



FarmIt - Game Rules & Guide

FarmIt is an educational simulation game that empowers players to explore sustainable farming in a changing climate. Players spawn in a random location on Earth - tropical, temperate, arid, or cold - each with authentic meteorological conditions powered by NASA data. The goal is to grow and manage a thriving farm while balancing productivity, biodiversity, and climate resilience.

Gameplay Overview

Players begin with a small plot and limited resources. They choose what to plant, when to irrigate, and how to expand. As seasons change, the in-game climate evolves dynamically based on NASA POWER datasets:

- T2M: Air Temperature at 2 meters
- RH2M: Relative Humidity at 2 meters
- PRECTOTCORR: Total Corrected Precipitation

These datasets, derived from MERRA-2 and IMERG, produce realistic daily and seasonal weather patterns that shape water availability, plant growth, and risks from natural hazards.

In-Game Chatbot Assistant

FarmIt includes a built-in chatbot coach that explains the rules, teaches core mechanics, and gives actionable tips on how to interpret and use satellite-derived data in context (for example, reading humidity to time irrigation or anticipating rainfall from precipitation trends). The assistant makes advanced concepts accessible to all players.

Objectives

Cultivate a sustainable and productive ecosystem. Expansion must respect environmental limits: forests and polyculture increase resilience, reduce risk, and boost adjacent field performance.

Core Mechanics

- Irrigation: Manage water efficiently to buffer dry spells.
- Firebreaks and Water Reserves: Protect land from fires and floods; plan for extremes.
- Crop Diversity: Rotate and mix species to stabilize yields and soils.
- Climate Adaptation: Adjust choices to local conditions and seasonal cycles.
- Chatbot Guidance: On-demand help that contextualizes NASA data for better decisions.

Scoring and Resources

- Score Points: Earn points for sustainable yield, soil health, water efficiency, and biodiversity; get penalties for deforestation, over-extraction, or pollution.
- Water: A shared water meter tracks rainfall inflows and irrigation outflows. Scarcity increases costs; reservoirs can stabilize supply.
- Workforce: A labor pool fuels all actions. Workforce decreases each turn; plan tasks, automate where possible, and invest in resilience to avoid over-spending labor.

Tips for Success

- Preserve forests: Tree cover supports nearby fields in a polyculture model.
- Use data, not guesswork: Let temperature, humidity, and precipitation guide planting and irrigation.
- Plan for extremes: Build firebreaks, store water, and diversify crops.

Systems Deep Dive

- Seasons and Turns: The year advances in turns. Each turn updates climate variables, resources, and workforce.
- Natural Hazards: Droughts, heatwaves, floods, and fires may occur in disaster-prone regions; mitigation pays off.
- Adjacency Bonuses: Forests and wetlands confer bonuses to adjacent plots (microclimate, soil moisture).
- Eco-Score: Your end-of-year rating reflects productivity and ecological balance.

Education and Vision

FarmIt bridges education, climate action, and farming by translating satellite science into interactive learning. Players practice systems thinking, balancing short-term gains with long-term resilience.

Global Empowerment

We aim to empower communities globally to leverage open space data for local decision-making. By grounding gameplay in NASA POWER data, FarmIt demonstrates how Earth observation can inform everyday choices across arid, tropical, temperate, and cold regions.

Tech and Data

Backend: FastAPI (Python). Frontend: React.js. Real-world inputs from NASA POWER: T2M (temperature), RH2M (relative humidity), and PRECTOTCORR (precipitation), derived from MERRA-2 and IMERG products.

Credits and Acknowledgements

Developed by the Farmlt team. We thank NASA POWER for open access to climate datasets that make science accessible for all.

Data Sources

- POWER API: Prediction Of Worldwide Energy Resources (NASA LaRC).
- MERRA-2: Temperature and humidity from global atmospheric reanalysis.
- IMERG (GPM): High-resolution global precipitation estimates.

Contact

Learn more or collaborate: reach out to the Farmlt team.