



FaRMer





Digital tools for handling risks in farming

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Categories of digital tools for risk management in Farming

In recent years, the agricultural industry has witnessed a transformative shift with the integration of digital tools into farming practices. These tools have proven helpful in mitigating risks and optimizing productivity in various aspects of agriculture. This technology can be used to have access to a wide range of digital solutions that enable them to proactively identify, assess, and manage risks more effectively. Some of the key digital tools that are revolutionizing risk management in farming can be categorized as follows:

1. Remote Sensing and Imagery:

Digital tools such as satellite imagery, drones, and remote sensing technologies offer farmers the ability to monitor their fields with precision.

There are 3 levels of sensing:

a. Proximal



Figure 1 Proximal sensing digital tools. Source; [Proximal Sensing for On-the-Go Variable Rate N Application in Corn – What's Cropping Up? \(cornell.edu\)](#)

b. Aerial



Figure 2 Aerial sensing-drone Source: [Aerial Sensing \(mtri.org\)](#)

c. Satellite

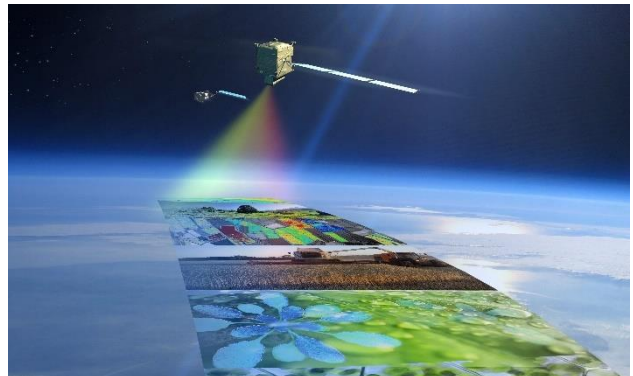


Figure 3 Satellite sensing to monitor plant health Source: [New Satellite to Monitor Plant Health \(eijournal.com\)](#)

These tools provide real-time data on crop health, water stress, pest infestations, and other vital parameters. By analyzing this information, farmers can identify potential risks early on and take timely action to mitigate them. For instance, they can detect areas prone to disease outbreaks and adjust their pest control strategies accordingly, ultimately reducing crop losses (ESA, 2015; Maes & Steppe, 2019; Pallottino et al., 2019).

2. Weather Forecasting and Monitoring:

Accurate weather information is crucial for effective risk management in agriculture. Digital tools offer advanced weather forecasting models that provide detailed insights into upcoming weather patterns, including rainfall, temperature, and wind conditions.

Weather monitoring and forecasting in agriculture is a result of combining accurate data and reliable technology. Sensors can collect a wide range of weather data—including temperature, humidity, wind speed and direction, precipitation, and soil moisture—and transmit it wirelessly to a cloud server. Farmers can use this data to make informed decisions regarding planting, watering, and harvesting schedules and minimize risks associated with extreme weather events (Ukhurebor et al., 2022).

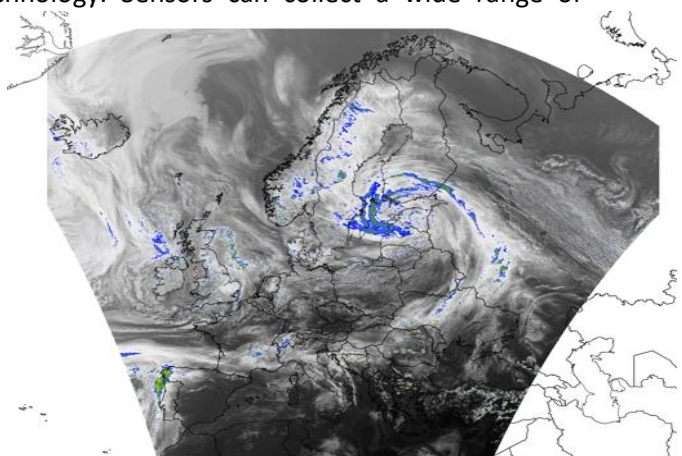


Figure 4 Coverage of EURO1k high precision weather forecasting. Source: [High-Resolution European Weather Model | Meteomatics](#)

3. Data Analytics and Predictive Models:

Data-driven analytics and predictive models have emerged as valuable tools for managing risks in farming. By harnessing historical and real-time data, farmers can employ sophisticated algorithms to predict outcomes and make proactive decisions. These models can assess factors such as market trends, crop yields, and input costs to optimize production plans, manage price volatility, and enhance profitability. Moreover, predictive models can help farmers anticipate disease outbreaks, pest infestations, and yield fluctuations, enabling them to implement preventive measures in a timely manner (Trends, 2021).



