

Board Game Preproduction

Prototype: The Market

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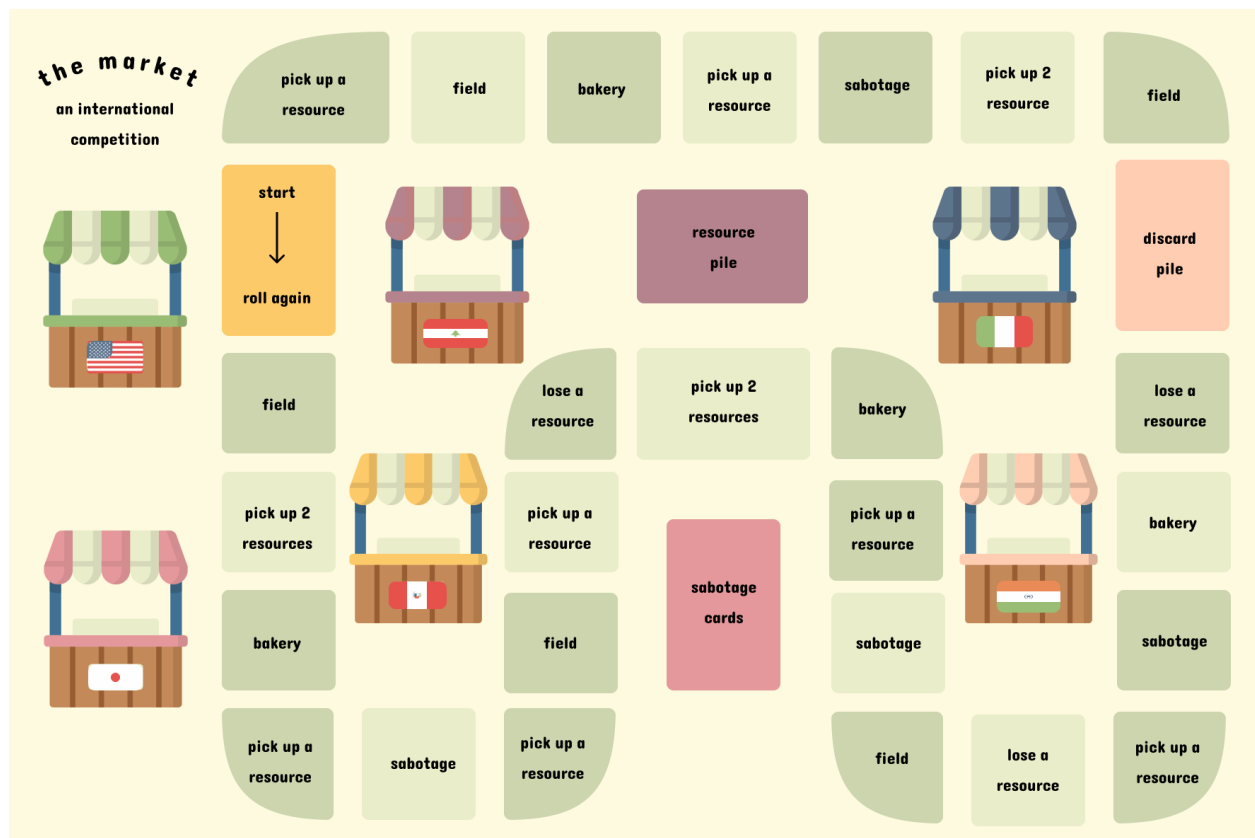
IAT 210

19-03-2023

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Game Board



Title

The Market

Core Statement

Farmers from different countries are here to participate in international farmers' competitions to produce and grow products like bread, vegetables, and fruits and use sabotage cards to get ahead to win the game.

