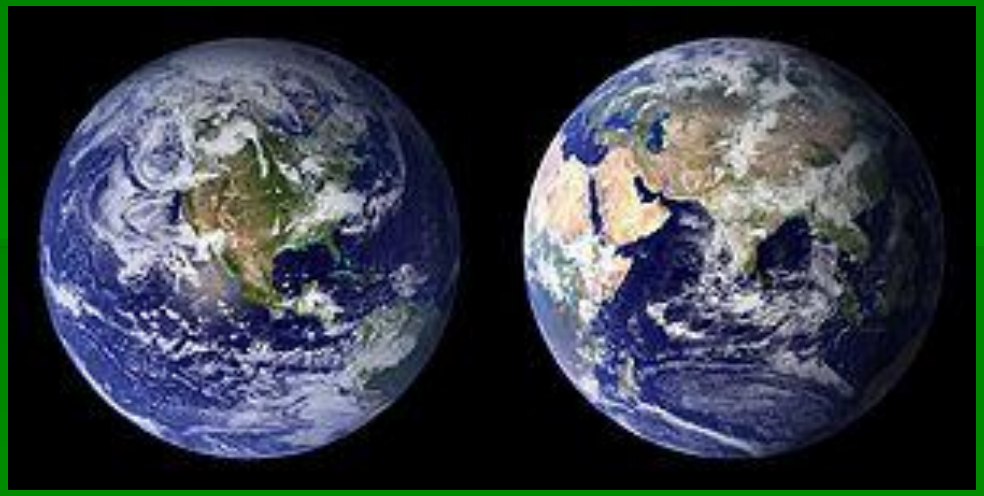
Primer On Sustainability



What is Sustainability?

- Definition flexible to venue and audience
- Definition often includes three E's
- Stated Goals vs Incidental Goals

Open ended definitions allow for discussions and avoid problems in establishing programs

