Public Funding for Research into Specialty Crops

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Outline

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  - Commodity Orientation
  - Congruence of R&D and Value of Production
- **The Economics of Specialty Crops R&D**
  - Economic Rationale for Lower ARIs for Specialty Crops
  - Sources of Market Failure
  - Rates of Return to Specialty Crops R&D
  - Prices and Productivity Growth
- **Interpretation of Evidence and Implications**
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- **Conclusion**

U.S. Public Agricultural R&D, 2004

- **Intramural USDA research**
- **State Agricultural Experiment Stations**
  - 30 percent federal sources
  - 47 percent state government
  - 22 percent from industry etc.
- **Extension**
  - 21 percent federal sources
  - 79 percent within-state sources

Figure 1.
US Public Sector Agricultural R&D, 1890-2004

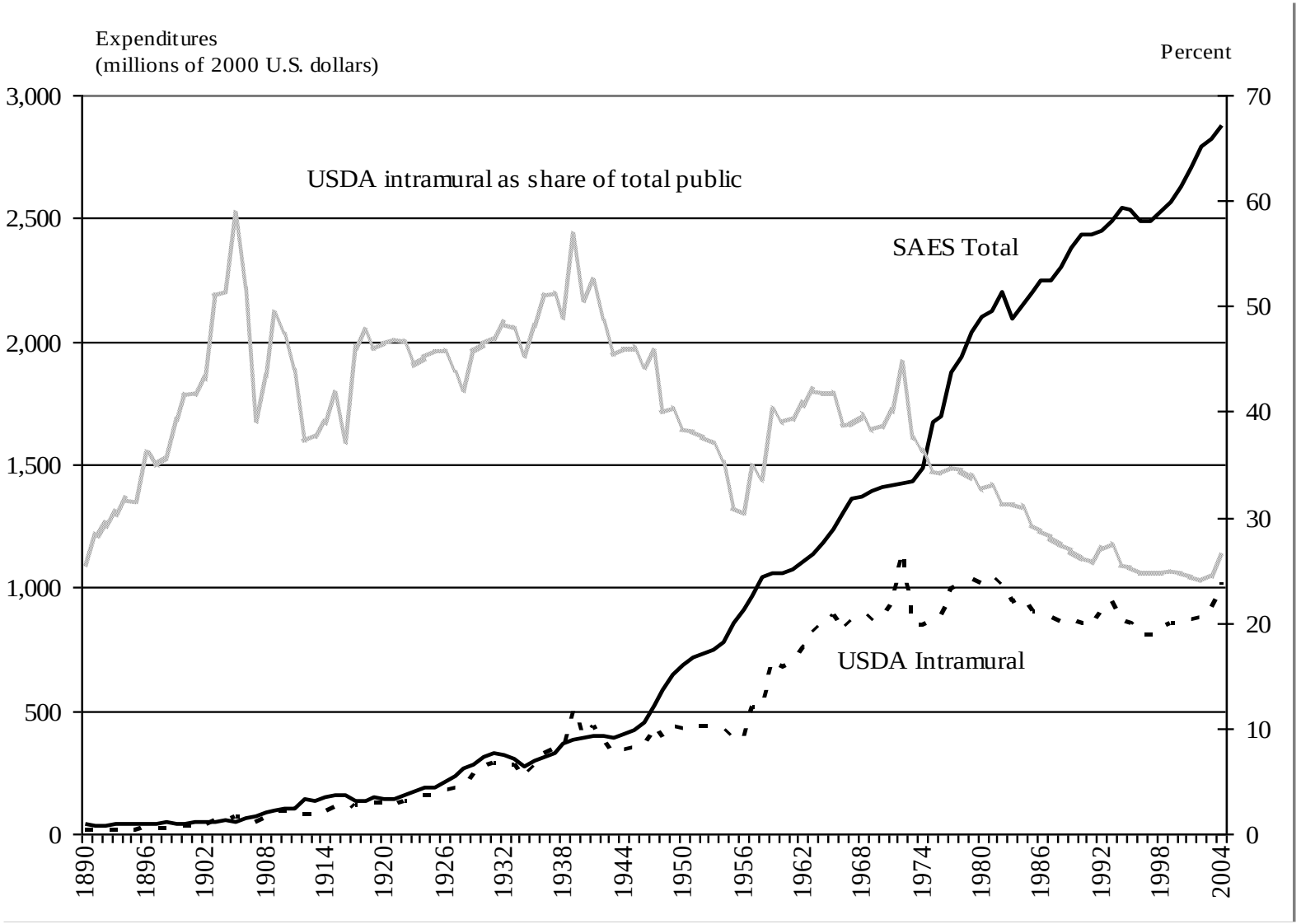


Figure 2.
SAES Research Expenditures by Source of Funds

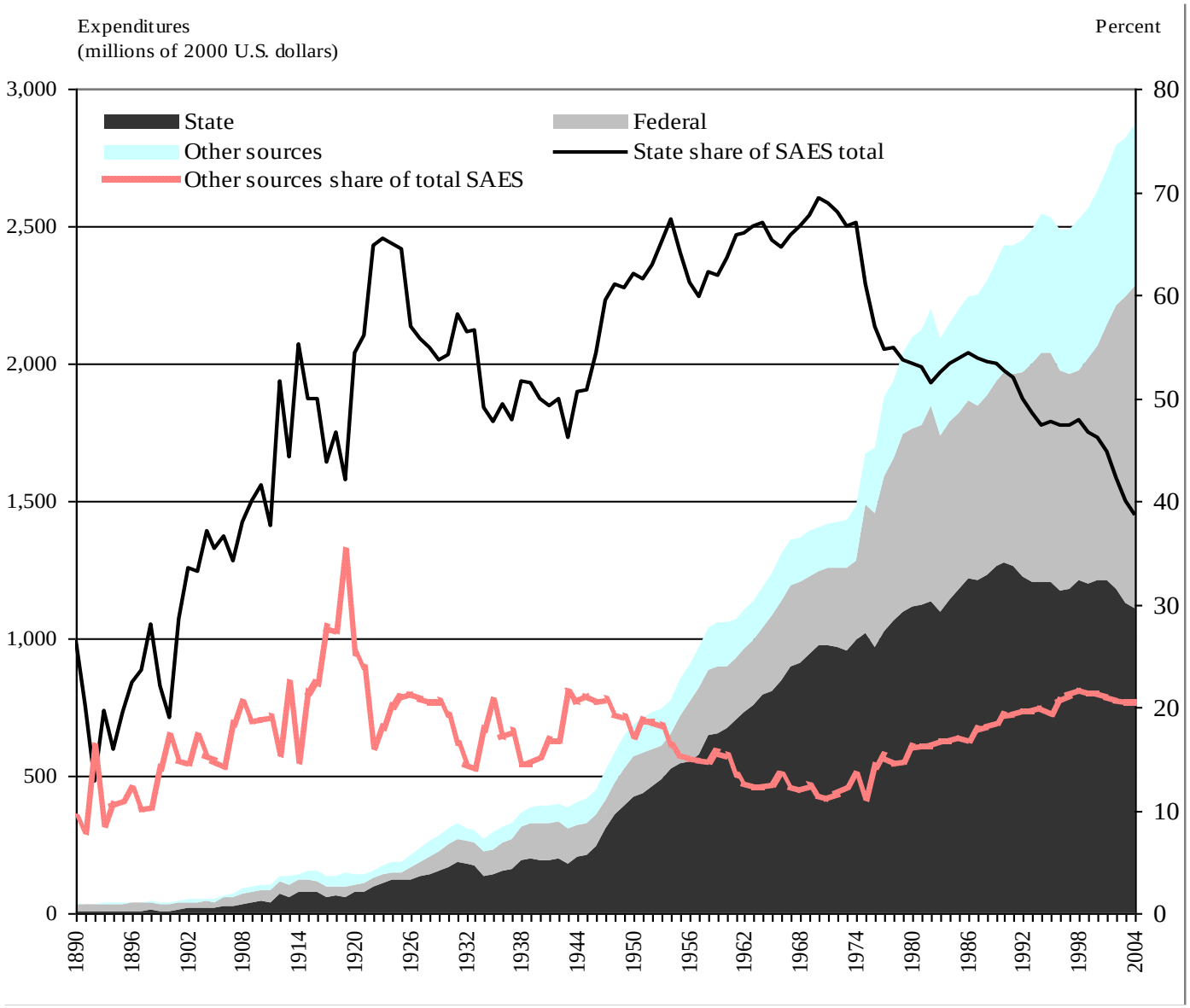
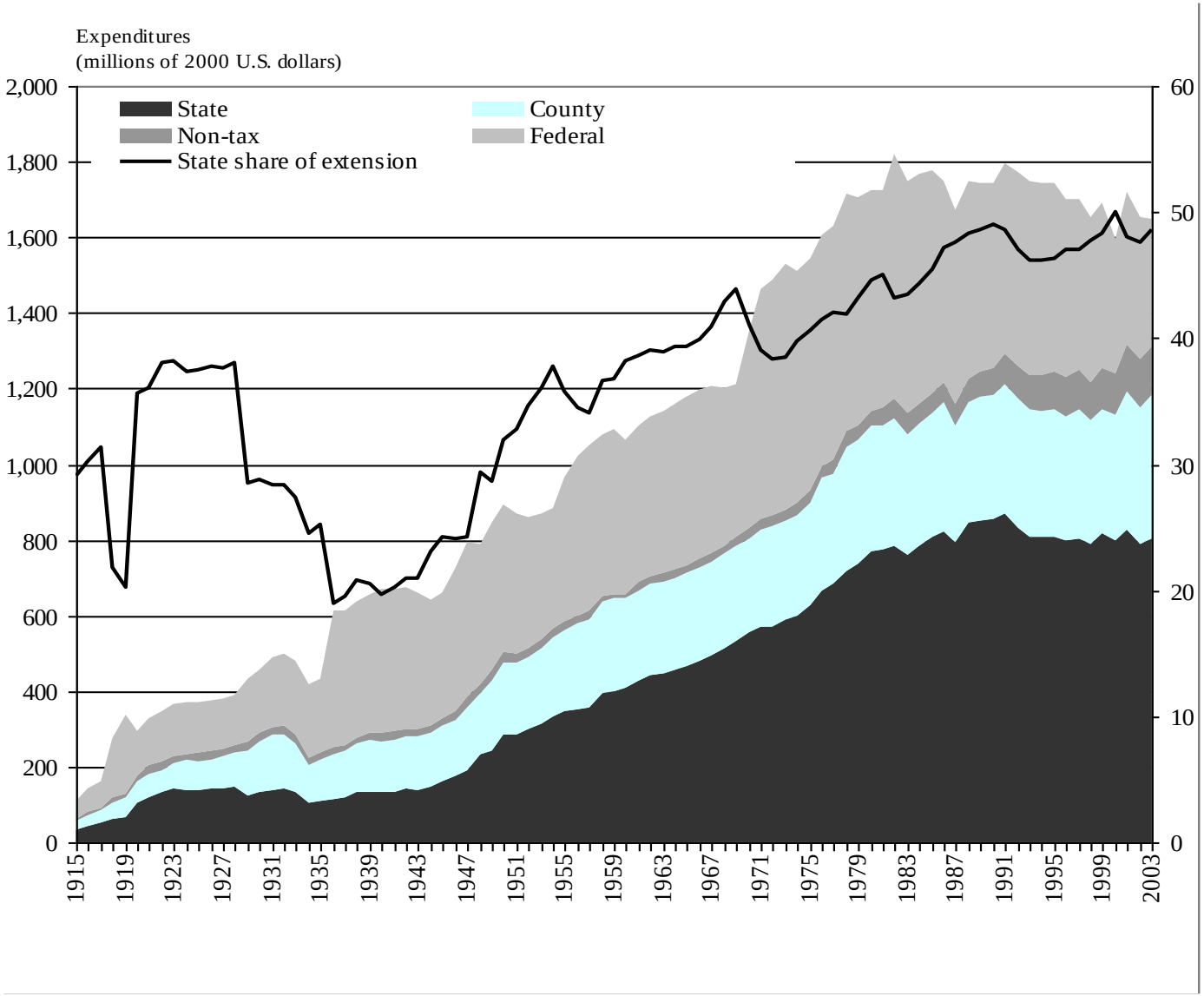


