DRY FARMING ZINE

This zine was created to increase the understanding of dry farming, its roots, and application in the maritime Pacific Northwest of North America.

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PREFACE

Our food system has a water problem.

In 2015, one of the worst droughts on record hit the Pacific Northwest of the United States. Many farmers had their water allotments reduced or restricted early in the growing season. Farmers with junior water rights had their water cut off weeks earlier than normal, some as early as June, causing crop failures and other major disruptions to their operations. This crisis raised awareness of our fragile water situation.

We depend on agriculture for the food we eat. Yet modern agriculture consumes approximately 90% of all freshwater used globally. Much of this use takes place in drought-prone or seasonally-arid areas where farmers tend to over-rely on modern irrigation practices, accelerating the depletion of waterways and aquifers and decreasing food system resilience. Hotter temperatures, more extreme droughts, and declines in snowpack caused by climate change are all making it harder for farmers to rely on freshwater sources they once did.

While climate change is affecting water availability throughout the world, droughts are nothing new. For millennia, Indigenous peoples have developed techniques and crop varieties to grow food within the constraints of their climate and soil without irrigation. To adapt to the current water crisis, many growers in partnership with the Dry Farming Institute and the Oregon State University Dry Farming Program are exploring and reviving these old water-wise approaches — and innovating them into the future.

This zine will give you a better understanding of what dry farming is and its origin and history. It will reveal why more growers are exploring dry farming, and discuss some of the principles and practices that support dry farming. You'll also find crops and cultivars that are suitable for dry farming in the maritime Pacific Northwest. Finally, we'll talk about what it means to 'Buy Dry' as more dry-farmed produce shows up at the market, and suggest recipes to try with your dry-farmed treasures.

WHAT IS DRY FARMING?

Dry farming is crop production without irrigation during a dry growing season. Instead of irrigation, dry farming relies on the moisture stored in the soil from the rainy season to support crops during the dry summer season.

The maritime Pacific Northwest gets plenty of rain during the wet season, so our soil moisture is replenished and fully saturated each year. However, that precipitation falls primarily during the fall, winter, and spring months, not during the hot, dry summer when many of our favorite fruits and vegetables need water the most.

Dry farming differs from traditionally irrigated cropping systems in that farmers do not irrigate at all, or only irrigate once during plant establishment. Then the crop relies on the stored soil moisture for the remainder of the growing season.

A broader way to understand dry farming is as a low-input, climate-responsive approach to growing crops. It's a method that allows farmers to work within the constraints of their climate and soil, using fewer resources and preserving water. Dry farming challenges growers to adapt their methods and crop selections to fit their environment, rather than modifying their environment to fit the crops. Over time this approach fosters resilience and sustainability in crop production.

TERMINOLOGY DEFINED

RAINFED FARMING, DRY FARMING, AND DRYLAND FARMING

Different terminology is used to describe farming without irrigation in different contexts. Although these terms are sometimes used interchangeably, they mean different things:

Rainfed Farming is a general term for farming without irrigation. Dryland farming and dry farming are types of rainfed farming, but rainfed farming also includes unirrigated farming in regions with abundant water during the growing season.

***Dry Farming** is rainfed crop production during a dry season in a region that experiences 20 inches or more of annual rainfall. In the maritime Pacific Northwest, winter rains replenish soil moisture each year, giving us sufficient water to grow a crop each year.

***Dryland Farming** is farming without irrigation in semi-arid regions, which receive less than 20 inches of rain a year. Some dryland farmers east of the Cascade Mountains keep their fields fallow for a year to bank enough water to grow a crop the following year. Most dryland farmers grow only the most drought resistant crops like wheat, barley, millet, sorghum, and cotton.

**These definitions of dry farming vs. dryland farming are not absolute or fixed, but rather depend on the context of culture and place. For example, some farmers describe their practices as "dry farming" even though their local climate gets less than 20 inches of rainfall and so would be considered "dryland farming" by our definition. In these cases of contradiction, we defer to the terms and identities used by people in their own localities. The key thing to note is that the context (e.g. annual rainfall, climate, soil) will strongly inform what crops will be successful and what practices make sense.*

The **Maritime Pacific Northwest** is the North American region west of the Cascade mountains in western Oregon, Washington, and British Columbia. This region's climate is heavily influenced by the Pacific Ocean. It experiences regular summer drought and receives enough annual rainfall to replenish soil moisture each year, making it a suitable location for dry farming.

Cover Cropping is the practice of growing a crop to cover the field during an off-season. Instead of being harvested, the cover crop is incorporated into the soil. There are many soil benefits to cover cropping, including weed suppression, increased fertility, reduced compaction, improved structure, and erosion prevention. Dry farmers must manage their cover crop carefully in the spring. Work in the cover crop when the soil is too wet, and it can become compacted. Let it grow too long, and it can use up precious soil moisture at the expense of the dry-farmed crop.

Open-Pollinated Varieties produce seeds through pollination with other plants of the same variety that grow plants with similar traits to their parents. This allows farmers to intentionally save seeds, creating crops that adapt to specific environments over time. By selecting seeds from the strongest plants, dry farmers develop varieties well-suited to local soil and climate, adding resilience and sustainability. These varieties often offer unique flavors and diversity, giving farmers and consumers a deeper connection to local produce and creating a locally adapted crop.

Hybrid Varieties are created by crossbreeding specific parent plants. They offer high yields, uniform growth, and drought resilience due to "hybrid vigor." This reliability benefits dry farmers, particularly in challenging climates. However, hybrid seeds can't be saved for future planting as they won't grow offspring that resemble their parents (botanists call this "true to type"). As a result, farmers need to buy new seed every year, which makes them dependent on suppliers and can increase costs while limiting farmer control over crop genetics.

A HISTORY OF DRYLAND AND DRY FARMING AROUND THE WORLD

Dry farming is far from a new concept; it's a practice with roots that stretch back for millennia. Before the construction of dams, aquifers, and modern irrigation systems, what we now call "dry farming" was simply "farming." Indigenous communities worldwide have long practiced dry farming and dryland farming techniques adapted to their landscapes, climates, and resources. **To this day, the majority of the world's cropland is unirrigated.** Here are some examples:

SOUTHWEST UNITED STATES

The Hopi people of Northern Arizona have practiced dry farming for millenia in a very arid region that receives less than 10 inches of annual rainfall. The Hopi approach emphasizes growing crops that adapt to the landscape rather than altering the landscape to suit the crops. Dr. Michael Kotutwa Johnson, a Hopi farmer, describes this philosophy: "Hopi is one of the few places I know where corn is raised to fit the environment and the environment is not manipulated to fit the corn." The Hopi grow corn, beans, squash, and melons, each adapted to thrive in their desert environment, using dryland farming methods passed down through generations.

SAHEL REGION OF AFRICA

There is a rich tradition of dry farming in the semi-arid climates of the Sahel region of Africa. Cowpeas, sorghum, pearl millet, and sesame are all drought resilient crops that are believed to have been domesticated within this region thousands of years ago, and continue to be a valuable part of traditional dryland cropping systems and foodways across much of the continent and beyond.

CENTRAL ASIA

Central Asia, including present day Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan, has been a major center of dry farm melon breeding and cultivation for over 2000 years. Once at the heart of the Silk Road, this semiarid region produced a wide array of prized melon varieties that were important for trade as well as local culinary traditions, many still existing today.

MEDITERRANEAN

The Mediterranean region has a rich history of dry farming various crops including perennials (grapes, almonds, olives, and figs) and annuals (tomatoes, eggplant, melons, chickpeas, and lentils). Dry-farmed wines are an ancient and renowned traditional product in the region. Though tomatoes only came to the region after the colonization of the Americas, the crop is famously adapted to dry farming systems in Italy and Spain, including dry farm tomato varieties that can be hung in bunches also known as spongilli or piennoli in Italy, tomàquets de penjar in Spain, or ristras in the American Southwest, and eaten throughout the winter.

PACIFIC NORTHWEST UNITED STATES

Cultivation and food systems were present in the Pacific Northwest prior to colonization, including tobacco gardens, managed camas plots, and estuary root gardens. Today, native growers continue to utilize a diversity of practices to maintain their First Foods. Despite this, colonial authorities deemed Northwest coastal communities “non-agricultural” and dispossessed them of their traditional garden sites. If you are interested in learning more about indigenous cultivation practices in the Northwest, we recommend the book *Keeping it Living*, by Douglas Deur and Nancy Turner.