*Positive vs Negative

*Some mentions in late 1980s Federal Development & Ag policy

*Wide adoption 1992

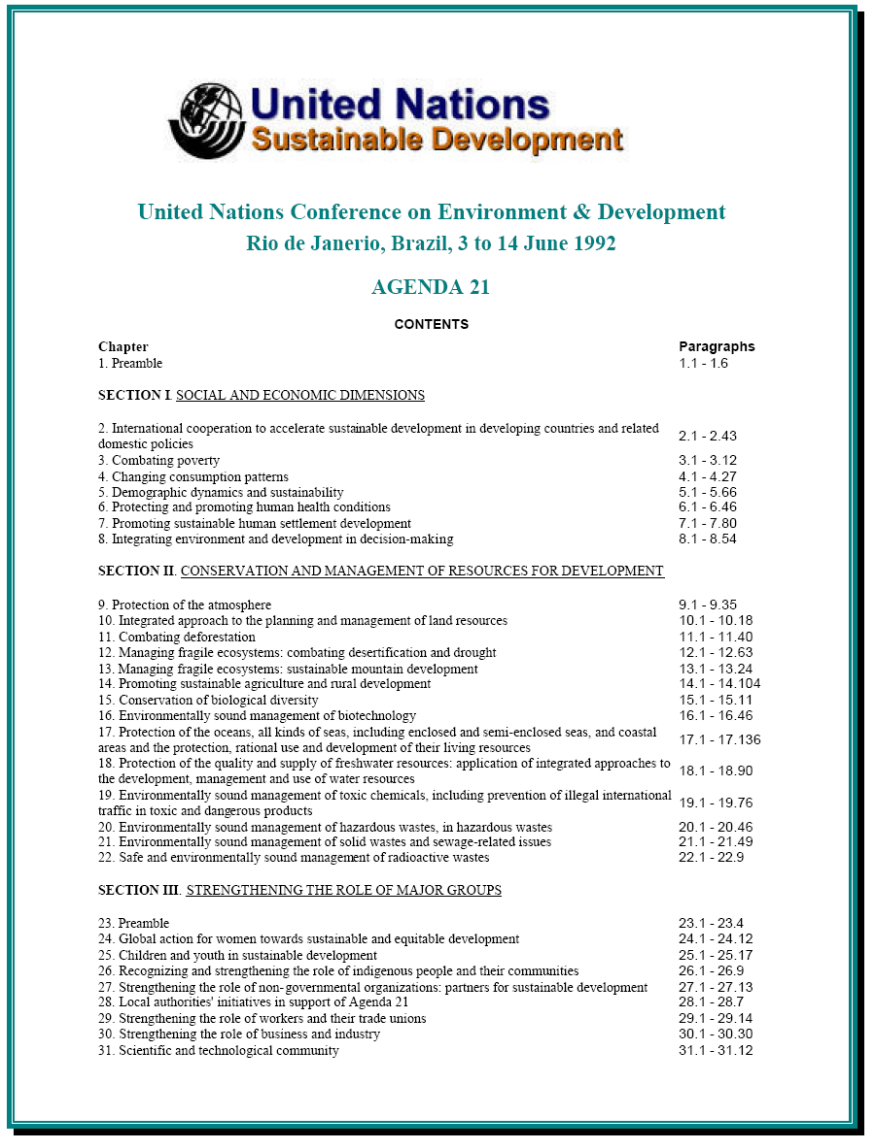
Agenda 21

UN Conference on Environment and Development

Origin 1992 Rio de Janeiro

All words phrases and concepts can be found in ‘Agenda 21’ at UN website

4 sections, 8 Chapters, 351 pages



United Nations
Sustainable Development

United Nations Conference on Environment & Development
Rio de Janerio, Brazil, 3 to 14 June 1992

AGENDA 21

CONTENTS

Lodi Rules and Sustainability

1992	IPM
2007	First 7,000 acres 12 growers
2008	10,000 acres
2009	15,000 acres
2010	20,000 acres

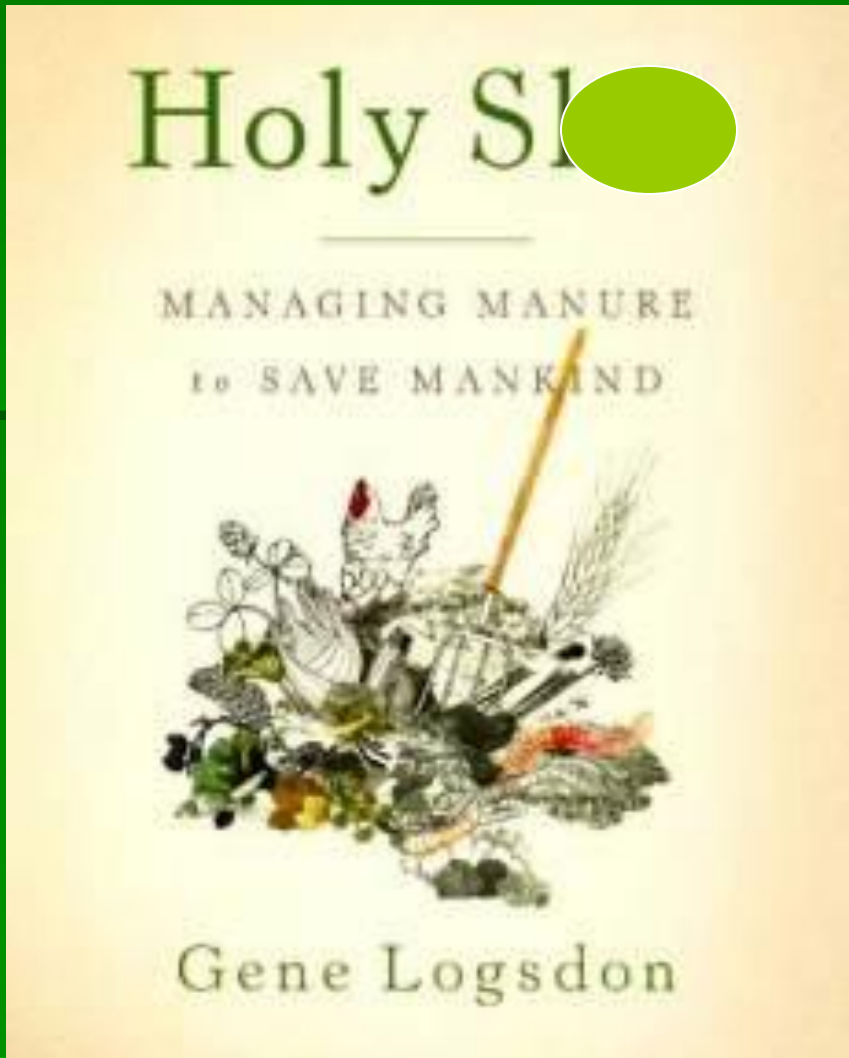
Integrated Pest Management Foundation of Sustainability