Trailer

Please refer to the ***Board Game Trailer.url*** in the submission folder or click on this link to access the trailer: <https://youtu.be/eBEw9wrVzPA>

Inspiration

In the brainstorming/ideation stage of our board game development, we discussed games we enjoy and drew inspiration from them. Regarding actual gameplay, we drew inspiration from Monopoly, Animal Crossing, Stardew Valley, and Uno. Our randomized, die-based movement, a board layout that features spots with unique functions and action items, and our trading and sabotage mechanisms drew inspiration from Monopoly. We also share some similarities to Animal Crossing, with our collecting of resources and upgrading into final products. Our group also created sabotage cards, like in Uno, and the concept of the game shares some similarities with the Stardew Valley Fair. Design-wise, we share slight similarities to Catan, with resource-themed spots that a player may land on, such as a Bakery (grain) and land (vegetables and fruit). Finally, for the board component of our game, we created a Monopoly-style loop randomly traversed by a die.

Three Game Pillars

What: The setting of the game takes place at an international farmer's market festival in Farmville, Kentucky, where each farmer is to represent a country and compete against each other by growing and baking their final products before the other farmers.

How: Players can move through the game by moving across a board with different tiles to obtain either resource or sabotage cards to grow or bake all the items they require.

Why: Players are motivated to progress through the game by growing their resources and using their sabotage cards to ultimately beat the other players and collect all their final items.

Thematic backstory

Farmers from different countries are here to participate in the international farmer's competition to produce and grow products like bread, vegetables, and fruits. Whoever is first to create one of each of those products wins the match. Farmers will have to follow the game board and gain resources to make and produce the products while also trying to sabotage other farmers to get ahead. The characters in our board game consist of different farmers from a variety of different countries since they are competing in an international farmer's market competition. There are six different farmers from India, Lebanon, Peru, USA, Japan, and Italy. Each character is represented by their flag on their market stand, their recipe cards, and their pieces which are used to move across the board. Each piece consists of a traditional farmer's hat such as a cowboy hat for America or a fedora for Peru. Each farmer also has a grain product, vegetable, and fruit that is either commonly grown or native to their country of origin.

Character Backstories

India: Meet Rajesh, an industrious farmer from India who has been cultivating land since he was little. Rajesh learned to make naan from his grandmother, who would cook for family meals. He gained a passion for farming watching his dad, who learned from his dad, who learned from

his dad, who learned from... (well you get the picture, it's been in the family for a while). Rajesh and his family have always taken great pride in their lush mango trees, healthy okra plants, and a secret recipe passed down from generation to generation for the softest and most delicious naan. Rajesh believes his fresh produce is a strong representation of his culture and family heritage. He's not here competing for himself alone, but to prove that his family has the best farmers' market. Upon hearing about the international farmers market competition, he wasted no time before signing up, full of confidence and excitement. "It's more than just winning. It's about sending a message."

China: Meet Mei Xing, a skilled farmer from China who's been cultivating the soil and tending crops since before she learned to walk! She takes a lot of pride in producing the highest quality fruits and vegetables, specializing in the sweetest dragonfruit and the freshest bok choy. She also learned how to make the softest, fluffiest mantou from her mother, who learned it from her grandmother. She believes that the quality of her produce reflects her strong work ethic and the rich cultural heritage of China. After hearing word of an international farmers market competition, her whole family pestered her into joining to showcase her skill. She hopes that by participating she can inspire others to appreciate farming and baking as an artform. Mei Xing is optimistic about the competition and hopes that some healthy competition, full of the sharing of knowledge, will be beneficial to all farmers. (She might be in for a surprise when she hears about the sabotages.) "I can't wait to meet everyone! May the best farmer win!"

Lebanon: Meet Samir, a passionate farmer from Lebanon who takes great pride in his delicious pita bread, along with healthy crops of red cherries and the crispest iceberg lettuce. He had a love for farming instilled in him by his parents, who taught him to respect the land and to always give his best at anything he does. Farming is not just a job but a way of life for Samir. He believes that his produce is a symbol of his cultural heritage and the unique flavours of Lebanon. After seeing an ad for the international farmers market competition in the papers, he knew he had no choice but to participate. After learning from his grandma how to cultivate the best crops and make the best pita, he fell in love with it and knew he'd be doing it for the rest of his life. Samir saw it as an opportunity to finally earn the respect and recognition that he and his produce deserve. He hopes that by competing, others will also see that he is the best farmer, period. "This is about more than just pita. It is about legacy."