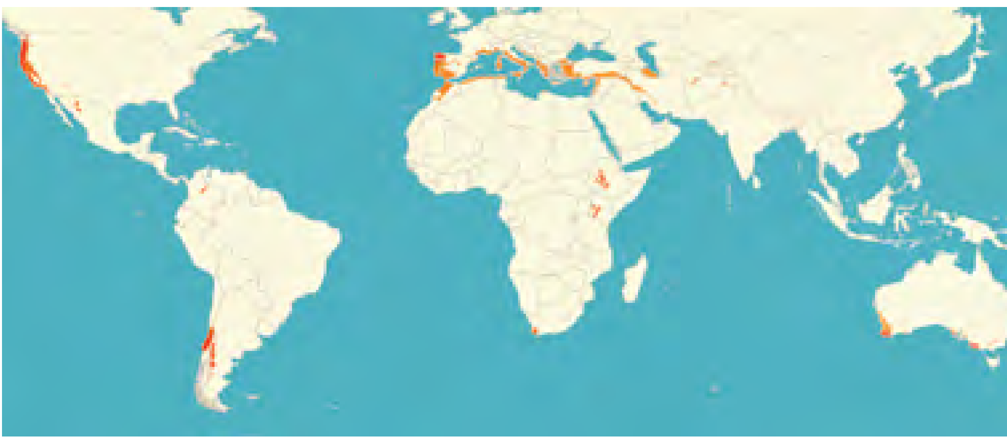
European settlement of the Pacific Northwest accelerated in the mid to late 19th century. Many took to the Oregon Trail, attracted by the ideal growing conditions of places like the Willamette Valley. These farmers initially relied on dry farming to produce their crops until government and private investments in canals, ditches, pumps, irrigation equipment, dams, and reservoirs increased access to irrigation. Popular dry-farmed crops in western Oregon during the early 20th century included wheat, potatoes, vegetables, hops, apples, walnuts, and prunes.

Today, many farmers throughout the United States, including in the Pacific Northwest, continue to practice dry farming (west of the Cascades) and dryland farming (east of the Cascades). This includes regions like the Palouse in eastern Washington, which grows dryland wheat. Farmers in western Oregon continue to dry farm crops such as grapes, hazelnut, annual ryegrass, and — increasingly — summer vegetables.

As we face climate change, water scarcity, and soil depletion, a growing number of farmers are exploring dry farming as a way to grow food sustainably within the limits of our natural resources. Reviving dry farming techniques not only helps address water scarcity, but also fosters a deeper connection to the natural systems that support us.

MEDITERRANEAN CLIMATE ANALOGS

Mediterranean climates, which are characterized by wet winters and dry summers, offer valuable insights for dry farming. Regions like California, parts of Chile, South Africa, Australia, and the Mediterranean Basin face similar water constraints. Studying these areas' traditional farming practices, crop choices, and water-conservation methods can guide adaptation strategies in the maritime Pacific Northwest, helping farmers cultivate resilient systems suited to our own increasingly hot summers. For example, the Willamette Valley in Oregon is transitioning from a warm-summer Mediterranean climate (Csb) to a Hot-summer Mediterranean climate (Csa).



TEMPERATE, DRY SUMMER (Cs)

Csa **Csb** **Csc**

Csa: Hot-summer Mediterranean climate
Csb: Warm-summer Mediterranean climate
Csc: Cold-summer Mediterranean climate

WHY BUY DRY?

ADAPTATION TO WATER SCARCITY

Traditionally irrigated agriculture currently uses an unsustainable amount of surface water and groundwater, accounting for about 80% of our total freshwater consumption in the Pacific Northwest. Because this groundwater is being depleted at unsustainable rates, irrigators have seen tighter regulations and stricter enforcement, reminding us that water is a finite, essential resource. As droughts intensify and water availability for irrigation becomes increasingly unpredictable, more farmers are turning to dry farming as part of their solution.

LAND USE AND ACCESS

In the western U.S., summer water scarcity is already a significant challenge. This means securing water for agriculture has become increasingly difficult, especially for new farmers. Many beginning farmers, including many who identify as a member of a disadvantaged and minority community, are unable to afford prime farmland with established water rights, and gaining new water rights is only becoming harder. Dry farming offers a pathway for these farmers to grow food for their community amidst these challenges.

FLAVOR AND NUTRIENT DENSITY

Dry-farmed produce can have higher concentrations of sugars, acids, and antioxidants, enhancing taste and nutritional quality. This occurs because plants in drier conditions allocate resources differently, producing compounds that intensify flavor and may offer health benefits. Reduced water also means less dilution of nutrients, resulting in a more nutrient-dense product overall.

STORABILITY

Dry-farmed produce often has a longer shelf life in part because of its lower water content. Without regular irrigation, dry-farmed plants develop thicker skins and denser flesh as a natural adaptation to conserve internal moisture. For example, some winter squash that typically rots in storage by December when irrigated will store successfully into the spring when dry farmed. Extended shelf life also offers growers more time to eat and market their produce, and reduces food waste.

CONSERVATION

Water is not the only thing conserved with dry farming. It also conserves energy and time. Without irrigation there are fewer weeds to manage. This translates into less people hours, fuel, and resources spent on managing weeds.

CHALLENGES OF DRY FARMING

Dry farming can bring a higher risk of crop failure, especially for new dry farmers. Dry-farmed produce is often smaller and yields are less. Drought stress can also cause physiological disorders that blemish dry-farmed produce, like blossom end rot in tomatoes. Some farmers charge a little more for dry-farmed products to address this yield gap.

Examples of dry-farmed product labels from Organically Grown Company (left) and The Dry Farming Institute (right)

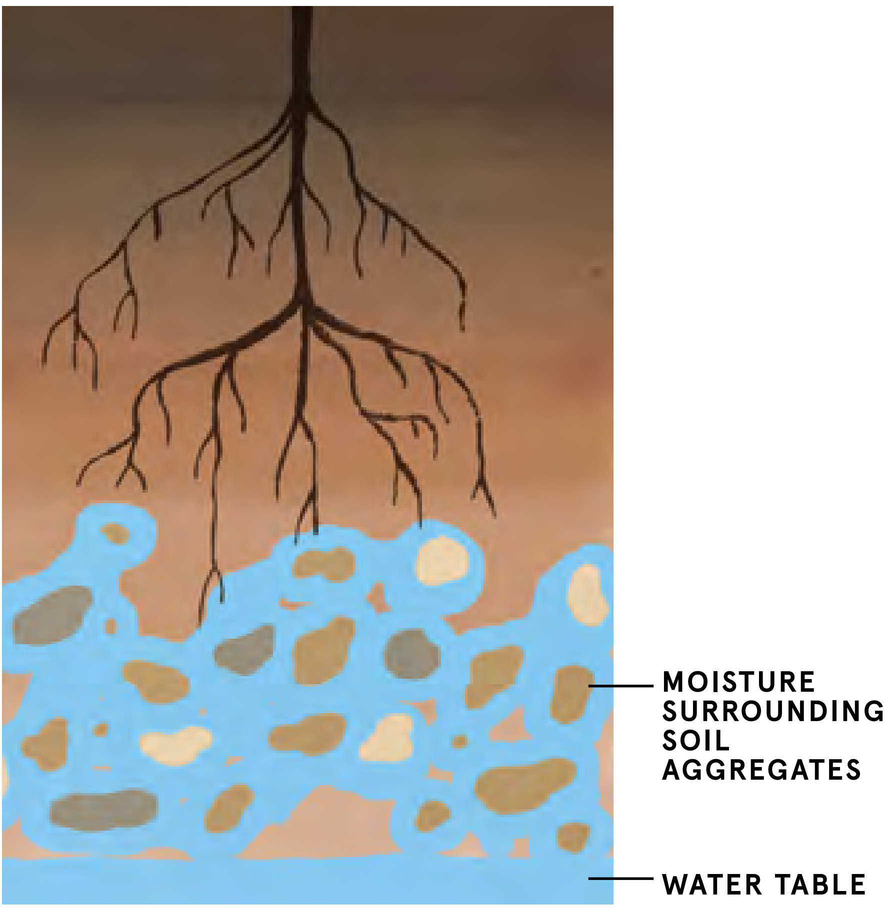
HOW TO DRY FARM

The key to dry farming is to harness and conserve soil moisture from winter rains for summer growth. Successful dry farming begins with selecting a site with deep, water-holding soil and employing practices that conserve water and encourage crops to develop deep root systems to reach moisture and nutrients several feet underground.