- Identify Pest
- Learn their biology
- Monitor
- Determine Threshold
- Choose Appropriate Control
- Keep Records

Current Trends Beyond IPM

Conventional/Standard/IPM

Sustainable
Organic
Biodynamic



Sustainability of Inputs

- Energy
- Water
- Resources & Nutrients
- Labor

Energy Alternatives

- Solar
- Biofuels
- Miscellaneous Fuel

- Natural Gas
- Nuclear
- Coal sand

Biofuels and Ethanol (Son of Gasohol)

If all soybean production went to biofuel; overall oil use decrease is 1.5%
4.5 million acres of all U.S. crops; could provide 63% of diesel demand
Biodiesel increases NOx and VOCs

1.34 gallons of EtOH equals 1 gallon of oil
All U.S. corn acreage could produce 7% of oil needs
EtOH increases NOx
increases VOC
produces Carbon dioxide
produces water vapor (a GHG)
corrosive to metal and some plastic

Solar

The 1% Solution

- Efficiency is limited, but increasing slightly
- Currently no potential for significant improvement
- Battery storage still a problem for 24 hour use
- Efficiencies often reported of less than 10% potential capacity
- Requires subsidies, grants, and tax credits or deductions

+ Can contribute in small scale and isolated sites

About 30,00 acres of land needed to provide half of San Joaquin electric use for one year (during daylight hours).

Other Sources

- Algae?
- Tidal?
- Thermal?

- Natural gas
- Coal sands
- Nuclear
- Hydro electric

H. Watson, Jr.

UNIVERSITY OF ARIZONA
AGRICULTURAL EXPERIMENT STATION

TIMELY HINTS FOR FARMERS

No. 95

June 12, 1912

WINDMILLS FOR IRRIGATION PUMPING

(Revised April 5, 1916)

Windmills in Arizona are one of the commonest features of the landscape, and one of the most pleasing. In some sections of the State every homestead requires a windmill to complete its equipment, and to the cattlemen windmills are indispensable. It is often asked to what extent they can be used for irrigation pumping. Is the possible acreage large enough to justify the expenditure? And are the uncertain winds sufficiently reliable to mature the crops? As in other matters of like nature the answers depend upon the attendant conditions. Occasionally windmill irrigators have been disappointed in their efforts and thousands of dollars worth of crops, sometimes nearly ready for the market, have withered and died because the winds did not blow at the right time. Yet in some parts of the State a large amount of produce, particularly garden stuff, is irrigated successfully with the aid of windmills, and it is believed that a fairly good brief can be written in the windmill's defense.

THE POWER OF THE WIND

The commonly used measure of the wind is the number of miles that it travels, or the number of miles of wind that pass by a place, say, in twenty-four hours or in a month. This is called the "wind movement" and is obtained by means of a registering anemometer. The wind movement varies greatly, being least in narrow sheltered valleys and greatest on elevated broad valleys or mesas

Wind –Back to the Future

General Resources

Julian Simon vs Paul Ehrlich
1981

Water Sustainability

- California storage system
  - 1937 Central valley Project
  - 1960 State Water Project
- Ground Water
- Urban - Environmental - Agriculture

Conservation and Innovation

Conservation may save 5% of future needs

Innovation in conservation technology may be limited.

For example: …

70,000 square foot facility designed for rain catchment could yield 400,000 gallons of rain water = 14.7 acre inches.

