University of Washington Farm

Seattle, WA

Western Water Resilience Case Study

The University of Washington (UW) Farm is a student-powered urban farm and educational facility located across three sites at the UW's Seattle Campus. Founded by students about twenty years ago, the farm serves as a campus hub for urban agriculture and sustainability, combining hands-on practice, academic study, and community education. It offers a living classroom for those interested in building productive and sustainable urban landscapes. As part of this water resilience project, UW Farm experimented with dry-farmed crops, mulching, and soil moisture sensors to better understand and manage irrigation needs.

Exploring Water Resilience: What was tried and learned

A cool, wet summer and severe deer damage made it difficult to draw conclusions about the performance of dry farmed tomatoes. However, dry-farmed potatoes and beans showed promising results. Looking ahead, the team plans to plant potatoes and tomatoes earlier, around mid-March (potatoes) to mid-May (tomatoes), to take full advantage of the growing season. Installing the soil moisture sensors was a steep learning curve, but once in place, they provided critical insights. The sensors helped standardize irrigation decisions, making them especially useful for a rotating team of student workers. Additionally, sensors revealed the significant benefits of cover crops and weed barrier fabric in retaining soil moisture.

Farm at-a-glance

TYPE
Student Farm

AVERAGE ANNUAL PRECIPITATION
39.3 inches

SOIL TYPE
Fill dirt composed of gravelly loamy sand amended with organic matter

- Available water holding capacity: 3-4 inches

CROPS
Mixed vegetables, rye, fruit trees, cut flowers, wapato, perennial herbs

FARM SIZE
2.5 acres cultivated, 6 acres total

LAND TENURE
University MOU renewed every three years

2024 WATER RESILIENCE PRACTICES
Mulches
Dry Farmed Crops
Soil Moisture Sensors
Cover Crops

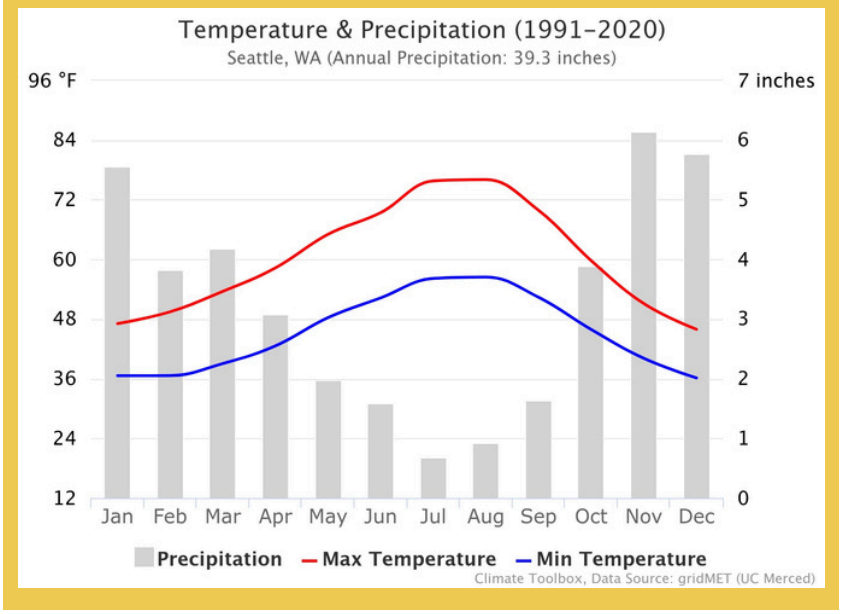
Understanding Context: Water, Climate, and Soil

Water Story

The majority of the farm's water supply is currently municipal water coming from the City of Seattle. Put another way, "it's snowmelt from the Cedar River Watershed," says farm manager Perry Acworth. They have a multifaceted approach of water conservation on the farm; drip irrigation is used throughout the farm and is micro-managed – every line of drip tape can be turned off individually.

In 2024, they put in a pond to catch water runoff and provide an area for growing *wapato*, a traditional Indigenous wetland crop long cultivated by Native communities in North America. In the future, they want to diversify further by putting in a high tunnel with rainwater catchment. As the farm sees increasingly higher temperature spikes in the summer - in 2021 a "heat dome" caused temperatures to rise to 109 degrees in the shade - this stress leads to more frequent irrigation needs.

Temperature & Precipitation



Soil Story

The farm sits on a capped landfill, meaning the soil consists of fill dirt until reaching the cap at a depth of 32 inches. Soil samples from the demo site showed about seven inches of quality topsoil, followed by a transition zone of compacted, gravelly loamy sand with poor drainage.