Sandy, gravelly, or shallow soils don't retain water well enough for dry farming, but silt loams and silty clay loams in the Willamette Valley are excellent. These soils can have as much as 12 inches of available water holding capacity in the top five feet, which means an acre of soil with this water holding capacity could hold over 325,000 gallons of accessible water. If there were about 3,000 tomato plants per acre, that would translate to well over 100 gallons per plant! It's also important that soils support robust root development so plants can reach all that moisture. For example, soils that are too acidic or with insufficient fertility can reduce root growth for certain crops, and farmers can compact the soil with heavy farm equipment if they operate while the soil is too wet. Cover cropping can help to improve soil structure, facilitating root development into the subsoil which is illustrated to the right.

Changes in soil management also help conserve soil moisture. Water leaves the soil in one of three ways: It can evaporate directly from the soil, be used and transpired by the crop, or be used and transpired by weeds and other plants. Some moisture will also remain in the soil throughout the summer without being used. By preventing evaporation and controlling weeds and other vegetation, farmers can maximize soil moisture reserves for dry-farmed crops. Over tillage and deep tillage disturbs and aerates the soil, increasing evaporation of soil moisture. Dry farmers who use cover crops should strive to terminate the cover crop early in the spring, as the cover crop can take moisture that could otherwise be used by the dry-farmed crop. Weeds must be well managed, often through shallow surface cultivation or mulching.

Dry-farmed crops should ideally be planted early in the growing season to take advantage of the cooler, humid weather in May and June for plant establishment. When planting, farmers will ensure that the seed or transplant is in contact with moist soil by planting deeply or by furrowing to expose moist soil. Then the clock is ticking. If the dug-up moist soil stays exposed for too long, it will start to dry out. It is important to ensure that transplants are well watered before they go into the ground. Some farmers will also use windbreaks, create partial shade, or use structures to protect the crop from excessive wind and sun exposure.



WINE GRAPES

To learn more about dry farming wine grapes, visit www.deeprootscoalition.org

IDEAL PLANT TRAITS FOR DRY FARMING

Plant traits that help conserve water and access deep moisture are ideal for dry farming. Key features include deep, extensive root systems that reach subsoil water and thicker leaves or waxy coatings that reduce evaporation. Plants with fewer or smaller leaves or leaf pores also help minimize water loss.

Crops suited to dry farming often share a history of natural and human-guided adaptation to low-water environments. Open pollinated varieties (OPs for short) can be saved and selected each year, creating locally adapted biodiversity. However, many farmers use modern hybrid varieties (F1s for short), as these also have suitable dry farming traits, even if they are not specifically bred for dry farming, and may have other important traits like storability and uniform shape. While hybrids can provide immediate resilience, the long-term value of open-pollinated varieties lies in their adaptability and independence from commercial seed sources. Many dry farmers choose to plant open-pollinated seeds and save them each season, slowly developing varieties that will thrive with minimal water.

Ultimately, the choice comes down to a farmer's goals: hybrids for consistency and immediate resilience, or open-pollinated varieties for a self-sustaining crop adapted over time to specific site and climate conditions. Both approaches have a place in dry farming, and the beauty is in finding a balance that supports each farmer's unique path toward a more sustainable, climate-resilient system on their farm.

Vegetable grafting is another tool that dry farmers can use to improve yields of dry-farmed crops. Grafting creates a physical union between a vigorous, drought tolerant rootstock, which will be the roots of the operation, and a tomato scion, which will provide the foliage and produce tasty tomatoes. OSU research has found that both dry-farmed tomato and dry-farmed melon yields are improved by grafting.

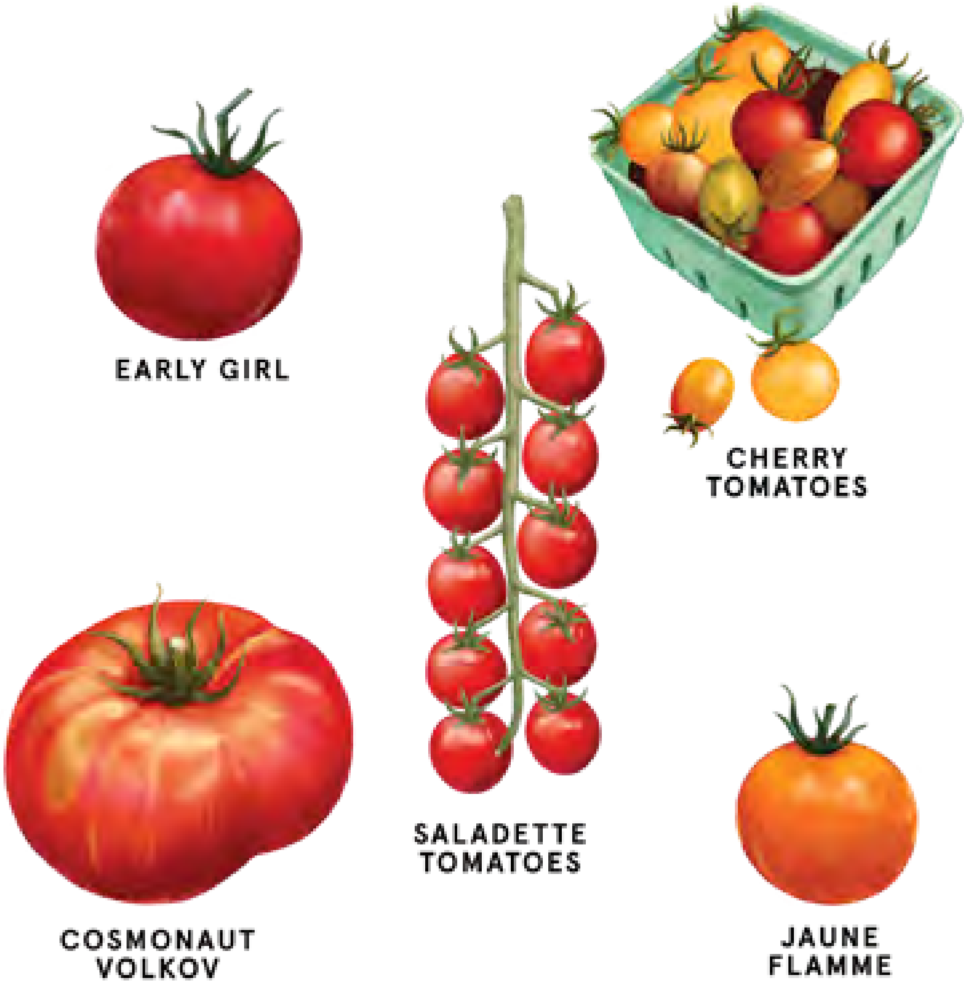
COMMONLY DRY-FARMED CROPS

In this section, we highlight several annual vegetable crops and varieties that have performed well in yield and flavor in dry farming trials across the maritime Pacific Northwest over the past decade. Many other orchard, vineyard, and grain crops have been dry farmed in the Pacific Northwest for decades, but will not be covered here. Fall-planted crops that grow primarily during the wet season, like garlic and fava beans, and cool season grains are also not listed. These crops are still an important part of a resilient bioregional food system, and are often not irrigated, but since these crops are growing primarily during a wet season they are not considered to be dry-farmed.

TOMATOES

Dry-farmed tomatoes are the quintessence of summer splendor. They are beloved along the central coast of California and are emerging as a popular crop in the Pacific Northwest too. Dry-farmed tomatoes tend to be smaller and sweeter than irrigated tomatoes. OSU research has found terroir effects, with tomatoes differing in flavor when grown on different soils or climates.

