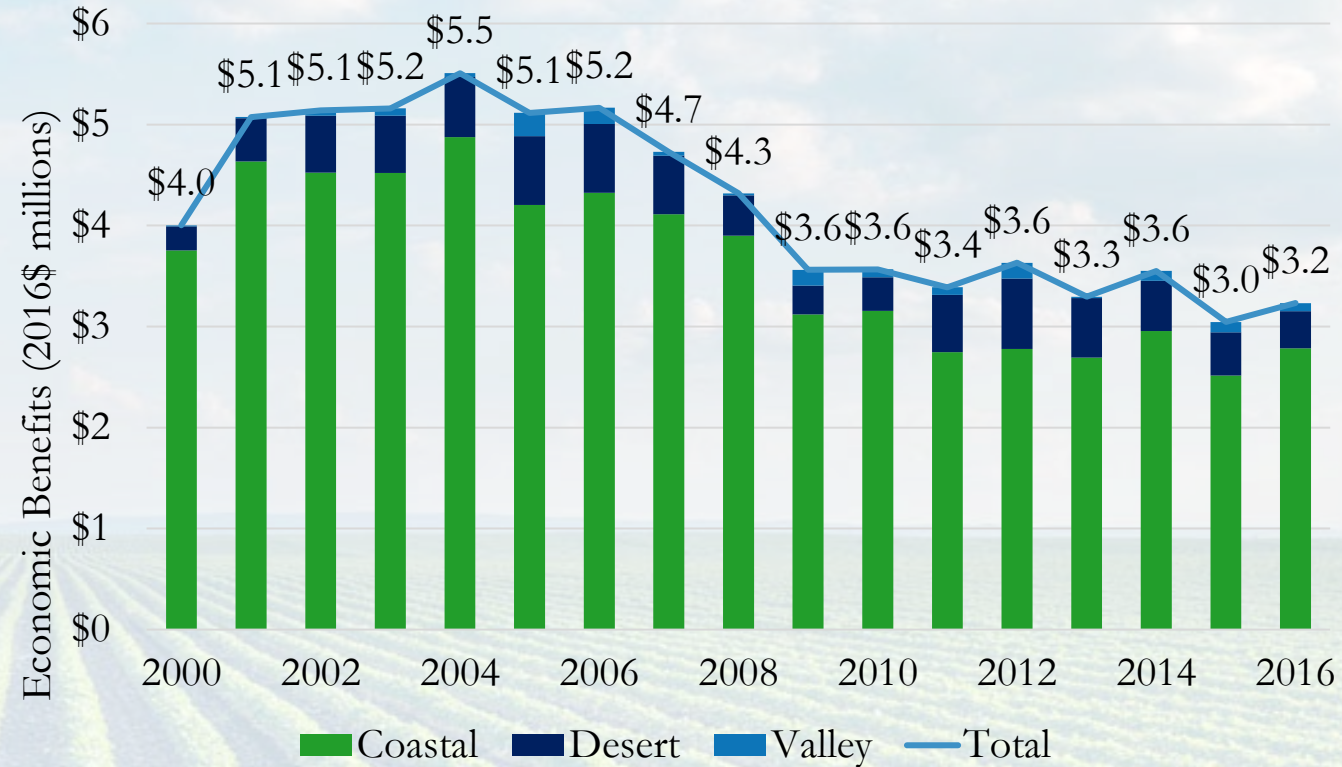
- 120,000 acre; \$785 million value
- 83% production in 3 counties
  - Monterey: 58,000 acres
  - Santa Barbara: 25,000 acres
  - Imperial: 15,000 acres
- Typically grown in lettuce, melon, or other vegetable rotations
- Acreage steady; value growth
  - Per capita consumption up 20% since 2000 (10.1 lbs)

California Broccoli and Lettuce Harvested Acres and Farmgate Value, 2000-2016



# Dacthal Broccoli Benefits

- Dacthal alternatives increase production costs by \$143/acre
  - Reduced material cost, increased hand-weeding cost
  - Alternatives herbicides have lower material cost, but higher hand weeding requirements
- Annual benefit range
  - \$3 - \$5.5 million



