Green Tech Advances in the Vineyard

Nick Frey – Sonoma Winegrape Commission
Pam Mitchell – SureHarvest
Julie Nord - Nord Vineyards

WITS
WINE INDUSTRY TECHNOLOGY SYMPOSIUM

July 15, 2008 - The Napa Valley Marriott

Agenda

- What does “green” mean?
- Green Technologies
- Conservation of Resources
- Green Technology Transfer to the Workforce
- Resources

What does “green” mean?

It's Not Easy Being Green:

It's not that easy being **green**
Having to spend each day the color of the leaves
When I think it could be nicer being red, or yellow or gold
Or something much more colorful like that

It's not easy being **green**
It seems you blend in with so many other ordinary things
And people tend to pass you over 'cause you're
Not standing out like flashy sparkles in the water
Or stars in the sky

But **green**'s the color of Spring
And **green** can be cool and friendly-like
And **green** can be big like an ocean, or important
Like a mountain, or tall like a tree

When **green** is all there is to be
It could make you wonder why, but why wonder why
Wonder, I am **green** and it'll do fine, it's beautiful
And I think it's what I want to be

Lyrics by Joe Rapposo

What does “green” mean?

California Sustainable Winegrowing Alliance (CSWA) –

- The sustainability program defines sustainable winegrowing as growing and winemaking practices that are sensitive to the environment (Environmentally Sound), response to the needs and the interests of society-at-large (Social Equitable), and are economically feasible to implement and maintain (Economically Feasible). www.cswa.org

Lodi Rules

- Sustainable viticulture is a long term approach to managing winegrapes which optimizes winegrape quality and productivity by using a combination of biological, cultural and chemical tools in ways that minimize economic, environmental, and health risks. www.lodiwine.com

Fish Friendly Farming

- The Farm Conservation Plan inventories and evaluates natural resources and practices on the entire property, not just in the vineyards. This approach assures a comprehensive program to achieve environmental quality and improvement. The Farm Conservation Plan is a strategy for implementing Beneficial Management Practices (BMPs) and guides the improvement of land management practices and the implementation of projects for a specific property. www.fishfriendlyfarming.org

What does “green” mean?

Central Coast Vineyard Team (CCVT) & UC Sustainable Agriculture Research and Education Program (SAREP) –

- Sustainability rests on the principle that we must meet the needs of the present without compromising the ability of future generations to meet their own needs. Therefore, stewardship of both natural and human resources is of prime importance. Sustainable farming systems are biologically-based and designed to be productive in both the short- and long-term. www.vineyardteam.org

- ***Green Technology –*** Green Technology is a continuously evolving group of methods and materials based on the application of knowledge for practical purposes in the areas of sustainability, cradle to cradle design, source reduction, innovation and viability. www.green-technology.org

- ***CCOF -*** Organic food is produced by farmers who emphasize the use of renewable resources and the conservation of soil and water to enhance environmental quality for future generations (USDA). www.ccof.org

What does “green” mean?

. . . stewardship of both natural and human resources

California Sustainable Winegrowing Alliance (CSWA) –
The susta
the envir
Equitable
. . . fa
Central
(SAREP)
Sustainal
future ge
importan
long-term

Sustainal
Because
can be ca
region. T
environm
. .
Green Tec
practical pu

CCOF - Organic food is produced by farmers who emphasize the use of renewable resources and the conservation of soil and water to enhance environmental quality for future generations (USDA). www.ccof.org

Fish Friendly Farming - The Farm Conservation Plan inventories and evaluates natural resources and practices on the entire property, not just in the vineyards. This approach assures a comprehensive program to achieve environmental quality and improvement. The Farm Conservation Plan is a strategy for implementing Beneficial Management Practices (BMPs) and guides the improvement of land management practices and the implementation of projects for a specific property. www.fishfriendlyfarming.org

. . . Practices that are sensitive to environment, social equity and economics

What does Green Mean?

Conservation of Resources

&

Action

Green Technologies

How do we make farming technology more green?

Use technology that requires less or alternative resources

Conservation

How do we support green farming practices through technology?

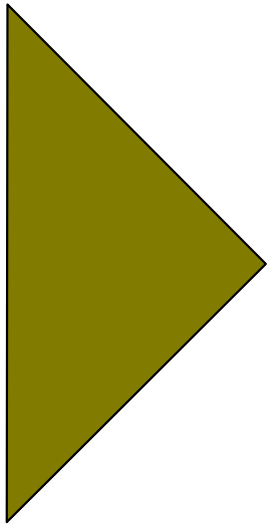
Use farming data for greater precision of resource usage and management

Active Knowledge

Green Farming through Technology

Data and Analysis–

- Farming Management Information Systems
- Field Monitoring Equipment and Mapping
- Farming Application Models



