

reFEWSing to give-up: reflections on a multi-year project to develop educational video games based on scientific models



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Motivation

- Develop systems thinking skills in youth
- Increase understanding of sustainable agricultural systems
- Raise awareness of STEM careers related to agricultural systems
- Leverage scientific research models and data for educational video games
- Use the Corn-Water-Ethanol-Beef System as a model for interconnected Food, Energy, Water Systems (FEWS)

CWEB System as the Context

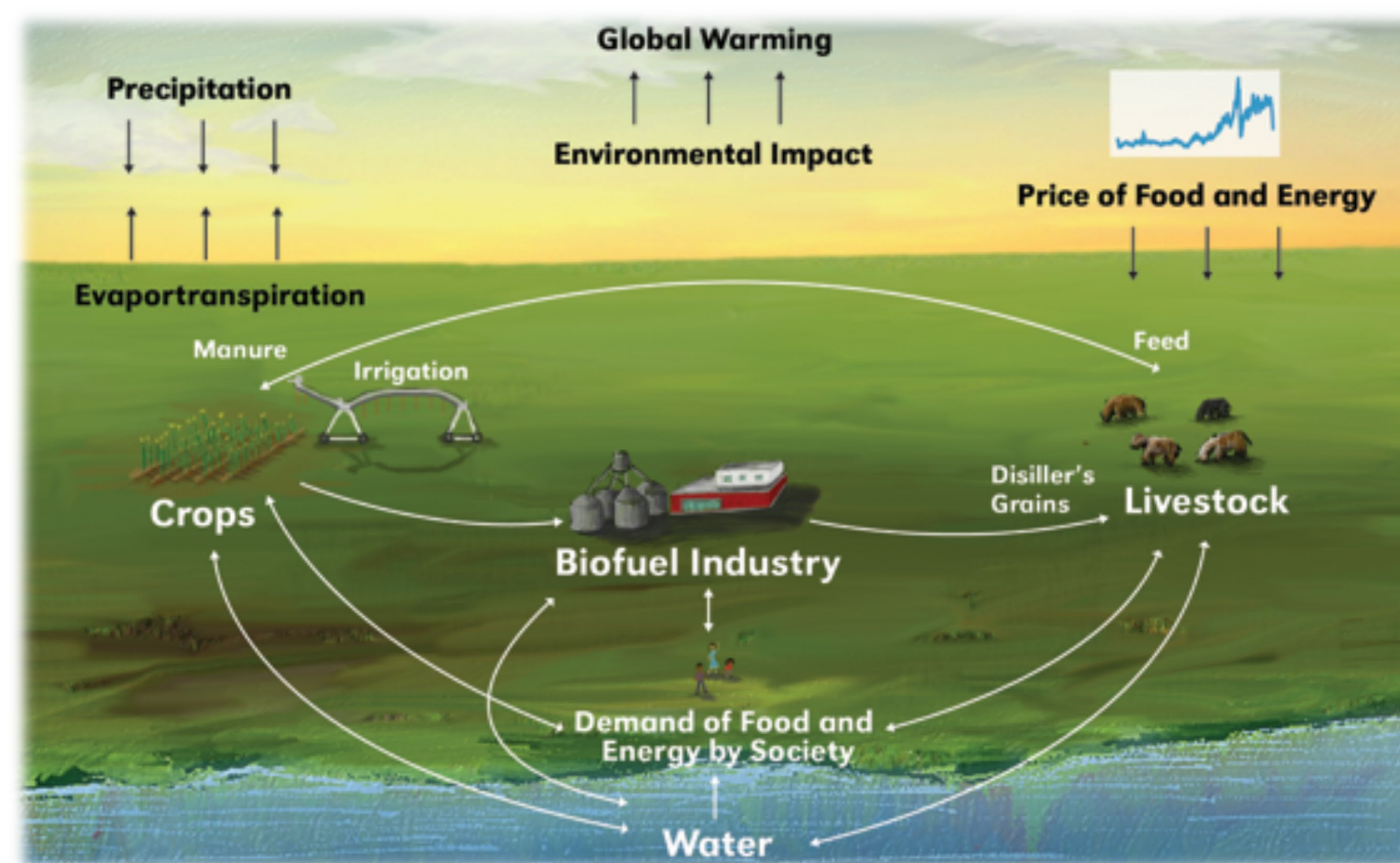


Figure 1. Simplified CWEB system highlighting the interconnections

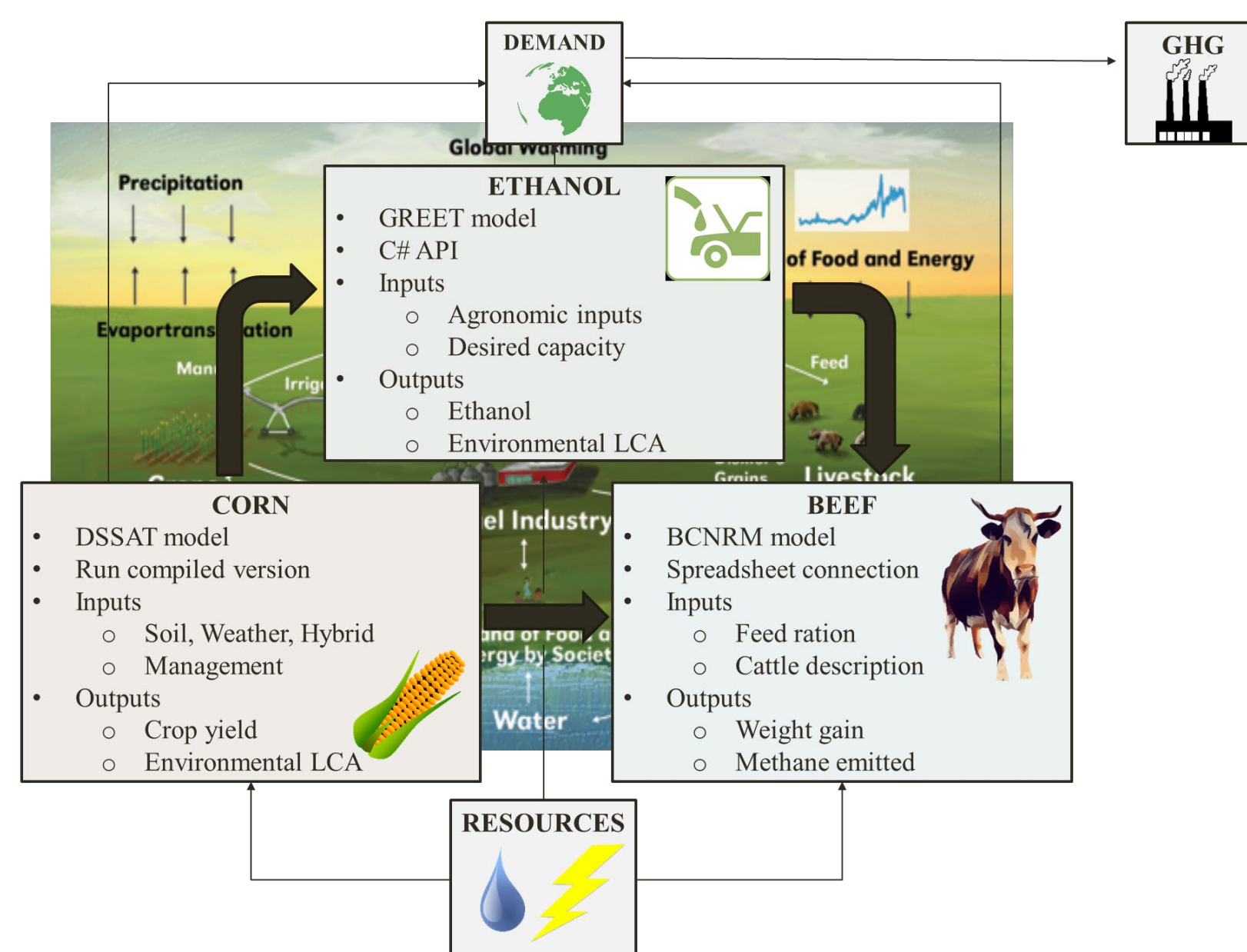


Figure 2. Scientific models used to represent the CWEB system

Approach for Game Development

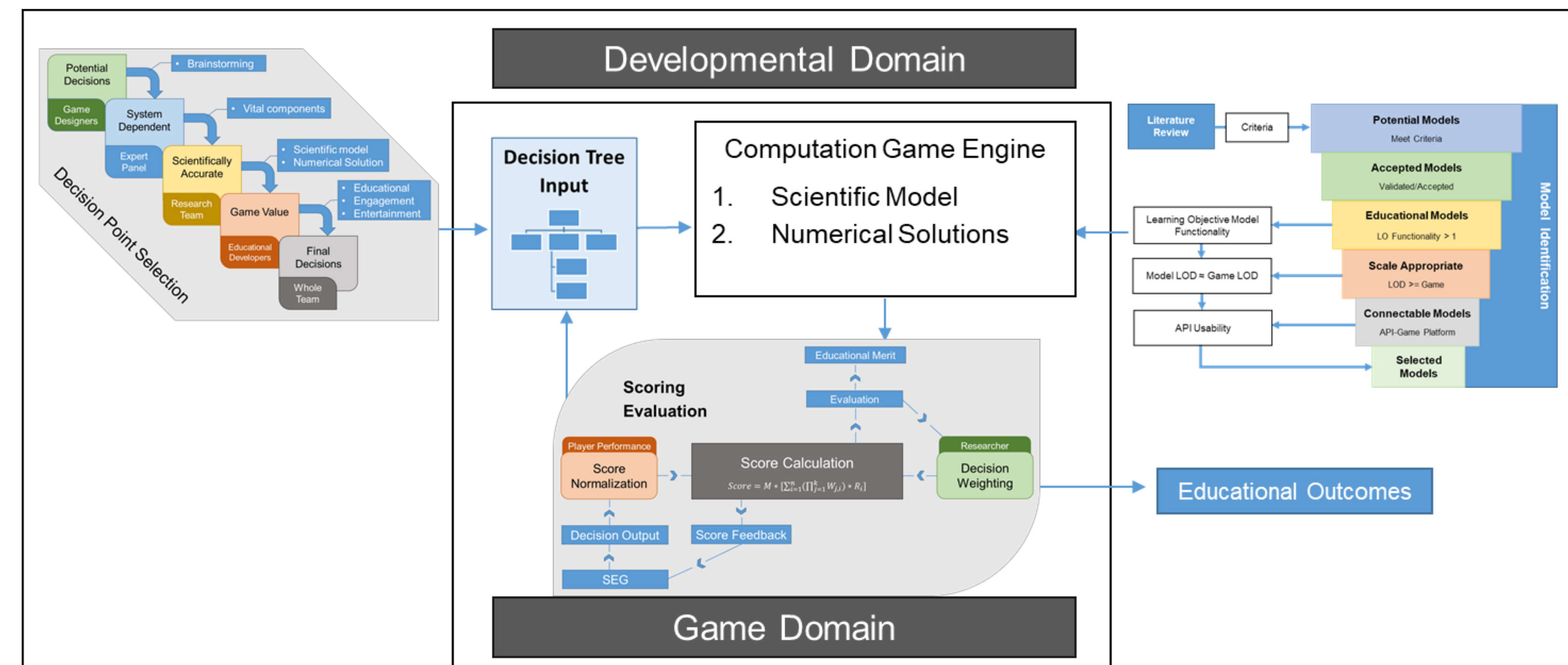