Whether farming, gardening, or shopping, there are a number of delicious varieties worth trying. The classic in California is 'Early Girl' (F1), a round red slicer known for its intense flavor. 'Dirty Girl' (OP) is the de-hybridized, dry-farmed version developed by Joe Schirmer of Dirty Girl Produce in Santa Cruz, California. Most cherry tomato varieties do very well dry farmed, except for elongated cherry-plum types like 'Green Tiger' (OP). If you are interested in Italian dry-farmed tomato varieties, then 'Piennolo Rosso' (OP) and 'Annarita' (OP) are two great varieties with excellent storage properties. Saladette tomatoes, which are slightly larger than cherry tomatoes, and thus perfect for quartering and putting on salads, are a great option because they resist many of the blemishes dry-farmed tomatoes are susceptible to. 'Matina' (OP) and 'Jaune Flammee' (OP) are two high–performing varieties from this market class. Heirloom beefsteaks that do well include 'Tiffen Mennonite' (OP), 'Azoychka' (OP), and 'Cosmonaut Volkov' (OP).



Dry farming tomatoes is possible for farmers, homesteaders, and gardeners. Soils with a high available water holding capacity are best such as loam, silt loam, and silty clay loams. Plant the tomatoes into moist soil between early May and mid-June; soil temperatures should be at or above 60oF. Ensure transplants are well watered prior to planting. Trellising can protect the fruit from sunscald. Excessive soil fertility can result in blossom-end rot, a physiological disorder that makes fruit unmarketable.

WINTER TOMATOES

In the Mediterranean there is a centuries-old tradition of dry farming certain tomato varieties for storing throughout the fall and winter months. These tomatoes are called “pomodori d’inverno” (literally “winter tomatoes”) and/or “pomodoro siccagno” (literally “dry tomato”). While there are a diverse array of winter tomatoes, three standout varieties are:

PIENNOLO ROSSO

PIENNOLO GIALLO

ANNARITA

‘Piennolo Rosso’ (OP) is a traditional variety of cherry tomatoes grown around Mount Vesuvius in the Campania region of southern Italy. These tomatoes have been awarded the “Presidio Slow Food” designation, which signifies their cultural and gastronomic significance. The name “Piennolo” (meaning “hanging” in Neapolitan dialect) refers to the traditional way of harvesting and preserving the tomatoes by hanging them in bunches, which is a method that helps maintain their flavor and texture.

The small, red oval fruits have a pointed nipple at the blossom end, and their low moisture content, thick skin, and dense flesh makes them perfect for long storage through the fall and winter. These tomatoes are known for their rich, sweet, and tangy flavor, with a distinctive acidity and a strong, intense taste. The volcanic soils of the Vesuvius region contribute to their unique flavor profile, giving them a slightly mineral or “earthy” taste, which makes them stand out compared to other types of tomatoes.

‘Piennolo Giallo’ (OP) is the yellow variation of Piennolo Rosso. The variety is less common, but has been higher-yielding under dry farm conditions in the Willamette Valley.

One of the most distinctive aspects of Piennolo tomatoes is how they are traditionally harvested and stored. They are often left to ripen on the vine until late in the season (typically in late summer or early fall) and picked in bunches still on the vine. After picking, those bunches are typically strung together in clusters and hung in a cool, dry place to dry. This process, called “appassimento,” helps concentrate the sugars in the fruit and increase their storage qualities.

These dried clusters of Piennolo tomatoes can be stored for months, often well into the winter, making them a valuable resource in the off-season. When dried in this way, the tomatoes develop an even more concentrated flavor and are commonly used in sauces, pasta dishes, and various traditional Italian recipes. In addition to dried tomatoes, Piennolo tomatoes can also be canned in jars, often preserved in their own juices, and can be used in many dishes throughout the year.

Piennolo tomatoes are often used in pasta sauces for pasta or pizza. When dried or preserved, they are often rehydrated in olive oil or added directly to sauces. Fresh Piennolo tomatoes are also sometimes used in salads, bruschetta, and as a garnish.

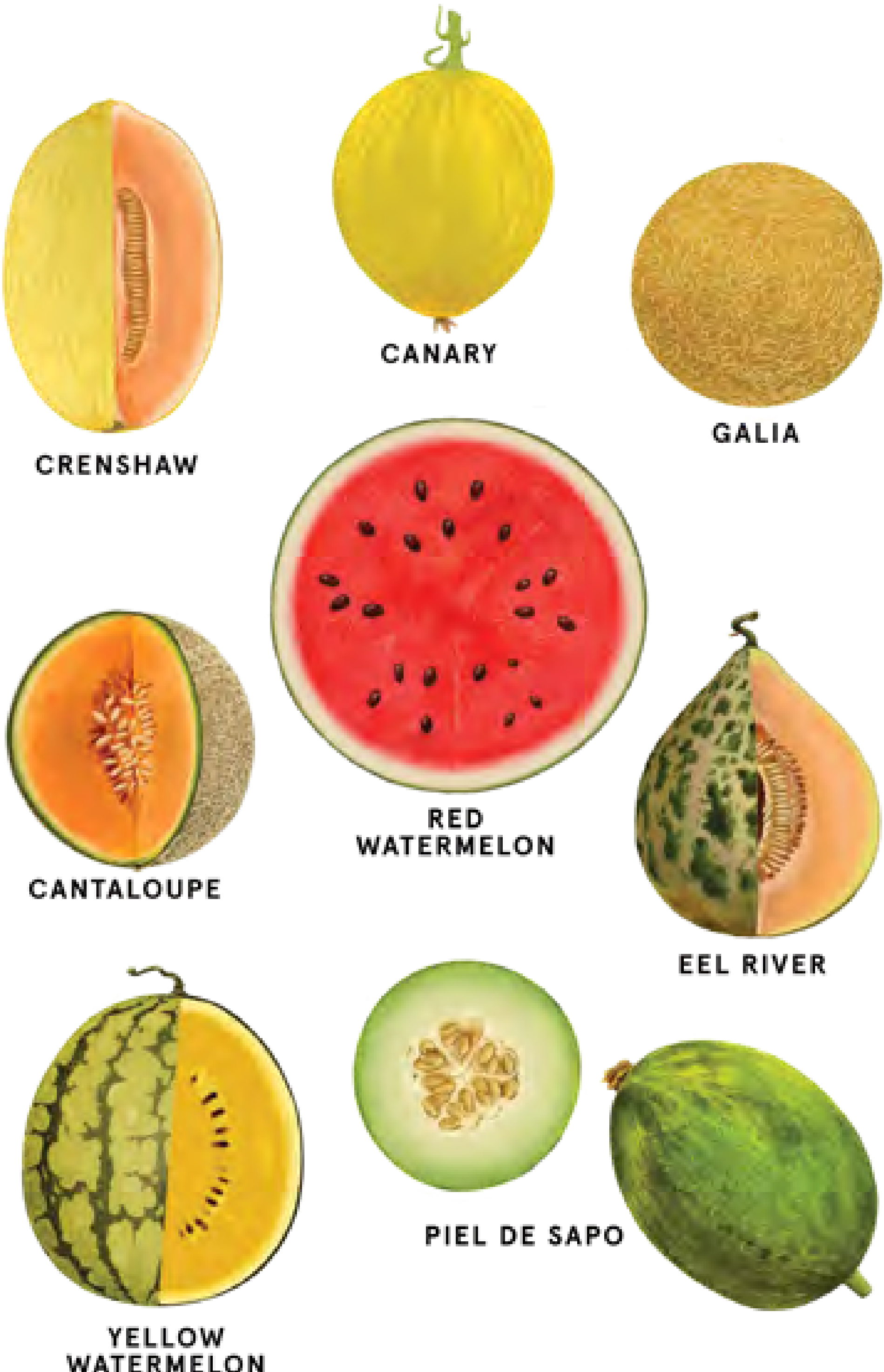
‘Annarita’ (OP) is another winter tomato variety that made its way to the U.S. from Italian breeder Andrea Ghedina of Smarties.bio as part of the ‘Gusto Italiano Project’ collaboration with Uprising Seeds and the Culinary Breeding Network. Annarita is most often consumed raw. It can be served on friselle (a special dry bread from Puglia) with a drizzle of olive oil and oregano, similar to bruschetta, or cooked to flavor dishes such as fish soup or sauces. It is strictly not used to make tomato puree. Annarita tomatoes are more often stored laid flat in well ventilated boxes, rather than hanging. Annarita is the highest yielding of these three varieties under dry farm conditions in the Willamette Valley.

