



### **Practical Guide for Growers:** Leveraging Data for Effective Crop Management



### **About this Guide**

#### Summary

This guide provides a concise overview of digital agronomy, explaining how technology and data can transform crop management by improving yields and quality. The guide also covers key steps for transitioning to modern agriculture, emphasizing the importance of embracing change, enhancing data literacy, and making data- decisions to achieve better crop outcomes. It serves as a practical resource for growers looking to adopt and succeed with digital agronomy and be better prepared for the latest changes in the industry.

#### Who This Guide Is For

Ideal for knowledge workers like **Growers**, **Seed Producers**, **Farm Managers**, **Agronomists**, **Irrigation Managers**, **R&D Managers**, **Head Growers**, and other **agricultural professionals** eager to enhance their expertise in modern crop management





### Practical Guide for Growers: Leveraging Data for Effective Crop Management

#### What is Data

Data is measurable information. In farming, data can range from straightforward metrics like rainfall amounts to more dynamic indicators like temperature fluctuations throughout the day. By using data, growers can make informed decisions on water usage, fertilizer needs, pest control, and other critical factors that impact crop health and yield.

Data can help to unlock crop growth and production as a single factor can limit crop growth and production even when ALL the other factors are perfect.

#### Why is data so important?

In agriculture, data enables smarter, fact-based decisions, eliminating guesswork. It reveals patterns in water usage, crop health, and local climate conditions. For example, in arid regions, data can help optimize irrigation schedules, reducing water waste while maintaining crop health.

#### **Data in Protected Cultivation**

In protected cultivation, such as greenhouses and tunnels where crops are grown, data plays a crucial role in optimizing growth conditions. By using realtime data from sensors that measure temperature, humidity and light, growers can fine-tune the environment to ensure plants receive exactly what they need at each stage of growth.

For example, in greenhouses, monitoring temperature and humidity helps maintain the ideal climate for crops, while automating irrigation based on soil moisture and substrate data ensures precise water use, avoiding over- or under-watering.





#### If we have data, let's look at data. If all we have are opinions, let's go with mine"

Barksdale, former CEO of Netscape

#### Data can help to optimize key farming practices:

**Irrigation:** Deliver precise water amounts, conserving resources.

**Pest and Disease Management:** Use climate data to reduce pest or disease outbreaks.

**Yield Prediction:** Forecast and plan for production volumes with greater accurately.

**Risk Management:** Use real-time alerts on climate conditions to respond proactively and rapidly.

**Harvest Timing:** Use yield and harvest insights to plan for resources like labour requirements.

#### **Operational Efficiency and Sustainability:**

Visualize trends and automate tasks, graphs and reports to save time and reducing costs. Reduce waste by optimizing inputs like water and fertilizer.



### Balancing data and experience: The power of a data-informed strategy

While intuition and past experiences are valuable, using data can significantly enhance your decisionmaking process. Data helps you identify patterns and insights, enabling you to make strategic choices that improve efficiency and productivity.

### Being data driven is not enough.

Being data-driven means relying solely on data for decisions, but it's important to also consider context, experience, and other inputs. This makes for more powerful and effective decisions.



#### The Data-Driven vs. Data-Informed Approach

**Data-Driven:** Decisions are based solely on data.

#### **Data-Informed:**

Data is one of several inputs, including experience and intuition, that guide decisions.



#### **Data Informed**

- **Data** (quantitative insights, e.g., microclimate data, experiment results).
- **Qualitative insights** (e.g., customer feedback, stakeholders, changes in the market, new varieties).
- **Experience** (aka "intuition"), which results from experience, knowledge and immersing yourself in your market and the growing environment context.

Integrating data with your expertise can result in more robust and impactful results. Enhancing data literacy is essential for achieving success with digital agronomy solutions.



## Steps to make informed decisions using data

**1. Define objectives and outcomes:** get clarity on your decision-making needs and what you want to achieve.

**2. Collect data:** Use sensors and other technology to gather information about your climate, weather, and crops.

**3. Analyze the Data:** Look at trends and patterns to understand what's happening on your farm.

**4. Make Informed Decisions**: Use your data together with experience and insights to drive actions, e.g how much water, fertilizer, or pesticides to use.

**5. Implement Changes:** Adjust your farming processes and practices based on your decisions.

**6. Observe Results and Refine:** Keep an eye on how your changes affect your crops and make adjustments as needed.





#### **Example:**

#### Situation

For instance, imagine you're growing berries. You notice your water usage is high, yet your yields aren't improving.

#### **Collect** data

The grower can leverage various data such as climate, irrigation, substrate, alongside forecasted water demand models to determine the optimal water and nutrient requirements of their crops.

#### Analyze the data

The grower reviews the previous day's irrigation events, including climate data (temperature, VPD, radiation), drip and drain metrics, and substrate sensor data (VWC, EC), to assess the irrigation plan's success and make adjustments for the current day.

#### Decision

After review, the grower can decide how the irrigation volumes and times should be adjusted based on the forecasted water demand model for the day.

#### **Observe and Refine**

Real-time monitoring of drip and drain data, along with substrate VWC and EC, enables growers to assess and adjust their irrigation plans effectively.

This approach promotes efficient water use, resulting in healthier plants, higher yields, and lower costs by preventing over-irrigation and related issues.