Peru: Meet Maria, an experienced farmer from Peru who has been farming since before she could even walk! She takes pride in her crops of juicy limon peruanos and ripe paitas, which are known for their unique flavours and rich textures. Her dad taught her how to make chancays and she's been hooked ever since. She hopes to represent the rich diversity of Peru and the unique flavours found only in the fertile soils of her homeland and the tradition of her people. After her best friend called her and told her about the international farmers market competition, she knew it would be her best chance at showcasing the beauty and bounty of Peruvian agriculture and cooking to the world. Maria hopes that she can promote sustainable farming practices and can inspire others to appreciate Peru as much as she does. She believes that her passion and skill are enough but won't hesitate to sabotage if the opportunity arises. "I'm going to put Peru in the spotlight, and you can't stop me!"

USA: Meet John, an old-time farmer from the United States who takes great pride in his crops of blueberries and potatoes and just so happens to also make the "best cornbread you'll ever have". He comes from a long line of farmers and has tended to his land for many years. Ever

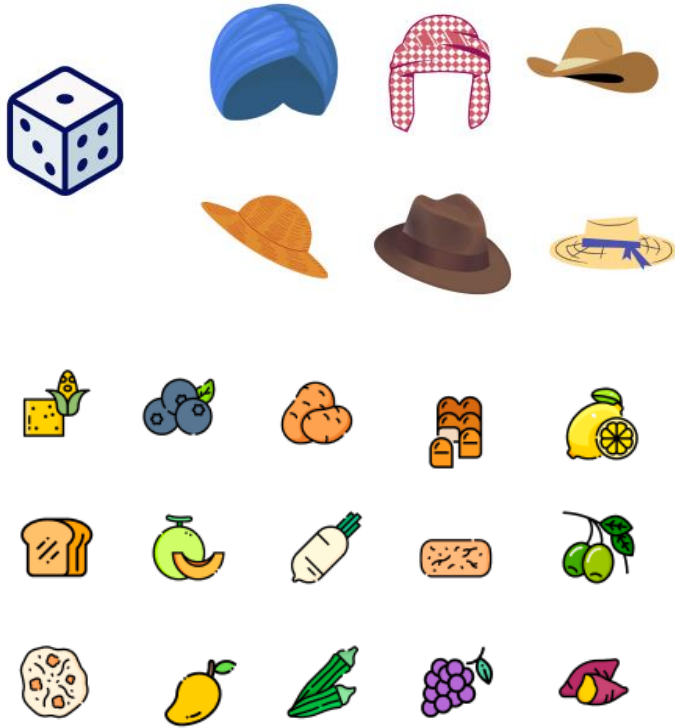
since he was a boy, his father taught him how to grow crops and learned the best cornbread recipe ever from his mother. He views farming as much more than just a regular job but as a way of life and an absolute necessity of life. Employing traditional farming practices and hard manual labour, John has been doing this for a LONG time. When his neighbour told him about the international farmers' market competition, he knew this would be his shot at some extra cash. John passed down his extensive knowledge to his daughter Bethany, who he wants to continue supporting in paying for her college degree in agriculture. "It ain't much but it's honest work. Hoping to make an extra buck here, don't care how many sabotages I need to use to do it."

