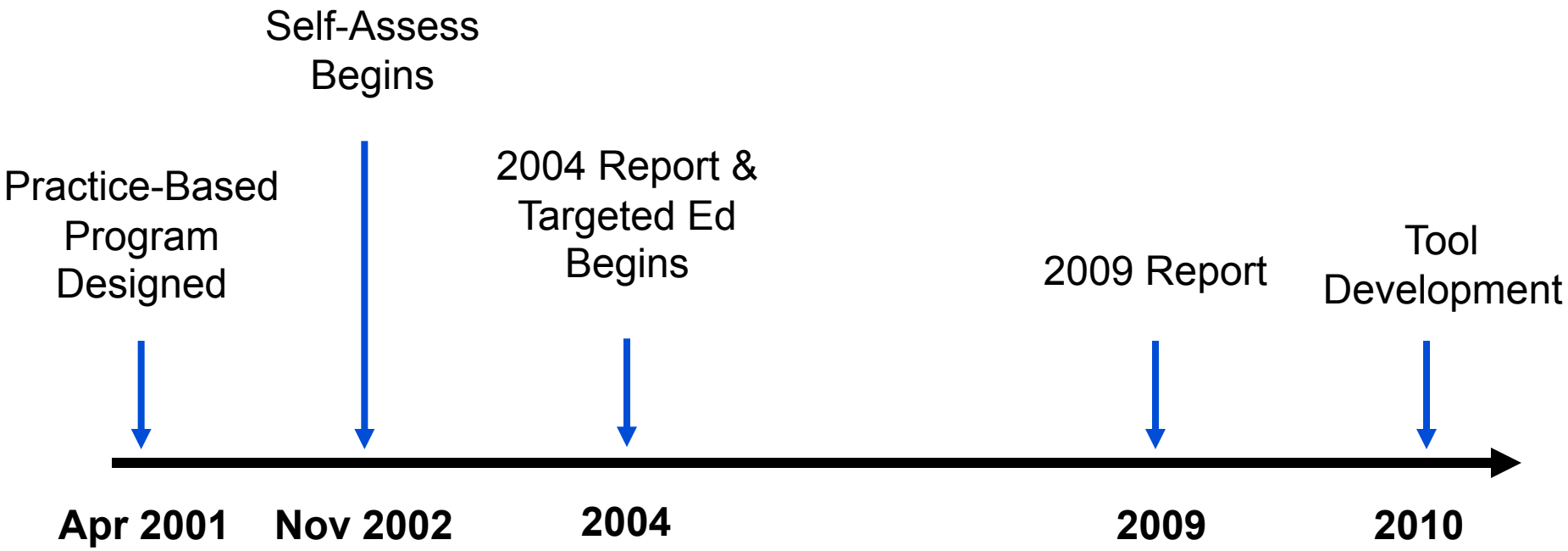
Performance Metrics: the Next Step for Sustainable Winegrowing

