Climate and Ag Summit

"Sustainable Walnut Orchard Practices To Reduce Green House Gases"

Presented by:

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Dixon Ridge Farms

- **Grower and Processor of Organic Walnuts;**
  - The largest handler of organic walnuts in the United States;
  - We grow organic walnuts on over 500 acres, and buy about 2,500 more acres of organic walnut production from 67 growers
  - Organic is less than 1% of total US Walnut Production
- **Family farming in California since 1867 and organic since 1990;**
- **We follow a sustainable, whole systems approach to organic farming and business.**

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Current Conservation Practices

1. **Recycle**
   - Hulls/shells – spread back into orchard
   - Water – recirculation systems since 1982
   - Aluminum/paper/plastic/steel/etc - as much as can
2. **Prunings – chipped and back into soil since 1976**
   - Low energy use - 50 vs. 500 HP
3. **Cover crop production methods since 1989**
   - Systems approach/multiple uses
     - Nitrogen
     - Tie-up excess nitrogen
     - Soil organic material, carbon sequestration
     - Beneficial insect habitat and food
     - Water conservation via mulch
     - Summer annual weed control via mulch
     - Water infiltration and cleanliness
     - Run-off elimination
   - Retain cover crop as long as possible
   - Partial mowing until hard cover crop seed set
   - Start complete mow down 1 ½ months before harvest
   - Cross mow only 2 times
   - Lightly till only every 5 years

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Conservation Practices (cont.)

4. Integrated Pest Management and Sustainable Organic
- Not “substitutional organic”
- Perennial and annual insectary and wildlife habitat

5. Fertilize with Compost, rather than synthetic fertilizers
- Nitrogen mostly comes from cover crop
- Broadcast application in May
- Petiole analysis shows long term trends
- Use about 1 ½ tons per acre of poultry compost
- Adding Char-ash from BioMax will sequester more C and N

6. Irrigation – New type
- Overhead hoses - through tree branches
- Drop rotary sprinklers – greenhouse style
- Compatible with cover crops/organic production
- Cross-mow without damage to sprinklers or hoses
- Operate at 5-30 PSI at pump vs. 35-50 PSI for drip and micro-sprinklers
- Operate at less than 10 PSI for coverage like micro or drip
- Operate at 25-30 PSI for full coverage
- VFD Electric Pump Motor is a good marriage
- Less and easier maintainenece

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Conservation Practices (cont.)

7. **Freezer improvements**
   - Insulation - above R 80 even though “normal” is R 25
   - Air-lock vestibules with automatic doors
   - VFD fan motors
   - State of the Art controllers
   - Energy savings estimated to be 35 - 40%
8. **Dryer Improvements**
   - Recirculation cover - tent/building
   - Hot, dry air is pulled from top, cold, wet air escapes out doors
   - Save 35-40% of drying fuel
   - BioMax producer gas replaces 40% of our propane
   - Same number of dryers and drying capacity
9. **Land conservation / preservation**
   - Easier to practice sustainable ag on the best soils
   - Less expensive to farm
   - Best use of a finite and valuable resource
   - Williamson Act and Conservation Easements are some of the best tools

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Our Energy Goal

Total farm and processing net energy self sufficiency by 2012 for all types of energy

We aim to achieve this goal while taking into account:

1. Carbon neutral or negative
2. Nitrous-oxide neutral or negative
3. Use non-food sources for energy
4. Energy costs should be reasonable
5. Transferable

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Current "Green" Energy Production

1. Solar
   - 3,500 square feet of PV panels
   - Generates $3,500/year of electricity
   - Future desire to increase to over 90,000 sq. ft
   - Side benefit of cooling by shading roof with panels
   - Have over 80,000 square feet

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Current "Green" Energy Production (cont.)

2. **Bio Max 50** – Manufactured by Community Power Corp (CPC), Grant from California Energy Commission (CEC)

- **Production**
  - **Propane:** Offsets $12-14,000/year during 5-week drying season
  - **Electricity:** Produces $30,000-$45,000/year
  - **Heating:** Use hydronic or hot air to heat our buildings & dryers
  - **Fuel:** Uses about 820,000 pounds of walnut shell per year
- **Environmental Impact**
  - **Walnut shells:** Are a renewable, non-food source of energy
  - **Carbon Cycle:** Atmospheric CO_2 absorbed by trees to produce walnuts, which provide food and shells for energy production that will be used to dry and process walnuts, emissions back to air
  - **Net negative release of carbon**: 1,000 year half-life in soil

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Status Report

- **Energy Generation and Reduction**
  - Generate about 20% of our electricity use
  - Offset about 60% of our propane use
  - Reduce dryer heat needs by about 70% via CHP and recirculation
  - ➔ Total is about 25% of all energy used
- **Costs**
  - ➔ Cost to produce electricity and propane onsite is about the same as retail price
  - ➔ May be revenue generating depending on GHG reduction market and excess energy generation sales

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Conclusion

- Stimulate short and long-term economy and job gains.
- Move the USA and CA energy sector toward domestic self-sufficiency.
- Encourage maximum energy conservation and efficiency.
- Meet the goals of AB 32 and the Renewable Portfolio Standard.
- Diversification of energy types is good, stabilizing the market, power generation and costs.
- Reduce GHG outputs
- These solutions can be implemented immediately
- **THESE GOALS CAN BE MET & AGRICULTURE CAN PLAY A HUGE ROLE**