Or enough to irrigate 1 acre for one season

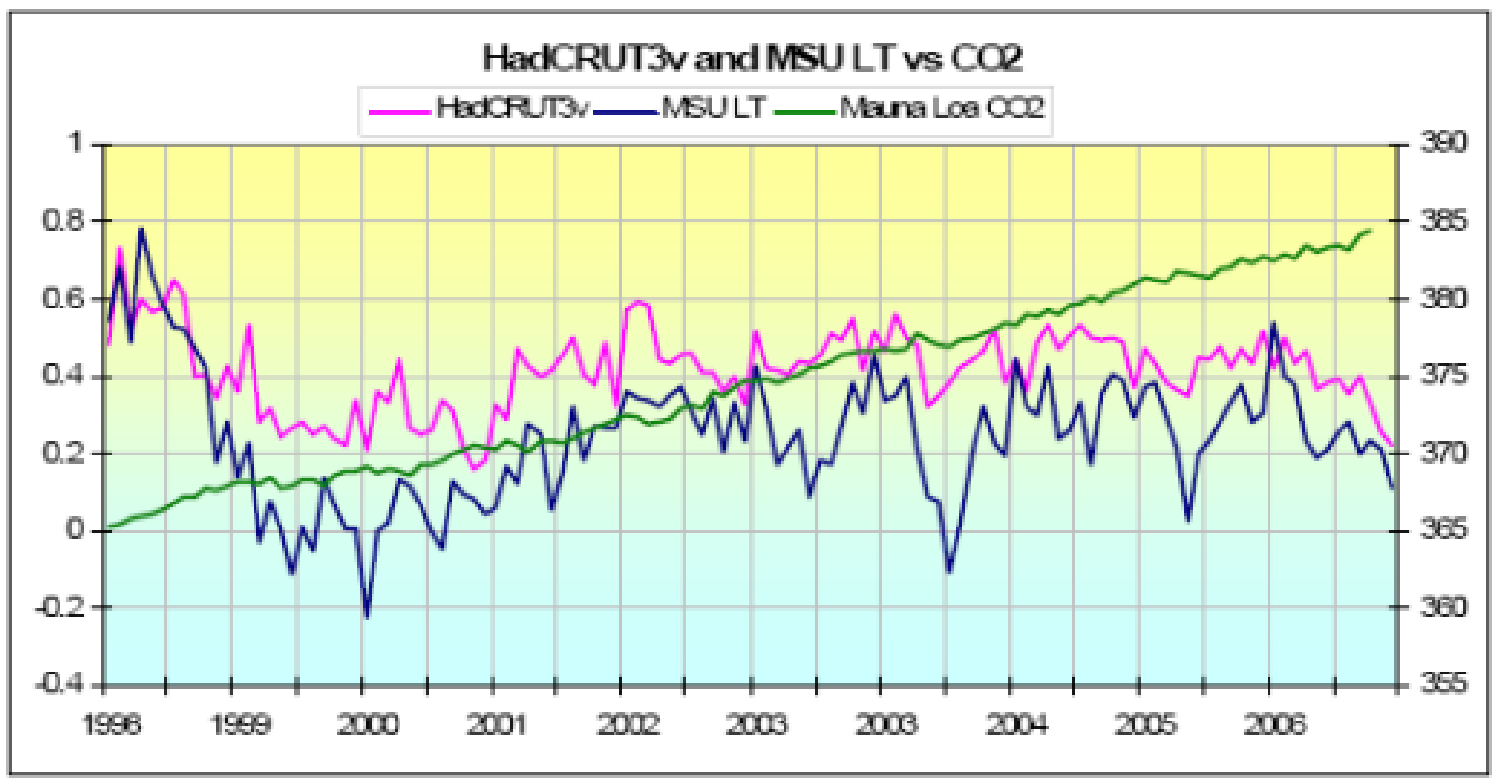
Labor & Alternative Systems

- Availability
- Costs
  - Direct Costs
  - Safety
  - Liabilities
  - Windows of Demand