The landfill cap itself is an extremely compacted layer of clay combined with loam, over three feet deep. Soil test results indicated a near neutral pH, so no lime needed; boron and phosphorus had accumulated excessively, and a magnesium amendment should be considered. Potassium levels were also found to be high.

Soil Health Practices & Preparation

All of the annual production beds were cover cropped until spring, then mowed. Black silage tarp was applied to increase biological activity (bacterial and invertebrates) and aeration for 6-8 weeks until green manure decomposed. Tarps were removed and beds were broad forked, followed by soil amendments (incorporated with a 1-inch Tilther or hand worked with rakes) based on soil test. No tillage that inverts soil layers was practiced; rototiller or plows in planted beds are restricted or minimized to one pass/year. As a certified organic farm, amendments are limited to: blood meal, bone meal, feather meal, kelp meal, lime, sulfate of potash and greensand; organic matter applications to build soil beyond cover crop include vermicompost, purchased certified organic bulk compost, campus-made mulch of leaves and coffee grounds

Water Resilient Strategies Explored in 2024

Synthetic mulches

The black woven weed fabric made a big impact: it cut irrigation needs by roughly 50% and drastically reduced weed pressure. The labor savings were significant, not only in watering, but also in weeding. Beds covered with the weed barrier didn't require any irrigation after July, while uncovered plots needed to be watered twice a week. However, not all plastic performed well. Red plastic mulch was damaged by deer, and concerns about plastic waste have led the team to move away from these materials entirely in future seasons.

Organic mulches

The farm also expanded its use of organic mulches, layering about six inches of leaves and coffee grounds around upright crops and along pathways. These materials—sourced for free—proved both effective and sustainable.

Not only did they help hold moisture, but they also build soil health.

They've experimented with other materials too, like cardboard covered with wood chips, but found that leaves and coffee grounds outperform them in both water retention and soil-building. Encouraged by these results, the team plans to expand their organic mulching efforts next season.

Dry farmed crops: potato, tomato, bean

The farm experimented with a small plot of Indigenous potatoes (Makah Ozette, Quilcene Hoh, To-le-ac), though they weren't able to get them in the ground as early as hoped. That said, even with the late start, the harvest was decent. Timing continues to be a challenge in the Pacific Northwest, where wet spring conditions often delay planting due to saturated soils.

Wildlife pressure was another hurdle. Deer browsing significantly damaged their tomato crop, leading to major losses. On a more positive note, their direct-sown beans (Jacobs Cattle, Wolverine Orca) did well, showing strong performance and fewer issues with pests or wildlife.

This mix of successes and setbacks offers a window into the balancing act many growers face—managing timing, crop selection, and local environmental pressures to make the most of the season.

Cover cropping & soil moisture meters

With funding support from this project, the farm was able to take a much more proactive approach to cover cropping this season. Having the resources to purchase seed early made a big difference—they were able to cover crop more extensively than in previous years.

They also experimented with alfalfa as a cover crop with their successful winter rye crop and were surprised to find that the soil retained significantly more moisture at a depth of two feet—an unexpected but encouraging result.

Looking Forward

One key takeaway is the importance of timing—getting crops in earlier and using heavier mulching to retain moisture and suppress weeds. the farmers described this past season as a "report card" on the practices they were already using, sharing that participating in the project gave them a rare moment to pause and critically assess what's working.

> *"Often when you're farming, you don't take a moment...being a participant in these [projects] makes you think more deeply about how effective your practices really are."*

To address ongoing wildlife pressure, the farmers plan to install perimeter fencing and use caterpillar tunnels to better protect their tomato crop. They're also shifting to using quart-sized starts for tomatoes instead of smaller 3-inch pots. Although this requires more labor during planting—digging larger holes—the faster maturity of the plants is expected to lead to better yields.

They'll also continue using soil moisture sensors next season, which provided valuable data on how different cover crops and management practices affected water retention. These tools helped inform their decision-making throughout the season and will continue to be part of their strategy for monitoring and adapting to changing conditions.

In addition, they're exploring the use of fallow or summer cover crop plots featuring drought-tolerant species like beans, buckwheat, and sunflower. For areas between beds, they're considering experimenting with cowpeas or other hardy cover crops that can handle low-water conditions. They are increasing perennial plants as they are more drought tolerant (standard fruit trees vs. dwarf) or drought avoidant like June bearing strawberries versus ever bearing and asparagus.

These planned changes reflect a growing toolbox of strategies aimed at building greater resilience to drought while improving soil health and productivity.

For More Information:

UW Farm (Seattle, WA)

Dry Farming Institute Case Studies

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