CalCAN UC Davis Summit
March 31, 2011

John Garn

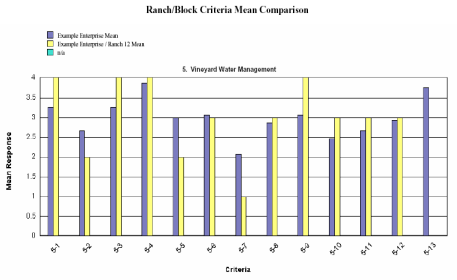
SWP Background



CALIFORNIA SUSTAINABLE WINEGROWING ALLIANCE

pest monitoring

Self Assess



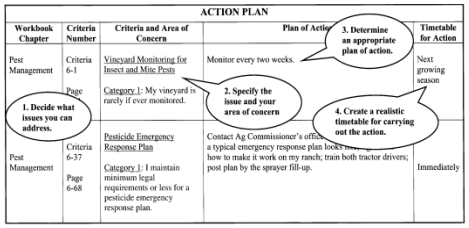
custom report

Interpret Performance

targeted education

Develop Action Plan to Improve

action plan



ACTION PLAN

Workbook Chapter	Criteria Number	Criteria and Area of Concern	Plan of Action	Timetable for Action
Pest Management	Criteria 6-1 Page	Vineyard Monitoring for Insect and Mite Pests Category 1: My vineyard is rarely if ever monitored.	Monitor every two weeks.	Next growing season
Pest Management	Criteria 6-37 Page 6-68	Pesticide Emergency Response Plan Category 1: I maintain minimum legal requirements or less for a pesticide emergency response plan.	Contact Ag Commissioner's office; a typical emergency response plan looks like; how to make it work on my ranch; train both tractor drivers; post plan by the sprayer fill-up.	Immediately

1. Decide what issues you can address.
2. Specify the issue and your area of concern
3. Determine an appropriate plan of action.
4. Create a realistic timetable for carrying out the action.