Sustainability for Climate Change/Global Warming

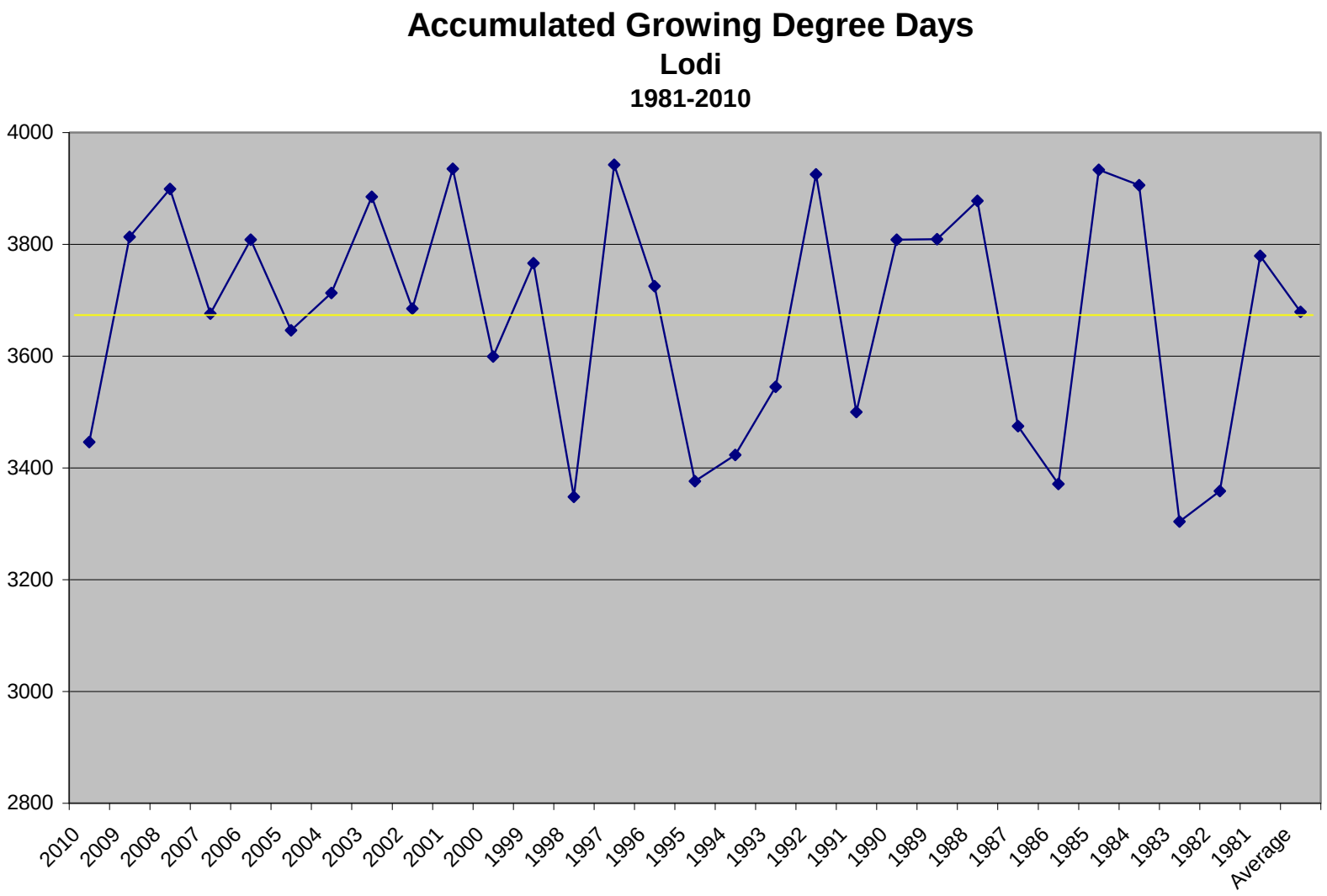
- CO_2 determined to be pollutant by EPA
- What will this mean for future of soda drinks and sparkling wines ?

TBD



HadCRUT3 = Hadley Research Unit Temperatures

MSULT = Microwave Sounding Unit Lower Troposphere Temperatures


Accumulated Growing Degree Days
Lodi
1981-2010
4000
3800
3600
3400
3200
3000
2800
2010
2009
2008
2007
2006
2005
2004
2003
2002
2001
2000
1999
1998
1997
1996
1995
1994
1993
1992
1991
1990
1989
1988
1987
1986
1985
1984
1983
1982
1981
Average