CUCURBITS

Cucurbits, including squash, zucchini, cucumbers, and melons, generally do well dry farmed, largely due to their prolific and deep rooting ability. Using soil moisture sensors, the OSU Dry Farming Program has detected squash roots sucking up soil moisture at four feet below ground! Some varieties do exceptionally well when dry farmed, some due to a history of dry farming, and others due to sheer plant vigor.

MELONS

Perhaps the only crop as popular as dry-farmed tomatoes are dry-farmed melons, which are renowned for their sweetness. One of the best things about melons is all of the different types you can try. Among the best for dry farming are crenshaw melons, with the variety 'Lilly' (F1) being highly recommended. Crenshaws are larger melons with orange flesh and floral aromas. If you want something more familiar, many cantaloupes have been identified as suitable for dry farming, including 'True Love' (F1) and 'Sarah's Choice' (F1). Long storing piel de sapo and canary melons are less aromatic and more sweet tasting, with 'Amy' (F1), 'Giallo d'Inverno' (OP), and 'Lambkin' (F1) all exemplary examples of the class. Watermelons also perform very well dry-farmed, with 'Yellow Doll' (F1), 'Sugar Baby' (OP), 'Blacktail Mountain' (OP), and 'Christmas Watermelon' (OP) all being top contenders.


CANARY
CRENSHAW
GALIA
RED WATERMELON
CANTALOUPE
EEL RIVER
PIEL DE SAPO
YELLOW WATERMELON

CUCUMBERS

Cucumbers (Cucumis sativus) originate from India, and root deeply like other cucurbits. However, this species tends to become bitter when water-stressed, especially when dry farmed in the warmer microclimates of the maritime Pacific Northwest. That said, a number of light-skinned varieties are more resistant to becoming bitter, and do well dry-farmed such as the lemon-shaped lemon cucumber and white slicing cucumbers like 'White Heron' (OP) and 'Silver Slicer' (F1).

The lesser-known cucumber melons (Cucumis melo) are melon varieties originating from western Asia and northern Africa that are bred to be eaten when immature, and never seem to get bitter, even when drought stressed. The Armenian cucumber (a.k.a. snake melon or serpent cucumber) has a long, narrow shape, and is an excellent option for cucumber melons, with 'Tortarello Abruzzese Bianco' (OP) as an outstanding example. Carosello cucumber melons, which originate in the Italian province of Puglia, are round-shaped cucumbers whose crisp texture, and complex, slightly sweet flavor never fail to impress. 'Carosello Leccese Light Green' (OP) is an exemplar variety in this market class.

STRIPED ARMENIAN CUCUMBER

STELLA BLUE SQUASH

WINTER SQUASH

Dry-farmed winter squash tends to have a more concentrated flavor, smaller size, and less water weight than irrigated winter squash. Dry-farmed squash can store for significantly longer through the dead of winter, better living up to its name. Several winter squash varieties stand out as delicious, long-storing, and drought-hardy.

'Stella Blue' (OP) is an exceptional medium-size kabocha squash with blue skin (turning to pink when ripening in storage!) and a deep orange, flavorful flesh. It was bred under dry farming conditions by the late Bill Reynolds along the Eel River in Humboldt, California. 'Tetsukabuto' (F1) is a kabocha x butternut hybrid that produces abundant, smaller-sized green-skinned squash that store very well through winter.

Standout hubbard varieties include the 'North Georgia Candy Roaster' (OP), which produces large, pink-colored banana-shaped squash; and the 'Oregon Homestead Sweet Meat' (bred by Carol Deppe), a blue-skinned, richly flavored, classic hubbard variety that can still be very large, even when dry farmed.

Among shorter-storing market classes, 'Golden Pippen' (OP) is a highly productive dry-farmed acorn squash variety, 'Zeppelin' (OP) is a favorite dry-farmed delicata squash variety, and 'Small Wonder' (F1) is a champion spaghetti squash when dry-farmed.

ZUCCHINI

If you are feeling burnt out on zucchini or otherwise find yourself unimpressed by its relatively bland flavor, dry-farmed zucchini may change your mind! Dry farming helps bring out zucchini's subtle flavors, and the lower water content helps reduce cooking time to further concentrate flavor. That means it will remain firm and caramelize nicely on the grill, too!

When it comes to standout dry-farmed zucchini varieties, 'Dark Star' is clearly the star of the show. Bred in Humboldt County, California, in a collaboration between Bill Reynolds, John Navazio, and Organic Seed Alliance, this hardy open-pollinated variety produces excellent, uniform, green-colored summer squash. 'Goldini Zucchini' (OP, bred by Carol Deppe) is a richly flavored, gold-colored zucchini that is tasty in many forms, including raw, cooked and dried down. The famed Italian heirloom zucchini, 'Costata Romanesco' (OP), also lends itself very well to dry farming.

DRY BEANS AND PULSES

Dry beans and pulses, including common beans, tepary beans, chickpeas, and cowpeas all have the natural ability to conserve water, and have been cultivated in water-limited regions for millenia. Although they are relatively new to the Pacific Northwest region, dry beans, also known as common beans, have been a cultural staple here for longer than the other pulses, and a couple of locally developed heirloom dry bean varieties have emerged as regional favorites: 'Whipple' and 'Rockwell.'

'Whipple'(OP) is a prized, richly flavored purple-colored bean that was dry farmed in southern Oregon by the Whipple family since the 1970s before being more widely grown in the region. 'Rockwell' (OP) is a milder-flavored, creamy white bean with purple spots that has been grown on Whidbey Island, initially by the Rockwell family, since the late 1800s.

Chickpeas have promise for dry farming in our region. They can be planted earlier in the season than other pulses, so they can benefit more from spring rains, and finish earlier in the season before the soil dries out. 'Golden Dragon' (OP) chickpea is a standout regionally-adapted variety that yields well when dry farmed. Tepary beans were dryland-adapted by the Tohono O'odham Nation in what is now Arizona; 'Sacaton Brown' tepary (OP, Adaptive Seeds) is a richly flavorful tepary bean that does well in the maritime Pacific Northwest. While under-explored as a potential dry farm crop in the Pacific Northwest, cowpeas (also called black-eyed peas) lend themselves very well to dry farming; 'Fast Lady Northern-Southern' cowpea (OP, bred by Carol Deppe) is a notable, tasty, white-colored cowpea variety with an early maturity that lends itself well to our climate, which is cooler than most cowpeas would like.

