INTRODUCTION

Farmers in the Western United States are becoming increasingly affected by climate change through reduced snowmelt, increased temperatures, and drought leading to reductions in summer water availability (Van Horne et al., 2013). Consequently, it is becoming critical for the viability of farms in our region, and the security of our food system, to increase our knowledge and awareness of drought mitigation tools and strategies for growing with little or no irrigation (Wheeler and von Braun, 2013).

In response to these escalating concerns, OSU Small Farms Program launched the Dry Farming Project in 2013. The project started small, but has had a growing impact over the past three years, leading to the establishment of the Dry Farming Collaborative (DFC). This article aims to raise awareness of the DFC and its importance to sustainable agriculture in the maritime Pacific Northwest by providing a brief overview of dry farming, a timeline of the Dry Farming Project, its evolution into the DFC, and potentials for the future.
Dry Farming Practices: Water Retention 101
Dry farming refers to crop production during a dry season (like Willamette Valley summers), utilizing the residual moisture in the soil from the rainy season, and usually occurs in regions that receive 20” or more of annual rainfall. Dry farmers work to conserve soil moisture during long dry periods primarily through a system of tillage, surface protection, and the use of drought-resistant plant varieties (Runsten and Mamen, 2017). These strategies could provide an alternative to irrigated crop production in the maritime Pacific Northwest on sites where there is deep soil with good water holding characteristics.

Keegan Caughlin of Taproot Growers is a member of the DFC and has been experimenting with dry farming in Springfield, Oregon. He emphasizes that “maintaining and improving soil health will be crucial to the success of a robust and coherent approach to the increasing frequency and severity of the water challenges in the arid West.” Furthermore, he explained, “dry farming, when done successfully, can best be explained by looking at what the grower has done to retain and capture useable water within his or her system throughout a growing season.”

Dry Farming Project
It is important to note that dry farming is not a new way of farming, but knowledge sharing has been limited because practices have primarily been passed down from farmer to farmer. Compounded by the fact that there is only a very small subset of farmers that experiment with dry farming and an even smaller number have extensive experience in these farming practices, the OSU Extension Dry Farm Project and the DFC are seeking to explore, revive, and expand awareness of dry farming.

The Dry Farming Project began in 2013 with case studies of farms in Western Oregon (Garrett, 2013; Garrett, 2014) and Northern California (coordinated by Community Alliance with Family Farmers) that dry farm a variety of fruit and vegetable crops. These case studies revealed a suite of management practices that support crop production without supplemental irrigation including: careful timing of tillage, keeping soil surface loose to conserve moisture in the root zone (also known as dirt or dust mulch), improving soil quality and water retention with organic matter addition (cover crops, compost, rotational grazing), increased plant spacing, and use of drought-resistant varieties.

2015 Demonstration
In an effort to disseminate this knowledge to a wider audience, OSU Extension Small Farms Program established dry farming demonstrations in 2015 and 2016 (Garrett, 2015) with support from the National Institute for Food and Agriculture’s Beginning Farmer and Rancher Development Program. The 2015 dry farming demonstration plots were implemented at OSU’s Oak Creek Center for Urban Horticulture in Corvallis, Oregon. Several squash, melon, potato, tomato, and dry bean cultivars were planted.
and survived an extremely hot and dry growing season without supplemental irrigation. A dry farming field day, organized in August, attracted more than 100 growers and stakeholders, many of whom noted being affected by the drought and expressed concern about water supply in the future. Media coverage followed (Mortenson, 2015), with a groundswell of interest amongst growers throughout the region. More information is available at http://smallfarms.oregonstate.edu/dry-farming-demonstration.

**2016 Project Expansion**

In 2016, the Dry Farming Project expanded to include:

1. Three dry farming demonstration and field days at OSU Extension research locations in Western Oregon.

2. Ten on-farm trials throughout Western Oregon.

3. ‘Growing Resilience: Water Management Workshop Series’ (funded in part by Western SARE) was organized to increase our knowledge and awareness of how Oregon growers are being affected by drought, expand our toolbox of drought mitigation tools and strategies, and educate agricultural producers and professionals about management practices and strategies for farming with little or no irrigation. More information is available at http://smallfarms.oregonstate.edu/wmws.

