

# Sustainable Farming Game - Final Paper

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CSC 361 : Computer Graphics

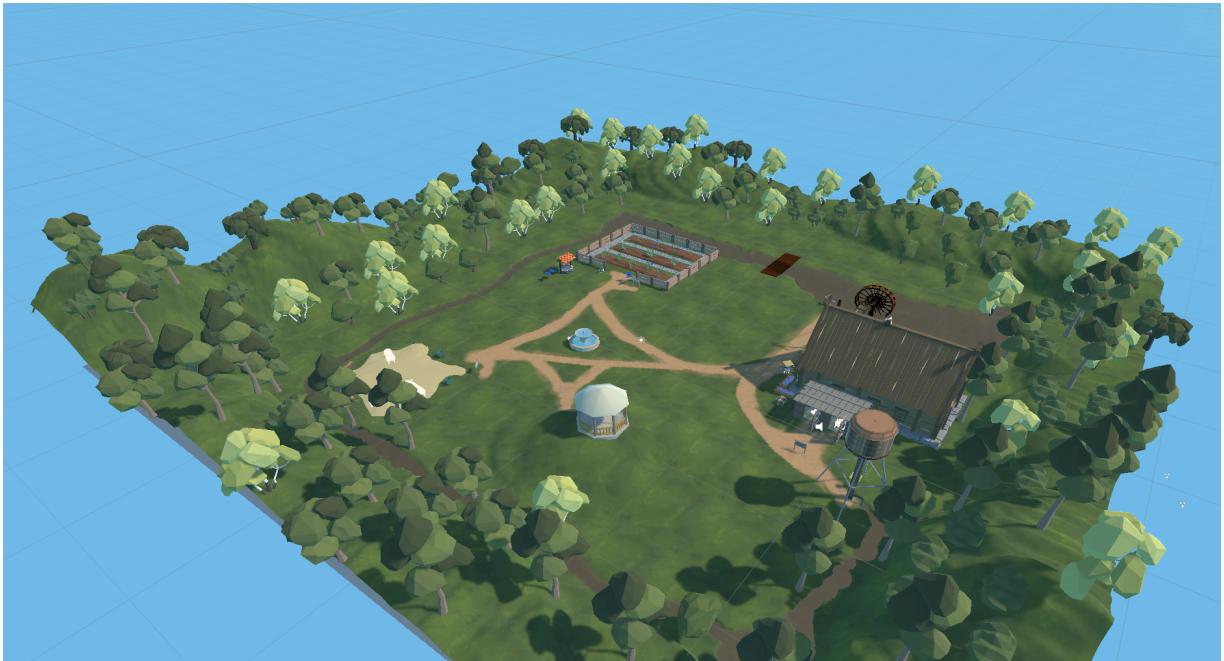


Figure 1: Image of playable scene for the Sustainable Farm Game

## INTRODUCTION

Our game, "Susty Coop", is a sustainable farming game focused on raising awareness about environmental issues in agriculture. It achieves this through an engaging and educational Unity-based experience. Throughout the project, I contributed to various aspects of its development, including creating minigames, implementing environmental storytelling, and enhancing the overall player experience through audio, animations, interactions, and other improvements. The game can be split into four main tasks: WaterTower, PigPen, Garden, and WaterWheel. Each task includes a minigame designed to teach the player about sustainable farming practices. I was responsible for developing the first three sections.

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Figure 2: Image of Jim and Water Tower

## WATER TOWER

After spawning in the stables and being taught the basics of movement and character-swapping between the chicken and cow, the user is encouraged to talk to the farmer beneath the water tower (Figure 2). This farmer, named Jim, explains to the player that he lost the valve which controls the flow of water from the tower. He instructs the player to speak to his friend, Susan, about its location. Susan can be found in the gazebo at the top of the hill and when interacted with, will give the player a riddle about the valve location (Figure 3).



Figure 3: Image of Susan in the Gazebo

*"I stand where wishes take their flight,  
With silver arcs that gleam in light.  
A mirror's face, a constant song,  
Find me, and you won't go wrong.  
Beneath my tears, the truth is veiled,  
The hidden valve, your quest unveiled."*

The player can find the valve resting against a fountain in the center of the farm. After approaching and collecting the valve, it can be returned to the slot in the tower and spun to trigger the flow of water. This interaction will begin the Valve spin animation, which rotates the valve around the Z-axis, and the water rise animation, which raises the water level to its appropriate height around the entire farm. Once this step is completed, the player can continue to the PigPen level.