Figure 3.
Extension Expenditures by Source of Funds



R&D Funding for Specialty Crops

- Commodity Orientation

Figure 4.
Allocation of US Public Agricultural R&D, 1975-2004

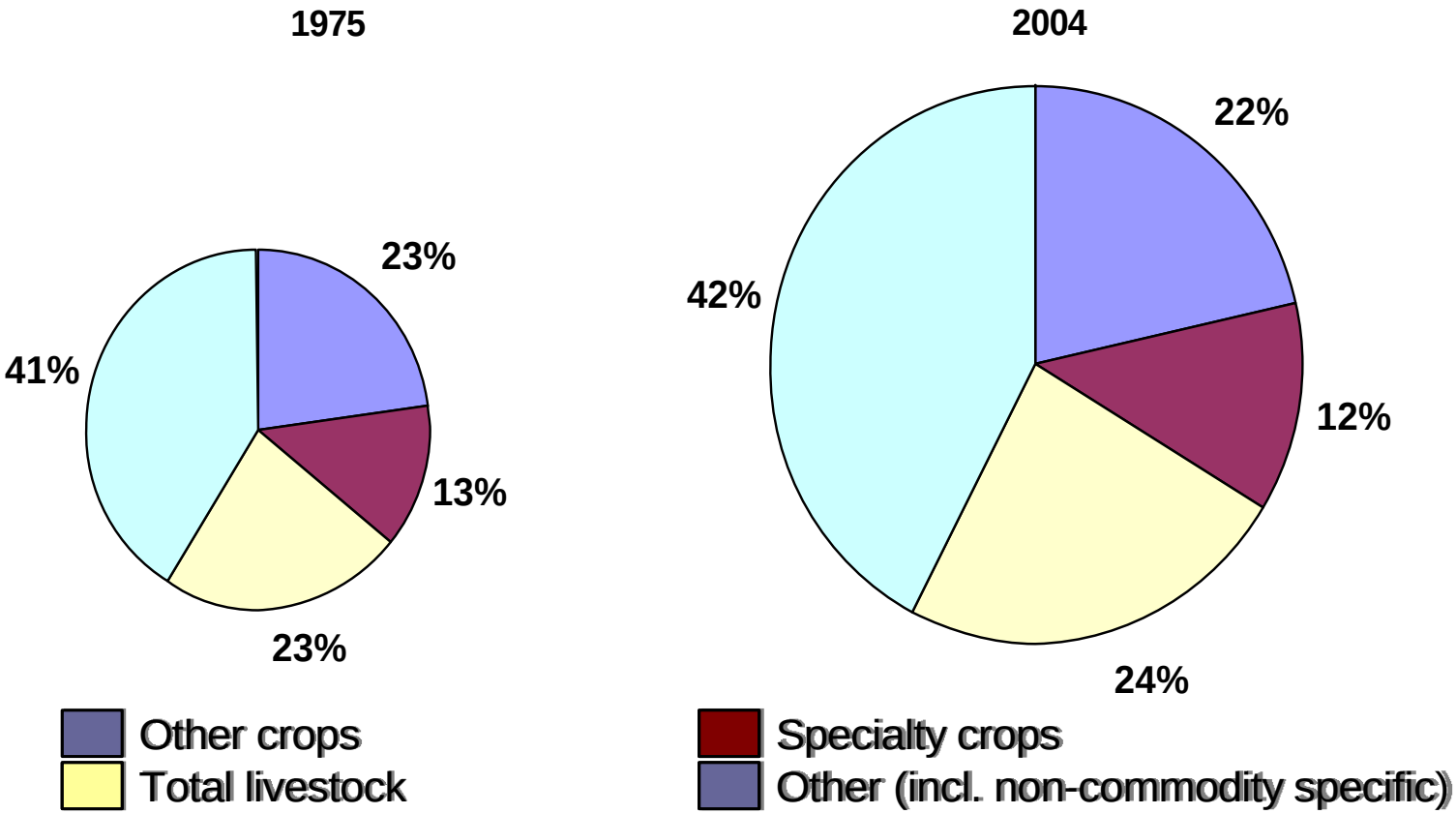


Table 2.
Shares of Public R&D, 1975-2004

	1975	1980	1990	2000	2004
Share of Public Ag. R&D			(percentage)		
Crops total	35.9	37.4	36.2	36.6	33.6
Specialty crops	12.8	12.9	12.8	13.1	11.9
Other (non specialty crops)	23.2	24.6	23.4	23.5	21.8
Livestock total	23.0	24.3	25.8	26.7	24.0
Other total (includes non-commodity)	41.1	38.3	38.0	36.7	42.4
All Research	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Share of crop total					
Grains and oilseeds	29.7	31.3	34.2	35.3	34.5
Pasture and forage	8.3	9.5	7.9	6.1	5.6
Other crop	26.4	24.8	22.6	22.8	24.7
Specialty crops	35.5	34.4	35.4	35.9	35.3
Vegetables	14.2	14.4	16.2	16.0	15.2
Fruits and nuts	16.0	14.8	14.3	14.1	14.3
Ornamentals	5.3	5.2	5.0	5.8	5.8
Share of livestock total					
Beef Cattle	30.5	32.6	26.1	20.5	20.9
Dairy Cattle	24.1	22.2	20.4	18.4	16.7
Poultry	16.7	13.7	13.6	12.9	13.0
Swine	12.7	13.1	13.5	13.6	10.4
Other livestock	16.1	18.3	26.4	34.6	39.1