Best Management Practices

- Goals
- Returns
- Marketing

Definitions and Interpretations

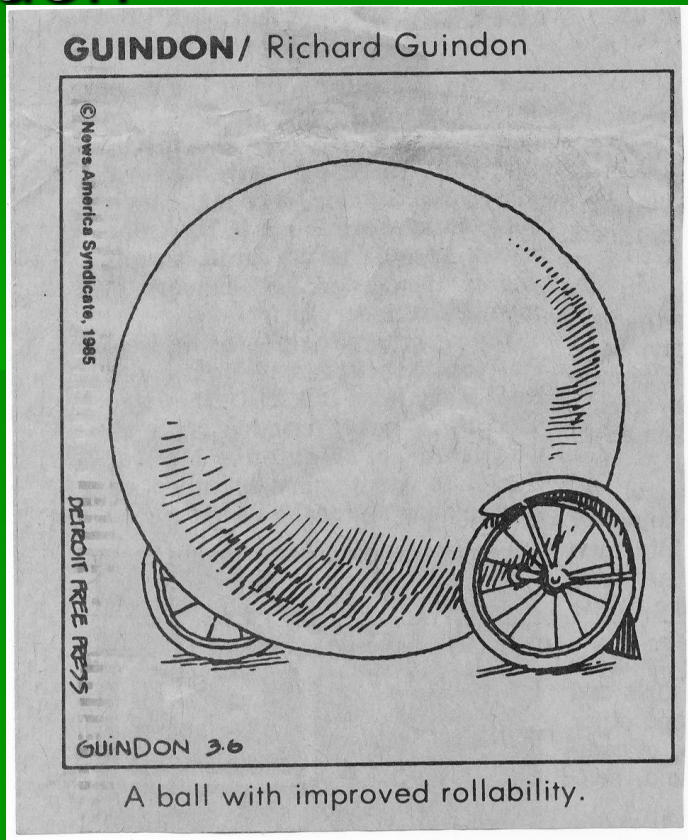
Ownership & direction of programs and efforts

Regulatory Interest Good vs Bad

Viticulture Practices and Sustainability

- Pruning Weight to Crop ratio
- Pruning wt per foot of cordon
- Buds per lb of Prunings
- Shoot Length
- Cluster Exposure
- Spur separation

Winkler's Principles of Pruning, 1931



What is Sustainability?

Back to the question, definition and goals within a context of real world demands.

Sustainability

Production costs

Inflation of inputs

Interest rates

Credit availability

Regulatory Burden

Partial List of Agencies, Offices, and Specific Legislation Affecting Agricultural Operators 2010

Acronmym	Agency	State or Fed/year
AHMTE	Agricultural Hazardous Materials Transportation Program	s 2002
ARLB	Agricultural Labor Relations Board	s
BLM	Bureau of Land Management	f
BOE	Board of Equalization	s
BOR	Bureau of Reclamation	
Cal/EPA	California Environmental Protection Agency	s
CALFED	California Federal Water Agency (23 agencies state & federal)	s/f
CalOSHA	California Occupational Safety and Health Administration	s
CARB	California Air Resources Board	s
CBDA	California Bay-Delta Authority	s
CBSC	California Building Standards Commission	s
CDFA	California Department of Food and Agriculture	s
CDHS	California Department of Health Services	s
CEC	California Energy Commission	s
CHP	California Highway Patrol (Trucking Terminal Inspection)	s
CHSWC	Commission on Health Safety and Worker Compensation	s
CIWMB	California Integrated Waste Management Board	s
CRHPC	California Rural Health Policy Commission	s 1996
CVRWQB	Central Valley Regional Control Board	s
CWRB	California Water Resources Board	s
DEHHA	Department of Environmental Health Hazard Assessment	s
DFEH	Department of Fair Employment and Housing	s
DHHS	Department Human Health Services	f
DHS	Department of Homeland Security	2002
DIR	Department of Industrial Relations	s
DLSE	Division of Labor Standards Enforcement	
DMV	Department of Motor Vehicles	s
DOC	Department of Conservation	
DOJ	Department of Justice	f
DOL	Department of Labor	f
DOSH	Department of Occupational Health	s
DOT	Department of Transportation	f
DPC	Delta Protection Commission	s
DPR	Department of Pesticide Regulation	s
DTSC	Department of Toxic Substances Center	s 1991
DWC	Division of Workers Compensation	s
DWR	Department of Water Resources	s
EDD	Employment Development Department	s
EPA	Environmental Protection Agency	f
FDA	Food and Drug Administration	f 1938
FGS	Fish and Game Service	s
FMCSA	Federal Motor Carriers Safety Administration	f 2002
FORC-G	Food Outbreak Response Group	f
FTB	Franchise Tax Board	s
FWS	Fish and Wildlife Service	f
HACCP	Hazard Analysis Critical Control Point Program (FDA)	f
ICE	Immigration Control Enforcement	2002
INS	Immigration and Naturalization Service	f
IRS	Internal Revenue Service	f 1913
NFSE	National Food Safety Initiative	f
NPDES	National Pollutant Discharge Elimination System	f
OEHHA	Office of Environmental Health Hazard Assessment	s 1991
OSHA	Occupational Safety and Health Administration	
OSHSB	Occupational Safety and Health Standards Board	
SFM	State Fire Marshal	s
SIP	Self Insurance Program	
SJCDPW	San Joaquin Co Public Works Water Resources Div	
SJCEHB	San Joaquin County Environmental Health Board	
SWRCB	State Water Resources Control Board	s
TSA	Transportation Services Agency	s 2002
USACE	U.S. Army Corps of Engineers	f
WCAB	Workers Compensation Appellate Board	s
WOSHTEP	Worker Occupational Safety and Health Training and Education Program	s