Figure 4: Image of the valve against the fountain

## PIG PEN



Figure 5: Image of the Pig Pen level

The player begins the Pig Pen level, and all following levels, by interacting with the sign placed in front of the minigame. The Pig Pen sign can be found in the bottom left corner of Figure 5. This sign teaches the player about the risks associated with large scale farms. Specifically, how runoff and poor waste management from these farms can negatively impact nearby water sources. The player also has the option to speak with the three pigs in this area to hear a few farm related jokes. Afterwards, the player is tasked with cleaning up piles of waste in the pig troughs next to the river. Waste can be deposited in either of the two bins.



Figure 6: Image of waste in the pig trough



Figure 7: Image of waste being deposited

A key feature of this minigame is the water cleanup process. As the player disposes of waste from the troughs, the mucky color of

the river begins to clean. Once all waste is removed, the river will fully shine blue and clear. This mechanic is implemented using linear interpolation, which blends the dirty and clean water materials.

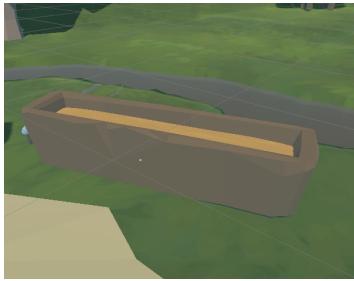


Figure 8: Image of dirty river



Figure 9: Image of clean river

Once the river is clean, the player is rewarded with a congratulatory message above the first sign. The next step is to use the newly cleaned water to help the garden flowers bloom.

## GARDEN



Figure 10: Image of the Garden level

Similar to the Pig Pen level, the player begins by reading the sign in front of the garden minigame. This sign gives information to the player about the importance of pollinators in healthy ecosystems, and how diverse plant species are helpful to the lives of pollinators.

There are two interactable butterfly NPCs in the area that flutter in place. One of these butterflies instructs the player to use the watering bucket to collect water from the clean well water. The other butterfly gives the player a fun fact about butterflies. Once the bucket is full (Figure 11) the player is able to walk around the garden and water each unbloomed plant.



Figure 11: Image of the full bucket

I designed each of the three flower petal models, and when the player pours water onto an unbloomed flower, it converts into a bloomed flower.



Figure 12: Image of flower model one



Figure 13: Image of flower model two



Figure 14: Image of flower model three

Once all the flowers have been watered, a success message appears above the sign that thanks the player for their hard work. The completion of the Garden level grants the player access to the fourth and final level, the Water Wheel.

#### **WATERWHEEL**

This minigame was primarily implemented by Blake. I helped with the SFX additions, testing, and idea generation, but he implemented the functionalities



Figure 15: Image of Water Wheel level

When the player arrives to the water wheel minigame, they begin by reading the sign in front of the generator box. This sign gives the player information about the advantages of sustainable energy sources, such as electricity produced by a water wheel. The player can then speak to the engineer who instructs the player to collect the necessary parts (Figure 16).



Figure 16: Image of the spare parts

After switching to the cow, the player must attach to the nearby wagon and bring it near the spare parts container.



Figure 17: Image of the cow attached to the cart

As the chicken, the player can collect the parts and deposit them into the wagon. After the cow brings the wagon and parts back to the generator box, the chicken can transfer the parts from the wagon into the generator. This begins the water wheel animation and provides power to the farm. Finally, the player can interact with the old farmer (Figure 18) who tells the player about a surprise on the roof.



Figure 18: Image of the old farmer

The player can then activate a celebration sequence to appreciate the work they did to improve the sustainable practices of the farm.



Figure 19: Image of the firework celebration

#### ADDITIONAL FEATURES

Another important aspect of the game I added was the SFX and audio design. A peaceful, ambient farm soundtrack plays in the background during the entirety of the game. Other, interaction-based, SFX help enhance the quality of the minigames. These are included in the following interactions: character dialog, valve spin, pig conversations, well water collection, water pouring, water wheel spinning, and the firework show.

To improve the immersiveness of the game, I adjusted the camera positions to include the beak and snout of the cow. This helps the player identify which animal they are playing as, but also helps the user feel more present in the game.



Figure 20: Image of the chicken beak from player POV



Figure 21: Image of the cow snout from player POV

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