R&D Funding for Specialty Crops

- Research Intensities and Congruence

Figure 5a.
Agricultural Research Intensities, 2004

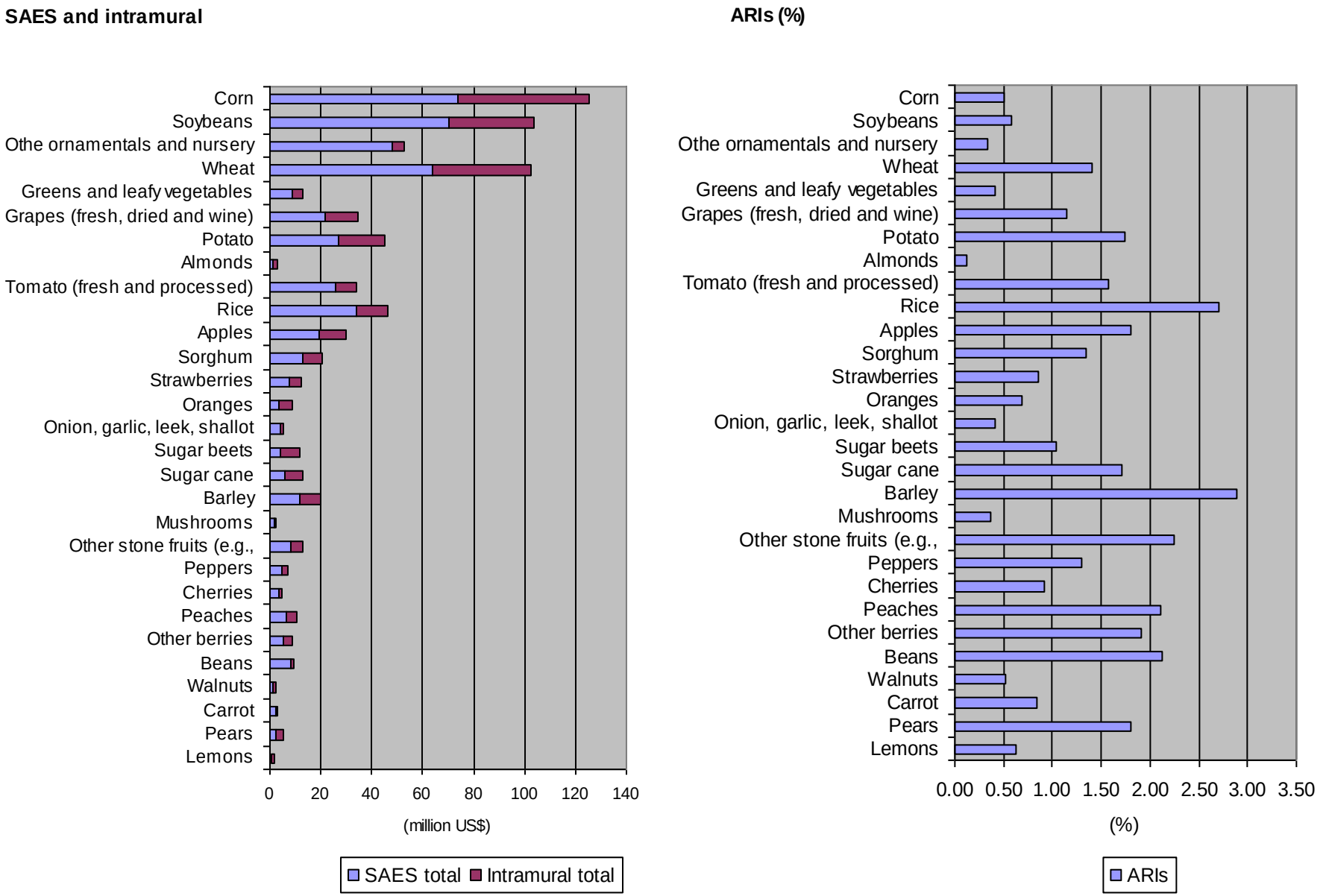
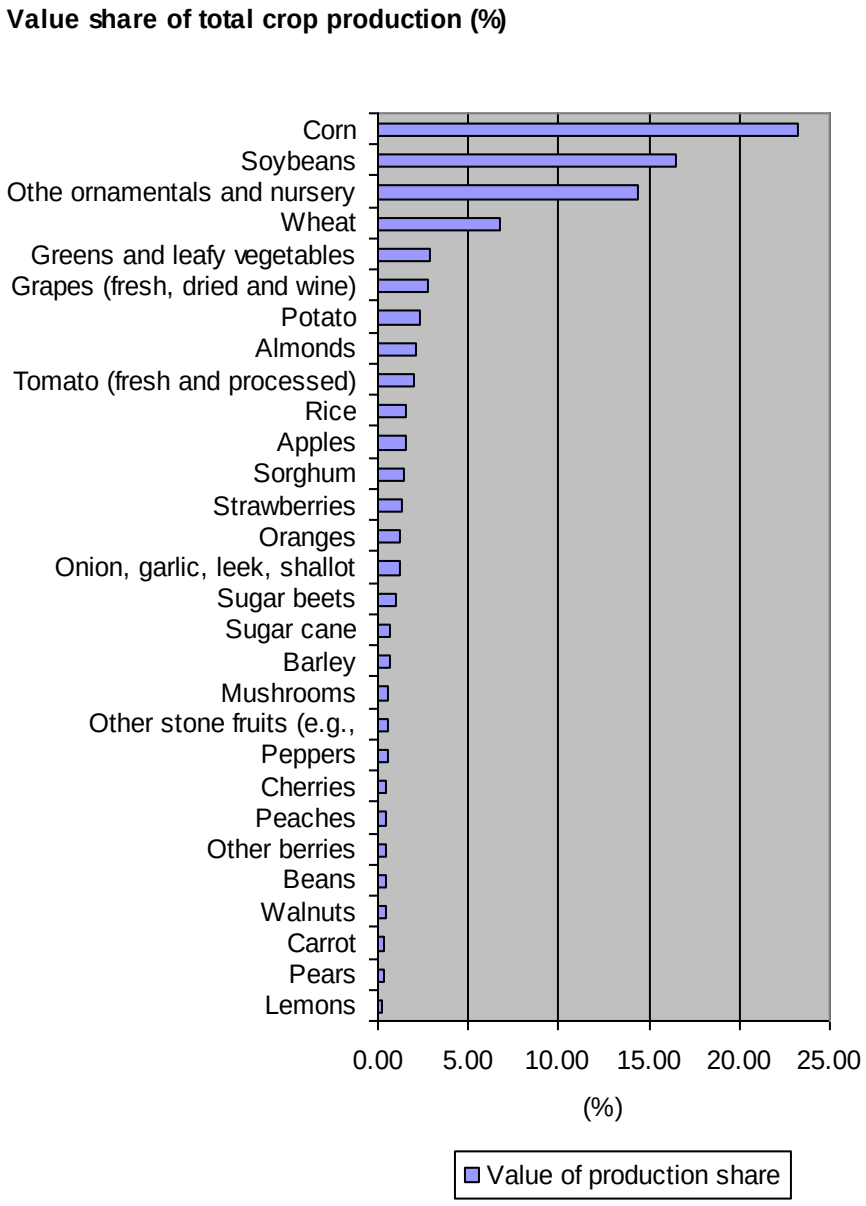