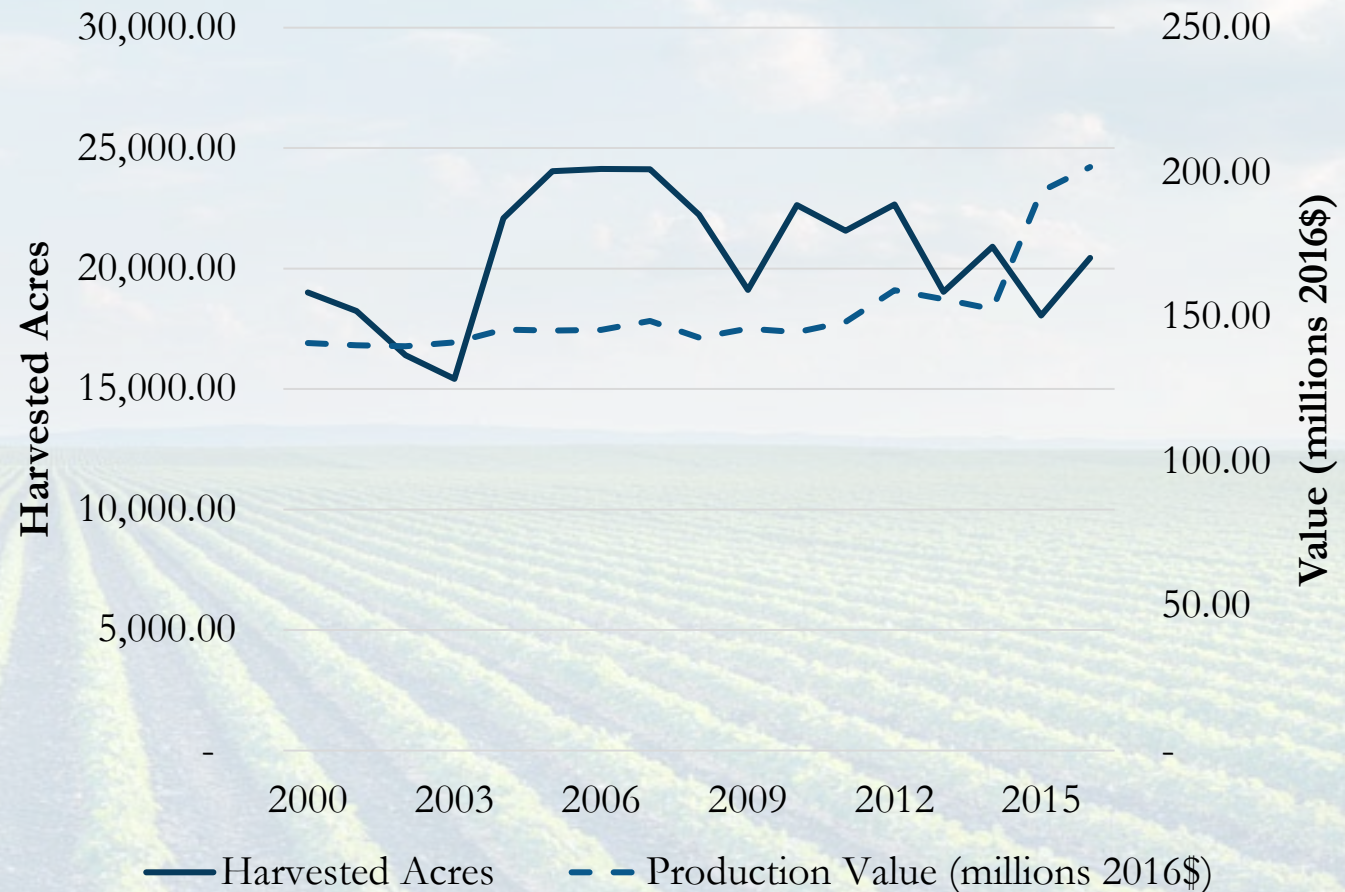
Total Economic Benefit	Broccoli
2000-16 per acre average	\$143