*SWP **Cycle** of Continuous Improvement*

Implement Change

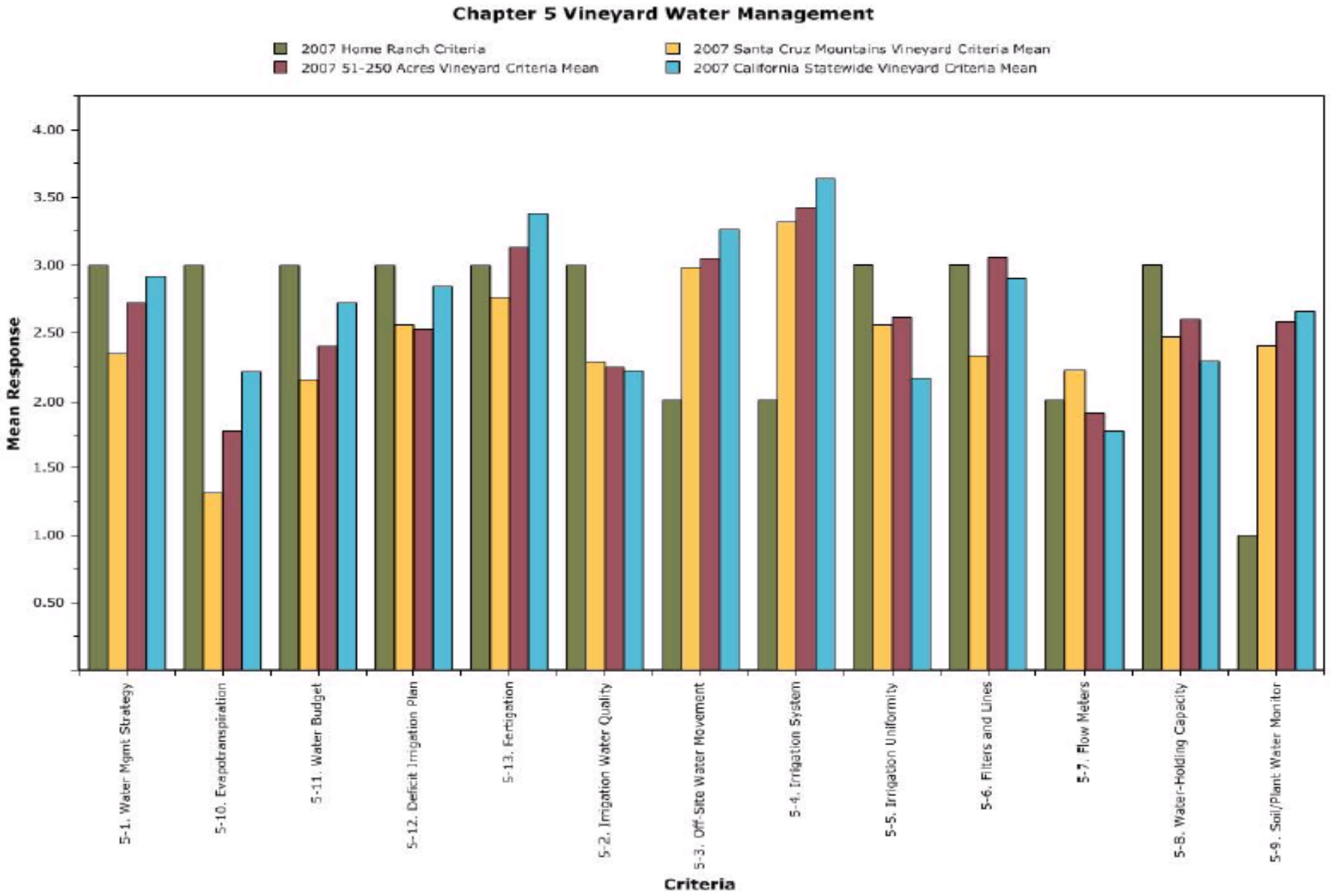
SWP Workbook Framework

227 Criteria with Four Categories of Practices

SOIL MANAGEMENT - TILTH

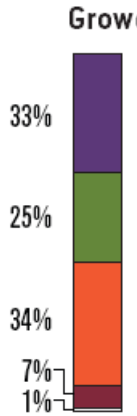
CRITERIA	CATEGORY 4	CATEGORY 3	CATEGORY 2	CATEGORY 1
4-8 Organic Matter (Skip if organic matter sufficient for your soil type)	A combination of organic matter is added to the soil **annually** (e.g. permanent or annual cover crop, compost, and/or manure) ***And*** Tillage is reduced or eliminated to lower the rate of organic matter breakdown.	Some form of organic matter is added to the soil **annually** (e.g. annual cover crop, compost, manure, or a combination of cover crop and manure or compost).	Resident vegetation is allowed to grow in the winter.	No organic matter is added to the soil other than what the vine produces, and resident vegetation is minimized in the winter ***And*** The vineyard is clean tilled.
Organic matter improves soil tilth and structure, improves aeration and infiltration, increases water-holding capacity, buffers soil pH, increases the availability of micronutrients, provides a source of plant nutrients, and feeds beneficial micro-organisms				

SWP – Practice Assessment



SWP – Practice Improvement

Benchmark Data



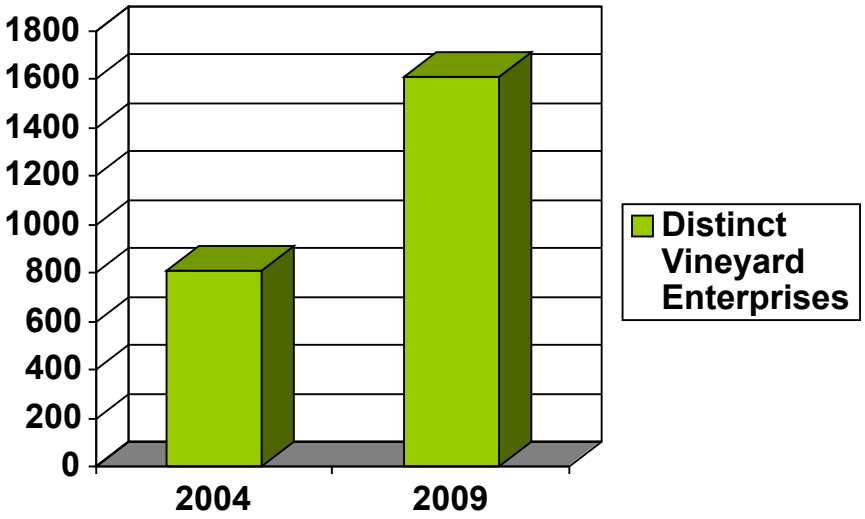
5-1. WATER MANAGEMENT STRATEGY
Development and implementation of a water management strategy is key to making effective and efficient vineyard water use decisions. 92% of the growers have defined comprehensive water management strategies and grape-growing goals, with 58% having in place the tools to accomplish those goals and 33% having implemented the strategy for over one year. 7% of the growers have not developed a water management strategy for their vineyards. Less than 1% of the growers replied N/A, not applicable or information not available.

