

# Economics of Pistachio Production

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Statewide Pistachio Day 2024

January 17, 2024

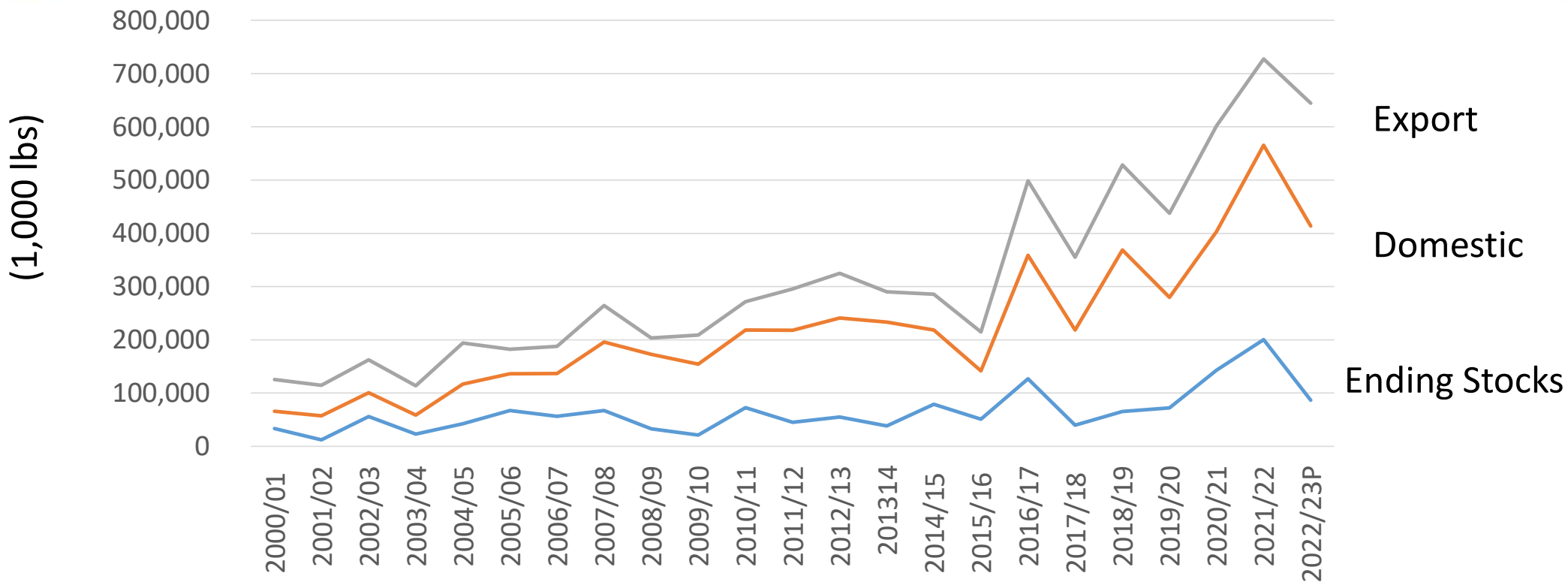
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# Road Map

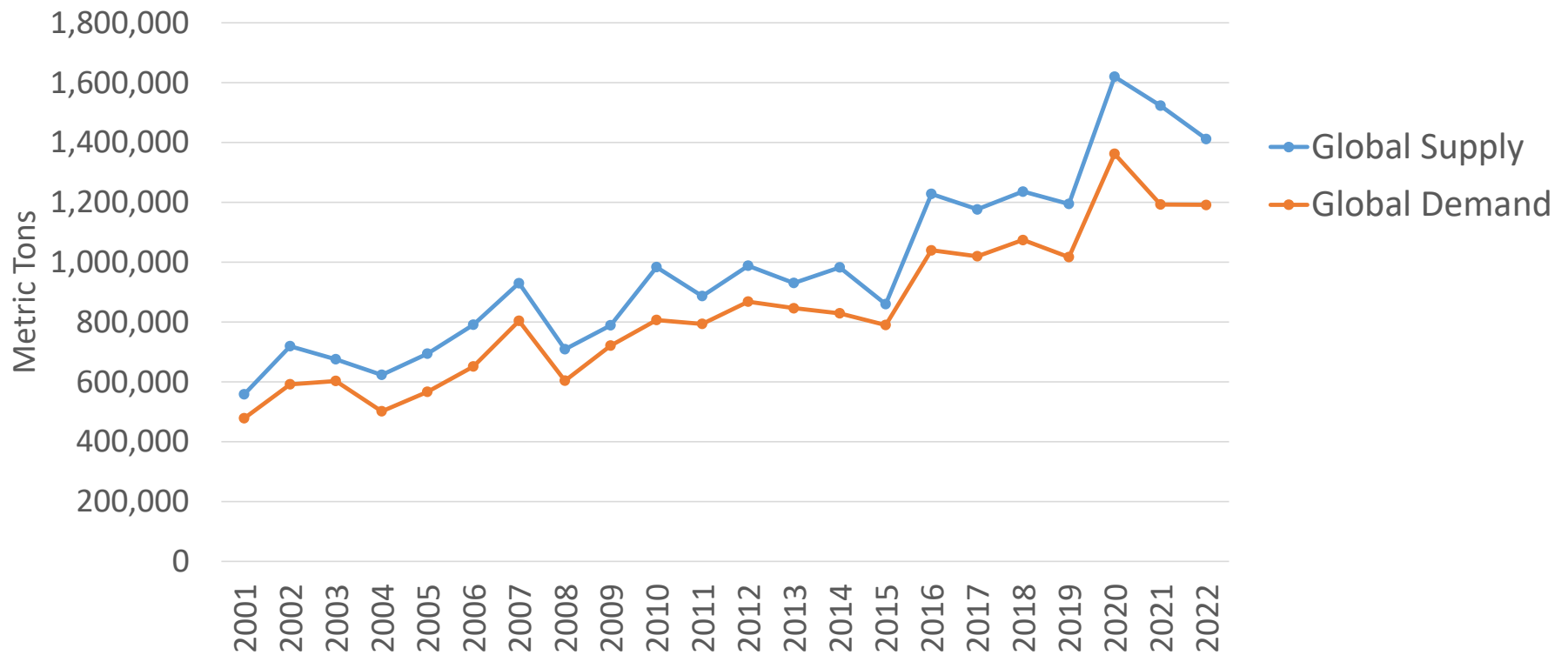
- Global pistachio trends
  - Global pistachio production increasing
  - Global pistachio demand also increasing but ending stocks increasing
- Tools to help evaluate profitability:
  - UC Davis Cost and Returns Studies
    - 2023/2024 Operating Costs Estimates
  - Partial Budget Analysis: Evaluate changes in a practice

