



Dry Farming in California

SEVERE DROUGHTS

California, a key agriculture state in the United States, is facing one of the worst droughts in history. The frequency of severe droughts may be increasing due to climate change. Better water efficiency may offset the impact of severe droughts now, and in the future. Improving water efficiency in agriculture, a sector that accounts for 70% water usage, is a priority. Although some farmers have adopted existing agricultural water conservation practices, the majority of farmers have not adopted practices described here. Understanding the barriers to adoption is important to increase adaptation of conservation practices by more farmers, and to improve water efficiency throughout the state.

HELPING SMALL-SCALE WINE AND GRAPE FARMERS

Many large-scale (agri-businesses) farmers in California are motivated to reduce water use by voluntarily adopting water efficiency practices, reducing operational costs. In contrast, many small-scale farming businesses operated by families do not have access to information, capital, and labor to manage severe and persistent droughts. It takes, on average, 40 tons of grapes for a grape grower to break even, making it difficult for small-scale farmers to prosper. To address this challenge, the project team developed water efficiency measures, and assessed methods to motivate small-scale grape growers to implement these measures.

BEST PRACTICES FOR GRAPE GROWERS

There are many best management practices for water conservation on vineyards, including: soil horizon mapping, soil moisture sensors, salt monitoring, irrigation scheduling, vine water status monitoring, evapotranspiration and weather-based data use, sap flow monitoring, regulated deficit irrigation, and dry farming. Dry farming works with natural conditions, to produce grapes that can thrive without irrigation. This method involves training the vines to extract as much soil moisture as possible with careful tillage practices and appropriate vine spacing.

Growers using dry farming methods manage soil moisture through a well-planned process that involves careful monitoring and adjustments to promote balanced growth in the vines. This helps ensure that vines have constant access to a low level of water that they must actively access, and results in a deeper root system. In contrast, typical irrigation methods provide the vines with intermittent shots of a lot of water, followed by periods of no irrigation. This method often results in stress of the vines, particularly during periods of drought.

THE COMMUNITY ALLIANCE WITH FAMILY FARMERS

The Community Alliance with Family Farmers, a 30-year old non-profit organization run by farmers and activists, was a key collaborator in this project. The Community Alliance advocates sustainable agriculture in the state of California. They operate six regional offices throughout north-central California. The Alliance has collaborated with a variety of stakeholders to garner support for reducing water usage through conservation methods and best practices. Stakeholders include the US Department of Agriculture, state officials, as well as local and regional water storage and regulation authorities in California, small-scale farmers, and other non-profit organizations.

The Community Alliance conducted workshops for farmers on best practices, and facilitated information sessions to discuss water use and conservation issues. During panel discussions, farmers shared their experience of adopting the dry farming technique. Farmers noted that grapes are adaptable and can tolerate dry conditions. Also, they noted that transitioning to dry farming required 39% less water the first year, and 60% less water the second year. Farmers also shared other practices to reduce water use, like using soil monitors and applying compost in the winter.



Many farmers perceived that dry farming, while initially riskier, was actually easier, as the vines transition to a symbiotic relationship with the soil. Farmers indicated that dry farming is possible in 80% of the north coast of California. The appropriate climate for dry farming, combined with the resiliency of dry-farmed vines can withstand heat waves, and droughts. Dry farming may increase the longevity of the vines. Panelists acknowledged the significant financial risks of beginning dry farming during a drought.

Panelists agreed that dry farming creates environmental and economic benefits through conservation, and reduced costs. Farmers suggested developing product labeling for consumers to increase awareness about dry farming water conservation best practices. Also, farmers advocated for changing the US Food and Drug Administration regulations by indicating the specific wine brands produced using conservation methods on product labels. Using less water increases the quality of berries used for wine that can be sold at a premium.

SURVEY RESULTS

In October and November 2014, the Community Alliance, and the project team conducted a survey among farmers to assess barriers in adapting water conservation practices. The most commonly cited barrier was limited financial resources, followed by the lack of information, bureaucracy, and regulatory barriers. Survey participants indicated a need for online classes, and demonstrations about water efficient technology.

RECOMMENDATIONS

The project team recommended increasing awareness among grape purchasers, wine buyers, and consumers about products produced using water conservation best practices. New labeling and a certification program would highlight small-scale farmers adopting this practice and help justify the increased costs associated with dry farming. In addition, consumer education could increase market demand of people seeking wines produced using sustainable water management practices. The Community Alliance could help farmers conduct targeted wine tastings to inform consumers about the benefits of dry farming, including increased quality of products and a reduction in water use. A campaign to highlight the benefits of dry farming may result in more farmers using this agricultural best practice, and greatly reduce the amount of water used by small-scale grape growers for irrigation.

CONCLUSION

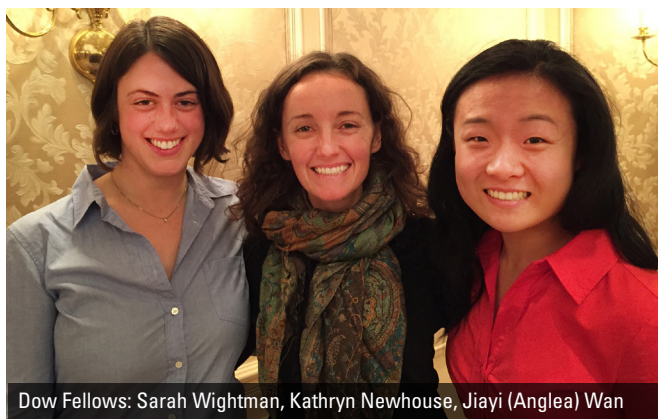
Any grape variety can be dry-farmed. A number of grape growers are increasingly sophisticated in choosing more drought-resistant rootstock. The ability of grape growers to adapt to climate change, including more frequent and severe droughts, is critical to sustaining the wine industry. These adaptation methods have the potential to impact the entire agricultural industry.

SUPPORT

Made possible by The Dow Chemical Company, the Dow Sustainability Fellows Program at the University of Michigan supports full-time graduate students and postdoctoral scholars at the university who are committed to finding interdisciplinary, actionable, and meaningful sustainability solutions on local-to-global scales. The program prepares future sustainability leaders to make a positive difference in organizations worldwide.



Dry Farming, "Everything You Need to Know" afternoon workshop session.



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READ MORE

- Full Project Report: "Lessons from the 2014 Drought: Water Conservation and California Vineyards," Kathryn Newhouse, Angela Wan, Sarah Wightman, 2014
- Dow Masters and Professional Fellowship Project Reports