# Brussels Sprouts and Asian Vegetables

## Overview

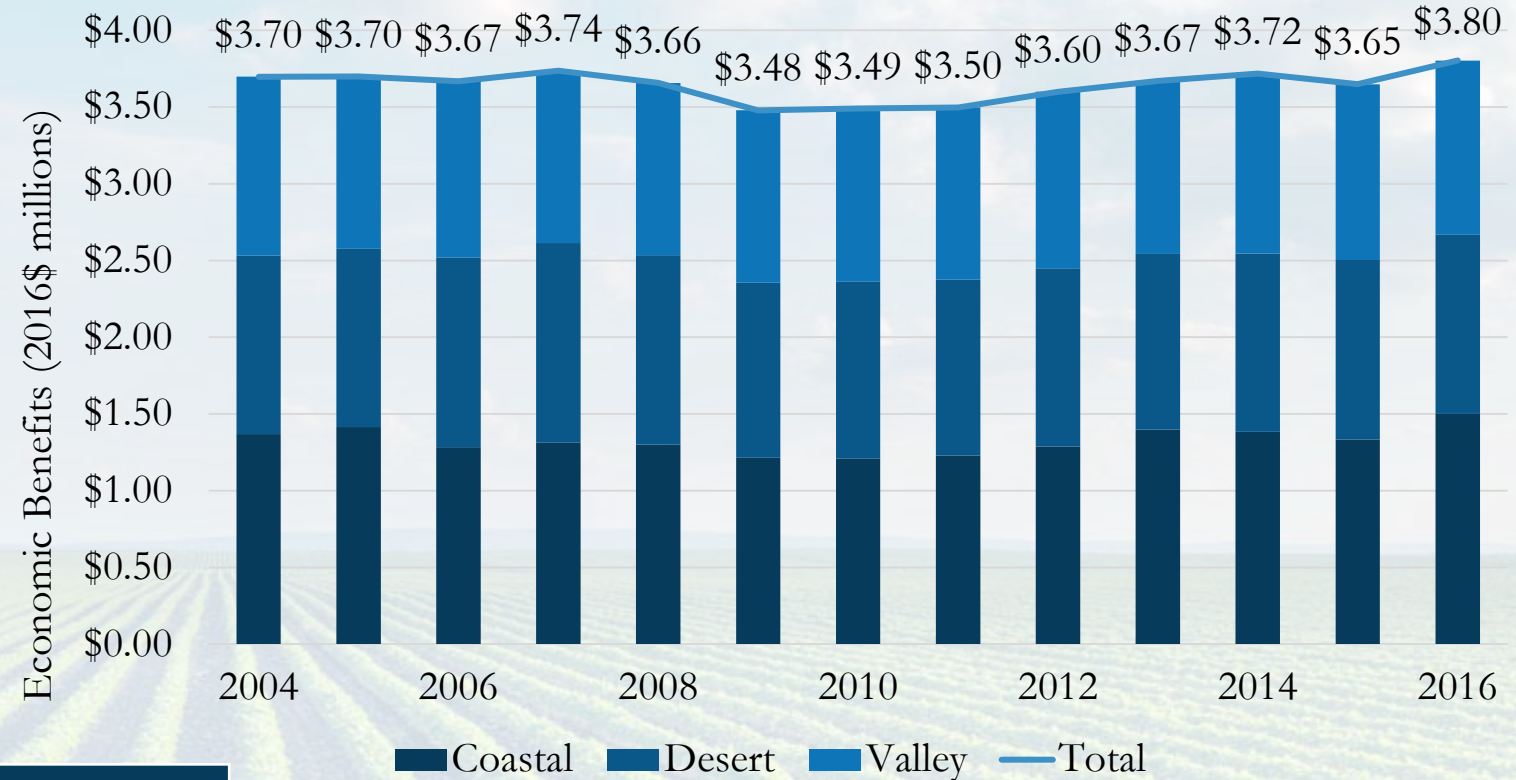
- Brussels sprouts
  - 5,300 acres; \$74 million value
  - Produced in coastal counties
  - Strong growth in fresh market
    - Consumption/capita up 72% since 2014 (0.8 lbs)
- Asian vegetables
  - 15,000 acres; \$152 million value
  - Acreage varies
  - Market growth in recent years
    - Nearly exclusive for the domestic fresh market

California Brussels Sprouts and Asian Vegetable  
Harvested Acres and Farmgate Value, 2000-2016



# Dacthal Brussels Sprout and Asian Vegetable Benefits

- Dacthal alternatives increase production cost by
  - \$120/acre (Brussels Sprouts)
  - \$128/acre (Asian Vegetables)
  - Reduced material cost, increased hand-weeding cost
- Potential crop damage for Asian Vegetables (modeled at 5%)



