

An aerial photograph of a rural landscape. The foreground is dominated by a dense forest of green trees. Beyond the forest, there are several large, irregularly shaped fields. Some fields are a vibrant green, while others are a rich brown, suggesting different stages of crop growth or soil types. A winding river or stream flows through the middle of the landscape, its banks lined with trees. In the background, more fields and a distant horizon are visible under a clear sky.

Integrated Air Quality/Energy Planning for Sustainable Farming/Ranching Systems

**Linda Scheffe – John Tunberg
NM/AZ Air Quality/Energy Training
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We've achieved a lot, but we must all do a better job

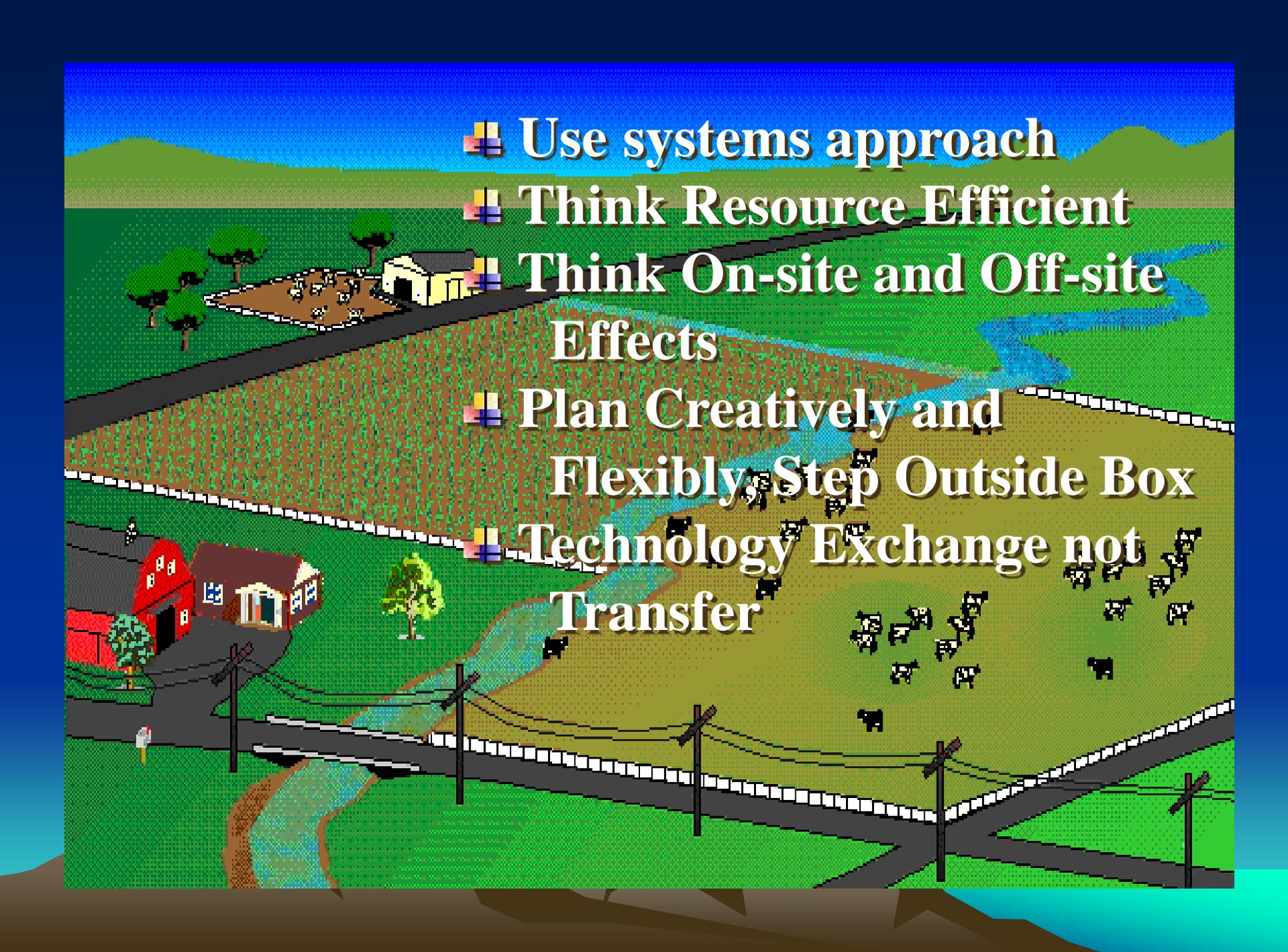
**This is our chance, maybe only chance, to really achieve
sustainability**

Sustainable Farming/Ranching Systems must consider and integrate:

- **Soil Quality**
- **Water Quality**
- **Nutrient and Salinity Management**
- **Cropping Systems, incl. Cover Crops**
- **Irrigation Water Management and Systems**
- **Integrated Pest Management**
- **Livestock and Wildlife**
- **Energy and Air Quality**
- **Economics**
- **Whole Farm Planning**
- **Watershed, Marketing Opportunities**

