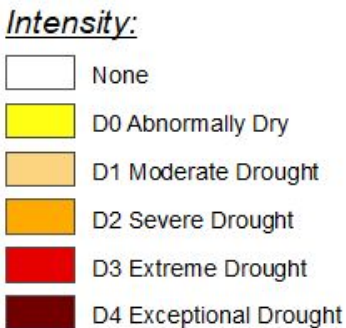
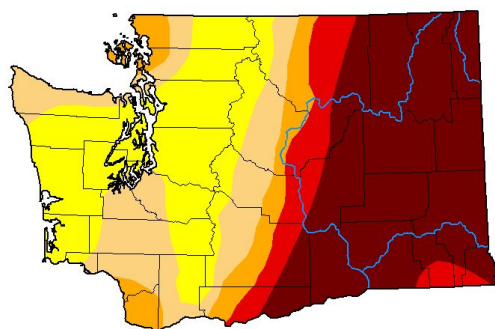


Essential Question: How does climate change affect Washington wheat farms?

Background



Vocabulary

climate: weather patterns and average conditions over a long time period.

susceptible: able to be harmed by something.

trend: the overall or average direction over time.

yield: the amount of wheat seeds that can be harvested and sold.

variety: a type of wheat plant or seed that has specific traits.

bushel: volume measure for harvested wheat.

pest: insect that harms the health or growth of the wheat plant.

Figures 1-3: [Left] Drought map for Washington state August 2021 from Tinker, Richard. *U.S. Drought Monitor Washington August 3, 2021*, CPC/NOAA/NWS/NCEP, August 2021, droughtmonitor.unl.edu [Right, top] Heat-stressed wheat from Berg, Nicole. *'Early and Fast' wheat harvest due to drought*, Capital Press, June 2021, capitalpress.com/ag_sectors/grains/early-and-fast-wheat-harvest-in-washington-due-to-drought/article_394eed38-d83c-11eb-bd4d-cb0440f58b21.html [Right, bottom] Hessian fly, a wheat plant pest from Bauer, Scott. *Hessian fly, Mayetiola destructor*, Agricultural Research Service USDA, August 2013, en.wikipedia.org/wiki/Hessian_fly#/media/File:Hessian_Fly.jpg

In the 2021 growing season, extreme drought in Washington state means that soils are very dry. Farmers are concerned about sufficient **yield** this year - about harvesting and selling enough wheat to make a profit.

Over much of Washington's wheat fields, farmers rely completely on precipitation (snow and rain) to provide enough moisture for their wheat plants (no sprinklers or irrigation on these fields!). Many, especially in areas where the **climate** is already dry, use a summer fallow rotation, which means that they leave empty, or fallow, half of their acres each year in order to build up moisture before planting more wheat. After a field is harvested (July-August) it will sit fallow until the following September when it will be planted with winter wheat. With enough precipitation the fallow field will accumulate moisture for the next year's crop. It's a long-term commitment that drought can quickly spoil.

In addition, the overall warming of temperatures in Washington state means wheat farms may become more **susceptible** to certain pests, wheat diseases, and even weeds. So, **how does climate change affect Washington wheat farms?**

1. MARK THE TEXT

Underline claims the author makes and any pieces of information and evidence that are relevant to the Essential Question. A claim is the idea (or ideas) the author will show you or try to convince you of.

Circle the vocabulary words listed in the box above if you find them in the text. These words might clue you into places where there is evidence in the text.

Put a question mark [?] above any other word you need to look up to help you best understand what the author is saying.

2. CONNECT AND RESPOND

Use these symbols to mark sentences or paragraphs in the article. Explain your connections or responses in the **margin**. Include at least two of the following:

- Something you have a connection to (Do you know something else about the point the author is making? Did you learn this information in another place?)
- † Something you agree with
- × Something you disagree with or have a counterclaim for
- △ Something that changes what you thought at first
- ~ Something you have a question about or don't understand yet

Essential Question: How does climate change affect Washington wheat farms?

'Early and fast' wheat harvest in Washington due to drought *Capital Press*
June 28, 2021 by Matthew Weaver

- 1 Drought means Washington's wheat harvest will be "early and fast," industry leaders say.
- 2 "They're not going to have the bushels to cut like they do normally," said Michelle Hennings, executive director of the Washington Association of Wheat Growers. "It's not going to be a bumper crop by any means. It's going to be below average, for sure."
- 3 Winter wheat yields are estimated to be 57 bushels per acre, said Glen Squires, CEO of the Washington Grain Commission. Spring wheat yields are expected to be lower as well.
- 4 The average winter wheat yield in 2020 was 76 bushels an acre. The average spring wheat yield was 61 bushels an acre.
- 5 "The 2021 crop season is one of the most challenging faced by the industry," Squires said.
- 6 The drought, low soil moisture, high temperatures and temperature swings during development all put the crop under stress, which reduces yields, increases protein levels and affects test weights.
- 7 Harvest could be a week to two weeks early, Hennings said.
- 8 "Now that we're seeing 100-degree weather for over a week, it's going to really push the wheat along quickly," she said. The heat will ripen the wheat faster, Hennings said. "The damage has already been done because of the drought," she said.
- 9 Winter wheat ranges from OK in certain areas to crop failures in dryland areas, Hennings said. Spring wheat doesn't look good across the state, she said.
- 10 Hennings expects the harvest to get fully underway during the next week.
- 11 She said harvest has likely begun in Benton, Yakima and Klickitat counties, the areas where it typically starts first.