Figure 3. Theoretical Framework for game development

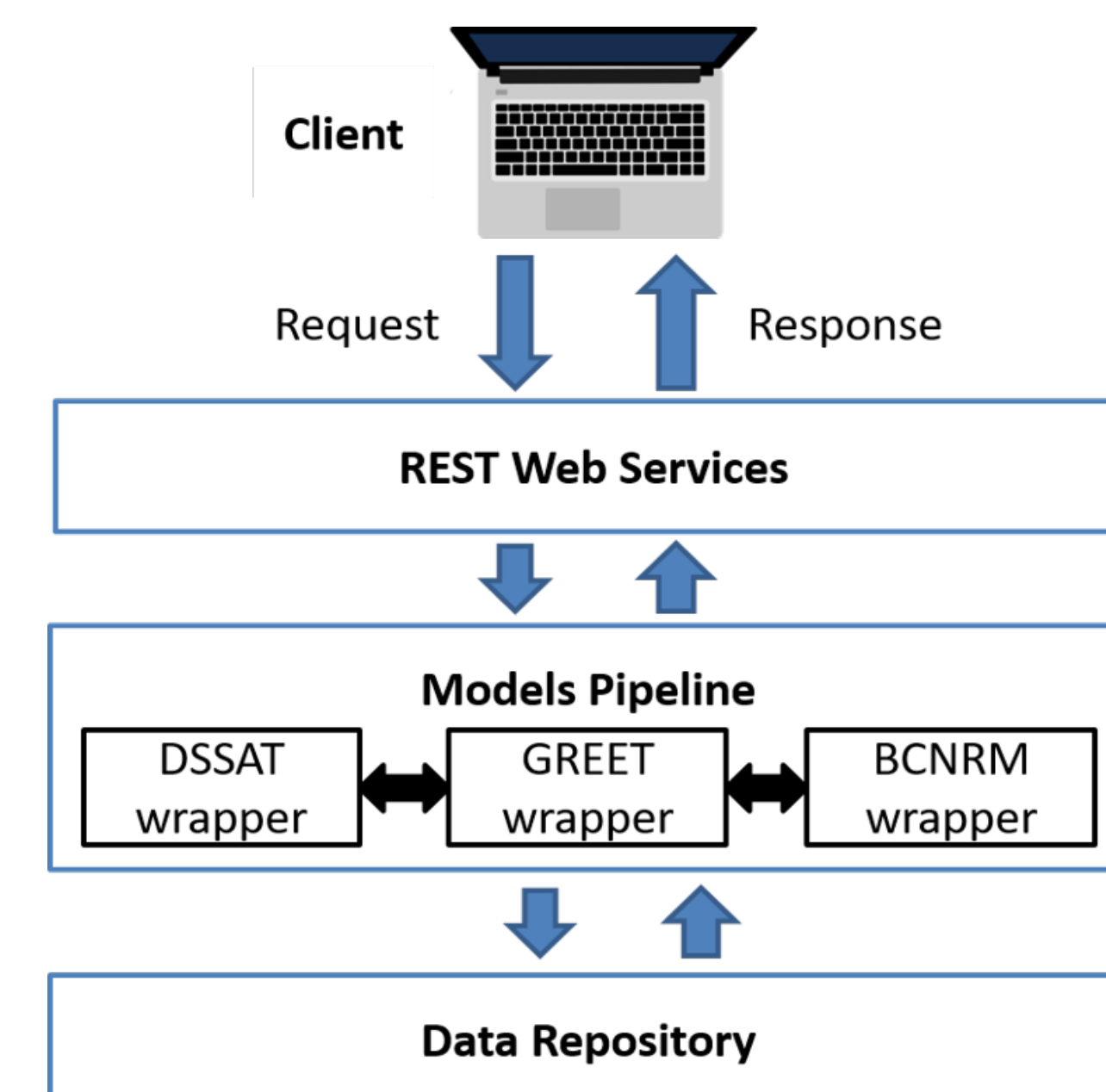


Figure 4. Loosely-coupled modeling approach based on REST architecture



Figure 6. cross-disciplinary interaction between agricultural engineers and graphic design majors