STRENGTHS AND OPPORTUNITIES FOR IMPROVEMENT

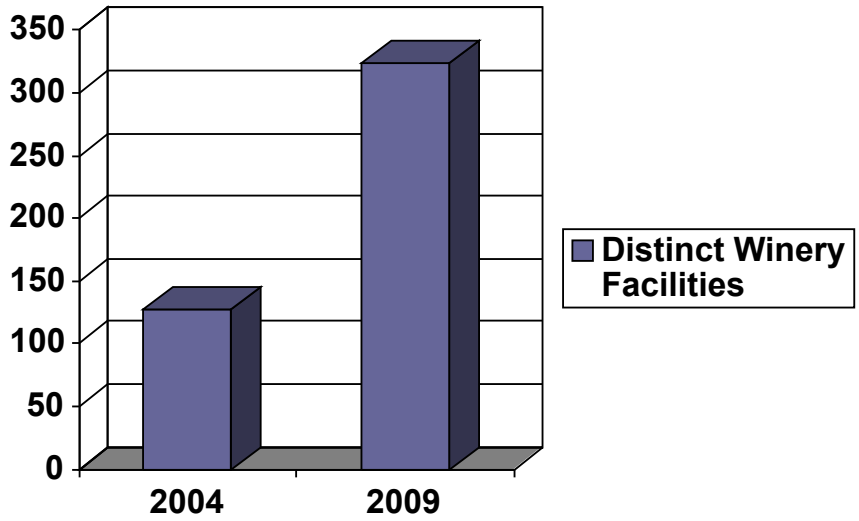
STRENGTHS	MIDDLE GROUND	MOST OPPORTUNITIES
Viticulture	Vineyard Water Management	Energy Efficiency
Soil Management	Pest Management	Materials Handling
Wine Quality	Winery Water Conservation & Quality	Waste Reduction
Ecosystem Management	Human Resources	Environmentally Preferred Purchasing
	Neighbors & Community	
	Air Quality	

Overall SWP Participation

2004 Report to Present



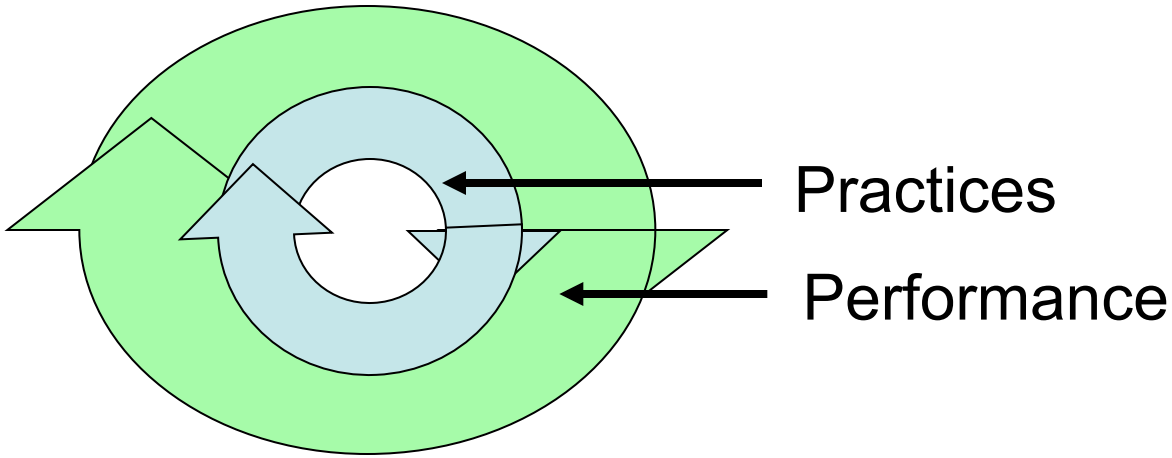
More than double!



More than 150%!

1,566 vineyards and wineries

Performance Metrics – The Missing Link?



Relationship between practices and outcomes?

Which practices have most impact?

CALIFORNIA
SUSTAINABLE WINEGROWING
ALLIANCE

SWP – Performance Improvement?

But what about quantifying impacts on resources?