DRY BEANS

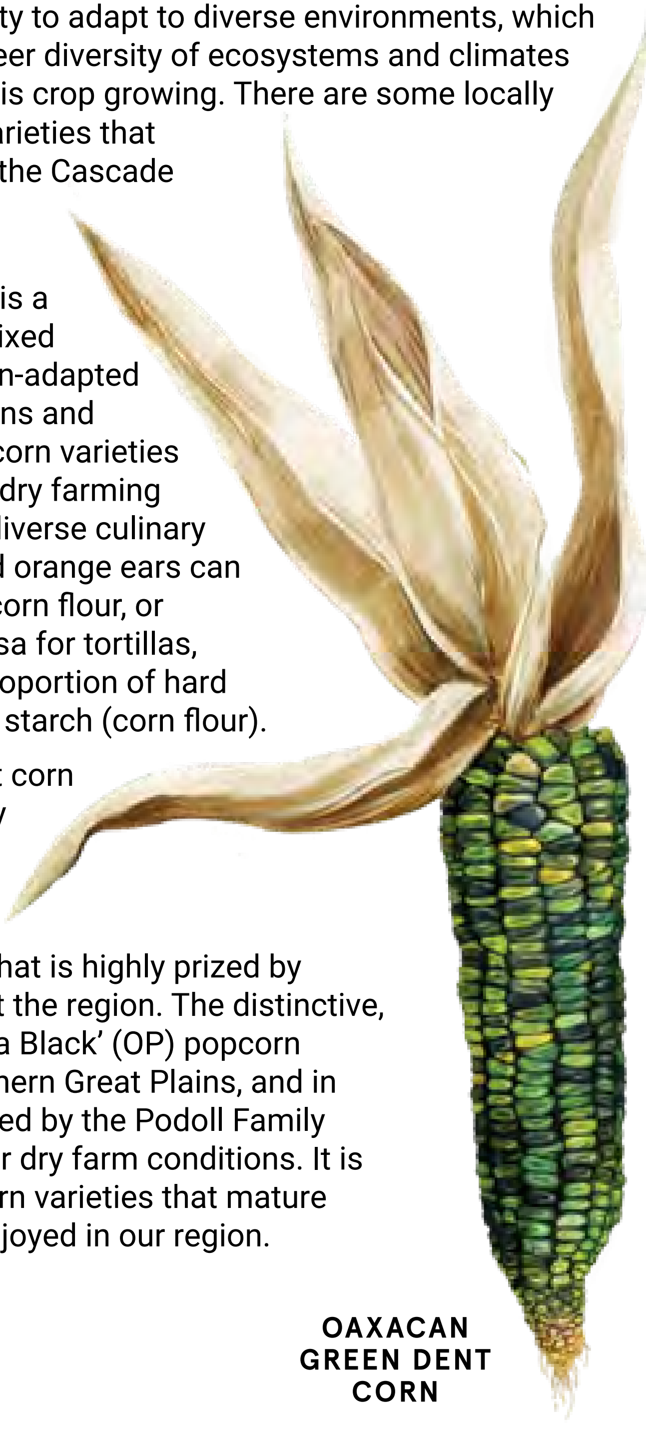
CHICKPEAS

CORN

Corn has a great ability to adapt to diverse environments, which is reflected by the sheer diversity of ecosystems and climates where you can find this crop growing. There are some locally adapted grain corn varieties that perform well west of the Cascade mountains.

'Open Oak Party Mix' (OP, Adaptive Seeds) is a genetically diverse mixed population of northern-adapted New England flint corns and upper-Midwest dent corn varieties that has outstanding dry farming potential, as well as diverse culinary uses. Red, yellow, and orange ears can be used for polenta, corn flour, or nixtamalized into masa for tortillas, depending on their proportion of hard starch (flint) and soft starch (corn flour).

'Strubbe's Green' dent corn (OP, also misleadingly called 'Oaxacan Green' corn) is a unique, green-colored corn variety that is highly prized by tortillerias throughout the region. The distinctive, richly flavored 'Dakota Black' (OP) popcorn originated in the northern Great Plains, and in modern times was bred by the Podoll Family in South Dakota under dry farm conditions. It is one of the few popcorn varieties that mature early enough to be enjoyed in our region.



OAXACAN GREEN DENT CORN

‘Painted Mountain’ (OP) is a diverse, short-season flour corn bred by Dave Christensen in Montana. It lends itself well to dry farming, as do the various varieties derived from this richly diverse population (‘Magic Manna’, ‘Papa’s Red, Blue, and White’, all OP), which mature early before the soil has time to dry out.

High performing dry-farmed sweet corn varieties include ‘Tux-ana’ (OP) by the late Oregon breeder Jonathan Spero, and ‘Honey Badger’ (OP), developed by the University of Wisconsin and the Washington-based Organic Seed Alliance.

POTATOES

Potatoes, like their solanaceous tomato counterparts, lend themselves to dry farming. Dry-farmed potatoes also tend to produce a denser, more flavorful spud. OSU dry farming trials have found the top performing potatoes include ‘Belmonda’, a golden potato variety that yielded three times more than other varieties trialed during the 2020 heat domes. Also notable is ‘Caribe’ an early-season, purple-skinned, white-fleshed variety; and the brilliantly colored and very productive ‘Purple Peruvian’ fingerling potato, which has been a hard-to-find seed for the past few years.

BELMONDA POTATO

RECIPES

Dry farming is a practice which encourages us as food workers to conserve both water and the crops themselves, which tend to be more conducive to long term preservation than conventionally raised annual crops. Incorporating dry-farmed foods into menus and recipes has only deepened my passion for conservation and food sustainability practices.

Specifically, I have found the dry-farmed tomato varieties Piennolo and Annaritas to showcase some of the strongest and most concentrated tomato flavors I have ever tasted.

—Josephine La Costa, chef, farmer, and writer

PIENNOLO ROSSO & MARIGOLD PACCHETELLE

Pacchetelle is a traditional Vesuvian method of preserving halved Piennolo tomatoes in jars with salt, retaining their shape, texture, and flavor. In this recipe, this rich, deeply flavored condiment is served with toasted garlic-rubbed bread and finished with aromatic marigold leaf oil.

Recipe provided by chef Timothy Wastell, chef at Antica Terra, and Josephine LaCosta, a chef, farmer, and writer working with food in the Pacific Northwest.

Ingredients

For the pacchetelle:

- 2 lbs dry-farmed Piennolo Rosso tomatoes, cut in half lengthwise, tossed with flaky sea salt
- 1 head fresh garlic, sliced as thinly as possible
- 2 cups extra virgin olive oil
- ⅔ cup dried marigold petals
- Salt

For the marigold leaf oil:

- 1 tightly packed pint marigold leaves
- 1½ cup grape seed oil
- Salt

To serve:

Baguette or peasant-style bread
One clove of garlic, peeled and halved
Olive oil, for brushing
Salt

Steps

For the pacchetelle:

1. Heat a medium saucepan over medium high heat, add the olive oil and garlic and cook until the garlic begins to sizzle and soften, but not color.
2. Add the marigold petals and continue to cook until the mixture is fragrant and the garlic is beginning to turn golden. Remove from heat.
3. Carefully add the tomatoes and return to medium heat to warm the tomatoes through, stirring very carefully as to help retain their shape.
4. Taste for salt and allow to cool to room temperature

For the marigold leaf oil:

1. Bring a medium sized saucepan filled with salted water (to the point of "sea water") to a boil.
2. Prepare an ice bath by filling a large bowl with ice and cold water.
3. Blanch the marigold greens for ten seconds and cool imme diately in the ice bath for two minutes. Remove the greens and gently squeeze away excess water, then blend with the grapeseed oil and a pinch of salt in a blender until completely smooth and bright green, two minutes or so.
4. Strain slowly through cheesecloth and reserve.

To finish:

1. Rub sliced peasant style bread or baguette with a peeled clove of garlic, brush with olive oil, season with flaky salt and toast until golden but still tender.
2. Generously cover the toasted bread with spoonfuls of the pacchetelle and finish with a few drops of the marigold oil.
3. Serve immediately

PIENNOLO GIALLO “BISQUE”

Bisques are traditionally made with seafood, but this exceptionally creamy yellow-hued soup is entirely vegan.

Recipe provided by chef Timothy Wastell.

Ingredients

2 lbs dry-farmed Piennolo Giallo tomatoes, cut in half
1 large sweet onion, very thinly sliced
1 quart cold filtered water
2 tablespoons fresh garlic, sliced as thin as possible
⅓ cup extra virgin olive oil
Salt

Steps

1. Place a medium sized saucepan over medium high heat and add the olive oil and the sliced garlic.
2. Cook until the garlic begins to barely color. Add the onion and reduce the heat to medium. Season the mixture liberally with salt and cook, stirring frequently, until soft but not colored, about five minútes.
3. Add the water and bring the mixture up to a boil. Add the tomatoes and stir well. Taste for salt, adjust if necessary, reduce heat to medium, and simmer until the tomatoes have collapsed and the mixture is fairly homogeneous, adding more water if it seems too thick.
4. Purée the contents of the sauce pot in batches in a high powered blender and then pass the mixture through a chinois, pushing with a large ladle to extract as much soup as possible while leaving the skin remnants behind.
5. Taste for seasoning and serve. Tastes great with focaccia and sheep cheese.

While saving water in the face of a changing climate is reason enough to dry farm vegetables, I always look for them because of an extra benefit: dry-farmed produce tastes better. Dryer soils means the plants have a lower water content, and the fruits and vegetables they produce have more concentrated flavor.

Tomatoes introduced me to the wonders of dry farming. When I worked in the produce department at New Seasons Market the store sold dry-farmed 'Early Girl' tomatoes from the coastal valley near Santa Cruz. Smaller and not as lovely as the multicolored heirloom varieties that shared the display, they tasted just like a freshly picked homegrown tomato.

