The Dry Farming Collaborative:
Co-creating the future of how we manage water on our farms
Climate Impacts to Water Conference

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Introduction

- Cropping options on land without water?
- Climate change
  - reduced snowmelt
  - increased temperatures
  - drought
- Vegetable growers using surface water for irrigation were cut off early during the 2015 growing season - Some as early as June!
What is dry farming?

- Crop production during a dry season like summers in the Willamette Valley in Oregon and Northern California
- Utilizes the residual moisture in the soil from the rainy season instead of depending on irrigation.
Resources

Steve Solomon
- *Growing Vegetables West of the Cascades*
- *Water-Wise Vegetables*
- *Gardening Without Irrigation: or without much anyway*
- *Gardening when it counts*

Carol Deppe
- *The Resilient Gardener*

David Granatstein
- *Dryland Farming in the Pacific Northwest*

California Ag Water Stewardship Initiative

Widtsoe, John. 1920
The Dry Farming Project

- Work to date
  - Case studies
    - Western Oregon
    - Northern California
  - Demonstration
    - Field Day
    - Sensory Evaluation
    - Preliminary Yield Data
  - Grant funding
    - Expand Demonstration
    - *Growing Resilience: Water Management Workshop Series*
  - Participatory Dry Farming Research
    - *Dry Farming Collaborative*
Dry farming vegetables: One farmer’s approach to building soil, conserving water and producing great tasting tomatoes
Veneta farmer with 40 years experience
Dry Bean Farmer in Elmira

- Grows dry beans for Hummingbird Wholesale
- Uses dry farming/irrigation as a tool to stagger his harvest
How Does Dry Farming Work?

- Starts with the soil!
  - Water-holding capacity
    - Clay
  - Organic matter - For each 1% increase in soil organic matter, soil water storage can increase by 16,500 gallons per acre-foot of applied water!
- 4’ of soil or more (Solomon)
- Nutrient-rich

- Site selection
  - Plants as indicators
  - Web Soil Survey
  - Soil auger

128B—Veneta loam, 0 to 7 percent slopes

Map Unit Setting
National map unit symbol: 234m
Elevation: 300 to 800 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Typical profile
H1 - 0 to 14 inches: loam
H2 - 14 to 39 inches: clay loam
H3 - 39 to 60 inches: clay

Properties and qualities
Slope: 0 to 7 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat):
  Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.3 inches)
How Does Dry Farming Work?

- Crop/variety selection
- Soil preparation
  - Timing
- Planting technique
  - Plant when and where there is moisture
  - Increased plant spacing
  - Pressing soil around seed or transplant
    - Good seed soil contact
    - Creates capillary action wicking moisture to the surface to help seed germinate and get established
  - Pre-soaking seed (Deppe)
- Surface protection
  - Dust mulch
Sand
Poor Capillarity

Clay; Sandy/Silt Loams
Good Capillarity

By Moria Peters
Roots Extend To Edge Of Water-Saturated Zone

By Moria Peters
Crop/Variety Selection

- Tomatoes
- Potatoes
- Watermelons
- Cantaloupes
- Winter squash
- Zucchini
- Dry Beans
- Corn
- Orchard crops
- Grapes
2015 Dry Farming Demonstration
Oak Creek Center for Urban Horticulture
‘Dark Star’ Zucchini

Corvallis, OR

July 6, 2015

July 15, 2015

July 27, 2015

New Moon Organics - Shively, Ca

August 18, 2015

September 25, 2015
Dry Farming Field Day
More than 100 farmers and gardeners attended the field day.

- **Sensory Evaluation**: 27 of them participated in sensory evaluations and ranked the dry farmed watermelon and tomato higher than the irrigated in the categories of color, texture, and sweetness.