# U.S. Pistachio Shipments and Ending Stocks 2000-2023P\*



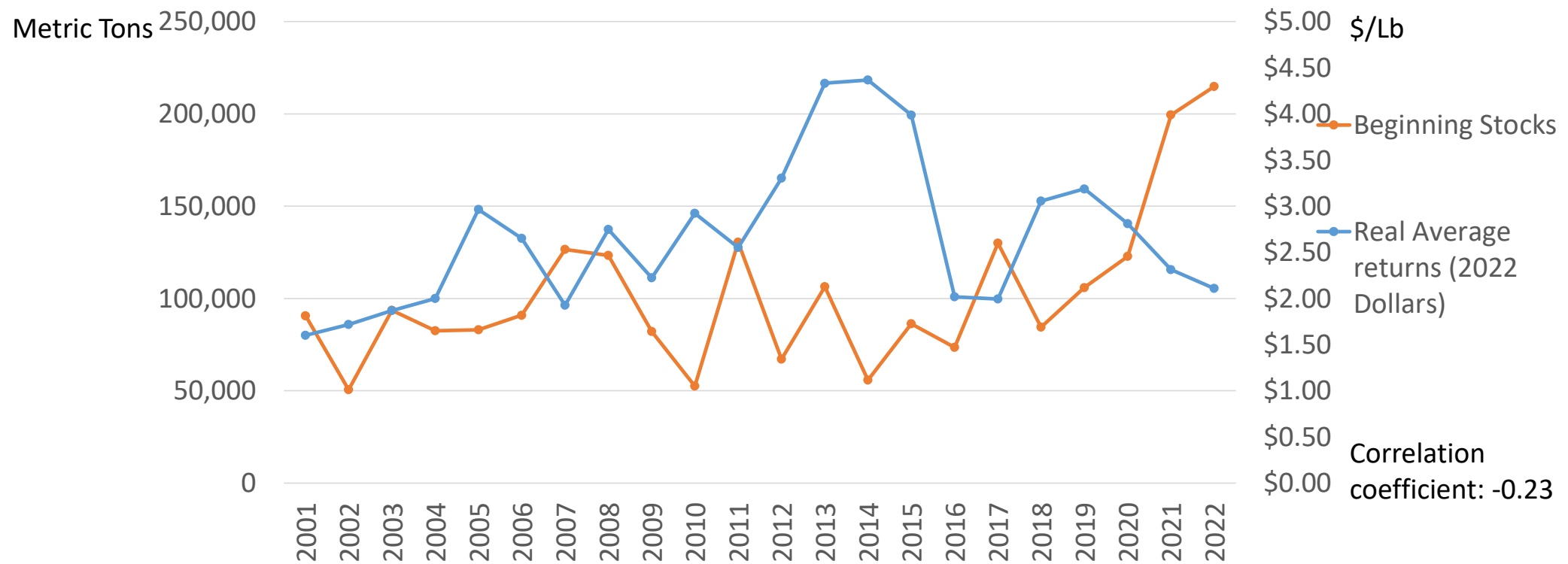
Source: USDA ERS Fruit and Tree Nuts Yearbook Tables

# Pistachio Global Supply and Demand (In-shell Basis)



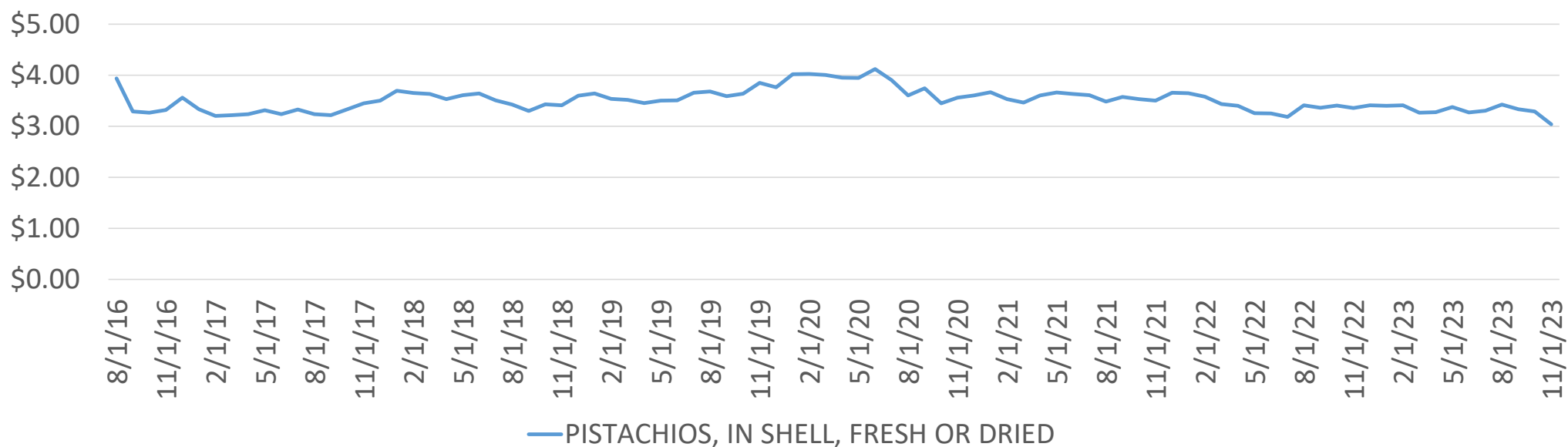
Source: USDA Foreign Agricultural Service (FAS), Production, Supply and Distribution Data