- Water use?
- Energy efficiency?
- Fertilizer use?
- Air quality?
- Pesticide non-target impacts?

What are the measurable outcomes from practices used by individual operations and the industry?

“If you can’t measure it, you can’t manage it…”

CALIFORNIA
SUSTAINABLE WINEGROWING
ALLIANCE

Performance Metrics – Why Care?

Cents & Sensibility = risk management

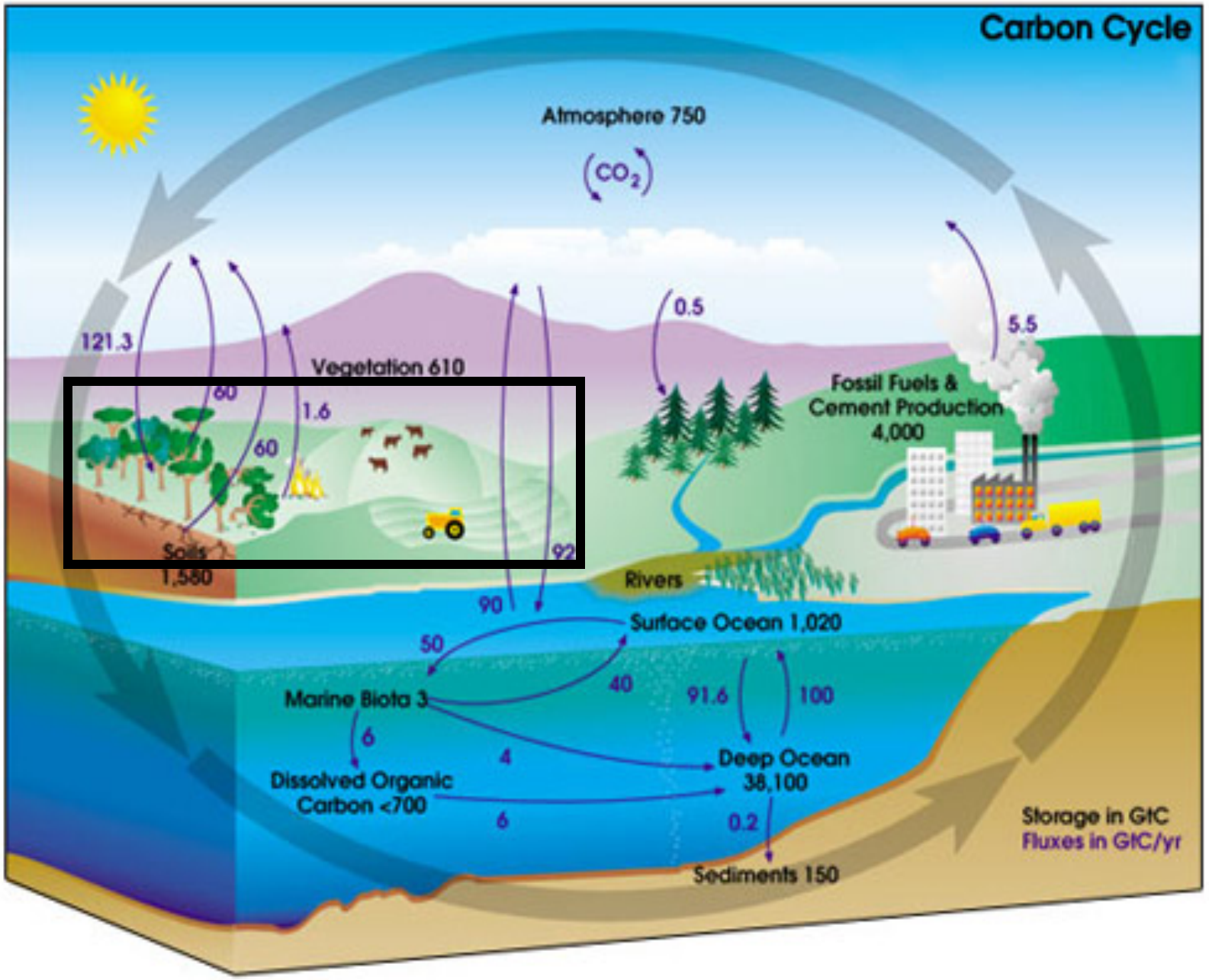
- "Practice-to-Outcome" understandings improve efficiencies ($)
- Measurements sort real from perceived performance
- Comparisons to peers reveal where you are and where you can go
- "Practice-to-Outcome" understandings minimize adverse human & environmental impacts
- Customer/market demand for transparency of product information
- Potential for incentives via market benefits, regulatory relief, and ecosystem services (saleable offsets or conservation payments)