### The transition to digital agronomy starts with effective change management

#### What is Digital Agronomy?

Digital agronomy refers to the integration of advanced technologies and data analytics in agriculture to enhance farming practices. By delivering precise, real-time information, it enables growers to optimize various aspects of farming, including irrigation management, understanding microclimates, and effectively managing pests and diseases. This approach not only improves resource efficiency but also promotes sustainable farming practices, ultimately leading to increased productivity and reduced environmental impact.

> Digital agronomy applies technology and data to enhance crop management.

#### Think of it like upgrading your phone

Remember when mobile phones only made calls and sent texts? Modern smartphones transformed communication by offering apps, real-time updates, and endless information at your fingertips.

In a similar way, digital agronomy is an upgrade in crop management, providing better insights and more functionality. Just like a smartphone, a crop management platform is continually evolving, so you always have access to the latest tools to adapt to changing climatic conditions. With crop management software, the possibilities for optimizing your farming practices are endless.

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Transitioning to digital agronomy can be transformative but often meets resistance. Moving from traditional methods to data-informed farming can feel daunting, especially with new tools and processes. However, the true impact lies in focusing on people and their needs. Technology is the tool, but purpose drives progress.

A clear plan is key to a smooth transition. Here are tips to help your team embrace digital agronomy, understand its value, and feel confident using new tools.



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### **Five tips** on how to make the transition smoother

**Explain the 'why' behind the change:** Start by clearly communicating the reasons for adopting digital agronomy. Highlight how data insights can help reduce guesswork, optimize resource use, and improve crop outcomes.

2 Encourage open communication and feedback: Resistance to change is often due to fears and misconceptions about the unknown. Address them early as possible listening to your team's concern. Effective communication is at the heart of successful change management.

Be or assign a 'Champion': We have observed that growers who designate someone to champion a new solution in the workplace have more success with the implementation and use of the tool.

**Start with small incremental changes:** Small changes can lead to big improvements. Start with one area, test adjustments on a small scale, evaluate results, and scale up gradually to minimize disruption.

#### Share data insights and success stories regularly: As data insights begin to show results, share them with the team. For example, show how a new irrigation schedule bas

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team. For example, show how a new irrigation schedule based on data has led to healthier crops or how pest forecasting has reduced pesticide use.

> In summary, change management is key to helping farm staff adopt new solutions. Managers must take responsibility to ensure their team feels supported during the transition and understands the benefits for both the business and themselves.

## From feelings to numbers: Using data to improve crop outcomes

### Embrace the journey to achieve higher yield and quality



Low data literacy

Transitioning to digital agronomy isn't just about adopting new tools; it's about learning to use data to inform decisions. Start with automating data collection and centralizing information. As your data literacy improves, you can enhance crop health, irrigation, and pest management, leading to better yields and quality.

As shown in the illustration above, the journey to unlocking benefits of digital agronomy starts with automated and digital data collection and data centralization. From here, we move up to crop risk management, resource and variable input management, optimization in infrastructure, improved climate, irrigation, crop health, pest & disease management, and ultimately, increased data yield and quality.

The biggest advantage of using data on your farm lies in effective change management and improved data literacy. Beyond driving efficiency and cost savings, data should empower people and contribute to building a better future.



### Avoiding information overload in crop management

The danger with so many data collection tools available is that the farm staff might feel overwhelmed with information.

#### To counter this, growers can:

- Set clear objectives on what outcomes they want to achieve and the decisions that need to be made to reach these.
- Identify ways to filter out irrelevant data, such as building a main information dashboard showing only the relevant data points needed to make key decisions.
- Decide how often data needs to be collected and analysed for decisions to avoid excess

### Checklist for informed decision-making with data

Be clear on your key objectives and desired outcomes.

Automate and digitize your data collection

Centralize your data

Learn how to read and use your data to make informed decisions

Start with small changes

Track your progress and celebrate improvements

# How FarmRoad as a digital agronomy solution can help growers

**Digitize and Unify their data:** Access centralized, real-time farm data from anywhere, allowing you to compare plots and stay updated on your farm's status.

**Make Better Decisions:** Utilize detailed insights and trend analysis to customize and optimize your farming practices.

**Save Time Spent and Money:** Automate tasks to reduce resource consumption and minimize your farm's environmental impact.

**Protect Crops:** Receive early alerts for potential pests, diseases, adverse climate or weather, enabling proactive crop protection.

**Boost Yield and Quality:** Make timely, informed decisions to improve both the quantity and quality of your produce.

**Seamless Integration:** FarmRoad's open API allows for easy integration with third-party systems, enhancing data management and analysis.

**Expert Support:** Gain access to our team of agronomy and crop science experts for personalized guidance and support.



#### Conclusion: embracing data for better crop management

Data is essential for modern farming and it drives more efficient and sustainable crop management. As global food demand rises and climate change creates new challenges, producing more with fewer resources has never been more crucial. In regions facing water scarcity, data can precisely measure water needs and optimize irrigation schedules, leading to reduced waste and more sustainable practices. By embracing digital agronomy, growers can unlock the potential to make more informed decisions that lead to better crop management. Whether it's improving irrigation, managing pests, or optimizing harvest timing, data is your key to achieving higher yields, better quality, and greater sustainability.

If you're unsure where to start, WayBeyond is here to support your on your digital agronomy journey. Let us help you transition to a data-informed approach and improve your crop outcomes.