Figure 5b.
Agricultural Research Intensities, 2004



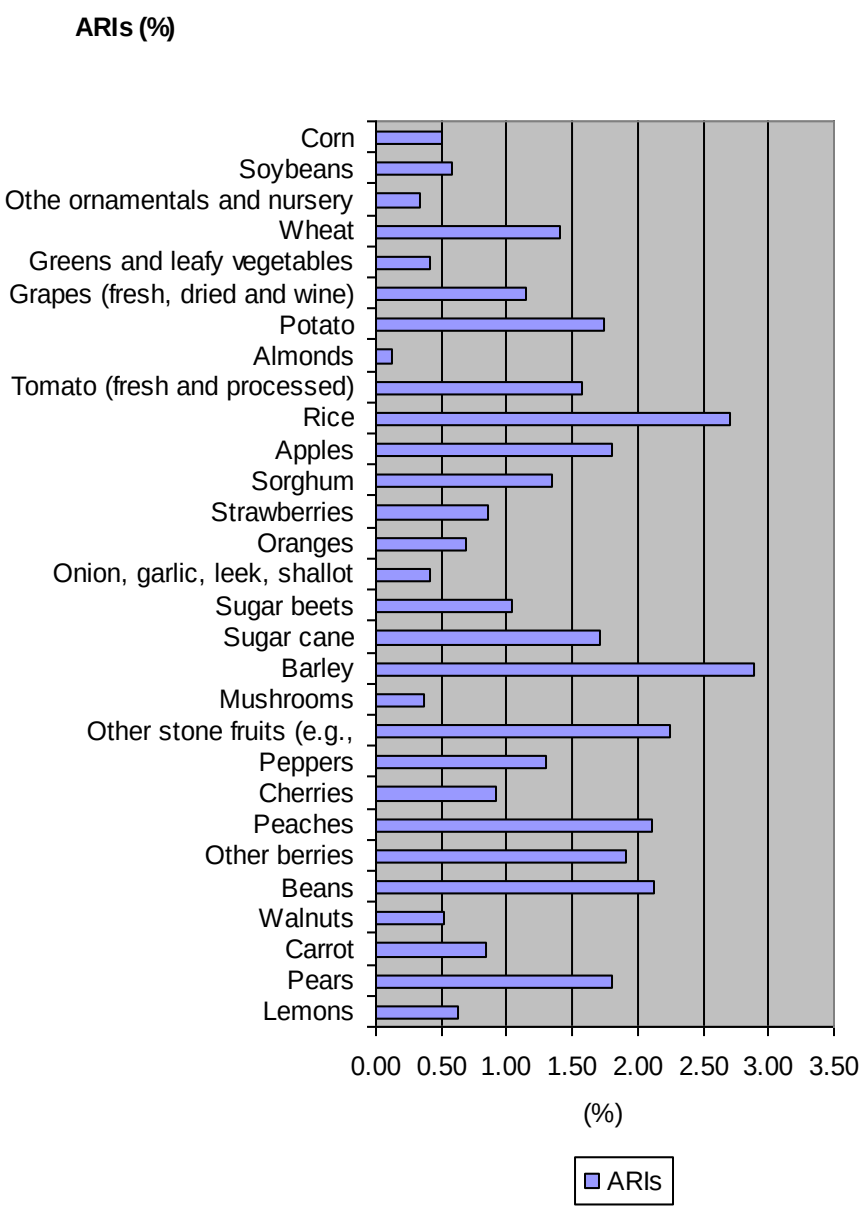
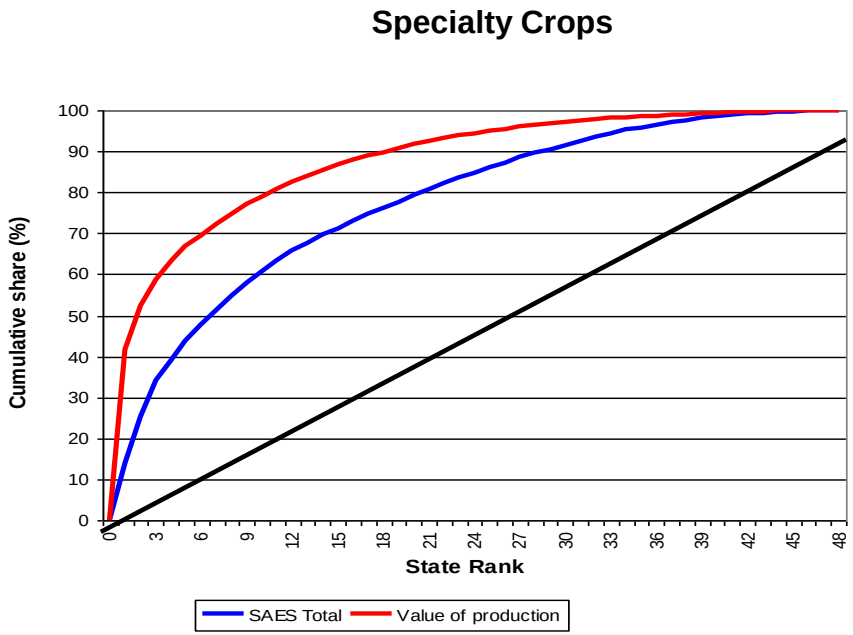
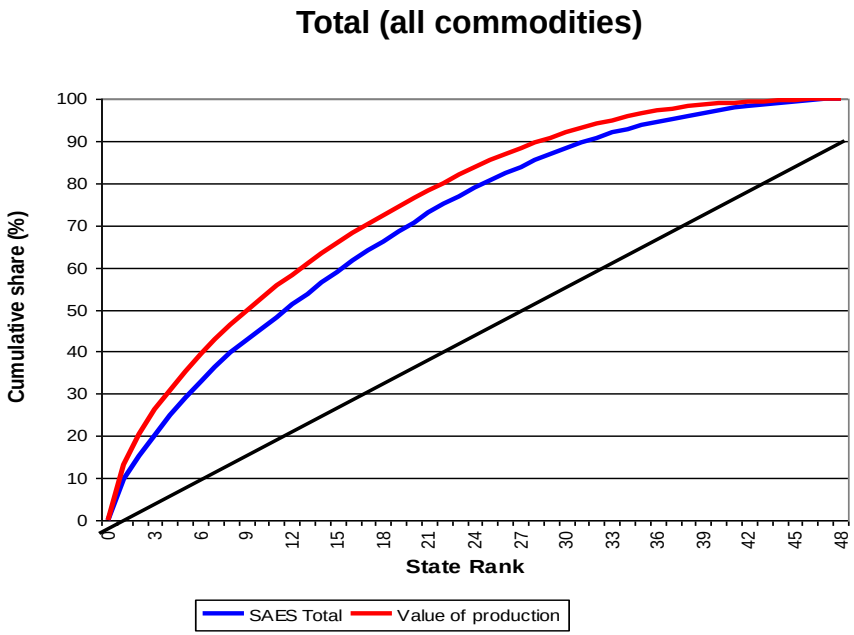