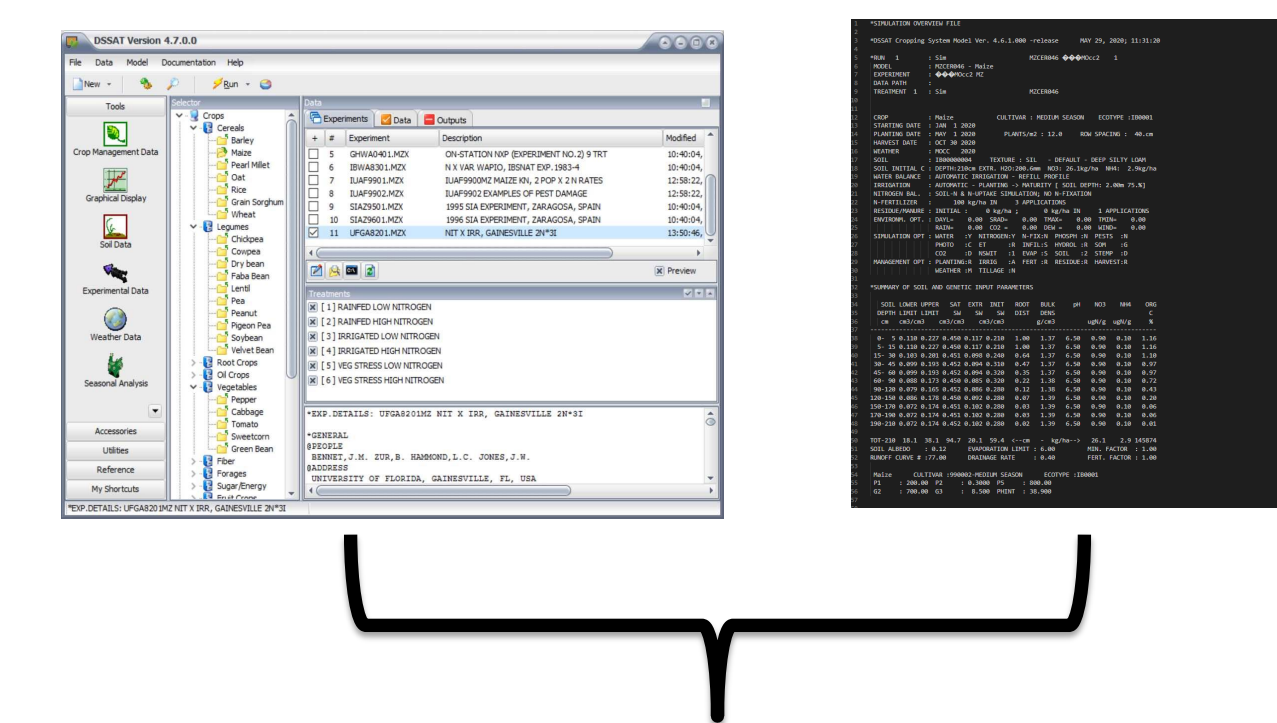


Figure 5. Scientific model interface vs video game interface

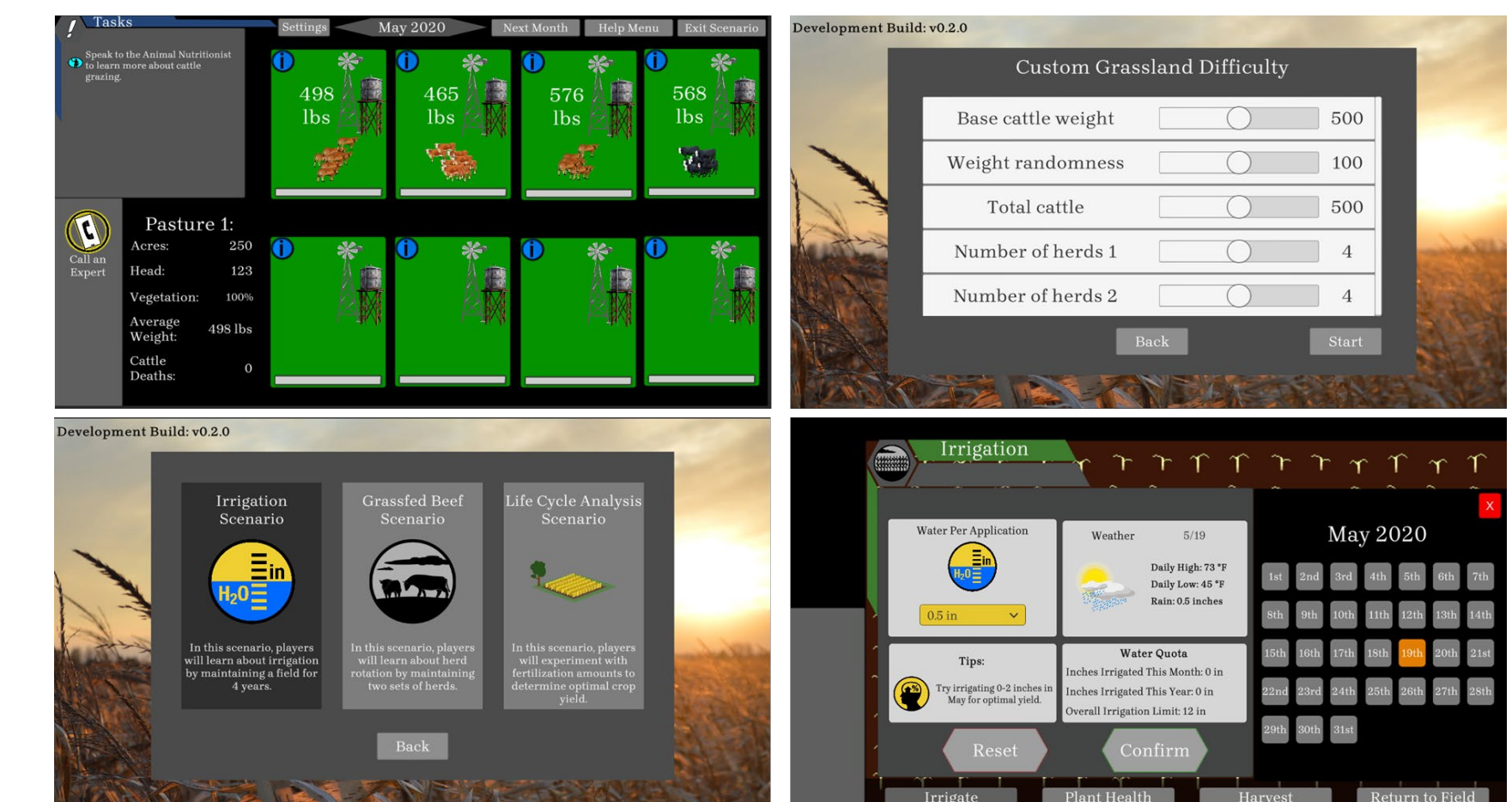


Figure 7. Beta-testing with youth in after-school programs and K-12 educators

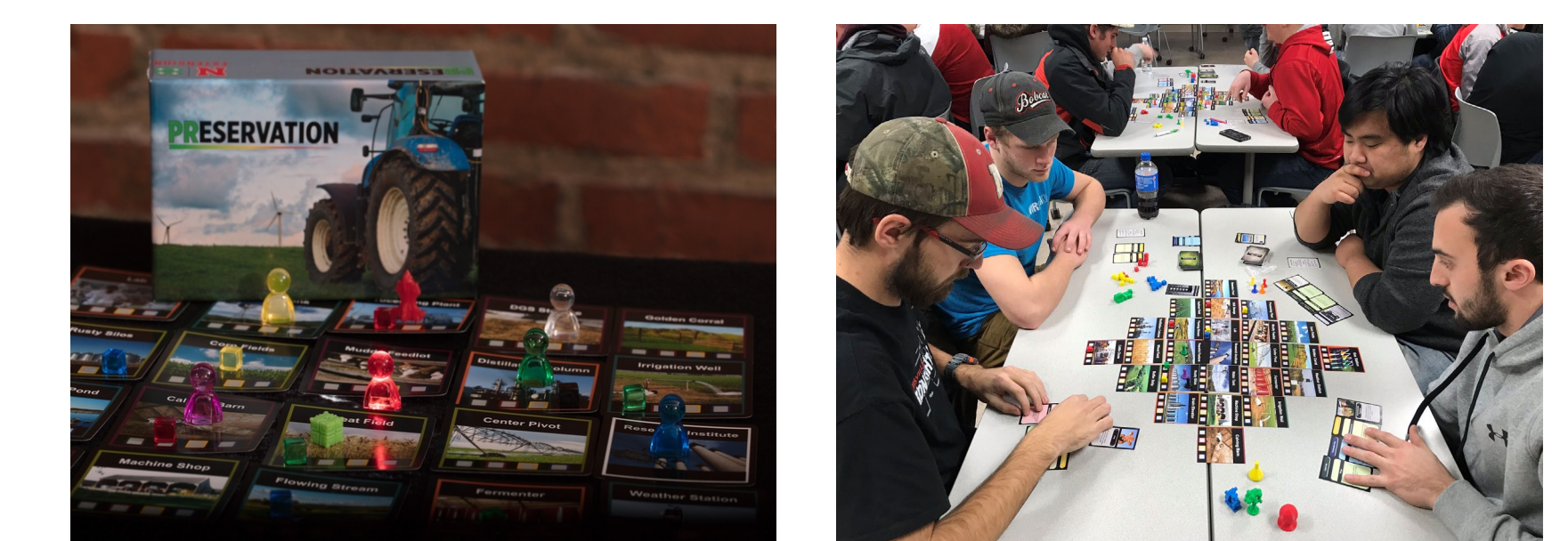
Phase 1: 3-D Immersive Version



Phase 2: Web-based 2-D Version



Fun side project: board games



Lessons Learned

- Always be engaging stakeholders, before, during, and after
- Function over form. 3-D is flashy but 2-D is more accessible and hardware-neutral
- Agile project management is effective when working across multiple disciplines