Japan: Meet Hiroshi, a talented farmer from Japan who recently quit his corporate job and bought a plot of land. He finds much fulfillment in producing the highest quality daikon, the sweetest melons, and baking the tastiest shokupan you'll ever have! He always felt like he wasn't where he needed to be, until he found himself standing on a rough-looking plot of land with a "for sale" sign posted. After hard, passionate work, Hiroshi managed to cultivate the previously rocky soil and grew his first harvest of daikon and melons. He finds that those fruits showcase the beauty of Japanese produce and hopes to prove that he can hang with the best farmers throughout the world. He believed he had what it takes to win the whole competition after his mother showed him an email advert she received. Hiroshi is hoping to showcase how much knowledge and skill he has attained in the few years he has been farming, and he's happy to use his dad's favourite shokupan recipe as well. "I know I have what it takes to win, and hopefully I'll learn a thing or two on the way."

Italy: Meet Giulia, a hardworking farmer from Italy for whom farming has been a way of life for as far back as she can remember. She comes from a long line of farmers and has been tending to her vineyard and olive crops along with her father her whole life. Farming is much more than a job, it is a way of life and she sees food as a way to bring a family together to share a meal and a good time. Her grandfather taught her to make the most delicious traditional focaccia she's ever had. Farming and cooking are a reflection of the unique flavours and rich cultural heritage of Italy. When her boyfriend sent her a text linking an international farmers market competition, she knew she had to go for it. Her family has supplied the best olives and the freshest grapes to olive oil and wineries alike for generations, so she is very confident in her training. She hopes that by competing, she can showcase the delicious food of Italy and the strength of a loving family. "My family's been in the business for so long, there's no way I lose!"

Visual Gallery of Game Components

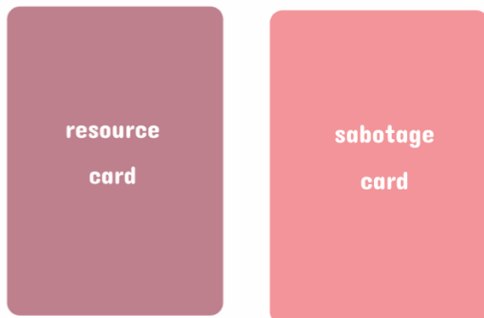
Pieces



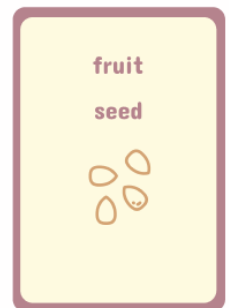
Game pieces include:

- A 6-sided die.
- Player hat tokens from different countries to mark where players are on the game board.
- Final food products tokens.

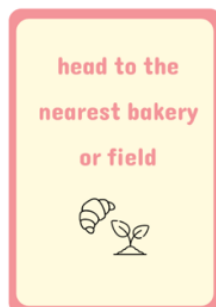
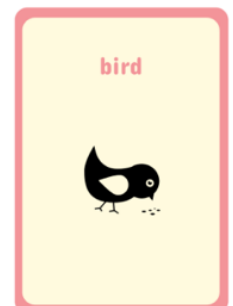
Back of Resource and Sabotage Cards



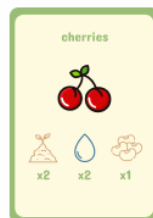
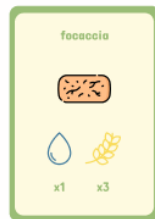
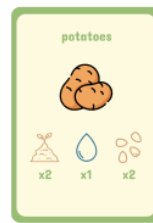
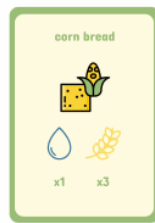
Resource Cards Front



Sabotage Cards Front



Recipe Cards Back and Front



Explicit Rules of Play

These are rules communicated to players in the guidebook, but using more specific terminology that avoids confusion.

Goal/Win Condition

To fill your country's stall with one grain, fruit, and vegetable product as seen on your country's recipe cards.

Ending the Game

Once someone has produced one of each food on their recipe cards, the game ends and they are the winner.

How to achieve the goal

Follow your recipe cards to gather resources and produce food products for your market stall.