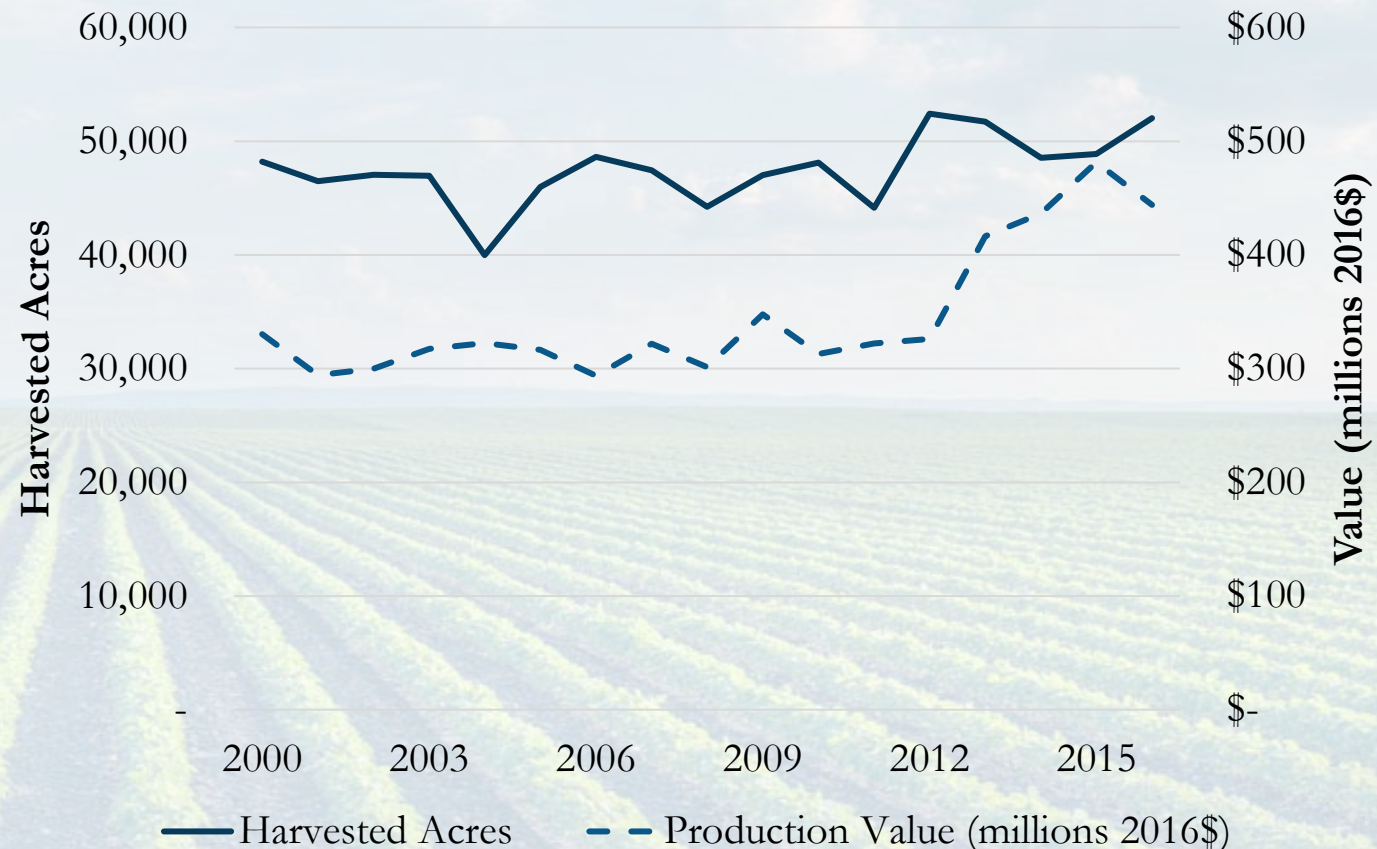
Total Economic Benefit	Brussels Sprouts
2000-16 per acre average	\$120

Total Economic Benefit	Asian Vegetables
2000-16 per acre average	\$1,360

# Cauliflower and Cabbage

- 52,000 acres; \$445 million value
- Over 85% of cauliflower and cabbage acreage in Monterey, Santa Barbara, Imperial, and Santa
- Fresh market cauliflower demand growth
  - Consumption/capita up 25% since 2000 (2.18 lbs)
  - 88% of US exports are from California
- Cabbage consumption per capita has stabilized, exports are currently around \$12 million annually

California Cauliflower and cabbage Harvested Acres and Farmgate Value, 2000-2016



# Dacthal Cauliflower and Cabbage Benefits

- Dacthal alternatives increase production cost by:
  - \$87/acre (cauliflower)
  - \$125/acre (cabbage)
  - Comparable material cost, increased hand-weeding cost
- Annual benefit range
  - \$400K - \$800K



