

Essential Question: Is no-till a no-brainer for Washington wheat farms?

Background



Figure 1: Tilled field from Mykura, Nigel. *Freshly Tilled Field*, geograph.org.uk/p/4200214



Figure 2: Crop residue from Burton, Rodney. *Grain Maize Stubble*, geograph.org.uk/p/724310

Vocabulary

no-brainer: A very easy or obvious choice, decision, or solution (So easy or obvious that it is humorously said to require no brain)¹.

conventional: done the usual way.

no-till (direct seeding): a farming practice where residue is left on the field and new seeds are planted into the covered soil.

residue: parts of the plant that are not harvested (i.e. roots, stem).

sustainable: crop growth is balanced with soil health and environmental stewardship.

erosion: the loss of soil from a field by wind or water.

No-till or **direct seeding** is a farming practice that skips the **conventional** step of **tilling** before planting seeds in the ground. The ground in figure 1 has been **tilled** - the soil has been broken up and turned over to remove weeds and leftovers from last season's harvest and prepare the field for planting new seeds.

The field shown in figure 2 has not been tilled and seeds will be planted by drilling directly into the soil through the **crop residue**, or the remains of last season's plants that have been left on the field after harvest.

No-till and direct seeding are lauded by many as a **sustainable** farming practice. These low-disturbance practices can protect against soil **erosion**, reduce carbon dioxide emissions, and save farmers money by reducing labor and fuel costs. So, **Is no-till a no-brainer for 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

¹no-brainer. (n.d.) *Farlex Dictionary of Idioms*. (2015). Retrieved July 8 2021 from idioms.thefreedictionary.com/no-brainer

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Direct Seeding - a farmer to farmer case study by *Georgine Yorgey, Kristy Borrelli, Kathleen Painter, and Hilary Davis*

- 1 Ron and Andy Juris are third and fourth generation farmers in an operation that began in 1930. Together, this father and son team farm about 4,800 acres on the western fringe of the Horse Heaven Hills in Bickleton, WA. The farm has a short growing season due to its location on a high plateau (3,000 feet), and is in one of the driest wheat-producing regions in the world (Schillinger and Young 2014). Shallow silt loam soils (30 to 36 inches) further limit available soil moisture and present a high risk of erosion.
- 2 To cope with these challenges, the Jurises have adopted a range of creative strategies and a unique farming perspective.
- 3 Ron's own experimentation began when he purchased a Concord no-till drill in 1996. By the end of the 1990s, he had shifted the whole farm to direct seeding. During those years, he also switched from a rotation where his fields remain fallow (unplanted) during some years to a system where he plants wheat yearly. The goal of these changes was to reduce erosion and improve overall yields. "We're getting more out of annual cropping than we were getting out of wheat-fallow. We're using almost all the water that we get, whereas before a lot of it was running off, and we had a terrible erosion problem."
- 4 In 2008, after ten years in the aviation industry, Andy returned to full-time farming with his dad. Continuing to build on their direct seed foundation, the Jurises have adopted a range of new equipment, technologies, and cropping strategies over the last few years
- 5 The Jurises hope that these strategies will help them cut costs, conserve soil moisture, improve crop yields, and enhance their flexibility in an ever-changing market.
- 6 One step they have taken is investing in new equipment to increase the height of crop residue. Ron comments, "This last year [in 2014], we had one of our fog years up here. What we saw was that all of the tall stubble scraped the frost out of the fog as it went by. It just built up. It's not a huge amount of moisture, but in a year like this we probably gained another tenth or two of moisture that the short stubble didn't get."
- 7 The Jurises also feel that the standing residue improves conditions for small plants by shading the soil and reducing wind speeds at ground level. This was particularly apparent on a windy spring day in 2014. "We went out with a wind meter and checked wheat growing up in tall stubble and saw that we had about a six miles-per-hour wind down by the new growth. And up above, the wind was 14 and 15 miles per hour, gusting to 24 or 25." Research in the Pacific Northwest and elsewhere has indicated that shading and reduced wind can benefit moisture retention.

- 8 Research also suggests that tall standing stubble can improve soil water retention by capturing more snow, reducing soil-water evaporation, and reducing wind speeds at the soil surface (Black and Siddoway 1977; Nielsen 1995; McMaster et al. 2000; Nielsen et al. 2005).
- 9 The no-till system is not without challenge for the Jurises. “The system we have now is capable of doing more with less, but the level of management needed to make it work is much higher and that’s really a challenge that we have to be willing to accept. For example, the machinery has a lot more complicated moving parts, and so it requires more maintenance. We have to be on top of it and be willing to do that,” says Ron.
- 10 The Jurises are also very concerned about their dependence on glyphosate (a herbicide also called Roundup) to successfully carry out their direct seeding system. “We’ve been trying to figure out what we can do to try to mix that up. We have tried other chemicals. Nothing works as effectively on everything as Roundup. But we’ve got to be paying attention to that.”
- 11 The increased crop residue height can complicate weed control efforts overall, especially for grassy weeds like cheat grass that are a challenge even in conventionally harvested acreage. So far, they have felt that their strategies for ensuring good herbicide coverage are meeting this challenge.
- 12 With investment in new equipment, the application of knowledge and experience, and some trial and error Ron and Andy Jurises have found that no-till practices are the best choice for their wheat farm. As Andy says “I have a long-term outlook because I need to make sure the operation stays profitable over the next 30 to 40 years.”

Adapted from Yorgey, Georgine, et al. “Stripper header and direct seeding: Ron and Andy Juris.” *Pacific Northwest Extension Publications*, March 2017, pubs.extension.wsu.edu/stripper-header-and-direct-seeding-ron-and-andy-juris-farmer-to-farmer-case-study-series.

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?

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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

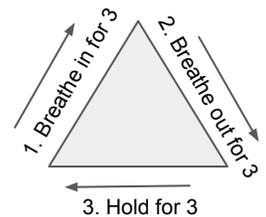
→ Answer the essential question by (at least 2)

- 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.

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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 | <input type="checkbox"/> a lot | <input type="checkbox"/> a little | <input type="checkbox"/> nothing |
| I participated | <input type="checkbox"/> a lot | <input type="checkbox"/> a little | <input type="checkbox"/> not at all |
| My thinking changed | <input type="checkbox"/> a lot | <input type="checkbox"/> a little | <input type="checkbox"/> not at all |
| I enjoyed it | <input type="checkbox"/> a lot | <input type="checkbox"/> a little | <input type="checkbox"/> 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.