Local farmers now use the same technique to dry-farm squash, beans, and a few other crops. I always look for them at the farmers market because I know they'll taste better.

–Jim Dixon, Founder of Wellspent Market in Portland, Oregon

NORTH AFRICAN-STYLE CHICKPEAS

Prep Time: 15 minutes
Cook Time: 15 min (plus 2 hours for chickpea cooking time)

Serving Size: 6–8
Recipe by Wellspent Market

Cultivated in the Middle East for more than 10,000 years, chickpeas, aka garbanzo beans, figure prominently in Mediterranean cooking. This simple dish features the North African flavors of preserved lemon and the spice blend called ras el hanout used in Algeria, Morocco, and Tunisia

Ingredients

3 cups cooked dry-farmed chickpeas
½ 28-oz can crushed tomatoes, Bianco DiNapoli brand preferred
3 shallots, chopped
2 teaspoons NY Shuk ras el hanout spice blend
2 tablespoons NY Shuk preserved lemon paste
2 tablespoons extra virgin olive oil
Sea salt, to taste
Smoked chili flake, sliced green onion, chopped parsley or mint, to serve

Steps

1. Chop the shallots and cook in the olive oil over medium heat until very well browned, about 10 minutes.
2. Add the ras el hanout, preserved lemon paste, and crushed tomatoes.
3. Cook for a few minutes, then add the cooked chickpeas and cook until warmed through.
4. Serve warm with a sprinkle of chili flake or harissa, chopped parsley or mint, and a drizzle of extra virgin olive oil.

CRISPY ROASTED POTATOES

Prep Time: 30 minutes
Cook Time: 1 hour
Serving Size: 4–8
Recipe by Wellspent Market

We stumbled across this recipe while researching the Sunday Roast, a traditional British meal served throughout the commonwealth countries. The Brits are serious about their “roasties,” and recipes for classic English-style roasted potatoes vary widely; this approach, adapted from a technique developed by J. Kenji Lopez-Alt, applies modern science to an age-old recipe to achieve maximum crispness. Ambitious? Maybe. Delicious? Absolutely.

The secret lies in the addition of baking soda, which makes the water alkaline and helps break down the outer layer of the potato chunks into a starchy slurry. Basically, you end up with pillowy chunks of potato coated in a layer of mashed potatoes, which in turn hold onto infused fat and get nice and crispy in a hot oven. The result is ideal: fluffy insides with crispy outsides, made deeply savory thanks to a coating of flavor-infused olive oil.

Ingredients

4lbs russet or waxy yellow dry-farmed potatoes, peeled and cut into good size chunks (for a large russet, think 6–8 pieces: cut in half crosswise, then quarter each half)

2 tablespoons kosher salt; more to taste

½ teaspoon baking soda

3 tablespoons extra virgin olive oil

3 tablespoons rendered duck fat
(to make vegetarian, omit the duck fat and double the olive oil)

4 garlic cloves, minced

1 teaspoon fresh rosemary leaves, minced

Small handful of fresh parsley leaves, minced

Freshly ground black pepper to taste

Steps

1. Set a rack in the middle position and preheat oven to 450º.
2. Bring a large pot of water to a boil; add the kosher salt, baking soda, and the cut up potatoes. Return the water to a boil, reduce to a simmer, and cook until the potatoes are tender (about 10-15 minutes).
3. Meanwhile, combine the olive oil, duck fat, garlic and rosemary with fresh ground pepper in a small skillet set over medium heat; cook, stirring and shaking the pan constantly until the garlic begins to turn golden brown, about 3-5 minutes. Immediately strain through a fine mesh strainer into a large mixing bowl and set aside, reserving the bits of garlic, rosemary, and pepper separately.
4. When the potatoes are done, drain and rest for 30 seconds, allowing excess moisture to evaporate. Add the potatoes to the bowl with the infused oil and duck fat mixture, season to taste with salt and pepper, and toss vigorously until a layer of "mashed" potatoes covers all the potato chunks.
5. Spread evenly on a rimmed baking sheet and transfer to the oven; cook, without moving, for 20 minutes. Use a fish or metal spatula to release any stuck potatoes, then shake the pan and turn the potato chunks. Return to the oven and roast until the potatoes are deep golden brown and crispy (about 40–50 minutes), turning and shaking the pan periodically to ensure even cooking.

5. Transfer to a clean mixing bowl and toss with the reserved garlic, pepper and rosemary mixture, season with flaky salt to taste, and serve immediately.

SOUTHERN TOMATO GRAVY

Prep Time: 20 minutes
Cook Time: 30 minutes

Serving Size: 4–6
Recipe by Wellspent Market

Southern tomato gravy has its roots in Appalachia, where the cold winters require produce to be put up when it's ready. Summer tomatoes in the garden mean canned tomatoes for the winter pantry. Ronni Lundy, one of the founders of the Southern Foodways Alliance and part of the hillbilly diaspora, says that "tomato gravy is a quick winter fix intended to remind you of the sharp tang of the summer garden."

But you don't have to wait for cold weather to make tomato gravy. Fresh, ripe tomatoes make for tasty gravy, too. Just don't confuse this with the meaty, long-cooked tomato sauce that some Italian-Americans call gravy. Southern tomato gravy, like most traditional gravies, gets thickened with flour. The ragu dubbed gravy by early immigrants gains viscosity during the hours-long simmer.

Historically made with the flour-thickened drippings from cooked meat, gravy offers some extra flavor from a handful of pantry ingredients. In Appalachia tomato gravy usually started with a dollop of bacon grease from a can on the back of the stove. It made simple foods like cornbread or biscuits taste better. Our version gets even more flavor with the non-traditional additions of celery and jalapeño.

Ingredients

2 slices bacon, chopped

½ onion, chopped

2 cloves garlic, chopped

1 stalk celery, finely chopped

1 jalapeño, finely chopped
(remove the seeds and white membrane for less chile heat)

2 tablespoons flour

3–4 medium dry-farmed tomatoes, chopped or grated

Pinch sugar

Sea salt and freshly ground black pepper to taste
Extra virgin olive oil, as needed

Steps

1. Cook the bacon in a bit of olive oil until lightly browned. Add the onion, garlic, celery, and jalapeño with a good pinch of salt and cook until soft, about 5 minutes.
2. Add 2 tablespoons of flour and cook for about 2 minutes, then add the tomatoes and a pinch of sugar.
3. Reduce the heat and simmer for about 15 minutes or until the gravy gets thick. Taste and add more salt and black pepper as desired.

HONEYDEW GAZPACHO

Prep Time: 10 minutes + 1–2 hours chilling in refrigerator (optional)
Cook Time: n/a

Serving Size: 6–8
Recipe by Wellspent Market

Maybe the Arabs brought gazpacho to Spain, although some think it might be older, from the Romans. There are countless versions across the Iberian Peninsula, and most include bread.

The ancient soup is thought to have originally been just stale bread soaked in vinegar, but with the advent of powerful blenders and refrigeration, gazpacho evolved to a smooth, vegetable, and olive oil emulsion flavored with vinegar. In the hot Andalusian summers, a lighter gazpacho leaves out the bread and is served ice cold to act as a tonic against the heat.

The classic style served in Seville, thin and thirst-quenching, contains just tomatoes, cucumber, onion, peppers, garlic, olive oil, vinegar, and salt. Stone fruit can add the same sweetly acidic note as tomatoes, like in our version with peaches.

Melons aren't as common, but they make good gazpacho, and the blended cold soup is the best use for the less-than-perfect melons all too common in the grocery store. The tomatillos are completely inauthentic, but they provide both a tangy flavor and a nod to the Americas ravaged by the conquistadors.

Ingredients

½ dry-farmed honeydew melon, peeled and seeded
3 green onions
1 anaheim chile, stem and seeds removed
3 tomatillos, papery husk removed
1 teaspoon fine sea salt
2 tablespoon white wine vinegar
½ cup extra virgin olive oil
Cured sumac to serve (optional)

Steps

1. Cut the melon and other vegetables into chunks that easily fit into your blender. Put the melon into it first since it will liquify and pull the other vegetables in.
2. Blend until completely smooth, then add the salt, vinegar, and olive oil. Blend again until emulsified.
3. Chill for a few hours or serve with ice. When ready to drink, drizzle with olive oil and finish with cured sumac.