# Global Beginning Stocks and U.S. Grower Returns (In-shell Basis)



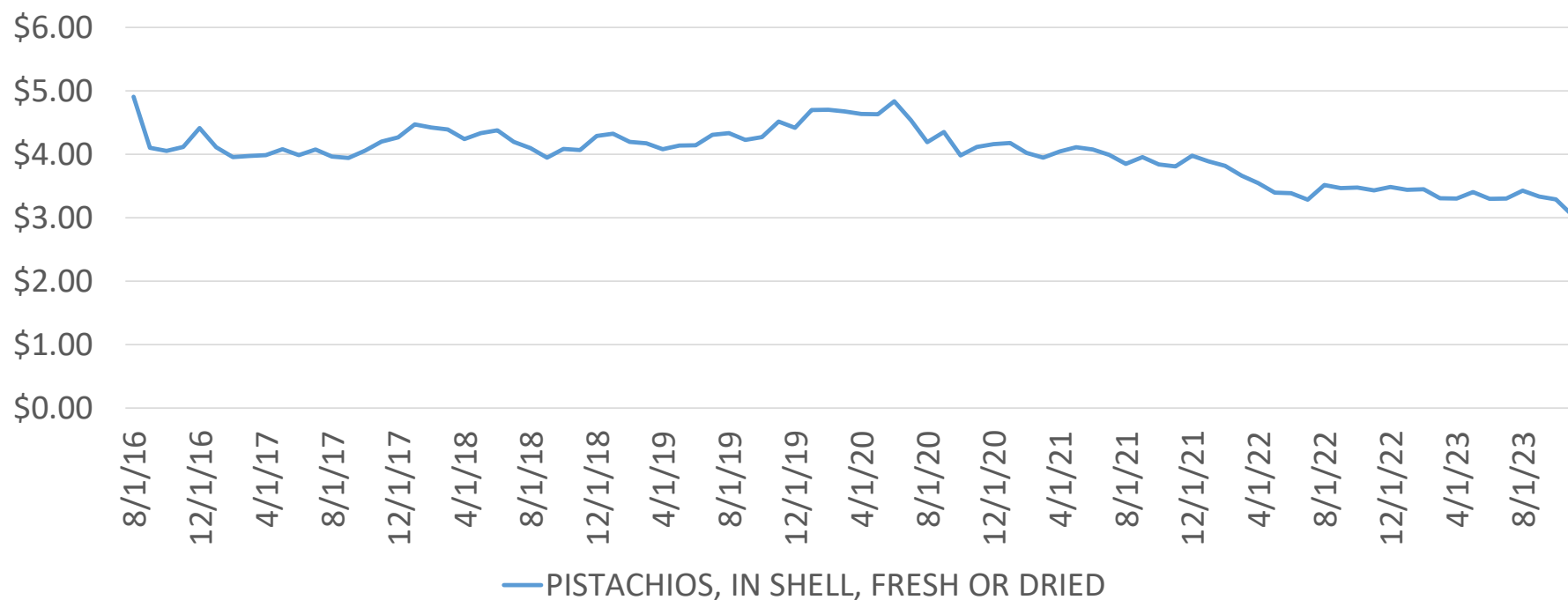
Sources: USDA FAS Production, Supply and Distribution Data; USDA Economic Research Service (ERS) Fruit and Tree nuts Yearbook Tables; Federal Reserve Economic Data (FRED), GDP Implicit Price Deflator

## In Shell Pistachio \$/lb Export Value



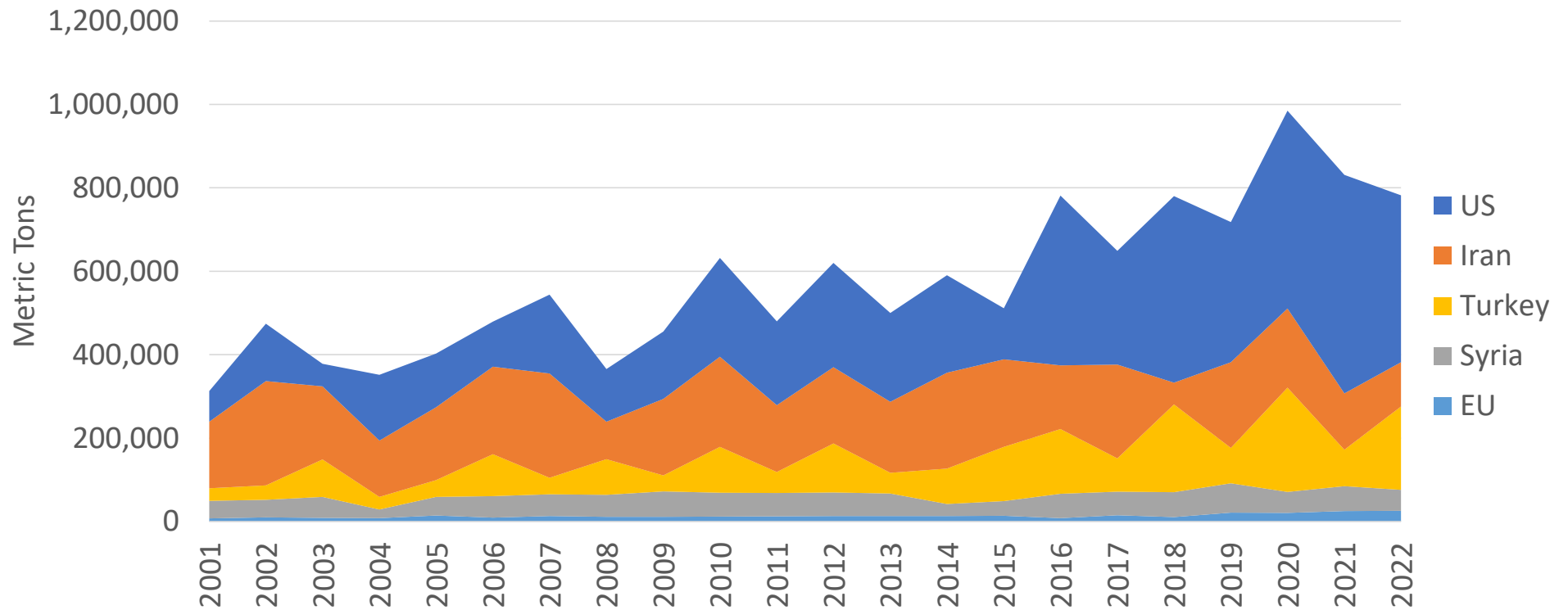
Source: US International Trade Commission

## In Shell Pistachio \$/lb Export Value-Real (2023 Dollars)



Sources: US International Trade Commission, Federal Reserve Economic Data (FRED), GDP Implicit Price Deflator

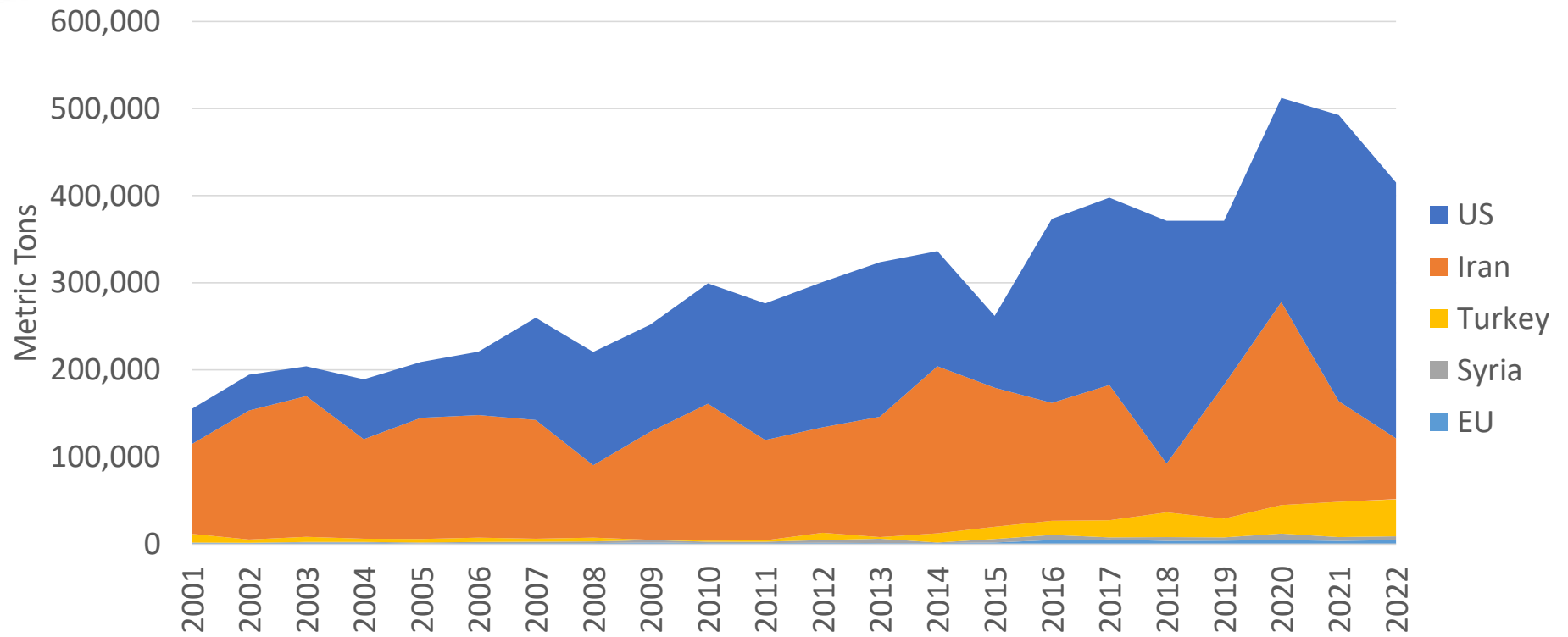
# Global Pistachio Production by Country (In-shell Basis)