How to start the game

Everyone begins with one of each resource. Choose your country, take their three recipe cards and place your farmer's hat token on the START tile. Each person rolls the numbered die. Whoever rolls the highest number goes first. Play continues clockwise.

Your turn

Roll the numbered die. Move your character token the die's number of tiles. Then, execute the action of the tile that you landed on. Throughout your turn, you have the ability to trade with any other player, regardless of where they are on the board.

Landing on tiles

There are eight different tiles strewn around the 28-tile board, each with their own unique action that can occur when you land on them. Here's a high-level breakdown of what each tile does (in order of appearance on the board):

Start: Where everyone begins the game. If you land on this tile, you roll the dice again.

Field: Trade-in resources to plant a fruits/vegetables.

Pick up 2 resources: Draw two cards from the resource deck.

Bakery: Trade-in resources to bake grain products.

Pick up a resource: Draw one card from the resource deck.

Sabotage: Draw one sabotage card from the sabotage deck.

Lose a resource: Discard one resource card into the discard pile.

Discard pile: Roll the die. Pick up that amount of resource cards from the discard pile.

Types of Resources

You must collect resources to create your food products. The types of resources are:

- **Grain seed** (used for grain products)
- **Fruit seed** (used for fruit products)
- **Vegetable seed** (used for vegetable products)
- **Soil** (used for fruit and vegetable products)
- **Water** (used for all products)

How to gain resources

You can collect resources through these methods:

- Landing on *pick up a resource* tiles.
- Landing on *pick up 2 resources* tiles.
- Landing on the *resource pile* tile.
- Playing a *steal 2 resources from anyone* sabotage card.
- Playing a *pick up discard pile* sabotage card.
- Trading with other players

How to lose resources

Resources are volatile in this game. Here are all the ways you can lose resources:

- Landing on *lose a resource* tiles.
- Someone plays a *drought* sabotage card on you.
- Someone plays a *flooding* sabotage card on you.
- Someone plays a *grain shortage* sabotage card on you.
- Someone plays a *bug infestation* sabotage card on you.
- Someone plays a *bird* sabotage card on you.

Sabotage

Sabotages bring strategy and competition to the game. When landing on a sabotage tile, pick up a card from the sabotage deck. Some sabotages affect you while other sabotages affect your fellow players. Regardless, picking up sabotages are always beneficial for you. You may play sabotages at anytime. Discard the card once you've played it. Here is a table of the sabotages and their actions:

| Name | Action |
|-------------------------------------|---|
| Drought | Play this card against someone. They must discard two water resource cards to the discard pile. |
| Flooding | Play this card against someone. They must discard two soil resource cards to the discard pile. |
| Grain Shortage | Play this card against someone. They must discard two grain seed resource cards to the discard pile. |
| Bug Infestation | Play this card against someone. They must discard two vegetable seed resource cards to the discard pile. |
| Bird | Play this card against someone. They must discard two fruit seed resource cards to the discard pile. |
| Pick up discard pile | Play this card against yourself. You must roll the die and pick up that amount of resource cards from the discard pile. |
| Head to the nearest bakery or field | Play this card against yourself. You must move your farmer's hat token to the closest bakery or field, whichever one is closest to your current position. |
| Steal 2 resources from anyone | Play this card against someone. They must give you two resource cards of your choosing. |

Field

When you land on this tile, you can convert resources into vegetable and fruit products. Discard the resources shown on the food product's recipe card to the discard pile and place the food token on your current field tile. In your next turn(s), once you have reached the next field on the board, the food product has grown and you may put it in your market stall. You cannot consider a growing food product part of your collection until it has grown and is in your market stall.

Bakery

When you land on this tile, you can convert resources into grain products. Unlike fields, you can immediately convert your resources to grain products. Discard the resources required and place your grain product in your market stall.

Discard Pile

When you land on this tile, you may access the discard pile and choose resources to collect. Roll the die to determine the number of resources you get to place in your inventory. You can sift through the discard pile and choose any resources in that pile. You can also access the discard pile from the *pick up discard pile sabotage* card.

