543 Precision Agronomy: Lessons from a semester of teaching

#RealisticRegenAg | In several episodes of this podcast, I've shared my experiences teaching Precision Agriculture to diploma and degree students at Lethbridge College. Teaching is a reciprocal process, and through it, I've gained valuable insights into the future of agriculture and the evolving landscape of agronomy in the upcoming years and decades. Join me in this final episode of the season as we delve into the key takeaways from the past semester.

Welcome to Plants Dig Soil, a podcast about #RealisticRegenAg. I'm your host, Scott Gillespie, and I'm an agronomist from the western Canadian prairies specializing in climate-smart agriculture. I discuss scientifically proven practices that benefit the planet and, just as importantly, farmers' economic sustainability. Be sure to visit my website, www.plantsdigsoil.com, for resources and information about the services I offer.

Transcript is available:
https://www.plantsdigsoil.com/podcast/precision-agronomy

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Back in high school, I recall working on a project about GPS—the Global Positioning System. During the mid-1990s, my partner and I crafted models of satellites using toilet paper rolls, toothpicks, and tin foil. In our project we explored how these satellites could precisely pinpoint locations on Earth. Little did I realize at the time how groundbreaking this technology was. The U.S. military had conceptualized it in the 1960s, refined it over the 1970s, and only released it to the public in the 1980s.

The application of GPS to agriculture, particularly the recording of yield monitor data, marked a significant advancement. Although the concept of the yield monitor emerged in the 1980s, it took six years to develop a viable commercial product. Witnessing the real-time display of yield during harvest was extraordinary. It became evident that pairing a GPS system with yield data could enable the mapping of this information.

In my perspective, this marks the birth of precision agriculture—the capacity to collect and link data to specific points in the field. While valuable on its own, the true power of precision agriculture lies in the future ability to manage distinct areas separately.

The initial major application was in fertilization. I observed this evolution in my career, where tying soil samples to specific areas enhanced the precision of nutrient management. EC mapping (Electrical Conductivity) became a tried-and-true method, often combined with topography for more refined models. This approach, as opposed to gridding the entire field, significantly reduced costs while providing similar or better-detailed maps.

Over the past two decades, precision agriculture has predominantly focused on nutrient management and technologies for applying variable rate fertilizers. However, recent years have seen a proliferation of new machines and ideas in this space.

Satellite imagery has been a game-changer in the last decade, allowing for remote assessment of fields without physical presence. Drones, or UAVs (Unmanned Aerial Vehicles), offer high-resolution data at flexible times, though their adoption has been hampered by regulatory requirements and time constraints.

Considering labor shortages in agriculture, drones might become a viable solution for scouting. Their potential to provide high-resolution images could surpass satellite imagery, especially if AI is employed to identify issues without manually looking through the images.

Drones also find application in spraying, particularly in challenging or hard-to-reach areas. Precision agriculture, fundamentally about managing specific field areas differently, has expanded to include advanced sprayers that can significantly reduce chemical usage by targeting only areas requiring treatment. Green on brown sprayers are already running in my area. These are suitable only when the crop is not in the ground as they just spray when a green object – a weed – is seen. Green on green sprayers are being trialed here. These ones spray the weeds in the crop, but of course they take much more processing and sensor capacity to differentiate between a desirable and undesirable plant. I already know of a machine operating that can do this except that instead of spraying herbicide, it shoots the weeds with lasers.

The evolving landscape of precision agriculture is steering toward autonomous machinery. The future entails on-board processes for mapping, prescription creation, and product application, minimizing the need for human intervention. When the machines can identify the pests and instantaneously take care of them, many of the tasks of the agronomist disappear.

This transformation extends beyond the field. AI models are being used to look up and locate information that was traditionally the role of the agronomist. While some will see this as a threat, I see this as an opportunity to offload one of the more mundane roles. Google has already replaced a lot of what agronomists were doing twenty years. AI is just the next level.

While our roles will change, I believe there will still be a role for agronomists. People still like to deal with people. Using tools and technology allows more impact when the time of agronomist can be used on the high-level problems. What do you think? Do you agree with me? Or think I'm totally off base. You can reach out through my website, www.plantsdigsoil.com, leave a comment on this episode or send a voice note through Spotify.

Before I wrap up, have you noticed the influence of AI in shaping the content of my episodes? From copy editing to creating thumbnail images and to LinkedIn posts, AI has become an integral part of my podcast production process. It's even used to edit the audio. I can manually delete mistakes and have pauses and filler words automatically taken out. All of this has drastically reduced the time I need to put out content. When I started this podcast, I put out a new episode once a month, and only for 8-10 months a year. A year ago, I challenged myself to go weekly. This being episode 42 means I reached 80% of my goal and more than doubled what I put out in the first four seasons combined.

Wrapping up this episode, having the opportunity to teach has excited me even more about the possibilities. Education is struggling with AI in the classroom, but I think it's better to embrace rather than restrict. I'm happy to see that Lethbridge College is embracing it. There are some holdouts but overall, they know students will use it and will need to use it as they get out into the work world. I hope this has given you a lot to think about. See you for Season 6 in the new year.