- **Follow-up survey**: 29 Dry Farming Field Day participants responded to a follow-up survey
Dry Farming Field Day Survey

- Why is dry farming of interest to you?
  - 11% - I don’t have water rights on my farm
  - 11% - My well ran dry this year
  - 86% - other reasons
    - Sustainability in a time of climate change
    - Conserving water, energy, and time
    - Weed management
    - Improved flavor

- 93% of them intend to apply what they learned at the field day on their land.
2016 Dry Farming Project Plan

- 3 Demonstration Sites
  - Aurora
  - Corvallis
  - Central Point

- *Growing Resilience: Water Management Workshop Series*
- Participatory Dry Farming Research

**Treatments**

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<tr>
<th>Crops</th>
<th>Irrigated</th>
<th>Low Irrigation</th>
<th>Dry Farmed</th>
<th>Dry Farmed with Biochar Compost</th>
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<tr>
<td>Potatoes</td>
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<td>Yukon Gold</td>
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<td>Winter Squash</td>
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<td>Early Girl</td>
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**Varieties**

- Big Beef
- Christmas Watermelon
- Eel River
2016 Dry Farm Demo – June 14th
2016 Dry Farm Demo – July 15th
2016 Dry Farm Demo – August 17th
2016 Dry Farming Field Day
Group of growers, extension educators, plant breeders, and agricultural professionals partnering to increase knowledge and awareness of dry farming management practices with a hands-on participatory approach.

Dry Farming Collaborative
Dry Farming Collaborative

- 10 main sites hosting trials in 2016 throughout Western Oregon
- 140+ members in Facebook Group
- 80+ members on email list
- Data Collection
  - Soil testing (5’ cores)
  - Yield
  - Sensory Evaluation
  - Soil Moisture – Corvallis site (1’, 2’, 3’)
- Winter Growers’ Meeting (Dec 2016)
- Presenting at multiple farm conferences this winter
Potato Yield Summary
Oak Creek OSU Demo 2016

Tuber Size: Large, Medium, Small

Dry Farmed
Biochar
Low Irrigation
Irrigated

Yellow Finn
Ib per plant

Yukon Gold
Ib per plant

Lb per ac

Treatment

AnOvation Group LLC
Gathering Together Farm
2016 Dry Farm Trial
Crop varieties bred in dry farmed systems performed well across sites
- Dark Star Zucchini
- Stella Blue Squash
- Christmas Watermelon

Dry farmed melons, tomatoes, potatoes ripened more quickly and were smaller than those irrigated

DFC trial hosts have different capacity, interest, and styles of collecting data but want to be involved...
Expanding Drought Mitigation Toolbox

Other Interests of Dry Farming Collaborative:

- No-till options
  - Winter-killed cover crop, stubble mulch...
- Mulching
- Dry farming seed-share and cultivar development

Co-creating the future of how we manage water on our farms.
Dry Farming Collaborative

Next Steps.....

- More than 20 sites have signed up to host trials this year
  - Emphasize replication across dry farming trial sites.
- Create data repository and user-interface to streamline data collection and analysis – input, search, visualization, statistics
  - Allow for different levels of involvement – Replication and/or Experimental
- Develop Dry Farming page on OSU Small Farms website to be a resource hub for dry farming in our region
- Initiate dry farming extension publication series
  - Site assessment and selection
  - Crop varietal selection
  - Case studies
- Initiate participatory plant breeding project for dry farmed systems.
- Develop a guide on to how to put together participatory climate adaptation research projects for others in our region and beyond.
Recommendations for those new to dry farming....

- Select site with deep soil and good water-holding characteristics.
- Start small and expand on your successes!
- Join the Dry Farming Collaborative
  - Email List – to join contact Amy Garrett
  - Facebook Group – open to the growers, extension educators, plant breeders, and agricultural professionals
For more info visit:
http://smallfarms.oregonstate.edu
/dry-farming-demonstration
/wmws

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Upcoming events......

Organicology – Feb 2nd
Climate Change and Drought on the Farm

Oregon Small Farms Conference – Feb 18th
• Dry Farming Collaborative
• Participatory Plant Breeding for Dry Farmed Systems