Figure 5 Date infographic in agriculture. Source: [The Impact Of Big Data In Agriculture \(analyticsinsight.net\)](https://www.analyticsinsight.net)

4. Farm Management Software:

Farm management software provides a centralized platform for farmers to streamline their operations, track inventories, manage resources, and analyze data. These digital tools offer features like crop planning, inventory management, financial tracking, and yield monitoring. By integrating various aspects of farming into a single platform, farmers can enhance operational efficiency, minimize wastage, and optimize resource allocation. Such software also enables better traceability, quality control,



Figure 6 Farm Management Software operations Source: [Top 9 Farm Management Software in 2022](https://www.top9farm.com)

and compliance with regulatory standards(Hristoski et al., 2017).

5. Smart Watering Systems:

Water scarcity is a significant risk factor in agriculture, especially in regions prone to drought or limited water resources. Smart watering/irrigation systems leverage sensors, weather data, and soil moisture monitoring to deliver water precisely when and where it is needed. These systems optimize irrigation practices, conserve water, and prevent over- or under-watering. By minimizing water-related risks, farmers can ensure optimal crop growth and yield while reducing environmental impact(Said Mohamed et al., 2021).

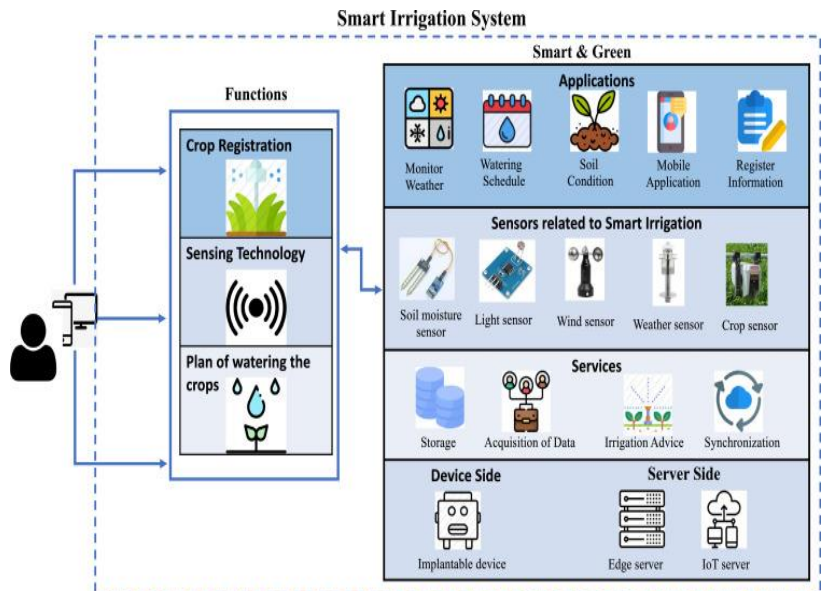


Figure 7 Structure of smart watering system. Source: [An overview of smart irrigation systems using IoT - ScienceDirect, FlatIcon.com](#)

Digital tools have become invaluable assets for modern farmers in managing risks and enhancing productivity because they equips farmers with real-time information, actionable insights, and efficient decision-making capabilities. By embracing these digital tools, farmers can proactively mitigate risks, improve resource allocation, optimize yields, and foster sustainable farming practices. As technology continues to advance, the role of digital tools in risk management will only grow, contributing to a more resilient and prosperous agricultural sector.

Table of Free Digital Tools

Digital Tools	Access to Digital Tools	Tool description
Remote Sensing and Imagery	➤ E-Surveyor UK Centre for Ecology & Hydrology (ceh.ac.uk)	➤ E-Surveyor, a no-cost mobile application, assists farmers and landowners in evaluating the quality of the habitats