Potential Benefits: Sustainable Systems

- **Soil Resource** - improved soil quality, reduced wind and water erosion
- **Water Resource** - Increased efficiency, reduced costs, water losses minimized
- **Plant Resource** – increased yields, improved quality, reduced pest incidences
- **Other** – Reduced overall on-farm energy use, increased beneficial use and recycling of nutrients

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- Use systems approach
 - Think Resource Efficient
 - Think On-site and Off-site Effects
 - Plan Creatively and Flexibly, Step Outside Box
 - Technology Exchange not Transfer

Achieving Sustainable Farming/Ranching

- Form interdisciplinary, interagency team, producer networks to identify/resolve resource problems/ opportunities



- Producers are the drivers of sustainable farming as we develop/exchange technologies, case studies, field trials, on-farm demonstrations, farmer-to-farmer networks.
- Need user friendly fact sheets, brochures, assessment tools on integrated systems

Achieving Sustainable Farming/Ranching

- ✚ Keep energy flow through the integrated system, close loop
- ✚ Reemphasize biological factors, improve biodiversity
- ✚ Improving soil quality is basis for improving soil, water, air, plant, animal, human, and energy resources

Sustainable Farming – Build Soil Quality

- Minimize or eliminate tillage
- Apply nutrients according to soil, water, plant tissue tests and nutrient budget
- Increase on-farm nutrient cycling, plant species diversity
- Maintain ground cover year round by using cover crops and mulches and by leaving crop residues in field
- Manage/protect soil organisms to preserve biodiversity

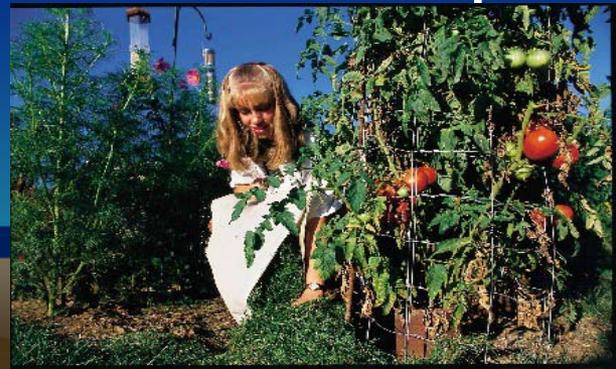
Sustainable Ranching – Build Soil Quality

- Optimize plant production aligned with environmental conditions
- Promote diversity of species with different rooting depths and patterns
- Protect soil from erosion by reducing bare soil patch size and connectivity
- Manage grazing, fire, vehicle use to maximize growing plant cover and roots



Sustainable Farming/Ranching – Develop Conservation Plan

- Use integrated approach to inventory resources and develop conservation plan for whole farm
- Choose and apply conservation practices, technologies, approaches to address identified resource concerns and take advantage of opportunities
- Not only think outside the box but step outside the box



Sustainable Farming/Ranching – Maximize Biodiversity

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- Integrate crop and livestock production
 - Use hedgerows, insectary plants, cover crops, etc. to attract beneficial insects, bats, and birds
 - Plant trees and perennial crops
 - Abandon monocropping in favor of crop rotations, intercropping and polycultures
 - Manage pastures to support diverse selection of forage plants
 - Plant cover crops

Integrated Air Quality/Energy Planning

- Air Quality –Atmospheric Resource Quality Assessment Tool: New Mexico NRCS Air Quality Tech Note 1;
<http://www.nm.nrcs.usda.gov/technical/tech-notes/air.html>
- Decision tree to help planners and producers assess whether or not they have air quality/atmospheric resource issues/concerns and then how to address that issue/concern.
- Need to revise after this training to incorporate energy opportunities

Common Ag Air Quality Issues - NM

- Prescribed Burning of rangeland, pasture, pecan piles (Nov. through March), cropland field ditches, wheat residue
- Wind Erosion from farmers still doing tillage operations in 30 mph winds or better, dirt roads, overgrazing
- Odors and dust from CAFO operations (dairy and beef) – CNMPs are planned to Resource Management System level

Selected NRCS Air Quality Funding Opportunities – be proactive

- EQIP and Air Quality EQIP Priority Areas – Dona Ana County
- Air Quality CSP Enhancements
- CIGs
- CNMPs