RAW SQUASH SALAD

Prep Time: 20 minutes
Cook Time: n/a
Serving Size: 4–6
Recipe by Wellspent Market

It always surprises people to learn that winter squash is good raw. It's name, after all, comes from the Narragansett Native American word askutasquash, which translates to "eaten raw or uncooked." Grating is the secret to making raw winter squash palatable. And while a box grater can do the job, a food processor works much better and faster.

You can use any winter squash, and all except butternut can be grated with the skin on (butternut squash skin has a hard, flinty quality that you can feel no matter how small the pieces). I prefer kabocha or one of the similarly pumpkin-like Cucurbita maximas. I think both the flavor and texture are better, and they keep longer than smaller squash.

Ingredients

3 tablespoons salt-packed capers
1 medium-sized dry-farmed winter squash
1 softball-sized celeriac, aka celery root
1 golf ball-sized shallot
Several sprigs of flat leaf parsley
3 tablespoons red wine vinegar
6 tablespoons extra virgin olive oil
1 tablespoon whole grain mustard

Steps

1. Before you start cutting the vegetables, put a few tablespoons of salted capers in cold water to soak; it'll make them less salty.
2. Cut the squash into pieces that fit through the feed tube of your food processor. I use a small knife to trim away the seeds and membrane, a process I find easier than scraping the seeds out with a spoon.
3. Peel and trim the root end of the celeriac. Squash and celery root sizes vary, so you may end up with a bit more of one or the other, but it won't really matter. You should end up with about a quart and a half of grated vegetables, and that will make enough salad to feed 4–6 people.
4. Using a food processor with the grater attachment or a box grater, grate the squash and celeriac.
5. Chop the shallot and parsley, and drain the capers.
6. Blend together the wine vinegar, extra virgin olive oil, and whole grain mustard. Add the vegetables and mix to combine.
7. Taste before adding any salt; the capers are already salty. If you can, let the salad sit for 15 minutes or more before serving.

SQUASH CAPONATA

Prep Time: 20 minutes
Cook Time: 45 minutes

Serving Size: 6–8
Recipe by Wellspent Market

Using winter squash instead of eggplant for this classic Sicilian dish wasn't my idea, but it's a really good one. The sweet and sour flavor, called agrodolce in Italian, reflects the North African and Spanish influences on Sicilian food.

Ingredients

1 dry-farmed winter squash. I think the big, pumpkiny varieties taste better, but you can make this with any winter squash.
Extra virgin olive oil, as needed

2 tablespoons salt-packed capers

1 red onion

A couple celery stalks

Fine sea salt, to taste

2 tablespoons tomato paste

2–3 garlic cloves

½ cup green olives, coarsely chopped

2 tablespoons red wine vinegar

2 tablespoons brown sugar

½–1 teaspoon oregano

Fresh mint leaves or parsley, to serve

Steps

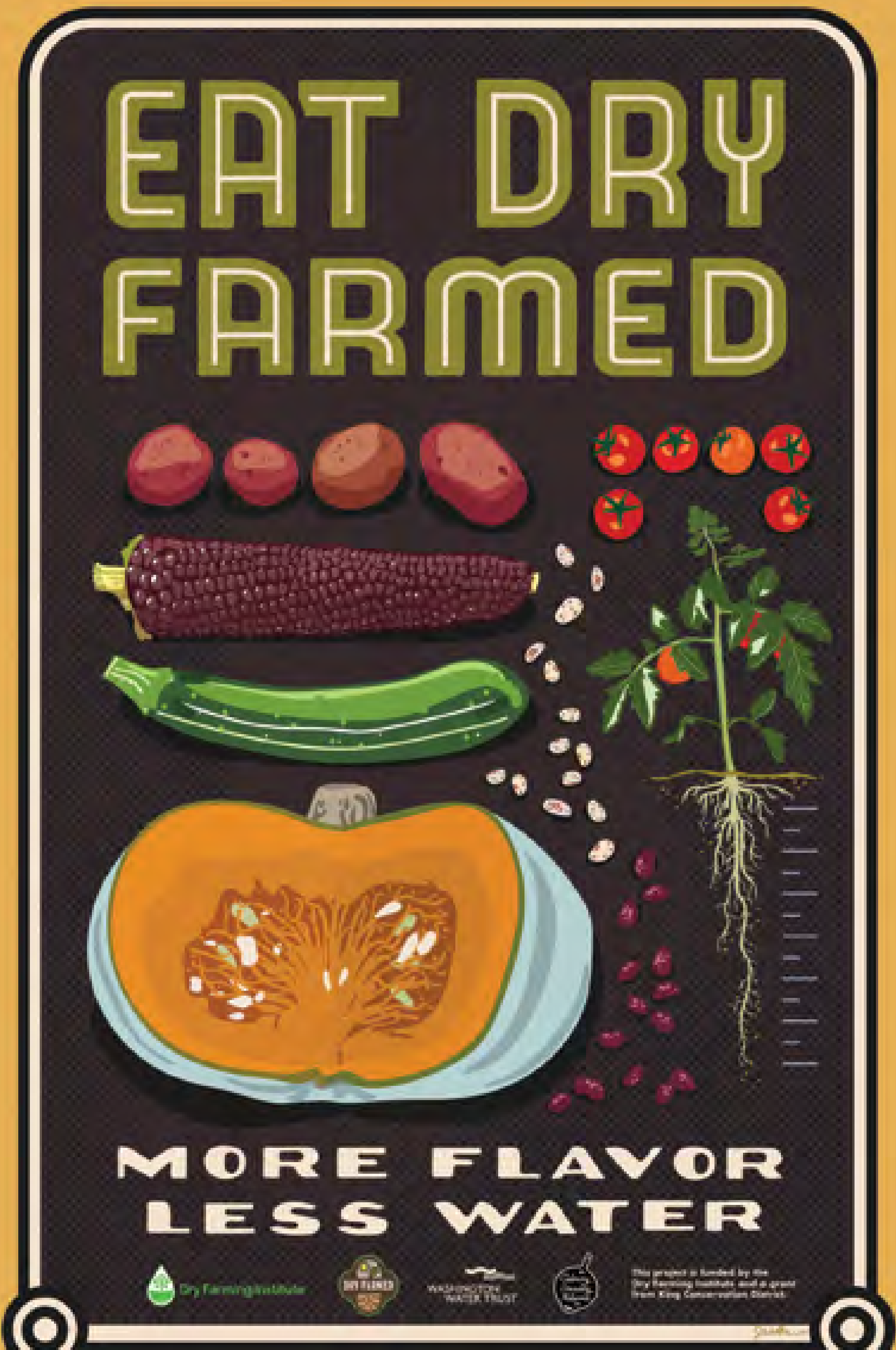
1. Preheat the oven to 350ºF.
2. Cut the squash into roughly ¾ inch chunks; you want about 3 cups. Drizzle with olive oil and bake for about 25 minutes or until tender.
3. While the squash bakes, soak the salt-packed capers in cold water for about 15 minutes, then drain.
4. Chop a red onion and a couple of celery stalks; cook them in olive oil with a good pinch of sea salt for about 5 minutes.

Push the vegetables to the side of the skillet and add about 2 tablespoons of tomato paste. Let it cook for a minute or two, then add 2–3 cloves of chopped garlic.

5. Add the cooked squash, the capers, and the green olives. Stir in a splash (2 tablespoons or so) of red wine vinegar and a couple tablespoons of brown sugar.
6. Cook gently for another 15 minutes to let the flavors blend, then sprinkle with a few pinches of oregano. Adding a handful of chopped fresh mint leaves would be appropriate, but use Italian parsley if you can’t find mint.

RESOURCES

We hope that you have enjoyed this dry farming zine. This publication was written by members of the Dry Farming Institute and Oregon State University Department of Horticulture. If you are interested in learning more about dry farming there are a number of resources and publications listed on the Dry Farming Institute website including a Dry Farming Seed Directory and a Dry-Farmed Produce Directory. For more info visit www.dryfarming.org


EAT DRY
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