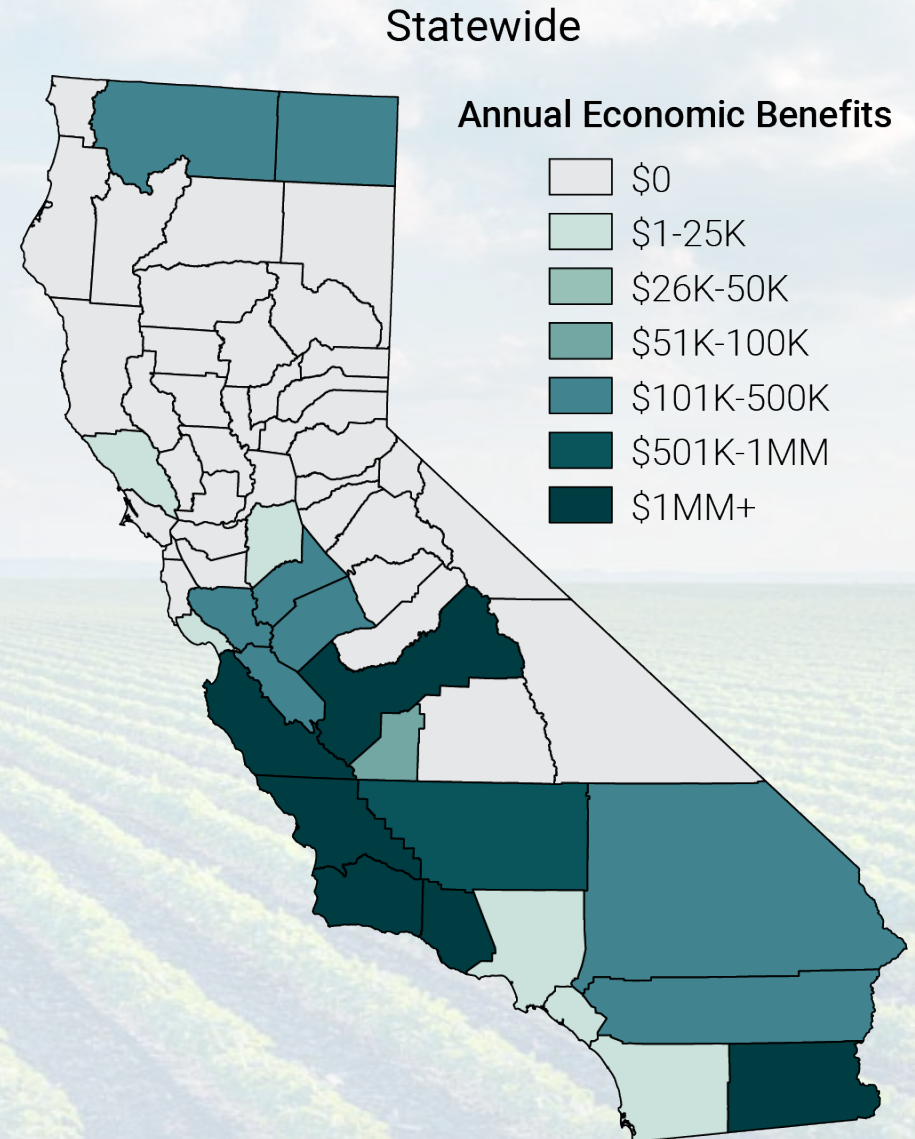
Total Economic Benefit	Cauliflower
2000-16 per acre average	\$87

Total Economic Benefit	Cabbage
2000-16 per acre average	\$125



# Dacthal Benefits Summary

- Dacthal Benefits:
  - \$10 - \$17 million/year for crop production
  - **\$20 – \$37 million/year in total**
- Dacthal increases variability in net farm income by 4% on average (1.5% – 9%)
- Uncertainties
  - Labor is increasing scarce and costly in California; economic benefits increase if growers are not able to secure labor supply
    - AB 1066 and immigration reform
  - The joint effect of other regulations
  - Greater yield losses will increase benefits



# EXHIBIT 2

# Economic Value of the Herbicide Dacthal for Brassica and Allium Crops in California

Steven Blecker, Steven Fennimore, Rachael Goodhue, Kevi Mace, John Steggall, Daniel Tregeagle, Tor Tolhurst, and Hanlin Wei

**California review of the herbicide dacthal triggered by the requirements of California’s Pesticide Contamination Prevention Act was conducted in 2018. This article estimates the economic effects a cancellation of dacthal’s California registration would have on brassica and allium crops. Statewide net revenue losses for broccoli, dry onion, and cabbage, the largest users of dacthal, are estimated at \$25.4 million: \$17.9 million for broccoli, \$2.4 million for cabbage, and \$5.1 million for onion.**



Broccoli alone accounted for 40% of pounds of dacthal applied in 2014–2016 in California, and almost half of treated acreage.

A review of dacthal (aka chlorthal-dimethyl or DCPA) was initiated in early 2018 by the California Department of Pesticide Regulation (DPR) due to the detection of its degradates in groundwater. Under California’s Pesticide Contamination Prevention Act, the confirmed detection of a pesticide active ingredient or degradation product in groundwater, which arises from legal agriculture use, automatically triggers a review. The purpose of the formal review is to determine whether or not the pesticide can continue to be used and, if so, under what conditions. One of the considerations in the review is whether or not a regulatory response would cause “severe economic hardship” for California agriculture.

This article evaluates potential economic impacts for brassica and allium crops if the California registration for dacthal was canceled. It is derived from a larger report prepared for consideration in the review process. Ultimately, DPR determined that the level of dacthal degradates was below the level of toxicological concern. If this had not been the case, economic impacts would have been considered as part of the regulatory response required to reduce pollution. Groundwater monitoring for dacthal and its degradates will continue, and DPR

will continue to review new research that could alter these review findings.