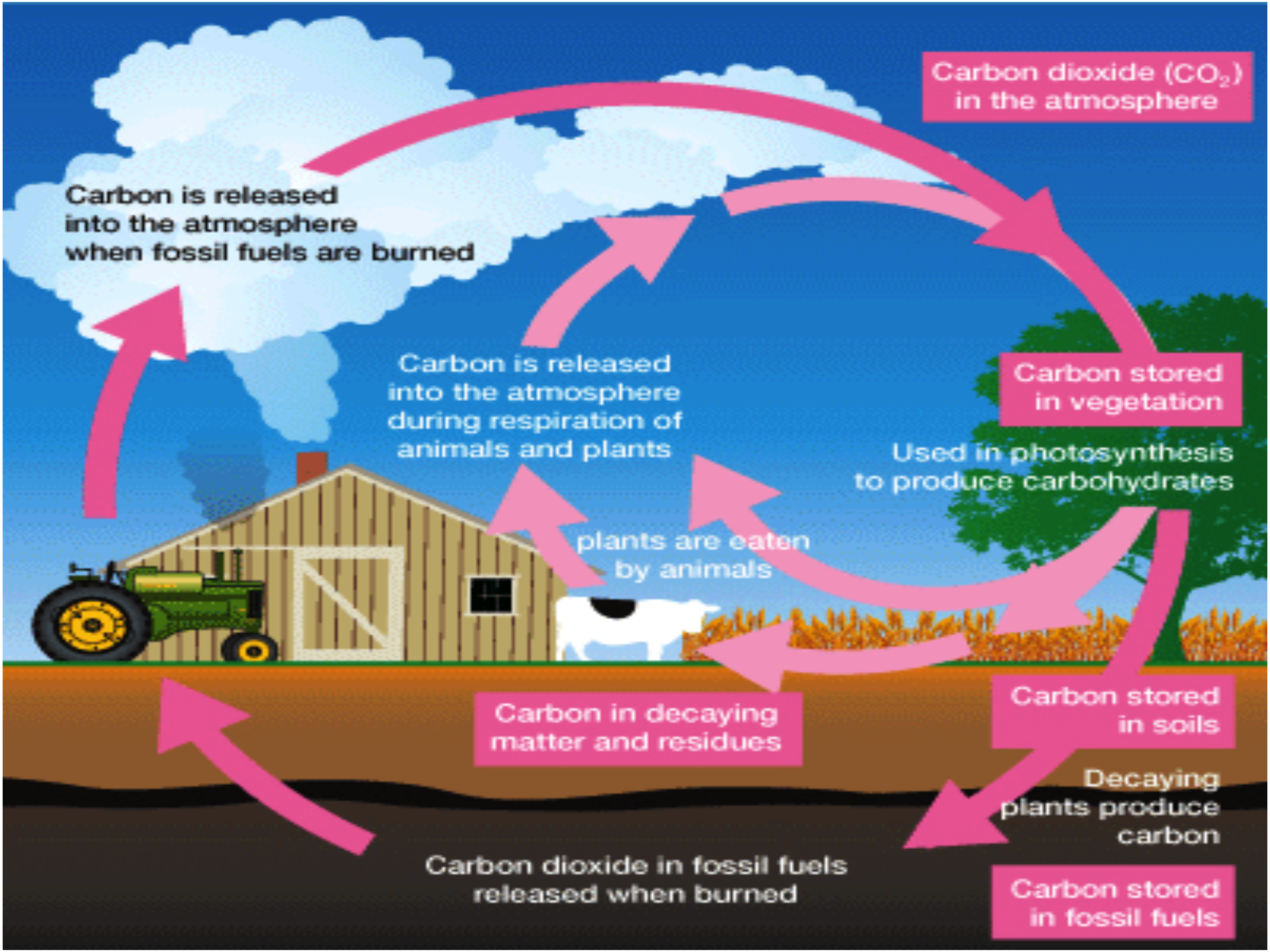
CALIFORNIA
SUSTAINABLE WINEGROWING
ALLIANCE

Performance Metrics – What are They?

