



## When to prepare:

# "Water" You Thinking About Drought?

### Resources, Chance, and Climate Conditions

The following tables include all the resources, chance, and climate information used in the “When to Prepare: ‘Water’ You Thinking About Drought?” game! We provided our definitions for each and included some resources to learn more about what we chose to include in the game.

Here is a website from the USDA Climate Hubs that provides a good overview about drought resistant practices, including a few of the resources we used here:

<https://www.climatehubs.usda.gov/hubs/northeast/topic/drought-resistant-practices>

Resource from game	Definition	Resources to learn more
Additional water supply or storage	Get some additional water or add water to your storage.	
New well	New wells mean more water supply. A personal well can also benefit you in the event of a municipal water pump failure.	
Dig a deeper well	Deeper wells can reach groundwater at lower levels.	
Implement precision agriculture strategies for water use	Precision agriculture uses technology to offer precise application of water to areas that need it and avoids putting it on areas that don't need it. This helps save water.	Information on precision agriculture: <a href="http://www.nal.usda.gov/legacy/waic/precision-agriculture">www.nal.usda.gov/legacy/waic/precision-agriculture</a>
Improve water infrastructure (ex. fix leaking pipes)	Decreases water loss and increases water use efficiency (less wasting of water).	

<p>Implement drip irrigation</p>	<p>Drip irrigation is a very efficient method of providing water and nutrients to plants by delivering water and nutrients directly to the root zone. This method greatly reduces water lost to the atmosphere and to areas that are not accessible to the plant.</p>	<p>Information about drip irrigation: <a href="https://agsci.oregonstate.edu/mes/irrigation/introduction-drip-irrigation">https://agsci.oregonstate.edu/mes/irrigation/introduction-drip-irrigation</a></p>
<p>Adopt conservation tillage</p>	<p>Soil is minimally disturbed when preparing land for sowing. Minimally disturbed soil is better at holding water.</p>	<p>Information about different types of conservation tillage: <a href="https://www.sare.org/publications/conservation-tillage-systems-in-the-southeast/chapter-1-introduction-to-conservation-tillage-systems/what-is-conservation-tillage/">https://www.sare.org/publications/conservation-tillage-systems-in-the-southeast/chapter-1-introduction-to-conservation-tillage-systems/what-is-conservation-tillage/</a></p>
<p>Enroll in crop insurance</p>	<p>Crop insurance helps protect the farmer against losses during the growing season from uncontrollable things like drought, freeze, and disease. It covers loss of yield or revenue exceeding a deductible amount.</p>	<p>Information from the USDA about crop and livestock insurance: <a href="https://www.usda.gov/topics/farming/crop-and-livestock-insurance">https://www.usda.gov/topics/farming/crop-and-livestock-insurance</a></p>
<p>Increase soil's health and water holding capacity</p>	<p>Increasing the health of the soil includes adding organic matter, minimal disturbance, and increasing local biodiversity. Healthy soil can hold more water, making water more available to crops.</p>	<p>Information on increasing soil health: <a href="https://www.fs.usda.gov/nac/topics/soil-health.php#:~:text=The%20USDA%20Natural%20Resources%20Conservation%20Service%20%28NRCS%29%20has,live%20stock%20to%20recycle%20nutrients%20and%20increase%20plant%20diversity">https://www.fs.usda.gov/nac/topics/soil-health.php#:~:text=The%20USDA%20Natural%20Resources%20Conservation%20Service%20%28NRCS%29%20has,live%20stock%20to%20recycle%20nutrients%20and%20increase%20plant%20diversity</a></p> <p>Information about soil water holding capacity: <a href="https://mytrellis.com/blog/swhc#:~:text=Implementing%20any%20of%20the%20following%20will%20help%20increase,conservational%20tillage%20%3%20Add%20manure%20%4%20Add%20compost">https://mytrellis.com/blog/swhc#:~:text=Implementing%20any%20of%20the%20following%20will%20help%20increase,conservational%20tillage%20%3%20Add%20manure%20%4%20Add%20compost</a></p>

<p>Plant drought resistant crops</p>	<p>These crops are more resistant to drought, meaning the effects of drought on the crop are minimized. Examples include reducing water loss through transpiration.</p>	<p>This website gives a good overview of how drought resistant plants work and some work done on barley and oats to make them more drought resistant: <a href="https://businesswales.gov.wales/farminconnect/news-and-events/technical-articles/drought-resistant-crops-future#:~:text=Drought%20resistant%20crops%20for%20the%20future%201%20Developing,creating%20new%2C%20drought-resistant%20and%20high-yielding%20cultivars.%20More%20items">https://businesswales.gov.wales/farminconnect/news-and-events/technical-articles/drought-resistant-crops-future#:~:text=Drought%20resistant%20crops%20for%20the%20future%201%20Developing,creating%20new%2C%20drought-resistant%20and%20high-yielding%20cultivars.%20More%20items</a></p>
<p>Use cover crops</p>	<p>Cover crops help to protect the soil surface from erosion and helps keep water from being as easily evaporated out of the soil.</p>	<p>Information on the use of cover crops: <a href="https://www.rma.usda.gov/en/Topics/Cover-Crops">https://www.rma.usda.gov/en/Topics/Cover-Crops</a></p>
<p>Meet with fellow farmers or USDA agents to discuss strategies and concerns</p>	<p>Strong working relationships with others can help support you when drought strikes! Sharing knowledge can help expand your mitigation strategies.</p>	<p>Information on Alaska's Natural Resource Conservation Service offices: <a href="https://www.nrcs.usda.gov/conservation-basics/conservation-by-state/alaska">https://www.nrcs.usda.gov/conservation-basics/conservation-by-state/alaska</a></p>
<p>Report drought conditions to the Drought Impact Reporter</p>	<p>The National Drought Mitigation Center launched the Drought Impact Reporter (DIR) in July 2005 as the nation's first comprehensive database of drought impacts. It collects and displays many types of information, providing researchers and interested members of the public with more context and detail about drought, as well as more readily summarized information.</p>	<p>Drought Impact Reporter website: <a href="https://droughtreporter.unl.edu/about">https://droughtreporter.unl.edu/about</a></p>