## Background

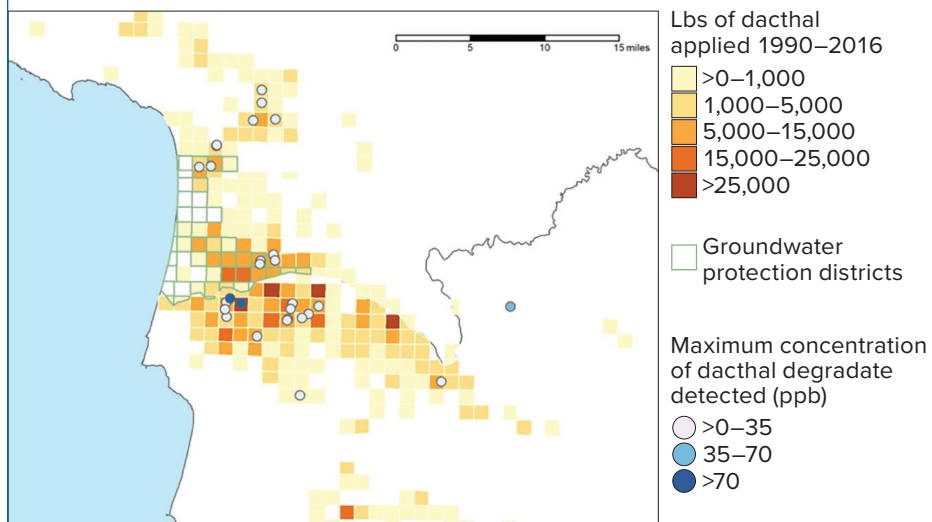
Dacthal is a selective pre-emergence herbicide used for controlling annual grasses and certain broadleaved weeds. The value of dacthal is its long list of crop registrations and excellent selectivity on a large number of crops in the allium (onion family) and brassica (mustard family) crops, which account for the majority of dacthal use. These crops have few alternative herbicides with similar selectivity and efficacy. Broccoli alone accounted for 40% of pounds applied in the 2014–2016 period, and almost half of treated acreage. Other brassica crops, such as cauliflower, and allium crops, such as dry onion, accounted for slightly more than half of total pounds applied and over 40% of treated acreage. Table 1 reports dacthal applications for brassica and allium family crops as well as all other uses, which were primarily nursery uses and acreage reported as uncultivated or without a crop specified.

A key concern regarding the availability of dacthal is the fate of small acreage brassica crops dependent on dacthal: bok choy, Brussels sprout, radish, kale, rapini, mustards, gai lan, and kohlrabi. Oxyfluorfen is not

Table 1. Dacthal Use by Pounds Active Ingredient Applied and Acres Treated: 2014–2026

	-----Pounds AI Applied-----			-----Acres Treated-----		
	2014	2015	2016	2014	2015	2016
Brassica	137,040	124,375	128,036	37,114	31,967	35,388
Allium	44,350	52,230	54,141	8,540	9,265	9,288
Other	7,872	7,465	6,762	1,803	1,378	1,232
<b>Total</b>	<b>189,262</b>	<b>184,070</b>	<b>188,939</b>	<b>47,457</b>	<b>42,610</b>	<b>45,908</b>

**Figure 1. Long-term Dacthal Use Trends and Detections of Dacthal Degradates in Groundwater in the Santa Maria Area\***



\*Squares represent 1 mile x 1 mile sections that contain previous dacthal use and/or GWPAs. Blue circles represent approximate locations of dacthal degradate groundwater detections.

registered for these crops. Alternative active ingredients such as bensulide and trifluralin provide less effective weed control and/or have long residuals that could interfere with rotational crops common to these cropping systems. Dacthal, in contrast, can be used on many crops and has a short life in the soil, so carryover injury to rotational crops is not an issue.

### Dacthal and Groundwater

Dacthal use and detections of its degradates are associated with the Central Coast production areas for Brassica and allium crops. High detections of dacthal degradates in well water in parts of San Luis Obispo, Santa Barbara, and Monterey counties were observed prior to the review. Monterey County alone accounts for about a third of all pounds of dacthal applied, and slightly under half of all acreage treated. Together, San Luis Obispo and Santa Barbara account for around another 10% of pounds applied and 8% of acres treated.

Figure 1 maps long-term dacthal use, whether a focal crop was grown, and detections of dacthal degradates in groundwater in the Santa Maria area in San Luis Obispo and Santa Barbara

counties. The highest dacthal use in the area (over the period 1990-2016) occurred south of the Santa Maria River near the community of Guadalupe in Santa Barbara. Figure 2 presents the same information for the Salinas Valley. The highest detections are located near Greenfield.

### Approach

The economic impact of a deregistration or other pesticide regulation is determined by its effects on costs, yield, price, and acreage for affected crops. Cost and yield effects depend directly on the chemical and non-chemical alternatives that are available and their prices and efficacy compared to the pesticide being considered for deregistration.

If yield declines, gross revenue will decline. However, if the change in quantity at the industry level is sufficiently large, price may increase, which would partially offset the effect of reduced yield on revenue. Price would only respond to a change in quantity if the industry-level demand was less than “perfectly elastic.” If demand is perfectly elastic, then the price does not change when the quantity supplied changes.