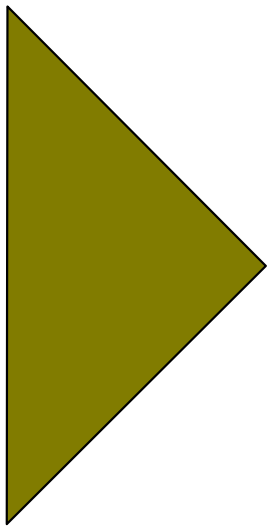
*Increase understanding of field status allowing more timely decision making and **precise application of resources** (e.g. chemicals, labor, water)*

WITS

Green Farming through Technology

Equipment Advances –

- Equipment Alternatives
- Precision Farming

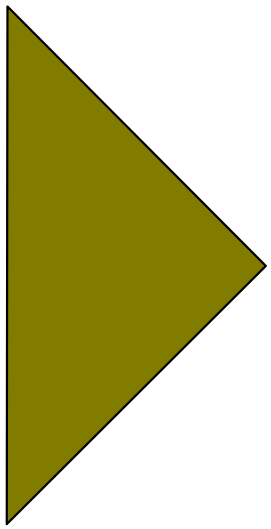


Reduce equipment impact *(e.g. emissions, compaction) with the same or similar result and* ***reduce resources*** *use by directing resources to targeted areas*

Green Farming through Technology

Chemical Advances –

- Chemical Use Rates and Toxicity
- Pest Targeting (Selectivity)



Reduce chemical use *with same/similar result and/or* ***reduce non-target impact*** *of application*

Conservation of Resources

Nick Frey

Sonoma Winegrape Commission

July 15, 2008 - The Napa Valley Marriott

WITS
WINE INDUSTRY TECHNOLOGY SYMPOSIUM

Conservation of Resources

- Fuel
- Water
- Materials Reduction & Recycling
- The Tradeoffs

Conservation of Fuel

- Cover crops
  - Reduce tillage
- Solar powered filter and valve operators
- Match horsepower to the task
- Radio and cellular communications
- On-farm housing for supervisors and vineyard employees

Conservation of Fuel

- Use disease models to time spray applications
- Multi-row sprayers to reduce tractor passes
- Electrostatic sprayers to reduce water volume
- Use ATV on farm instead of pickup
- ATV for in-row herbicide applications
  - Weed seeker for follow up

Conservation of Water

- Drip irrigation with pressure compensating emitters
- Monitor soil and plant water status
- Irrigate based upon ET demand
- Short, frequent irrigation to avoid water moving through the root zone
- Nighttime irrigation
- Raise threshold for heat suppression
  - Short intervals for cooling, e.g. 1 hr on, 1 hr off

Conservation through Materials Reduction & Recycling

- Bulk pesticide and fertilizer purchases
  - Reduce packaging
- Maintain wider row spacings
  - 6 or 8 ft vs 4 ft
- Recycle pesticide containers and drip tubing
- Recycle steel and wire when replanting

Conservation through Materials Reduction & Recycling

- Integrated Pest Management
  - Treat based upon pest/predator monitoring data
  - Only treat hotspots, e.g. for mites, not entire vineyard
- GPS to program sprayers and fertilizer applicators
- Fertilize based upon soil and petiole analyses

WITS

Conservation through Materials Reduction & Recycling

- Sulfur dusting every 7-10 days versus fungicide sprays with 21-day intervals
  - Less material handling
    - 10 lbs/application vs 2 oz
  - Fewer equipment passes

WITS

The Tradeoffs

- Biodiesel
  - Higher cost
  - Lower energy content
  - Engine warranty loss at certain biodiesel content
  - Energy required to produce biofuels
  - Lower emissions than diesel
  - Renewable energy source

Tradeoffs

- Organic production
  - In-row weed control
    - Tillage
    - Contact only herbicides
  - Bulky inputs
    - Compost and rock phosphate versus concentrated fertilizers
- Do we reduce carbon footprint or synthetic pesticides and fertilizers?

Going Green in the Vineyard

- Technologies exist to lower fuel use and to conserve water
- Different growers will make different choices
- There are tradeoffs for every decision
  - Costs and ROI
  - Environmental impacts
  - Personal values

WITS

Transferring Green Technology throughout the workforce

Julie Nord
Nord Vineyards

WITS
WINE INDUSTRY TECHNOLOGY SYMPOSIUM

July 15, 2008 - The Napa Valley Marriott

Types of Green Vineyard Technology

- Data Collection (collected by hand)
  - Crop load, pruning weights, cluster size
  - Insect monitoring
- Monitoring Equipment
  - Weather Stations
  - Moisture – Neutron Probes, Pressure Bombs
- Software and Analysis
  - Need ability to input all data collected
  - Must be able to analyze results
  - Have ability to transfer information to the field

Types of Green Vineyard Technology

- Equipment Improvements
  - Multi row tractors
  - Electronic irrigation controls, can be run from a PC
- Pesticide Improvements
  - Pesticides targeted for specific pests, reduce application to as low as ½ oz per acre
  - Worker safety – Choose labels with “Caution” rather than Warning or Danger.
- Conservation of resources

WHAT IS THE MOST EXPENSIVE COST IN THE VINEYARD?