Guidebook

Please refer to the ***Guidebook.pdf*** in the submission folder. The guidebook is a starting guide for players to learn the basic rules of The Market. It was not made to be a one-stop shop for the specifics of the game. It was made to give enough direction to new players on how to play the game. They are meant to either reference the Explicit Rules of Play or create their own rules for specific scenarios of play. This gives players flexibility on how they want to approach the game and to not overwhelm them when they learn how to play.

Group Meeting Log

Please refer to ***Meeting Log.pdf*** in the submission folder.

Playtesting Log

Playtest 1

Problems

- Very slow game at the start
- It's frustrating to land on tiles you don't need
- It's frustrating to not land on tiles you need
- Little interaction between players
- Start is kind of OP
- Sabotages are useless when everyone has lots of resources
- People know the game is over if you are the first to plant your field as growing is the same amount of time for all and is the end game.

Solutions

Slow Game

- Have some tiles allow you to pick up two resources
- Add more resource pickup spaces
- Start with one of each resource to speed up game and make sabotages/lose a resource make sense

Irritation from Landing on Tiles

- You pick up a resource every turn (not recommended)

Interaction Between Players

- Sabotage Card: Trade by Force
 - Force someone to trade you one of their resources for one of your resources when you land on the same tile. You get to choose the resources.
 - If you land on a space with another player on it, you can initiate a trade of resources by force with a trade card or by peace, negotiating a fair trade
- New Space: Duel
 - Choose an opponent. Wager items. Do some farming related competition. Winner gets the wagered items.

OP Start

- Randomize resource pick up using die or spinner
- Lower number of resources to one of each but only one seed of your choosing

Useless Sabotages

- Roll die to determine how many resources are sabotaged
- Wipe out the entire resource
- Change them to "Wild Cards" to allow for broadened card ideas
- Add more personal sabotages
 - Move forward or backward a certain number of spaces
- New Sabotage: Steal crop
 - Steal an in-progress crop that someone else has planted

Early Knowledge of Game Ending

- Change the end condition
 - Have a limited amount of resources everyone can pick up. Once the stockpile is completely drained, the game ends the next round.
- Change how fruit and veggies grow
 - Roll to see how many spaces you need to proceed to obtain your fruits and veggies
 - Plant on one tile, gather it when you pass the next field.
- Change the goal system
 - You get one goal card at the beginning of the game. You can obtain additional goal cards in replace of your turn.
- Change the win condition
 - Use a points system. Once the game ends, whoever has the most points wins
 - Goal cards now award points based on how difficult it is to complete it.
 - You lose points if you don't complete goal cards
 - Each complete product rewards points

- In-progress products (fruits, veggies on the field) don't award any points
- You lose points on any remaining resources (spoiled resources)

Potential Problems

1. There might be a dominant strategy in play for planting field seeds first, then going to the bakery at the very end of the game, as you don't have to wait around for bakery stuff to grow.
 - a. **Optional Solution:** Make it where you must grow the grains, and then you go to the bakery to convert the grains to a final product (a two-stage process).
2. We need to figure out how the field works as we don't really have a set method.
 - a. **Optional Solution:** Fields can have a crop plot beside them with limited space. You put a farmer in there for every product you are growing. (e.g. if you want to grow 1 fruit and 2 veggies, you would put 3 farmers in there). You would pick up your farmers when you loop around the board. Crop plot would have limited space (3-4 spots)
3. How will the resource cards work? If we have a pile, we won't be able to individually pick up one of each resource (like when you pass START).
 - a. **Optional Solution:** Have the cards in a little carousel (like seed packet carousels you'd [find at the supermarket](#)). And if we need to randomly select a card, we can create a roulette wheel of resource choices or you can spin the carousel and take whichever card is facing you.
 - b. **Optional Solution:** Stick with a deck of cards and leave all resource picking to luck. Rework START to pick up 3 cards from the deck.