If there are many good substitutes for a crop for consumers and if there are competing producers who can expand output, then the price of a crop will respond less to a given decline in quantity than it would if a crop had few substitutes in consumption and few competing producers. These changes in costs and revenues will affect net returns per acre. Growers may choose to plant fewer acres of the affected crop, which would reduce industry quantity still more and increase price if demand was less than perfectly elastic.

We separate the economic impact of a dacthal deregistration for a crop into four factors: (i) changes in herbicide material costs, (ii) changes in application costs, (iii) changes in hand-weeding and cultivation costs, and (iv) changes in yield, which affect gross revenues.

An overarching challenge is that dacthal does not have a direct substitute and thus one or multiple possible replacement herbicides may provide only partial spectrum of control relative to dacthal. Further, the available set of possible replacement herbicides that are registered depends on the crop in question.

To calculate (i), we begin by identifying one or multiple possible replacement herbicides. The change in material cost is then determined by the amount of material required to achieve a spectrum and level of control as close to dacthal as possible, as well as the price difference between dacthal and the chosen potential replacements. To calculate (ii), we determine if the identified replacement(s) would require changes in the number of applications conducted and thus incur additional application costs. Regarding (iii), additional hand-weeding and/or mechanical cultivation may be needed. Finally, to account for the fact that replacement herbicides may not provide complete

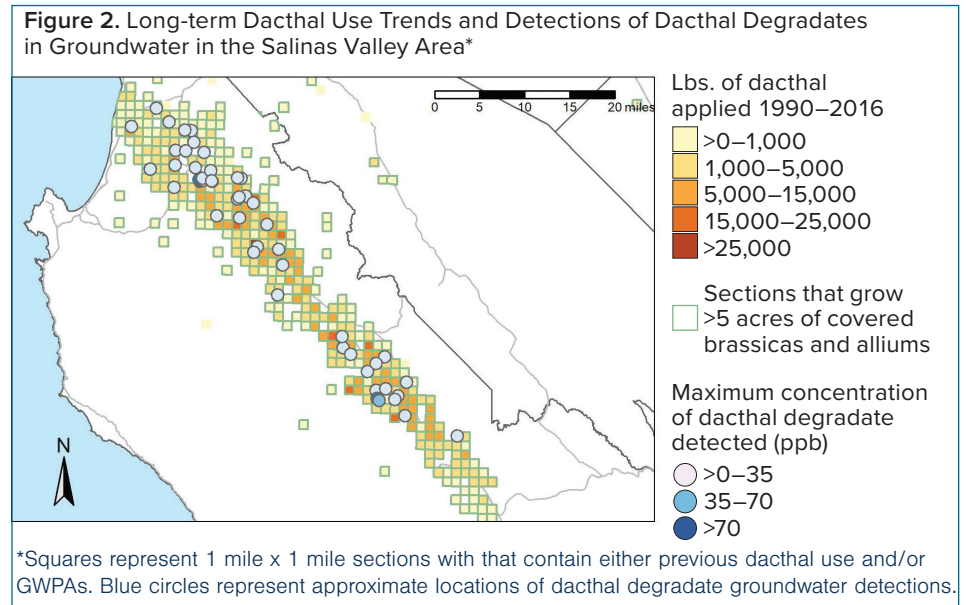
control relative to dacthal, we calculate (iv) based on an expected yield loss, if any, of incomplete control and current output prices. Given crop-level values for (i)–(iv), we calculate the total economic impact of a dacthal prohibition as the product of the change in per-acre cost for each crop from (i)–(iv) and the number of acres planted to each crop treated with dacthal.

Prior to initiating the analysis, we identified crops that would be most likely to sustain economic losses if dacthal was deregistered: brassica and allium crops. Then we focused attention on determining the crops for which sufficient information was available to conduct the analysis. Pesticide use data were obtained from the DPR Pesticide Use Reporting (PUR) database. Specifically, we collected the amount of active ingredient and treated acreage from 2014 to 2016 from the PUR database for dacthal and all possible replacement herbicides.

Based on this information, 14 brassica and allium crops were identified that used dacthal in that time period and would be impacted by its loss. Ordered by decreasing total pounds of active ingredient applied, the crops are: broccoli, dry onion, cabbage, cauliflower, Chinese cabbage, bok choy, Brussels sprout, kale, rapini, mustard, leek, gai lon, kohlrabi, and green onion.

Crop acreage, production, and price data were obtained from the CDFA annual report. This information was not available for bok choy, rapini, mustard, and gai lon, eliminating them from the analysis. University of California cost studies for broccoli, dry onion, and cabbage were used to provide a baseline for hand-weeding and mechanical cultivation costs and calculate changes in these costs.

Cost studies were not available for seven crops, so only the effects of



changes in pesticide costs and yield were included in the computation of the anticipated change in net returns for cauliflower, Chinese cabbage, Brussels sprout, kale, leek, kohlrabi, and green onion. Data limitations mean that the estimate of economic losses is a lower bound for two reasons: not all crops are included, and not all costs are included for most of the remaining crops.