		they oversee. It is designed for conducting assessments of agri-environment practices.
Weather Forecast and Monitoring	<ul style="list-style-type: none"> ➤ Windy: Wind map & weather forecast 	<ul style="list-style-type: none"> ➤ Windy is a Czech company providing interactive weather forecasting services worldwide by using their site and their application.
	<ul style="list-style-type: none"> ➤ Custom Weather Alerts - Apps on Google Play 	<ul style="list-style-type: none"> ➤ Custom Weather Alerts is a valuable mobile application, especially for individuals who need to closely monitor their fields and soil due to the risk of abrupt cold weather. This app allows users to set a specific time of day to check the weather and provides notifications if the temperature drops too low. It is also beneficial during droughts as it can provide updates on high temperatures or any temperature outside the user's customized range.
	<ul style="list-style-type: none"> ➤ Local and National Weather Forecasts, Radar & News WeatherBug 	<ul style="list-style-type: none"> ➤ WeatherBug offers users a wide range of weather alerts including lightning, wind chill, local temperature, pollen count, UV index, precipitation, and many other features. Users can also utilize weather widgets to conveniently view the weather information on their home screen. What sets WeatherBug apart from other apps is its provision of up to 18 different map types, allowing for

		personalized weather displays.
Farm Management Software	<ul style="list-style-type: none"> ➤ Farmable: Farm Management App - Apps on Google Play 	<ul style="list-style-type: none"> ➤ Farmable can help in managing the data of the farm: <ol style="list-style-type: none"> 1. Free Mobile App 2. Unlimited Hectares 3. Unlimited Team Members 4. Unlimited Data Entries 5. No Software Installation 6. Modular Pricing
	<ul style="list-style-type: none"> ➤ Agworld 2023 Capterra 	<ul style="list-style-type: none"> ➤ Agworld is a comprehensive farm data management system that facilitates collaboration between farmers and advisors. It allows users to gather data throughout their entire operation and easily share it with relevant stakeholders. This includes growers, farm workers, agronomists, input suppliers, contractors, and more, who can collectively work with the shared data.
	<ul style="list-style-type: none"> ➤ fieldmargin 2023 Capterra 	<ul style="list-style-type: none"> ➤ This user-friendly application can help in consolidating the farm maps, field work, inputs, and reporting. Minimize paperwork and maximize productivity on your farm. Keep track of crops, plan rotations, and effortlessly share field tasks involving inputs like seeds, sprays, and fertilizers. Assign tasks to team members, set planned dates, and record completion.



		Streamline audits and assess farm performance with meticulous and reliable records, reducing stress in the process.
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References

ESA. (2015). *New Satellite to Monitor Plant Health*.

<https://eijournal.com/news/industry-insights-trends/new-satellite-to-monitor-plant-health>

Hristoski, I., Kostoska, O., Dimovski, T., & Kotevski, Z. (2017). *Farm Management Software for Increased Productivity and Competitiveness* (pp. 375–392).

Namık Kemal University/Turkey, University of Agribusiness and Rural Development/Bulgaria, University “St. Kliment Ohridski” Faculty of Economics/Macedonia.

http://www.ibaness.org/conferences/kirklareli/ibaness_kirklareli_proceedings_12_03_2018.pdf

Maes, W. H., & Steppe, K. (2019). Perspectives for Remote Sensing with

Unmanned Aerial Vehicles in Precision Agriculture. *Trends in Plant*

Science, 24(2), 152–164. <https://doi.org/10.1016/j.tplants.2018.11.007>

Pallottino, F., Antonucci, F., Costa, C., Bisaglia, C., Figorilli, S., & Menesatti, P.

(2019). Optoelectronic proximal sensing vehicle-mounted technologies in precision agriculture: A review. *Computers and Electronics in Agriculture*,

162, 859–873. <https://doi.org/10.1016/j.compag.2019.05.034>





- Said Mohamed, E., Belal, AA., Kotb Abd-Elmabod, S., El-Shirbeny, M. A., Gad, A., & Zahran, M. B. (2021). Smart farming for improving agricultural management. *The Egyptian Journal of Remote Sensing and Space Science*, 24(3, Part 2), 971–981. <https://doi.org/10.1016/j.ejrs.2021.08.007>
- Trends, M. (2021, January 7). The Impact Of Big Data In Agriculture. *Analytics Insight*. <https://www.analyticsinsight.net/the-impact-of-big-data-in-agriculture/>
- Ukhurebor, K. E., Adetunji, C. O., Olugbemi, O. T., Nwankwo, W., Olayinka, A. S., Umezuruike, C., & Hefft, D. I. (2022). Chapter 6 - Precision agriculture: Weather forecasting for future farming. In A. Abraham, S. Dash, J. J. P. C. Rodrigues, B. Acharya, & S. K. Pani (Eds.), *AI, Edge and IoT-based Smart Agriculture* (pp. 101–121). Academic Press. <https://doi.org/10.1016/B978-0-12-823694-9.00008-6>