Chance from game	Definition	Resources to learn more
<p>Congrats! You received grant money</p>	<p>Helps with financial resources.</p>	<p>The USDA has many grant opportunities:  <a href="https://www.usda.gov/topics/farming/grants-and-loans">https://www.usda.gov/topics/farming/grants-and-loans</a></p> <p>This website can help you find appropriate funding:  <a href="https://www.nal.usda.gov/legacy/afsic/where-can-i-find-agricultural-funding-resources">https://www.nal.usda.gov/legacy/afsic/where-can-i-find-agricultural-funding-resources</a></p>
<p>Migratory birds and moose have found your crop!</p>	<p>Animals are always looking for an easy meal. Birds and moose have stumbled upon your crops and found them quite tasty!</p>	
<p>Bummer! Fungus has plagued your crop</p>	<p>Some fungus can infect crops even during dry conditions. It requires water to use a fungicide and to keep your plants healthy!</p>	
<p>A wildfire has burned part of your crop</p>	<p>Wildfires are more likely to spread faster during dry conditions due to low water content in plants.</p>	
<p>Price of inputs increases (ex. seeds, fertilizer, equipment)</p>	<p>It now costs more to buy day-to-day things, meaning less money can go towards your operation.</p>	
<p>Phew! A light rain has given slight moisture to your crops</p>	<p>Even though drought can be ongoing, that doesn't mean it can't rain! Any sort of rain will help provide some moisture for your crops.</p>	

Finally! A break in the warm temperatures for a few days	High temperatures can evaporate water out of the soil and cause plants to transpire more, which causes water to be lost faster. Cooler temperatures slow down those processes, so water isn't lost as fast.	
Oh no! Weeds are taking over!	Weeds can spread very fast when conditions are favorable. They are problematic because they steal water and nutrients from the crops!	

<b>Drought Indicator</b>	<b>Definition</b>	
Precipitation	Includes both rain and snow	<p>National Weather Service Fairbanks <a href="http://www.weather.gov/afg/">www.weather.gov/afg/</a></p> <p>National Weather Service Anchorage <a href="http://www.weather.gov/afc/">www.weather.gov/afc/</a></p> <p>National Weather Service Juneau <a href="http://www.weather.gov/ajk/">www.weather.gov/ajk/</a></p>
Temperature	How warm or cold it is	<p>National Weather Service Fairbanks <a href="http://www.weather.gov/afg/">www.weather.gov/afg/</a></p> <p>National Weather Service Anchorage <a href="http://www.weather.gov/afc/">www.weather.gov/afc/</a></p> <p>National Weather Service Juneau <a href="http://www.weather.gov/ajk/">www.weather.gov/ajk/</a></p>
Snowpack	This is mainly an indicator of snow depth. Deeper snowpack, more melted runoff	<p>Snow data from the National Weather Service: <a href="https://www.weather.gov/aprfc/SnowDepth">https://www.weather.gov/aprfc/SnowDepth</a></p> <p>The National Water and Climate Center has an interactive map that displays different types of snow and water information, including snowpack: <a href="https://www.nrcs.usda.gov/wps/portal/wcc/home/">https://www.nrcs.usda.gov/wps/portal/wcc/home/</a></p>

Streamflow	An indicator of how much water is moving through streams. Lower streamflow is typically associated with less water.	The National Water and Climate Center has an interactive map that displays different types of snow and water information, including streamflow: <a href="https://www.nrcs.usda.gov/wps/portal/wcc/home/">https://www.nrcs.usda.gov/wps/portal/wcc/home/</a>
Wildfires	Wildfires are an annual occurrence, but they are more likely to grow and spread faster during dry conditions.	Alaska fire information with lots of maps: <a href="https://akfireinfo.com/maps/">https://akfireinfo.com/maps/</a>  Local National Weather Service offices will also issue Red Flag Warnings: <a href="https://w2.weather.gov/arh/fire">https://w2.weather.gov/arh/fire</a>
Short-term Outlook	Temperature and precipitation trend forecasts 1-2 weeks out.	Climate Prediction Center 6-10 Day Temperature & Precipitation Outlooks <a href="http://www.cpc.ncep.noaa.gov/products/predictions/610day/">www.cpc.ncep.noaa.gov/products/predictions/610day/</a>
Long-term Outlook	Temperature and precipitation trend forecasts 3 months out.	Climate Prediction Center 8-14 Day Temperature & Precipitation Outlooks <a href="http://www.cpc.ncep.noaa.gov/products/predictions/814day/">www.cpc.ncep.noaa.gov/products/predictions/814day/</a>