Playtest 2

VS. 1st Playtesting Session

- We picked up 25% fewer resources
- We lost 16% fewer resources
- Our net resources were 37% lower (this is bad)
- We acquired 34% more sabotage cards

The first two stats are good. We solved our problem with picking up too many resources in playtest 1. The net resource stat is what concerns me.

Net resources are how many resources you gain overall throughout the game. If you're gaining few resources overall during the game, it feels like you haven't progressed at all, stuck in an endless loop of picking up and discarding cards for no reason.

For every 30 turns, we were gaining 6 resources overall in playtest 2 vs gaining 9 resources in playtest 1.

We need to figure out how to bring that number back up closer to the double digits to make the game faster and more meaningful to the player. And maybe relax on the sabotage cards a tad bit. We axed a sabotage space on the board halfway through the game, so that might have solved it.

Survey Results

Ratings

Theme: 4.8/5

Pace: 3.4/5

Overall Enjoyment: 4/5

Interaction: 5/5

Fairness 3.8/5

Rules: 5/5

Written Questions (from most popular response to least popular)

What did we enjoy?

Sabotage (literally everyone lol), luck/suspense

What did we dislike?

Not enough opportunities to pick up cards, losing so many cards, slow.

Why we rated the way we did?

Slow, could involve more strategy, everyone kept losing cards, wasn't enough pickup slots.

Additional Thoughts

Find more ways to increase your own cards, faster resource pickup, less sabotage pickup, more concrete rules for specific cases.

Flowcharts

Please refer to ***Flowchart.png*** to view the game mechanics flowchart.

Quantitative Analysis

Summary

During and after our playtesting phase, The Market used quantitative-backed data to balance gameplay. We used playtesting data to balance tile distribution, quest card resource requirements to balance the resource card deck and polled our play testers about the sabotage cards to balance the sabotage card deck. These changes resulted in a smoother gameplay experience that was more enjoyable across the board.

Playtesting Analysis

With data gathered through playtesting, we determined necessary changes to the game to balance its pacing, enjoyability, and fairness. We recorded the following data over both playtesting sessions:

- Type and number of resources picked up & discarded each round
- Type and number of sabotage cards picked up & played each round

This data was recorded for the entire playthrough (22 rounds) of Playtest #1 and for the first 29 rounds of Playtest #2.

In Playtest #1, we observed that we were picking up too many resource cards. This left us with an empty deck and cards that we didn't need after creating certain products. Picking up too many resources also led to Sabotage Cards not being as rewarding/effective to use on other players. It rendered players' success generally to pure luck, as Sabotage Cards is our core strategy-based game mechanic.

Our qualitative observations were backed up by the data we gathered. Players were gaining 21.1 resources per 29 turns, while sabotages only removed 3.3 resources per player per 29 turns. On top of discarding resource to form the food products, the net resources gained were still 9.2 per 29 turns.

| total rounds | 22 | Playtest 1 | | | |
|--------------|--------------|----------------|---------------|---------------|----------|
| | player | plus resources | neg resources | net resources | sabotage |
| | 1 | 17 | 12 | 5 | 2 |
| | 2 | 15 | 6 | 9 | 3 |
| | avg | 16.0 | 9.0 | 7.0 | 2.5 |
| | avg per turn | 0.7 | 0.4 | 0.3 | 0.1 |
| | avg 29 turns | 21.1 | 11.9 | 9.2 | 3.3 |

| total rounds | 29 | Playtest 2 | | | |
|--------------|------------------------|----------------|---------------|---------------|----------|
| | player | plus resources | neg resources | net resources | sabotage |
| | 1 | 17 | 9 | 8 | 5 |
| | 2 | 7 | 8 | -1 | 6 |
| | 3 | 17 | 7 | 10 | 4 |
| | 4 | 10 | 7 | 3 | 3 |
| | 5 | 28 | 19 | 9 | 4 |
| | avg | 15.8 | 10.0 | 5.8 | 4.4 |
| | avg per turn | 0.5 | 0.3 | 0.2 | 0.2 |
| | change from Playtest 1 | -25% | -16% | -37% | 34% |