Figure 6. *SAES Spending and Value of Output, 2004*





Economics of Specialty Crops R&D

- **Economic Rationale for Lower ARIs**
  - Political-economic factors
    - Individually small crops
    - Collectively small in many states
    - Low spillovers
    - Diverse interests
    - Inertia in spending patterns
  - Smaller payoff?
    - GARB = kV (size of industry matters)
    - Supply and demand conditions
    - Costs of research, fixed factors
    - Economies of scale and scope

Economics of Specialty Crops R&D

- **Sources of Market Failure**
  - Usual factors, perhaps magnified
  - Health-care system

- **Rates of return to research,**

Table 4.
Rates of Return to Specialty Crops R&D

Crop	Total number of studies	Observations		Rate of return		
		Total Number	U.S. Share	minimum	maximum	average
	count		*percent*	*percent per annum*		
Potato	11	21	47.6	1.05	100.0	44.8
Other specialty crops	8	33	48.5	1.4	92.8	30.7
All specialty crops	19	54	48.1	1.05	100.0	36.2
Corn	20	62	8.1	-6.9	96.9	40.0
Wheat	32	103	24.3	11.1	97.0	47.9
Rice	31	15	6.5	11.44	99.6	54.8
All crops	111	520	18.3	-7.4	100.0	44.5

