# PRECISION FARMING

## Field and Storage Mapping on the Vander Zaag Farm

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In Ontario potato farmers Kate and Peter Vander Zaag were among the first to adopt potato yield monitoring and, more recently, field-to-storage load tracking and mapping. Tech-savvy producers who prioritize quality, the Vander Zaags believe capturing quality information is key to growing better potatoes. I sat down with Kate to hear her perspective.

**Bill:** What made you first consider yield monitoring?
**Kate:** When we started seeing yield maps for grain, we thought immediately that we wanted something similar for our potatoes. We spend so much time and effort deciding on the right inputs, but back then we had no idea how they affected in-field variability.

**Bill:** What value do you get from potato yield monitoring?
**Kate:** For me, the priority is to see variability in a field. Once you can see patterning, you can start addressing issues. Yield monitoring in potatoes isn't nearly as straightforward as it is in, say, wheat since you pull up debris. But, you see universal truths: trends in areas of the field, repetition of patterns over seasons.

**Bill:** Recently, you added field-to-storage tracking. How has that impacted your business?
**Kate:** Storage mapping today is incredible. Since my field and bin maps are colour-coded by each truckload, I can now track exactly where the potatoes I'm shipping were grown in a field. Before, I could see quality when the potatoes came out of the ground; now I have an incredibly detailed map of how that quality changes after a long period in storage.

**Bill:** You also use your maps with customers?
**Kate:** Absolutely. We use the maps to educate buyers. A lot of people think you start harvesting at one side of the field, end at the other and that it's all about the same in between. In reality, there are a million ways to approach a rectangular field depending on the obstacles in it, and there are all kinds of factors that affect yield and quality. If I can sit down with them with my field and storage maps, I can show them exactly what and where we harvested. Now we can have a real conversation. I see that being a real and increasing benefit as buyers want more information.

**Bill:** How have you integrated the monitors into your business?
**Kate:** Some people don't see value in data collection. I see enormous benefit in collecting data of all kinds. But, like any technology, yield and tracking monitors are just one component of a bigger effort. They don't remove the need for further investigation; they don't replace scouting. They are simply tools we've found really useful on our farm. ○

# FERTILIZER

## Water Soluble Versus Slow-Release Fertilizers

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Not all phosphorus-based fertilizers are created equal. For this reason, achieving adequate and well-timed phosphorus nutrition in potatoes can prove complicated and – if managed incorrectly – unnecessarily costly. Consider this: if two fertilizers contain the same total amount of elemental phosphorus but that phosphorus is held in different compounds that react differently in soil, the fertilizers may vary widely in how much and when their phosphorus is available to plants. This reality frustrates many potato producers and leads to frequent errors in crop nutrition.

To ensure growers get what they've paid for when they invest in crop nutrients, all major commercial phosphorus fertilizers are labelled with the per cent of phosphorus ($P_2O_5$) that is actually available to plants. Plant-available phosphorus is calculated by measuring a phosphorus fertilizer's solubility in both water and ammonium citrate, a mild acid that mimics organic acids that occur naturally in soil or are released by plant roots.

Optimizing one's nutrient source, rate, timing and placement depends on understanding how various fertilizer formulations work both in soil and in plants. While water-soluble phosphorus fertilizers are the least expensive by the pound, they are least efficient. This form of phosphorus can be tied-up relatively quickly in many potato growing soils, resulting in inadequate phosphorus supply through the peak-demand bulking stage. To mitigate this challenge, growers often band fairly heavily at or near planting or apply later season nutrients via fertigation and/or foliar sprays. While a second application can solve some of the availability challenge, incorporation of nutrients into the soil around the root zone is very difficult once the crop has emerged, resulting in potential nutrient losses through run-off or leaching.

Several slow-release fertilizers and fertilizer amendments are available today that increase fertilizer use efficiency by changing the timing of nutrient availability via physical or chemical means, helping to fine-tune nutrient availability. Slow-release fertilizers are relatively insoluble in water but more soluble in ammonium citrate. In order to dissolve in the soil and become available to plants, they require phosphorus in the soil to be depleted by leaching or plant uptake, or organic acids to be released from plant roots.

Slow-release fertilizers are applied at or near seeding and, when applied at the correct rate, will fulfill phosphorus needs throughout the crop's entire growing period. This single-application timing significantly reduces equipment cost and operator time. Slow-release fertilizers also minimize nutrient tie-up in soil, surface run-off and leaching into the water table, important benefits from both a financial and environmental perspective. ○