Source: USDA FAS Production, Supply and Distribution Data

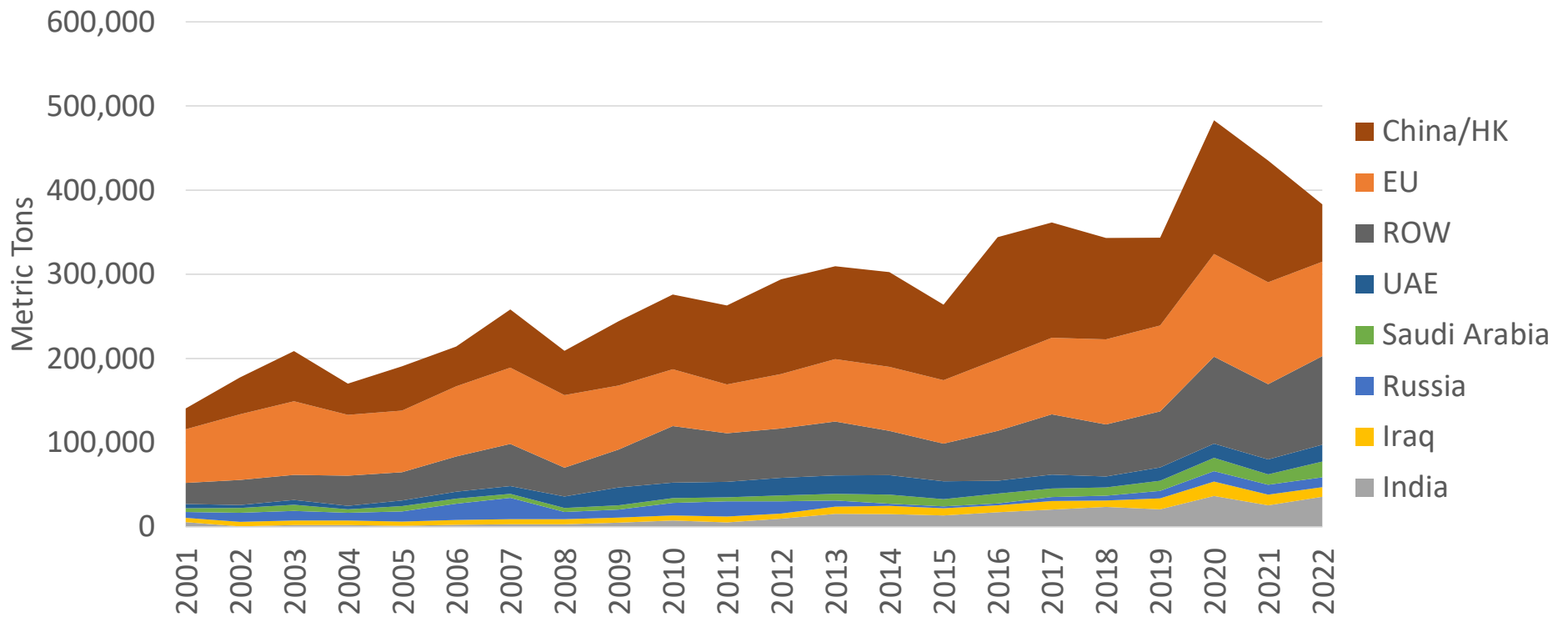


# Global Exports by Country (In-Shell Basis)



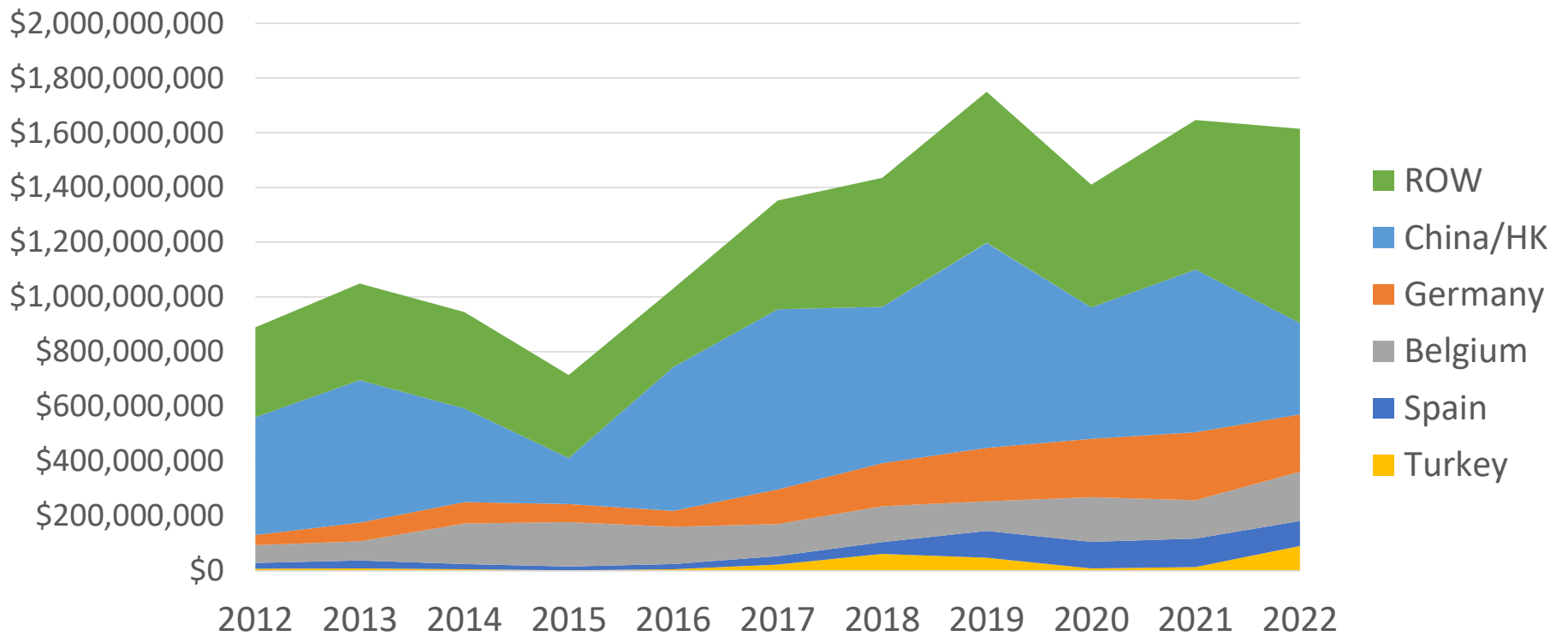
Source: USDA FAS Production, Supply and Distribution Data