We assume that acreage in each crop remains unchanged. We also assume that demand for these California crops is perfectly elastic. Many of the crops are very minor ones that have multiple close substitutes for consumers. Furthermore, not all acreage utilizes dacthal, dampening industry-level average yield losses and any associated price response. Ex ante, these factors imply that any price increase will be small in response to a given percentage decrease in production.

An offsetting consideration is that California is a major producer, in some cases the only U.S. state with non-negligible production, so that a change in California’s output is likely to affect price unless foreign competitors increase production. Any such price increase would reduce losses compared to those reported here.

## Results

We focus on changes in net returns for the three crops for which we have information on baseline hand weeding and mechanical cultivation costs: broccoli, dry onion (henceforth onion), and cabbage. Based on the assessment of efficacy presented in the previous section, plus the availability of alternatives given current product registrations, a single alternative active ingredient was selected for each crop. In practice, specific weed problems will influence growers’ choice of an alternative pesticide or pesticides, and a variety of herbicides are applied to these crops. PUR data were used to identify a “representative” product for each alternative in order to compute the change in pesticide material costs. Based on product labels and other information, we determined that the alternatives would most likely be applied the same way as dacthal is, so there would be no change in application costs. For broccoli and cabbage, oxyfluorfen (represented by GoalTender) is a partial alternative. For onion, pendimethalin (represented by Prowl H2O) is a partial alternative. While there is substantial use of oxyfluorfen, it does not address early season needs during onion emergence and establishment.

The second step in the analysis is to identify changes in costs and yields. The pesticide material cost per acre of these alternatives is less than the cost of dacthal. Its significant use suggests that differences in yield and other costs are important factors in growers' herbicide use. In the absence of dacthal, hand weeding costs will increase because replacement products do not control weeds as well as dacthal. Based on estimates from UC Cooperative Extension personnel, we assume a 40% increase. Regarding mechanical cultivation, UC cost studies for both organic and conventional broccoli report identical mechanical cultivation costs. In the absence of an organic cost study for cabbage, we assume that mechanical cultivation costs are unchanged, as for broccoli. For onion, we estimate early season cultivation costs will increase by 70%. Based on UC Cooperative Extension estimates, UC cost studies, and the scientific literature, we estimate that there will be a 10% yield loss. If additional hand and mechanical weeding were used exclusively, yield losses would likely be at least 10% owing to the increased need for cultivation and hand weeding, which will damage the delicate crop feeder roots.

Under these specifications, net revenues per acre for broccoli would decrease by \$834. Net returns per acre for cabbage would decline by \$1,017. Net returns per acre for onion would decline by \$590. Information in the cost studies enables us to compare these changes in net revenue to overall net revenue per acre. For broccoli, net returns per acre decreased by 62%. Net returns per acre for onion decreased by fifteen%. Net returns per acre for cabbage decreased by 85%.

If prices are unchanged, the corresponding reductions in statewide net revenues would be \$17.9 million for broccoli, \$2.4 million for cabbage, and \$5.1 million for onion, totaling \$25.4 million.

## Additional Crops

If DPR had found it necessary to regulate dacthal, there are other regulatory options available. A regional ban or specific use regulations could reduce the impact by focusing on areas with high levels of degradates. Alternatively, dacthal could be added to DPR's groundwater protection list and new groundwater protection areas could be created in order to reduce leaching potential and enhance monitoring and oversight.

Non-regulatory options include enhancing the efficacy of existing alternatives, such as the use of "intelligent" cultivators to reduce hand weeding costs, and pesticides not currently registered for affected crops. One specific possibility would be to screen all brassica crops for tolerance to S-metolachlor (e.g., Dual Magnum). This herbicide active ingredient is gaining many registrations for vegetables and may be helpful for transplanted brassica crops like bok choy. Another would be to expand the set of crops for which oxyfluorfen is registered. Another relatively new herbicide for brassica vegetables is sulfentrazone (Zeus).

## Authors' Bios

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### For additional information, the authors recommend:

California Department of Pesticide Regulation. "Pesticide Contamination Prevention Act Review Process Triggered by Detections of Chlorthal Dimethyl in Ground Water." [www.cdpr.ca.gov/docs/emon/grndwtr/chlorthal\\_dimethyl/chlorthal\\_dimethyl.htm](http://www.cdpr.ca.gov/docs/emon/grndwtr/chlorthal_dimethyl/chlorthal_dimethyl.htm).

## CERTIFICATE OF SERVICE

I certify that on May 27, 2022, the foregoing Objection and Request for Hearing by the Grower-Shipper Association of Central California, Sunheaven Farms, LLC, J&D Produce, Ratto Bros., Inc., and Huntington Farms was submitted via the U.S. Environmental Protection Agency's Administrative Law Judges' e-Docket with copies via electronic mail to the following:

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