- **Water**
- **Energy**
- **Nutrients**
- **Greenhouse Gases**
- Air Quality
- Waste
- Pesticides
- Biodiversity
- Human Resources

CALIFORNIA
SUSTAINABLE WINEGROWING
ALLIANCE


Carbon Cycle
Atmosphere 750
(CO_2)
121.3
60
60
1.6
Vegetation 610
0.5
5.5
Fossil Fuels &
Cement Production
4,000
Soils
1,580
92
Rivers
90
Surface Ocean 1,020
50
40
91.6
100
Marine Biota 3
6
4
Deep Ocean
38,100
Dissolved Organic
Carbon <700
6
0.2
Sediments 150
Storage in GtC
Fluxes in GtC/yr


Carbon dioxide (CO_2) in the atmosphere
Carbon is released into the atmosphere when fossil fuels are burned
Carbon is released into the atmosphere during respiration of animals and plants
Carbon stored in vegetation
Used in photosynthesis to produce carbohydrates
plants are eaten by animals
Carbon in decaying matter and residues
Carbon stored in soils
Decaying plants produce carbon
Carbon dioxide in fossil fuels released when burned
Carbon stored in fossil fuels

GHGs, Efficiencies & Potential Markets

Inputs

- Climate
- Soil
- Plant

- Fuel
- Electricity
- Water
- Fertilizer
- Crop protection

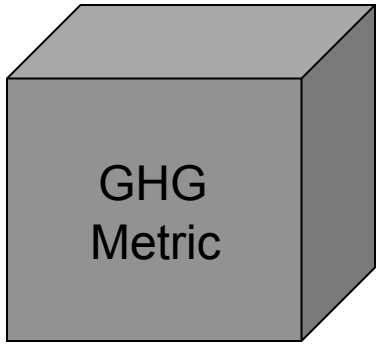
GHG Metric

$X (?)