# Global Imports by Country (In-Shell Basis)



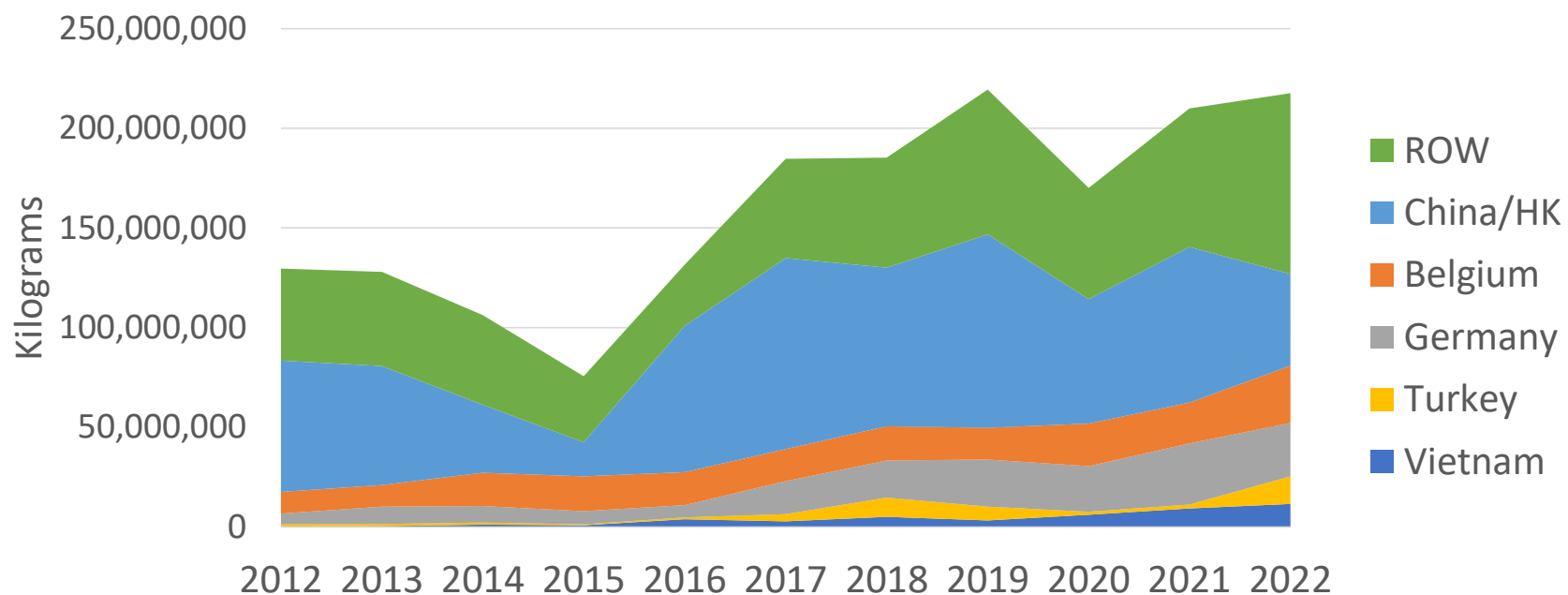
Source: USDA FAS Production, Supply and Distribution Data