**Dry Farming Collaborative (DFC)**

The DFC is a group of farmers, Extension educators, plant breeders, and agricultural professionals partnering to increase knowledge and awareness of dry farming management practices with a hands-on participatory approach. The original function of the DFC was to facilitate farmer-to-farmer information sharing as growers started to experiment and establish their own dry farming trials (Garrett et al, 2016). The ten on-farm trials mentioned previously were a catalyst for initiating the DFC in March of 2016. By May of the same year, there were twenty Oregon growers in the DFC conducting exploratory trials involving site selection and crop varietal choice (tomatoes, potatoes, squash, melon, dry beans), taking notes on crop varietal performance, and capturing pictures and videos, many shared on the DFC Facebook page (currently 190+ members), throughout the growing season.

An email list (currently 90+ members) was also created to help facilitate communication within the group and coordinate field trials. OSU Small Farms Program sourced seeds and starts, many of which have a history of being dry farmed, and distributed them to trial hosts along with ‘grower input forms’ to record information about their site (soil type), crops (varieties, planting date, planting density), and results (harvest dates, yield). In addition, five-foot soil cores were pulled at eight of these dry farming sites. Soil type, texture, water-holding characteristics, and productivity ratings (Huddleston, 1982) were used to help explain yield differences. Sensory evaluation data was also collected at the dry farming field days in 2016, with side-by-side tastings of dry farmed and irrigated melons and tomatoes. Dry farmed ‘Early Girl’ and ‘Big Beef’ tomatoes were ranked higher than those irrigated in the categories of color, texture, and sweetness (Pykorny, 2017).

Our first DFC winter grower’s meeting (Dec. 2016) was held at the Mary’s River Grange in Philomath, Oregon. More than 60 stakeholders attended to learn about trial results, share experiences, and discuss future directions for this project. Thirty growers from all over Western Oregon have signed up to host trials in 2017. The group also provided...
input on the crops and varieties of interest for our collaborative dry farming research, and specified how many square feet they intend to dry farm this year. Five members of the group volunteered to be on the Replication Committee, to decide upon protocol and planting densities for each crop.

**Innovation and Future Directions**

By design, the inclusivity of this participatory climate adaptation research project has broadened our reach and is growing into a movement in our region. Each member of the DFC brings expertise and innovations, which accelerate collective learning. DFC members share concerns about the future of our water supply and agree that exploring alternatives to irrigated agriculture is a necessity for the sustainability of their farms. They also have common values in regards to care for the environment, future generations, and appreciate the opportunity to learn from and share with each other.

Many growers are experimenting with different techniques, hosting dry farmed variety trials, and growing multiple crop varietals across sites (corn, dry beans, winter squash, zucchini, tomatoes, potatoes, and melon). In addition to hosting trials, members are also informing future directions and coming up with key questions such as these (Caughlin, 2017):

1. How do we gain access to and distribute seed bred for drought tolerance when most seed companies are either breeding in the opposite direction or patenting and restricting access to material that exhibits useful qualities?

2. How can different scales of agriculture adopt these methods?

3. Beyond water conservation and farm resilience, what other long term benefits does dry farming have?

Some new developments already underway include participatory plant breeding for dry farmed systems and dry farmed tree fruit production, as well as expanding with Washington partners, including the Organic Seed Alliance. As the movement continues to grow, resources will be needed to assist those new to dry farming with site assessment, soil preparation, planting, and crop varietal selection. OSU Extension publications on these topics are being developed and will be informed by DFC trial results. There is also a strong need to streamline data collection, quality, and analysis, which will help facilitate integration with existing resources from Extension, agencies, and academic organizations.

The tools and resources developed for this project could be used and modified for participatory climate adaptation research projects in our region and beyond. We hope that the DFC provides a working template to help inspire other projects and ways we can work together to co-create the future of how we manage water on our farms. ✺

PICTURED: Ridgeline Meadows Farm in Southern Oregon had good results using weed fabric in their dry farmed melons/A. Garrett.