Economics of Specialty Crops R&D

- Prices and productivity growth

Figure 8.
Commodity Shares of Value, 1950-52 and 2002-04

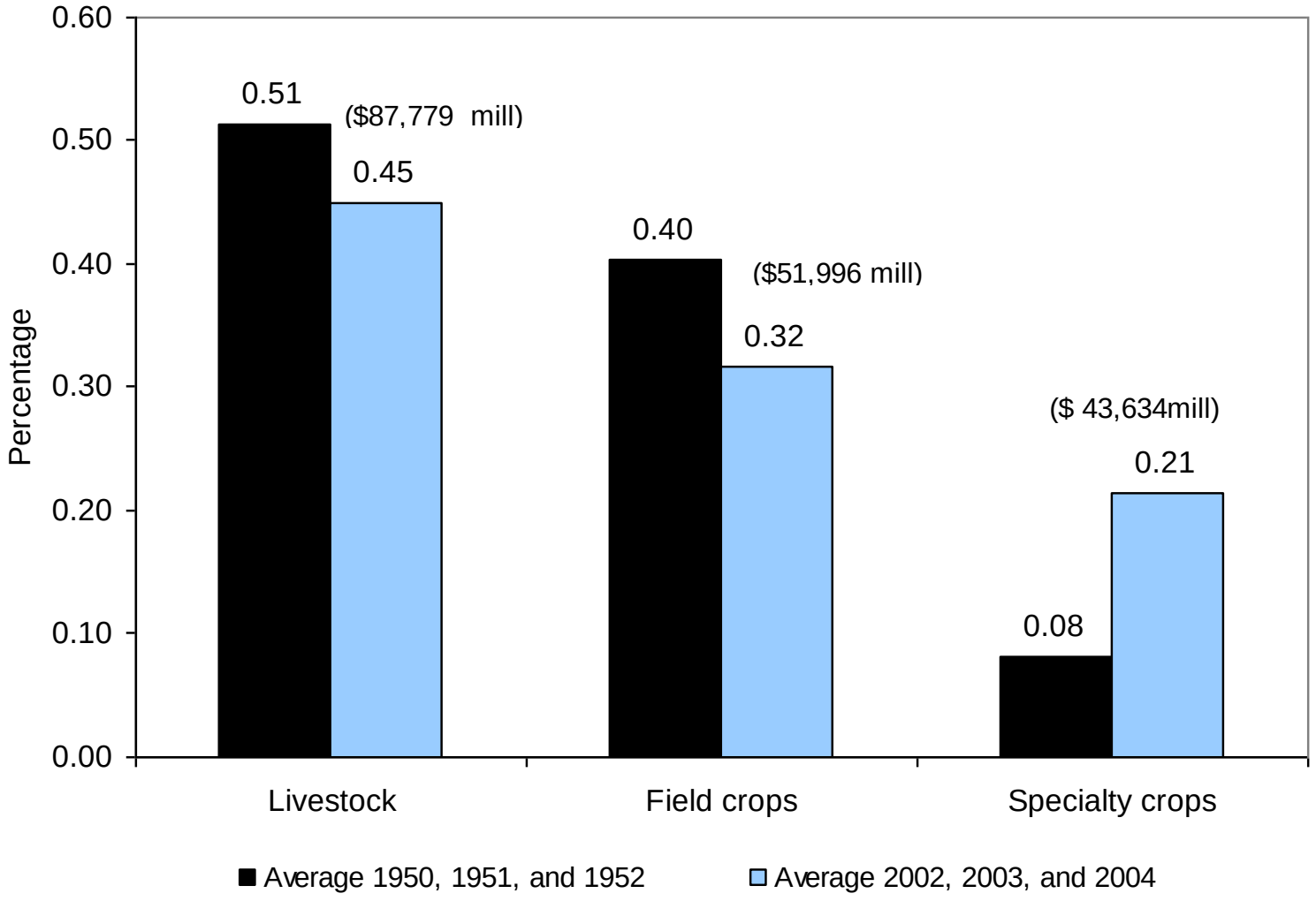


Figure 9.
Nominal Prices of Commodities, 1949-2004

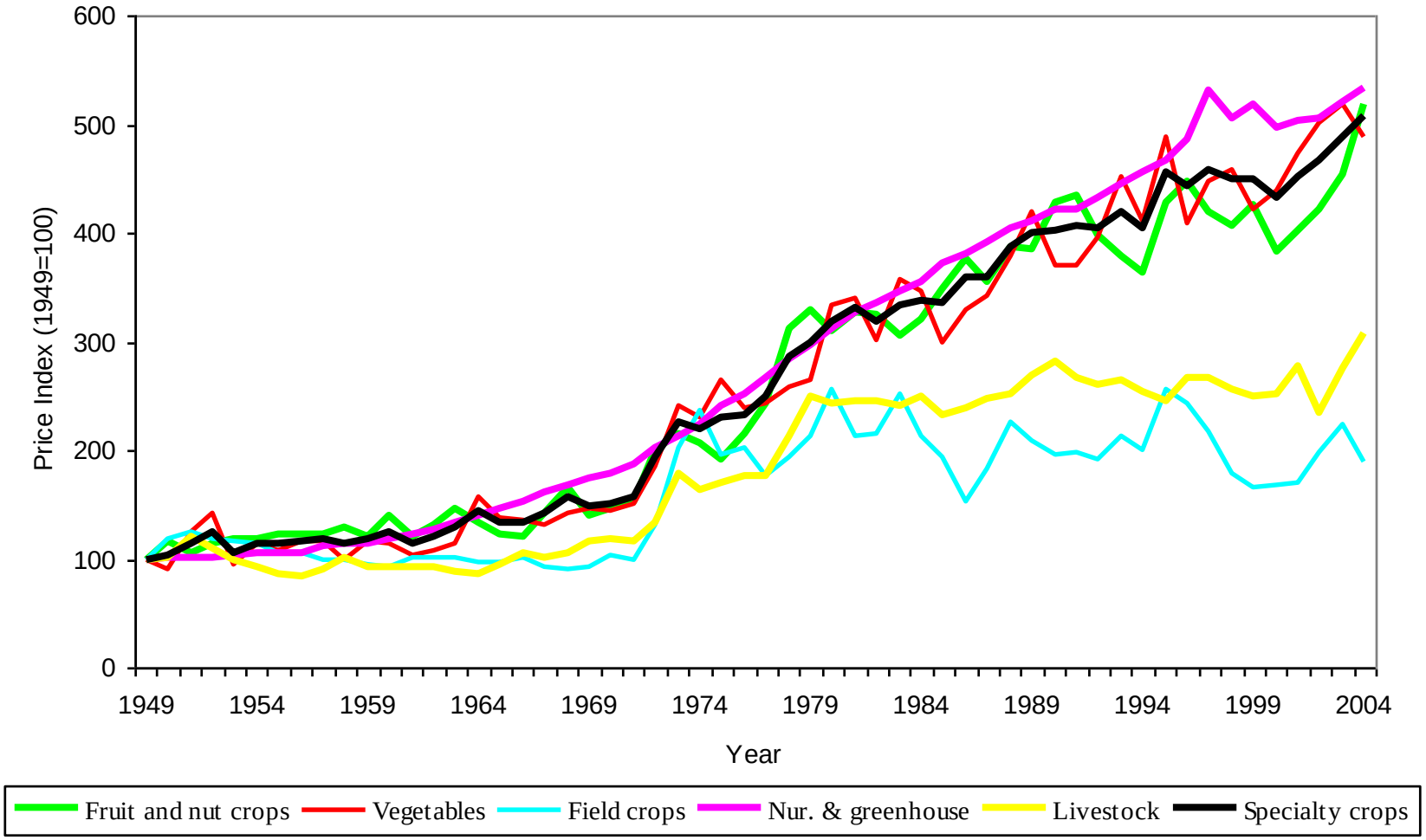


Figure 10.
Real Prices (GDP-IPD) of Commodities, 1949-2004

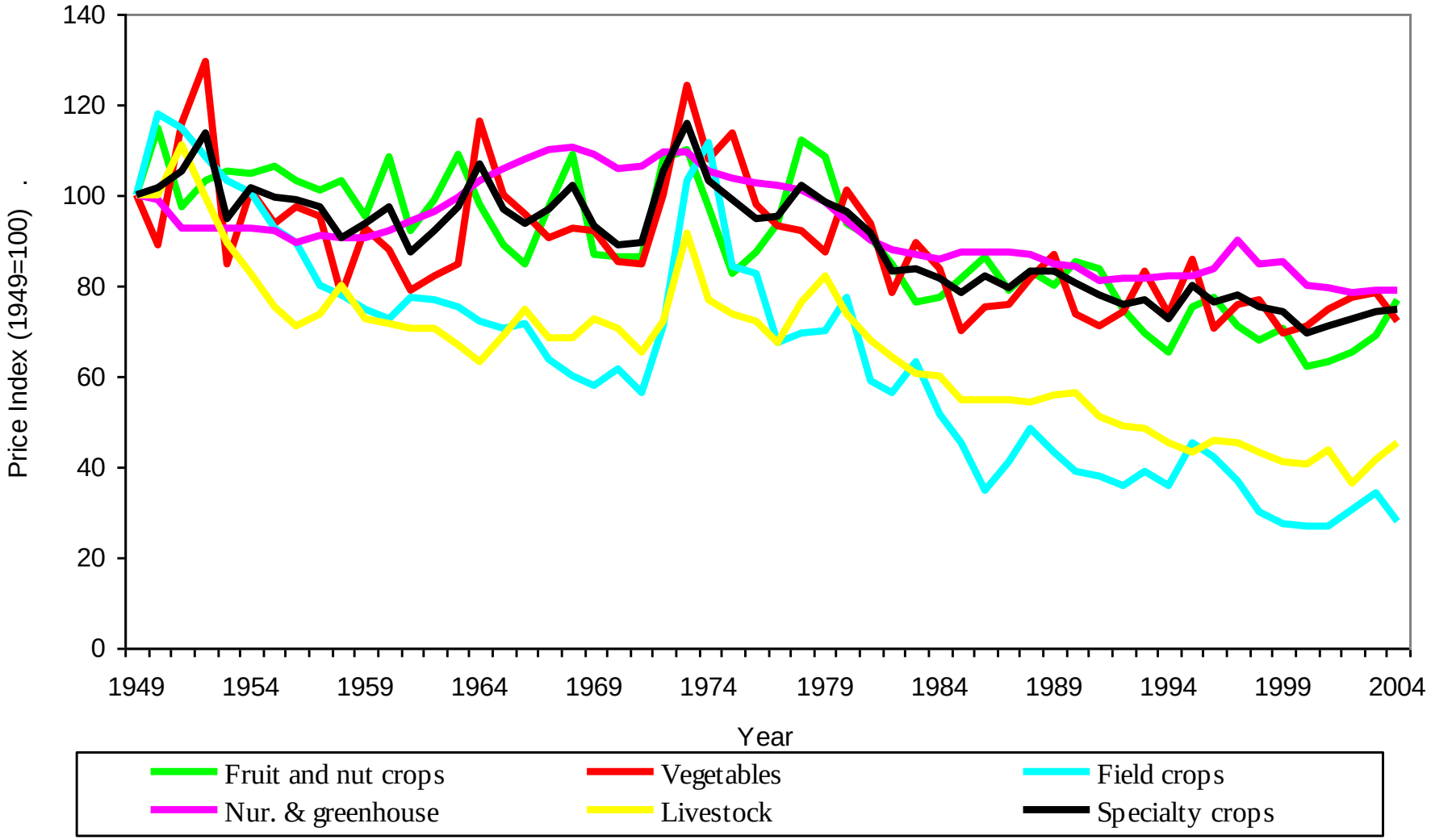


Figure 11.
Growth Rates of Real Prices, 1949-2004

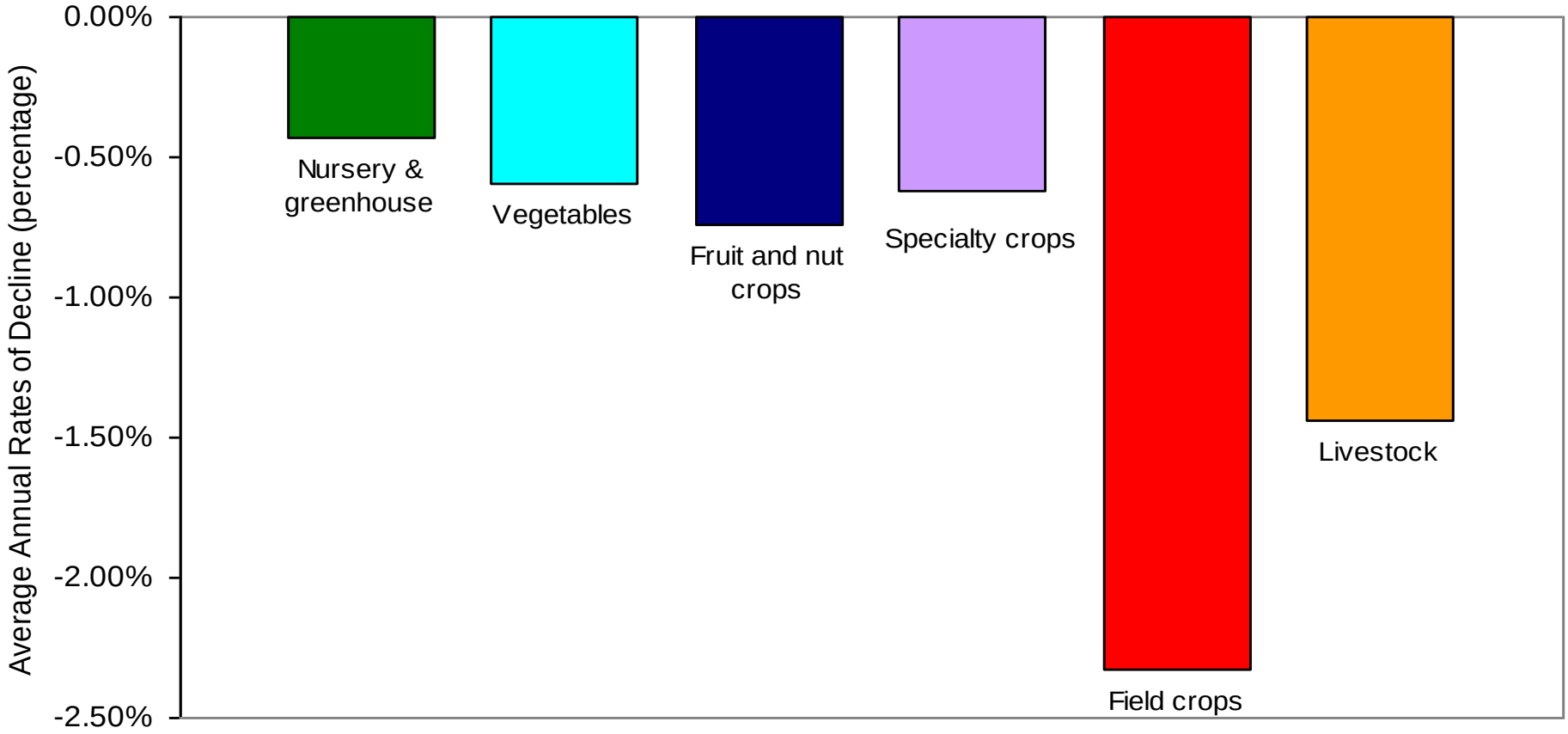


Table 5.
Growth in Prices and Production, 1949-2004

Commodity Category	Percentage Changes between 1949 and 2004 in				
	Production	Nominal Price	Real Price	Supply Growth	
				$\varepsilon = 1.0$	$\varepsilon = 0.5$
Livestock	112	207	–55.1	167.1	139.6
Field Crops	178	90	–72.4	250.4	214.2
Vegetables	162	489	–27.9	189.9	176.0
Fruits and Nuts	183	419	–22.5	205.5	194.3
Greenhouse and Nursery	642	534	–20.2	662.2	652.1

Collective Action

- **California marketing programs**
  - cover 55 percent of CA production, by value, and 74 percent for fruits and nuts
  - spent over $200 million in 2002, and ~$150 million for specialty crops
  - spent < 10 percent of that amount on research

- **Check-off funds with matching support from the federal or state government may provide more enduring and larger total support for specialty crops R&D**

Conclusion

- In 2004 $516.7 million was spent on specialty crops R&D
- Externality arguments could justify spending more but . . . .
- Increased total funding could be achieved by the development of a collective action program, with joint public-private funding