# U.S. In-Shell Export Value by Country



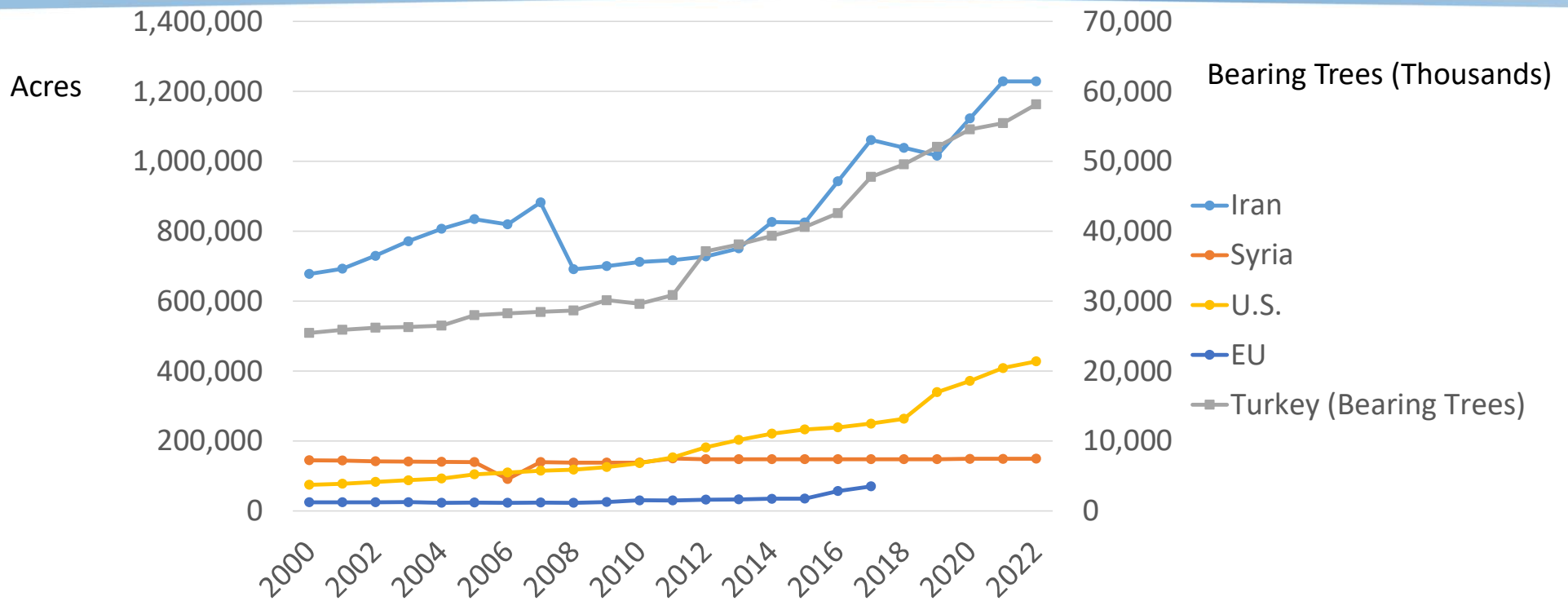
Source: USITC Dataweb

# U.S. In-Shell Export Quantity by Country



Source: USITC Dataweb

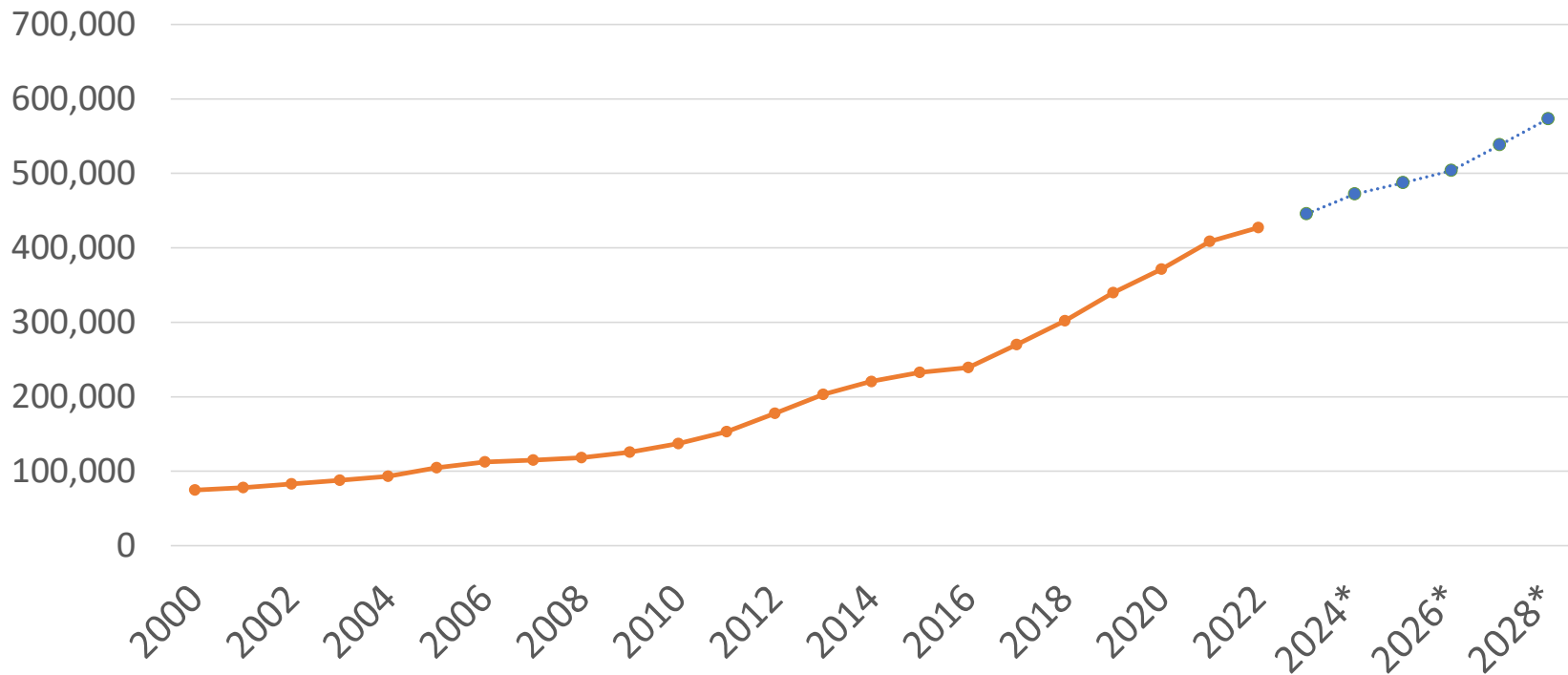
# Pistachio Acreage by Country



Source: FAOSTAT, Crops and Livestock Products, Turkey Ministry of Ag and Forestry

Note: Iran 2016, 2018 and 2020 are imputed estimates

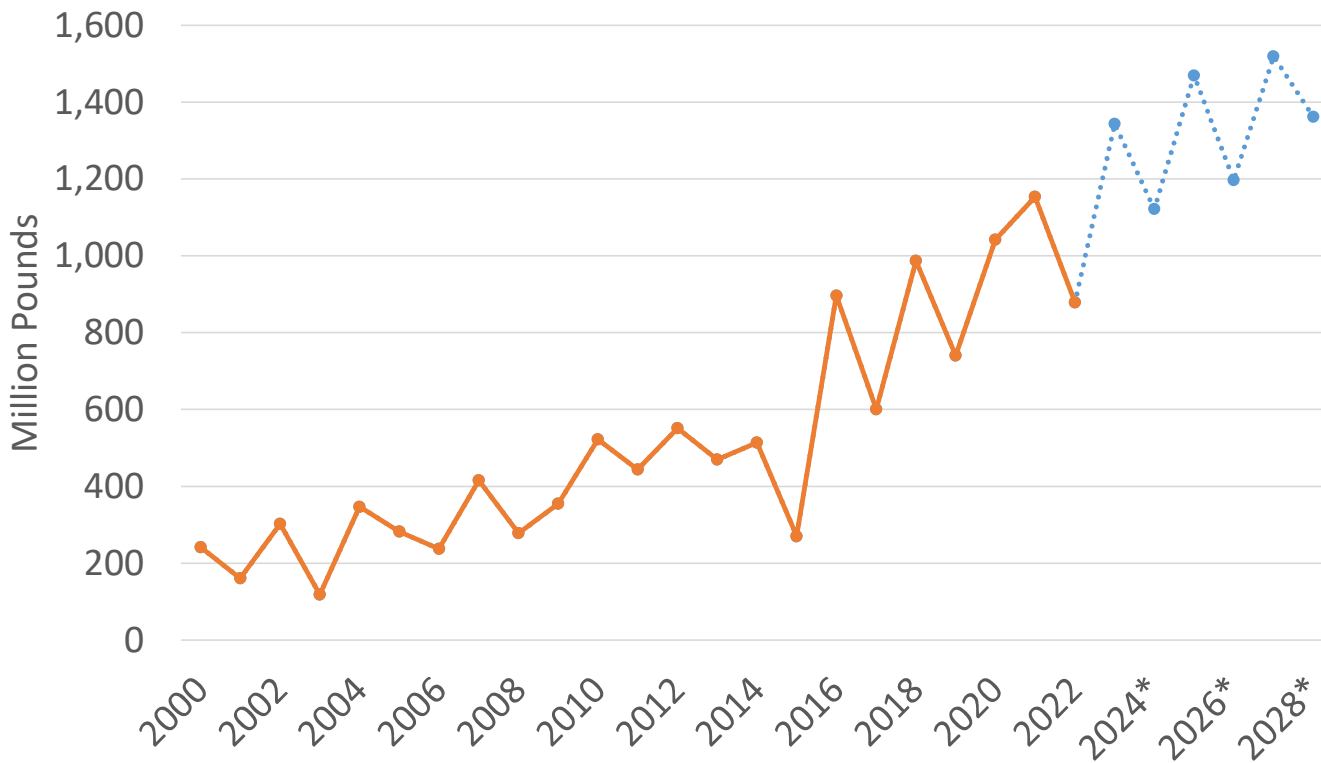
# U.S. Pistachio Acreage 2000-2028 Projected