Carbon Offsets/Credits

Efficiency = ↓ Costs

CALIFORNIA SUSTAINABLE WINEGROWING ALLIANCE



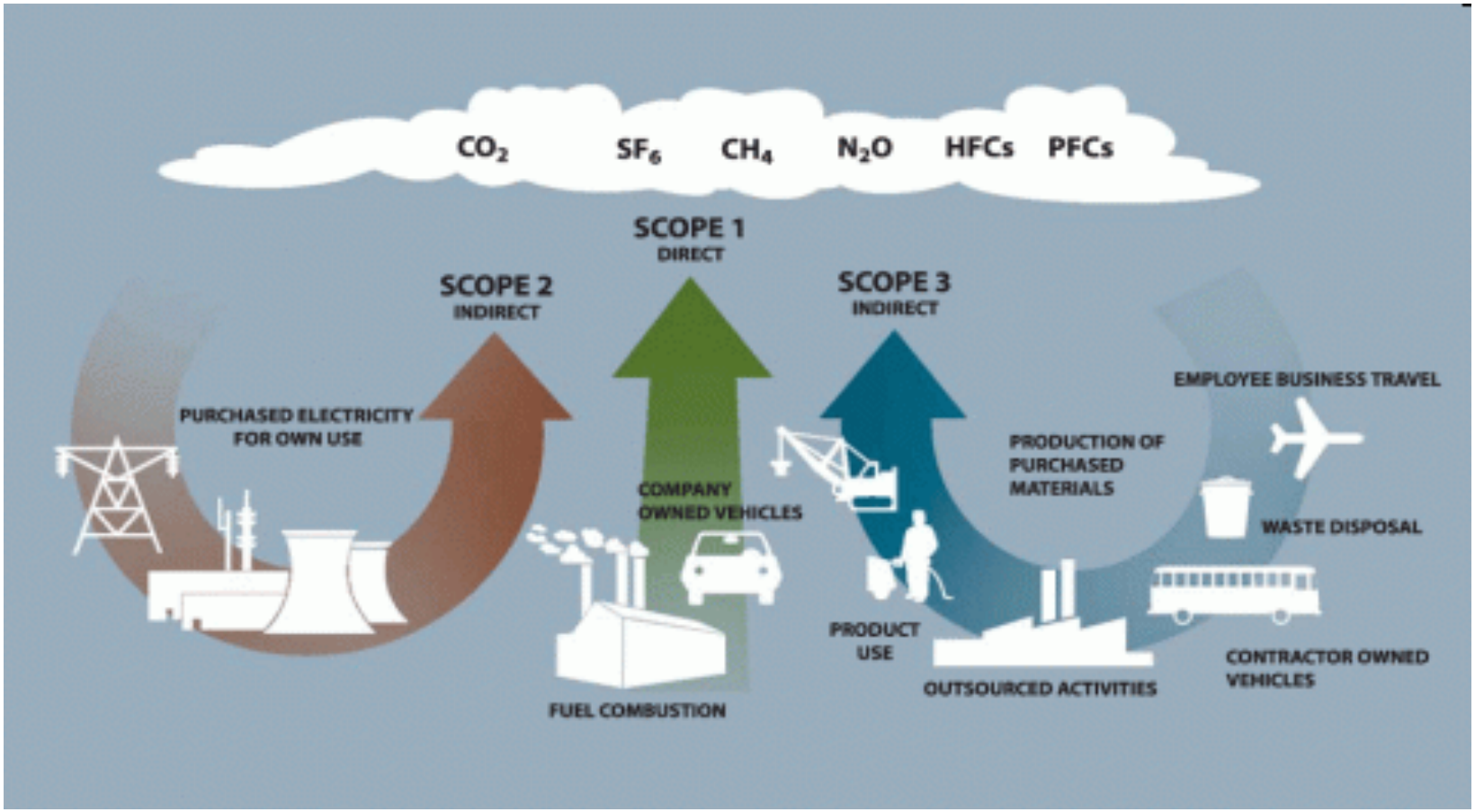
Which protocol?

What coefficients?

What scopes?

Uncertainties like sequestration

GHG Basics



- Phase 1 Tool focus is Scope 1 & 2 emissions from fuel & electricity use
- Carbon Footprint = emissions - offsets

CALIFORNIA
SUSTAINABLE WINEGROWING ALLIANCE

IWCC v1.3 Global Warming Potentials for Refrigerants			
		100-year Global Warming Potentials	
Refrigerant	Chemical Formula	IPCC SAR 1996	IPCC AR4 2007
HFC-23	CHF3	11,700	14,800
HFC-32	CH2F2	650	675
HFC-41	CH3F	150	92
HFC-43-10mee	C5H2F10	1300	1640
HFC-125	C2HF5	2800	3500
HFC-134	C2H2F4 (CHF2CHF2)	1,000	1,100
R-134a (HFC-134a)	CH_2FCF_3	1,300	1,430
HFC-143	C2H3F3 (CHF2CH2F)	300	353
R-143a (HFC-143a)	C2H3F2 (CH_3CF_3)	3,800	4,470
HFC-152a	C2H4F2 (CH3CHF2)	140	124
HFC-227ea	C3HF7	2,900	3,220
HFC-236fa	C3H2F6	6,300	9,810
HFC-245ca	C3H3F5	560	693

Online Energy & GHG Intensity Tool

- User-Friendly
- Educational
- Scientifically Credible & Accurate

(stepwise development)

http://www.sustainablewinegrowing.org/ghg

Username = ghguser
Password = winegrapes

CALIFORNIA
SUSTAINABLE WINEGROWING
ALLIANCE