Acronym	Specific Legislation	State or Fed/year
AB 3030	*Ground Water Management Act*	s 2002
AB 32	*Global Warming Act*	s 2008
ADA	*Americans with Disabilities Act*	1992
BA	*Bioterrorism Act*	f 2002
CAA	*Clean Air Act 1972*	f
CACSS	*AB3001 California Cargo Securement Standards*	s 2007
CEQA	*California Environmental Quality Act*	s
CERCRA	*Comprehensive Environmental Resource, Compensation and Recovery Act*	f 1980
CTR	*California Toxics Rule*	s 2002
CWA	*Clean Water Act 1970*	f
EWA	*Environmental Water Account*	
FIFRA	*Federal Insecticide and Rodenticide Act*	f 1933
FLSA	*Fair Labor Standard Act*	f
FMLA	*Family Medical Leave Act*	1996
FQPA	*Food Quality Protection Act*	f 1996
GISO 3395	*Heat Stress Standard Training*	s 2008
IRCA	*Immigration Reform and Control Act*	f 1986
MSPA	*Migrant and Seasonal Worker Protection Act*	
NEPA	*National Environmental Policy Act*	f 1969
NLRA	*National Labor Relations Act*	f
PCWQA	*Porter-Cologne Water Quality Act*	s
PHSBPRA	*Public Health Security and Bioterrorism Preparedness and Response Act of 2002*	f 2002
RCRA	*Resource Conservation and Recovery Act*	f 1976
SARA Title III	*Superfund Amendments and Reauthorization Act* (EPCRKA)	f 1986
SJCHMR	*SJC Hazardous Material Registration Annual*	
SDWA	*Safe Drinking Water Act*	f 1974
SSA	*Social Security Act*	f 1934
WPS	*Worker Protection Safety Act*	1990

63 Agencies
28 Acts/Laws
Total = 91 (62 total in 1999)

Paul S. Verdegaal, U.C. Farm Advisor
October 2010

91 62 in 1999

Fiscal and Monetary Policy

Spending Free Money & Grants

$1 Trillion ($1,000,000,000,000)

Spend $10,000,000 per day, after 137 years, you would have spent HALF!

$25 Billion ($25,000,000,000)

Spend $10,000,000 per day, you would run out of cash in November 2017

Sustainability: Definitions and Ownership

- Economics – Moderation & commonsense
- Environment – Leave a place better than you found it
- Equity – Do unto others as you would have them do unto you

Science & Common sense

Set Realistic Goals

Question terms an definitions

Ownership vs Regulatory & Advocacy Interest

Funding Research & Education vs Regulatory Investment

Conclusions

"Cultivators of the earth are the most valuable citizens. They are the most vigorous, the most independent, the most virtuous and they are tied to their country and wedded to its liberty and interests by the most lasting bonds."

Thomas Jefferson

"The cultivation of the earth is the most important labor of man. Unstable is the future of the country, which has lost its taste for agriculture. If there is one lesson of history, that is unmistakable, it is that national strength lies very near the soil."

Daniel Webster