Source: APG 2022 Annual Report

Note: 2023-2028 are projections assuming no pistachio acreage removal

# U.S. Pistachio Production 2000-2028 Projected



## Projection Assumptions:

- No pistachio acreage removed
- Average Yields
  - On year: 3,015 lbs/acre
  - Off year: 2,375 lbs/acre

# Pistachio Cost and Returns Estimates for 2023/2024



## Cost & Return Studies

Home   Current Studies   Archived Studies   Tree and Vine Loss Calculators   Cow/Calf Budget Calculators   Pest Management Calculators



## Pistachios

Home - Current Studies - Commodities - Pistachios

### Current Studies

Study	Regions	Counties	Year	Production conditions
<a href="#">Pistachios (pdf)</a>	San Joaquin Valley South		2020	Low-volume Irrigation

### Filter Current Studies

#### Commodities

Select Value



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## Pistachio Cost and Returns Estimates for 2023/2024

- Methods: Updated 2020 Pistachio Cost and Returns Study in San Joaquin Valley South
  - Caveat: These are my very quick preliminary estimates!
- Updated material costs of fertilizers, herbicides, insecticides, fungicides, rodenticides
- Labor costs:
  - Equipment operator: \$26.10
  - Non-Machine labor: \$22.48
- Fuel costs:
  - Gas: \$4.40/gal
  - Diesel: \$4.80/gal
- Custom operations: Assume an increase of 10%
- Decreased prices based on trends in export values (\$/lb)
  - In-shell: 13% decrease to \$1.96/lb
  - Shelled: 5% decrease to \$2.57/lb

# Pistachio Cost and Returns Estimates for 2023/2024

	2020				2023/2024				Difference
	Qty/Acre	Unit	\$/Unit	\$/Acre	Qty/Acre	Unit	\$/Unit	\$/Acre	
<b>TOTAL GROSS RETURNS</b>		2800 Lb	2.115	5,922		2800 Lb	1.86	5,208	-12%
<b>OPERATING COSTS</b>									
Herbicide				47				43	-9%
Insecticide				195				249	28%
Fungicide				108				142	31%
Rodenticide				13				20	54%
Fertilizer				178				184	3%
Aflatoxin-AF36				10				10	0%
Water - District & Pressurize	49.5 AcIn	at \$24/AcIn		1186	49.5 AcIn	at \$24/AcIn		1186	0%
Custom Pruning/Hedging/Sanitation				501		Assume 10% Increase		551	10%
Custom Harvest	128 Trees	at \$2.50/Tree		320		Assume 10% Increase		352	10%
Custom Application & PCA				58		Assume 10% Increase		64	10%
Labor				356				373	5%
Machinery				95				132	39%
Pistachio Research Board Assessment	2800 Lbs @	.03/Lb		84	2800 Lbs @	.0015/Lb		4	-95%
<b>TOTAL OPERATING COSTS/ACRE</b>				3,151				3,310	5%
<b>TOTAL OPERATING COSTS/LB</b>				1.13				1.18	5%
<b>NET RETURNS ABOVE OPERATING COSTS</b>				2,771				1,898	-32%

# Coming soon: Pistachio Cost and Return Study Excel Spreadsheet

Home Insert Draw Page Layout Formulas Data Review View Automate Developer Acrobat Tell me

Arial B 8 A A' Wrap Text General Conditional Formatting as Table Normal 2 Normal Bad Good

Update Available: We've made some fixes and improvements. To complete the process, the app needs to restart.

116 fx

**UC DAVIS DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS AND UC COOPERATIVE EXTENSION  
SAMPLE COSTS TO PRODUCE PISTACHIOS SAN JOAQUIN VALLEY SOUTH  
2020**

1 The yellow shaded areas are user input fields. If you choose to change them to reflect your own enterprise, the calendar below shows how many times each operation is performed in each month. For irrigation, it shows the number of acre-inches applied.  
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Pistachio Type	Yield (Qty/Acre)	Unit	Price (\$/Unit)	Total Revenue (\$/Acre)	Cash and Labor Costs per Acre																	
					Labor Cost	Fuel Costs	Lube & Repairs	Material Cost	Custom/ Rent	Total Annual Cost	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Split In-shell	2380 lb (kernel)		2.25	5,355																		
Shelling Stock	70 lb (kernel)		2.7	189																		
Closed Shell	140 lb (kernel)		2.7	378																		
<b>Total</b>				<b>5,922</b>																		

Note: Input payable yield, kernel weight for shelling stock and closed shell.  
Kernel weight: 0.75 Total Yield

Operation	Labor Cost	Fuel Costs	Lube & Repairs	Material Cost	Custom/ Rent	Total Annual Cost	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Irrigation Operation	41	0	0	1186	0	1,227	0.00	0.00	3.50	3.00	6.00	10.20	12.00	10.00	3.00	2.00	6.00	0.00
Prune: Mechanical Topping/Pruning	0	0	0	70	0	70												
Prune: Prune & Stack	0	0	0	250	0	250												
Prune/WS: Shake/Blow/Rake	53	6	2	0	0	71												
Prune/WS: Disc Mummies/Prunings	8	3	2	0	0	13												
Weeds: Winter Strip (Goal/Prowl/Roundup)	8	0	0	31	0	39												
PCA: Leaf/Soil - Sample/Analysis	0	0	0	8	0	8												
Fertilize: (Zn/SO4/Solubor)	11	5	3	11	0	29												
Insects: NOW Hang Traps (phoronone)	0	0	0	0	0	0												
Insects: NOW Hang Traps (egg)	0	0	0	0	0	0												
Fertilize: (UAN32)	0	0	0	14	0	14												
Insects: Plant Bugs (Warrior II)	11	5	3	16	0	34												
Vertebrate: Gopher	22	1	1	7	0	32												
Vertebrate: Squirrel	15	1	1	5	0	22												
Fertilize (10-0-10)	0	0	0	103	0	103												
Weeds: Spot Spray 2x (Rely 280)	10	0	0	17	0	27												
Insects: Mealybug (Movento)	11	5	3	44	0	63												
Disease: BOT (Luna Experience)	11	5	3	71	0	89												
Fertilize: (AF36)	0	0	0	10	15	25												
Fertilize: (15-0-05)	0	0	0	50	0	50												
Disease: Alternaria (Merivon)	0	0	0	38	0	38												
Insects: Mites (Sulfur)	11	5	3	10	0	28												
Insects: NOW (Intrigide/Brigade WSB)	11	5	3	52	0	70												
Insects: NOW (Intrigide/Brigade WSB)	11	5	3	52	0	70												
Insects: NOW (Abacon/Warrior II)	11	5	3	54	0	72												
UTV	64	3	2	0	0	69	1	1	1	1	1	1	1	1	1	1	1	1
Pickup	61	11	8	0	0	80	1	1	1	1	1	1	1	1	1	1	1	1
PCA: Consulting Service	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
Additional Operation	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1