WHAT IS THE MOST EXPENSIVE COST IN THE VINEYARD?

Labor

WHAT IS THE MOST EXPENSIVE COST IN THE VINEYARD?

Labor

WHO OPERATES THE MOST EXPENSIVE EQUIPMENT?

WHAT IS THE MOST EXPENSIVE COST IN THE VINEYARD?

Labor

WHO OPERATES THE MOST EXPENSIVE EQUIPMENT?

Tractor Drivers

The Great Divide

- Viticulturist
  - knows latest techniques, great computer skills
- Vine Manager
  - some computer skills, great field knowledge
- Multi Skilled/ tractor driver –
  - In the field every day,
  - Knows vines inside and out
  - Probably hasn't heard the word "sustainable"

Employment Needs

For 900 acres of vineyards

- 1 viticulturist
- 1 office manager
- 3 vineyard managers
- 20 multi skilled tractor drivers
- 100 seasonal workers

Skill Requirements

- Viticulturist and Office manager
  - Highly skilled, computer savvy, college educated, English only
- Vineyard managers
  - Worked up through ranks, leadership skills, expert gardeners, high school grad, bilingual
- Multi-skilled tractor drivers
  - Vyd experience, some education, minimal English
- Seasonal workers
  - Little education, little English

Why focus on tractor drivers?

- Qualified personnel are already hard to find
- Mechanical work in vineyard will increase in the future
- Tractor drivers are in the field everyday and work year around.
- Workers have already shown dedication and skill to be selected from seasonal labor force.

Training Needs beyond req'd training

- Spanish Language Sessions
- Pest monitoring
- IPM – Pest Identification
- Company philosophy
- Awareness of surrounding environment
- Reason behind new techniques

Training Opportunities for Multi Skilled Workers

- Local Grower Organizations
  - Napa Valley Grapegrowers
  - Sonoma County Grapegrowers
- Local Ag Commissioner
- Junior College Courses
- In-house training
  - California ETP grants available

Employment Training Panel

- The program is funded by the Employment Training Tax paid by California employers
- Targets firms threatened by out-of-state and international competition
- Agriculture automatically qualifies for the funding
- Outside companies offer free training, just pay for workers hourly time
- Companies can apply directly for funds
- http://www.etp.ca.gov

ETP Program Overview

- Must guarantee minimum pay of $12.85 after training. ($9.65 for seasonal workers)
- Reimbursement at $26 per hour of training per employee
- Fast Track programs for small businesses up to 100 employees, offers extra support.
- Can offer training from 8 hours to over 100 hours.

Nord Vineyards ETP Grant

- Applied at end of January ‘08, started training mid-February
- Received $16,000 for training our tractor drivers
- Completed 45 hours of training in February and March 2008
- Workers were very enthusiatic about the training

Topics

- Sustainable Philosophy
- Tractor fuel efficiencies
- Pest Identification
- Pest interactions (good vs bad bugs)
- Math conversions
- Measuring techniques
- English Classes (up to 45% of hours qualify)

What resources are available?

- Air
  - Carbon Footprint Calculations
    http://www.carbonfootprint.com/
- Land (soil)
  - Resource Agency's Geospatial Information Office
    http://gio.resources.ca.gov/
  - IPM program model
    http://www.ipm.ucdavis.edu/GENERAL/tools.html
  - Web Soil Survey
    http://websoilsurvey.nrcs.usda.gov/app/
  - US Composting Council
    http://www.compostingcouncil.org
  - Year round IPM program for Grapes
    http://www.ipm.ucdavis.edu/PMG/C302/m302yi01.html
  - Nematodes
    http://www.uckac.edu/nematode/
- Data/System Resources
  - WBM article
    http://www.winebusiness.com/ReferenceLibrary/webarticle.cfm?dataId=43865
  - Napa County - Topo maps, aerials, land use designations etc
    http://gis.napa.ca.gov/default.asp
- Water
  - Green Business Water Use Tools
    http://www.greenbiz.com/browse/resource-efficiency/Water
- Energy
  - PG&E Business Analysis Tools
    http://www.pge.com/mybusiness/myaccount/analysis/
  - Solar Electric Power Association
    http://www.solarelectricpower.org/
- Sustainability
  - California
    http://www.wineinstitute.org/programs/swp/
  - Lodi, California
    http://www.lodiwine.com/viticultureprogram1.shtml
  - Central Coast, California
    http://www.vineyardteam.org/
  - Napa Sustainable Winegrowers Group
    www.nswg.org
  - Walla Walla, Washington
    http://vineatrust.com
  - Fish Friendly Farming
    www.fishfriendlyfarming.org
  - Climate smart
    http://www.pge.com/mybusiness/environment/whatyoucando/climatesmart/
  - U.S. Department of Energy – Energy Efficiency and Renewable Energy
    http://www.eere.energy.gov/greenpower/about/index.shtml