A **crop failure** is the total loss of all yield; there is nothing for the farmer to sell

A **combine** is the machine that harvests the wheat grain

- 12 “They don’t have much of a crop, either,” she said. “There’s a lot of complete crop loss over there.”
- 13 Nicole Berg, Paterson, Wash., wheat farmer and vice president of the National Association of Wheat Growers, uses a 12-inch-tall coat hanger as a gauge to determine the height of her wheat. That’s the height farmers run their combines, she said.
- 14 A crop insurance agent assessed her wheat would yield 0.5 bushels per acre.
- 15 If wheat is priced at \$6.50 per bushel, that means Berg couldn’t buy a cup of coffee at Starbucks off an acre of wheat, she added.
- 16 “It’s just, it’s a drought,” she said. “Droughts cycle, weather cycles, we’re in an extreme drought situation and now we have extreme temperatures. It’s been a wild ride.”
- 17 Berg and her family raise dryland wheat. They use irrigation on other crops, including green peas, bluegrass, sweet corn, field corn, dry peas and dry beans — all of which have fared better than the wheat.
- 18 “Everything else is good,” Berg said. “You have to have water. Water makes things grow. We haven’t had any measurable precipitation, really, since February.”
- 19 The heat can pose a risk to farmers’ equipment, Berg said. “You have to remember, it’s hotter even in a combine,” she said. “The belts will melt, they’re running fast and creating heat.” Some growers will likely work early in the morning and at night, Hennings said.
- 20 Moisture is also needed to plant next year’s crop, Hennings said. “If we have a two-year drought, next year’s going to look even worse,” she said.

Adapted from Weaver, Matthew. “‘Early and fast’ wheat harvest in Washington due to drought.” *Capital Press*, 28 June 2021, capitalpress.com/ag_sectors/grains/early-and-fast-wheat-harvest-in-washington-due-to-drought/article_394eed38-d83c-11eb-bd4d-cb0440f58b21.html.

Summary: Review the essential question and your annotations. Answer at least two of the following questions in the space below. What claim(s) does the author make about the essential question? Do you agree with the claims? Are they well supported by evidence from the article? What connections did you make that help you evaluate the author’s claim?

Essential Question: How does climate change affect Washington wheat farms?

Discussion Use the information on this page to help guide your discussion to answer the essential question. Remember to say just enough to make your point while leaving **room for others to speak**. It is okay for there to be **periods of silence** while you and your classmates think. (If it's quiet - **go back to your article** annotations and try a sentence starter below!) Make sure you respond to or question each other's ideas while you talk. Look out for times when you can clarify with evidence, ask questions about relevancy or accuracy of information, or identify a counterclaim.

Near the beginning

Give (and analyze) claims and evidence

My author claims...

My article says...but I think...

My article says...and I think...

In the middle

Evaluate information and look for connections and/or counterclaims

From what I know...because...

What does your article say about...

A counterclaim would be that...

Does anyone have more information about...

Does...depend on having...point of view?

Near the end

Answer the essential question

When you said...I thought...

Does the group agree that...?

Even though my article claims...I now think...

My article claims...and I think it is right because...

After listening to everyone's thoughts, I think...

Discussion Checklist

→ Share information by stating (at least 1)

- My article's claim, quoted directly from article**
- My analysis of the claim
- Relevant connection or background information**
- Evidence, quotes directly from article

→ Respond to others ideas by (at least 1)

- Pointing out a counterclaim
- Asking for examples
- Asking for evidence
- Saying more about others' ideas**
- Prompting someone else to respond

→ Show respect for others' ideas by (at least 1)

- Paying attention to people who are talking**
- Staying on-topic
- Re-engaging the group after a period of silence or if you go off-topic
- Monitoring time

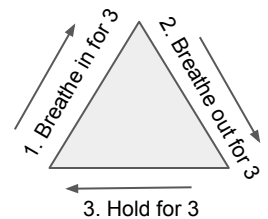
→ Answer the essential question by (at least 2)

- Saying my ideas about the essential question**
- Using evidence to back up my ideas**
- Providing a different answer or idea
- Giving OR asking for a summary

Nervous about speaking? It's normal.

Here are some things that might help:

Breathe. Use a triangle breath to regulate your nerves and prepare yourself to speak.



Go back to your article and look for where you noted **personal connections** to the text. Speaking about something you have experience with may be easier in the group discussion.

Look at the sentence starters above. Write out what you are going to say by filling in the blanks and be on the lookout for when to add your thoughts.

Essential Question: How does climate change affect Washington wheat farms?

Reflection Think about what you read and what others said in the group discussion to answer the following questions.

- 1. What did you get out of this activity?
 - I learned a lot a little nothing
 - I participated a lot a little not at all
 - My thinking changed a lot a little not at all
 - I enjoyed it a lot a little not at all

2. Choose a stem from above and say more. For example, *I participated a lot because the article I read had good evidence for the essential question or My thinking changed not at all because I agreed with the article's claim and we did not find any credible counterclaims during our discussion.*

3. How would you answer the essential question in 3-5 sentences? Consider the claims and evidence from your article, along with connections, background information, and counterclaims and evidence brought up during the discussion.