Ready Accessibility: Investigate

UC DAVIS DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS AND UC COOPERATIVE EXTENSION  
SAMPLE COSTS TO PRODUCE PISTACHIOS SAN JOAQUIN VALLEY SOUTH

2020					
GROSS RETURNS	Quantity/Acre	Unit	Price/Unit	Total Returns	
PISTACHIOS	Split In-shell	2380	lb (in-shell)	2.25	5,355
	Shelling Stock	70	lb (kernel)	2.7	189
	Closed Shell	140	lb (kernel)	2.7	378
<b>TOTAL GROSS RETURNS</b>				<b>5,922</b>	

Operation	Cash and Labor Costs per Acre					Total Annual Cost
	Labor Cost	Fuel Costs	Lube & Repairs	Material Cost	Custom/ Rent	
<b>Cultural:</b>						
Irrigation Operation	41	0	0	1186	0	1227
Prune: Mechanical Topping/Pruning	0	0	0	0	70	70
Prune: Prune & Stack	0	0	0	0	250	250
Prune/WS: Shake/Blow/Rake	53	6	2	0	0	71
Prune/WS: Disc Mummies/Prunings	8	3	2	0	0	13
Weeds: Winter Strip (Goal/Prowl/Roundup)	8	0	0	31	0	39
PCA: Leaf/Soil - Sample/Analysis	0	0	0	8	0	8
Fertilize: (Zn/SO4/Solubor)	11	5	3	11	0	29
Insects: NOW Hang Traps (phoronone)	0	0	0	0	0	0
Insects: NOW Hang Traps (egg)	0	0	0	0	0	0
Fertilize: (UAN32)	0	0	0	14	0	14
Insects: Plant Bugs (Warrior II)	11	5	3	16	0	34
Vertebrate: Gopher	22	1	1	7	0	32
Vertebrate: Squirrel	15	1	1	5	0	22
Fertilize (10-0-10)	0	0	0	103	0	103
Weeds: Spot Spray 2x (Rely 280)	10	0	0	17	0	27
Insects: Mealybug (Movento)	11	5	3	64	0	83
Disease: BOT (Luna Experience)	11	5	3	71	0	89
Atlatxin: (AF36)	0	0	0	10	15	25
Fertilize (15-0-05)	0	0	0	50	0	50
Disease: Alternaria (Merivon)	0	0	0	38	0	38
Insects: Mites (Sulfur)	11	5	3	10	0	28
Insects: NOW (Intrigide/Brigade WSB)	11	5	3	52	0	70
Insects: NOW (Abacon/Warrior II)	11	5	3	54	0	72
UTV	64	3	2	0	0	69
Pickup	61	11	8	0	0	80
PCA: Consulting Service	0	0	0	0	0	35
Additional Operation	0	0	0	0	0	0
<b>TOTAL CULTURAL COSTS</b>	<b>356</b>	<b>56</b>	<b>37</b>	<b>1737</b>	<b>660</b>	<b>2747</b>
<b>Harvest:</b>						
Harvest: Bulk (Shake/Catch/Haul)	0	0	0	0	320	320
Assessments	0	0	0	84	0	84
Insert Operation Name	0	0	0	0	0	0
Insert Operation Name	0	0	0	0	0	0
Additional Operation	0	0	0	0	0	0
<b>TOTAL HARVEST COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>84</b>	<b>320</b>	<b>404</b>
Interest on operating capital				Interest rate:	5.25%	59
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>356</b>	<b>56</b>	<b>37</b>	<b>1,821</b>	<b>880</b>	<b>3,210</b>
<b>NET RETURNS ABOVE OPERATING COSTS/ACRE</b>						<b>2,712</b>



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# Considering Alternative Production Practices to Save \$\$? Use Partial Budget Analysis!

Alternative being considered:

Additional Costs		Additional Revenue	
Reduced Revenue		Reduced Costs	
Total additional costs and reduced revenue	\$	Total additional revenue and reduced costs	\$
<b>Total Net Change in Profit</b>		\$	-
<b>Per-Acre Net Change in Profit</b>		\$	-

# Partial Budget Analysis: Consider Alternative Production Practices

**Alternative being considered:** Decrease target yield from 2,800 lbs/acre to 2,600 lbs/acre

Additional Costs		Additional Revenue	
<b>Reduced Revenue</b>		<b>Reduced Costs</b>	
Reduced yield (200 lbs/acre @ expected price)		Fertilizer?	
		Irrigation?	
		Harvest	
Total additional costs and reduced revenue	\$	Total additional revenue and reduced costs	\$
<b>Total Net Change in Profit</b>		\$	-
<b>Per-Acre Net Change in Profit</b>		\$	-

## Disclaimer: Consider Any Federal Crop Insurance Policies

- In 2022, 48% of pistachio acreage was insured by USDA RMA
- Crop insurance policies based on prior years' production or Actual Production History (APH)
  - Reducing target yields will reduce APH and level of yield you can insure in future years
- Also, from USDA RMA Pistachio Crop Provisions:
  - “You must report...
    - Any change in practices, or any other circumstance that may reduce the expected yield below the yield upon which the insurance guarantee is based...”
    - Best to check with your crop insurance agent
- Don't have crop insurance? Consider Catastrophic:
  - Insures 50% yield and 55% price and costs “\$655 per crop per county, regardless of the number of acres”
  - Crop insurance agent locator at: <https://www.rma.usda.gov/>

## Take Home Messages

- Global pistachio production increasing
  - Global pistachio demand also increasing but ending stocks increasing
  - More pistachios on the market = lower price for foreseeable future
    - Unless weather shocks or significant demand increases
- Focus on profit maximization rather than yield maximization
  - Tools to help evaluate profitability:
    - UC Davis Cost and Returns Studies: Enterprise budgets
    - Partial Budget Analysis: Evaluate changes in a practice



# Questions?



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## Cost & Return Studies

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