

Data-driven decisions



2.3.2



Dear students, welcome to the second chapter! This chapter introduces how farmers can make better decisions using digital tools and data — such as sensors, satellite maps, and mobile apps. You'll learn about zoning, yield prediction, and real examples from European farms. Focus on understanding how different types of data support smart choices on the field.

 **For deeper insight, explore the recommended platforms (e.g. Farmonaut, GeoPard, ONDO) and follow the external sources provided in the text.**

 **Don't skip the examples — they show how small farms use data in practice.**



Study text

Introduction

Data-driven agriculture uses digital tools to support better decisions on the farm. These tools — from weather stations to mobile apps — help farmers act based on real data instead of assumptions. Even small farms can benefit. Simple and low-cost platforms (e.g. [CleverFarm](#), [Farmonaut](#)) enable monitoring of soil, crops, and climate without requiring technical skills.

What is Data-Driven Decision-Making?

It means using data — not guesswork — to decide when, where, and how to act on the farm. Examples:

- **When to irrigate (based on soil moisture).**
- **Where to fertilize (based on NDVI maps or yield zones).**
- **Which crop to plant (based on local conditions and past yields).**



💡 These decisions are more precise and often cheaper than traditional blanket approaches.

Data Sources for Decision-Making

Farmers can use multiple data streams:

- Soil sensors – e.g., moisture, temperature
- Weather stations – rain, humidity, wind
- Satellites & drones – crop health (NDVI), vegetation stress
- Yield monitors – historical production by field zone
- Mobile apps – visualizations and alerts

📌 Start simple: Use one free data source (like [Sentinel satellite maps](#)) and one field sensor to begin data-informed farming.

Zoning and Tailored Interventions

🔍 What is zoning?

Zoning divides a field into smaller areas (zones) based on how different parts perform – e.g., productivity, soil condition, moisture. Not all areas need the same treatment.

- High-performance zones → may need fewer inputs
- Low-yield zones → may require extra fertilization or better drainage

🛠️ How to create zonal maps

You can identify zones using:

- NDVI maps – from satellite or drone imagery
- Yield maps – from past harvest data (e.g., combine harvester monitors)
- Soil & weather data – from sensors or farm records

✓ Free platforms like [Farmonaut](#) or [Agrosat](#) offer zonal maps for small farms.

🔧 What is zone-based management?

Zone management means adjusting inputs (like water or fertilizer) to the specific needs of each zone. Examples:

- Irrigation only where soil is dry
- Fertilizing low-nutrient zones
- Changing crop variety in areas with poor drainage

📌 This saves costs and improves environmental impact.

EXAMPLE: 🇧🇬 Bulgaria – ONDO Smart Farming ([Roseland Farm Case](#))

Farm profile: Roseland is a 3-hectare fruit and greenhouse farm using ONDO LITE.

System: Automated irrigation, fertigation, and microclimate control.

Results:

- 30% water savings
- 20% reduction in fertilizer and energy use
- 20% yield increase
- 30% less manual labor required

Yield Prediction (Forecasting Harvest Outcomes)

Yield prediction helps estimate how much crop will be produced — even before harvest.

It combines different types of data:

- **Pre-season data:** soil analysis, previous yields, climate history
- **In-season data:** rainfall, temperature, plant growth status
- **Crop-specific data:** water needs during flowering, disease sensitivity



These inputs are processed by software to detect risks or expected yield levels.

 **Example:** If June is extremely dry, the system can adjust the forecast down — helping the farmer plan irrigation or reduce planting area.

 **Tools like [GeoPard](#) or [CleverFarm](#) provide visual forecasts and anomaly alerts.**

 /  **GeoPard – Precision Zoning for Small and Medium Farms**

Tool: GeoPard enables satellite-based zoning, NDVI analysis, and historical yield mapping.

Usage: Farmers can generate “prescription maps” for variable-rate fertilization or seeding.



Summary and Conclusion

Digital tools can help any farmer make smarter decisions — no matter the size of the farm. You don't need expensive equipment or an IT background. Start small, and build step by step.

Recommendations:

- **Start with one tool:** e.g. a soil moisture sensor or free NDVI maps
- **Use mobile apps:** such as [Farmonaut](#), [Agdata](#), [CleverFarm](#).
- **Learn to read maps and graphs:** focus on visual trends — green = healthy, red = stress
- **Combine your knowledge with data:** use experience together with technology
- **Don't aim for perfection:** use data as a compass — not as an autopilot

 **Final thought:** Data won't make the decisions for you — but it will help you make better ones, faster and with more confidence.