

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

- 1 Ron Jirava (pronounced “Jeray”) has been farming near Ritzville since 1985 on the farm he grew up on. Jirava has experimented with direct seeding over the years, but has generally found that the use of limited tillage better retains the limited rainfall on his farm’s 6-foot-deep soils.
- 2 Jirava has long been at the forefront of efforts to develop cropping systems that are both economically and environmentally sustainable for his area. Environmentally, direct-seeded annual cropping systems are winners, but they are not competitive economically under the conditions on Jirava’s farm.
- 3 Direct seeding can significantly reduce wind erosion, but regional studies in low-rainfall farming areas have consistently shown that no-till systems can lower profitability compared to conventional farming practices. Lower economic performance is likely the result of how much water can be stored in the soil under the various tillage systems. Untilled sandy soils, such as those on Jirava’s land have been shown to lose water to evaporation faster than tilled soil.
- 4 If soil moisture is lost to evaporation, it can make it difficult or impossible to plant winter wheat on time (in the late summer). Waiting to plant winter wheat in the late fall, after fall rains arrive, has a risk of substantial yield loss and less profit for the farmer.
- 5 Even still, Jarava sees the benefit of reducing tillage on his farm. “If we’re going to do tillage, the Haybuster [undercutter] is the tool that gets used. Everything else has been parked.” Though not strictly a no-till method, using an undercutter implement allows most of the residue to remain on the surface while still turning the soil underneath.
- 6 In 2012, after an extremely dry winter, Jirava began experimenting on a limited basis with no-till. “There was no moisture at all coming into the spring, and so we decided to just leave it alone.”
- 7 For Jirava, the greatest challenge to reducing or eliminating tillage has been making sure that his seed drill can successfully plant through surface residues. (Seed drills are machines pulled by a tractor that create holes in the ground and precisely place seeds.) Higher levels of residue can be particularly challenging for farmers who have a lot of money invested in a single drill, if that drill is not suited to higher residue levels.
- 8 Over the years, Jirava has acquired a number of different drills. Multiple drills allow him to seed under different residue conditions and vary row spacing to take advantage of soil moisture where it exists. His feeling is that “our farm can’t have enough different drills for the different conditions that we might run into.”

- 9 Jirava has also experienced weed management challenges from using the undercutter. “The less intense the tillage, the more you increase the possibility that grassy weeds are going to be a problem.”
- 10 Weed control is even more challenging on Jirava’s no-till wheat field, and has had to deal with finding herbicides for a number of persistent weeds. Jirava’s feeling is that “you never know what’s going to pop up, because you’ve changed the conditions out there by eliminating tillage. And so it’s always a guessing game, and you’re always a step behind the weeds.”
- 11 With multiple types of tillage and crop rotations across his farm, Jirava says that his final challenge is keeping it all straight. “The more different types of tillage there are, the more it keeps you jumping. What did we do here? And what’s there? And so, it takes a little bit more thought, sometimes, on different pieces—to decide what we’re going to do.”

Adapted from Yorgey, Georgine, et al. “Conservation Tillage in a Winter Wheat - Fallow System: Ron Jirava.” *Pacific Northwest Extension Publications*, August 2018, pubs.extension.wsu.edu/conservation-tillage-in-a-winter-wheat--fallow-system-ron-jirava-farmertofarmer-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

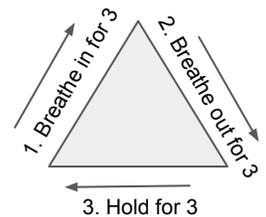
→ Answer the essential question by (at least 2)

- 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 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.