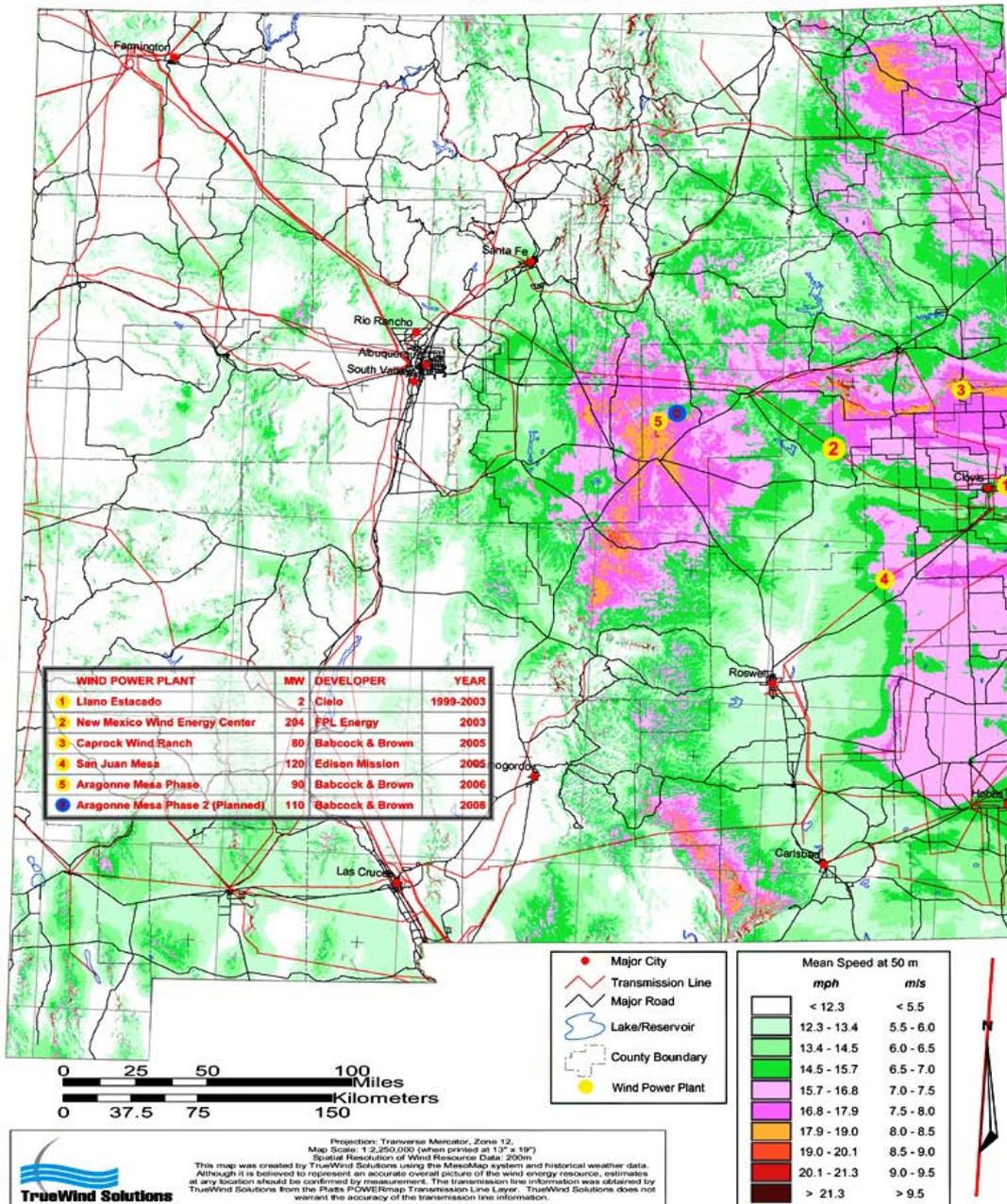


Energy Opportunities - NM

- Renewable Energy (Solar, Wind, Biomass, Biofuels) – Dr. Ghassemi will cover
- Solar, algae, biobutanol, cellulosic bioethanol, and biodiesel technologies are not yet price competitive – research/demo phase, some exist with incentives, Pecos biomass project example
- Wind is very competitive if power lines are nearby
- On-Farm/On-Ranch Conservation (Stephanie will cover)

Wind Speed Map of New Mexico at 50 meters

New Mexico Wind Power Plants - 2007



Wind Energy Opportunities - NM

- NM ranks 14th in wind power capacity, but 5th for wind power utilization
- Large-scale wind farms (500MW) could generate 20,000MW (more than enough to meet state's needs)
- Right now, NM generates <1,000 MW.
- Existing farms include: Clovis (2MW), San Jon (80MW), Elida (120 MW), House (204 MW), Santa Rosa (220 MW), Gladstone (20 MW), and Clayton (120 MW).

Wind Energy Opportunities - NM

- Corona Ranchers in Torrance County – by collectively bargaining for land leases, they can match the value of raising cattle (per acre basis)
- Wind Research and Training Center is unique in the nation



Promoting On-Farm/On-Ranch Conservation Energy Opportunities - NM in Learning Phase

- Incorporating energy into conservation practice standards, planning process
- Producer and agency Sustainable Ag Workshops across state, forming partnerships
- Tech notes, fact sheets
- On-farm/on-ranch case studies/demos/ workshops
- Conservation Innovation Grants funded
- EQIP
- CSP Enhancements
- RC&D Projects
- Discussing more in brainstorming session