We made a few changes to the board's tiles and sabotage rules with this data. The changes ultimately lowered resources gained while increasing the effectiveness of sabotage cards:

- Changed two P/U 2 Resources to P/U 1 Resource
- Changed one P/U 2 Resources to Sabotage
- Changed one Bakery to Sabotage
- Changed one Bakery to Field
- Sabotage Cards: Discard 2 resources when played a Sabotage Card (previously 1)

These changes were very visible in Playtest #2. The data showed a 25% decrease in resources gained. Additionally, Sabotage Card pick up rate increased 34%. On top of doubling the resource penalty of Sabotage Cards, they were extremely influential in the outcome of the game.

From our qualitative observations of Playtest #2, we found our changes to resource collection and sabotage card effectiveness were too extreme. With that in mind, we counter-balanced again by slightly increasing resource collection opportunities and slightly decreasing sabotage card collection. These were the changes we made after Playtest #2:

- Changed two P/U 1 Resource to P/U 2 Resources
- Changed one Sabotage to P/U 1 Resource

We found that the effectiveness of doubling the resource penalty and adding one more Sabotage tile still made Sabotages very effective, while also keeping a steady pace throughout the game with ample opportunities to collect resources. Using qualitative analysis in playtesting helped us make informed decisions that balanced The Market to accurately represent the gameplay experience we were hoping to achieve.

Balancing Resource Card Deck

We found out very early on in playtesting our current resource deck was unbalanced. Even in early-game stages of play, we had way too many Fruit Seeds and way too few Water in our hands. We needed a way to balance the number of cards to closely match the required number of resources needed to complete a full set of products.

To solve this, we closely matched the distribution percentage of resource cards in the Resource Deck to the distribution of each type of resource occurring in the quest cards. This balancing act also gave us a sense of the total number of cards there should be in the deck according to our 2-6 player rating. We ended up adding 26 new cards to the deck and balancing each resource to a ~1:7 ratio of resources needed to resource available in the deck. We balanced Fruit Seeds slightly higher (1:9) as they have a very rare chance of appearing in the deck. We don't want people to go through half the deck without encountering a Fruit Seed.

Balancing Sabotage Card Deck

As Sabotage Cards play an impactful role in The Market, we need to tread carefully on how we want to balance the Sabotage Deck. Adding too many negative cards (losing resources) could cause users to feel they cannot progress. However, if we overrun the deck with personally benefitting cards (gaining resources), it retracts from the strategic player interactions we were hoping to garner with the cards.

We knew we shouldn't leave the deck a consistent, static amount of three cards per type of sabotage, but how could we distribute them with data? To answer this question, we created a Sabotage Card Impact Poll. Play

| Product Requirements | | | | | | |
|----------------------|----------|----------|----------|----------|----------|-----------|
| | Soil | Water | Veggie | Fruit | Grain | |
| Grain Product | | | 1 | | 3 | |
| Fruit Product | 2 | 2 | | 1 | | |
| Veggie Product | 2 | 1 | 2 | | | |
| Total | 4 | 4 | 2 | 1 | 3 | 14 |
| Distribution % | 28.6% | 28.6% | 14.3% | 7.1% | 21.4% | |
| 2-Player Game | 8 | 8 | 4 | 2 | 6 | 28 |
| 4-Player Game | 16 | 16 | 8 | 4 | 12 | 56 |
| 6-Player Game | 24 | 24 | 12 | 6 | 18 | 84 |

| V1 Resource Deck | | | | | | |
|------------------|-------|-------|--------|-------|-------|-------------|
| | Soil | Water | Veggie | Fruit | Grain | Total Cards |
| Number of Cards | 15 | 15 | 15 | 15 | 15 | 75 |
| Distribution % | 20.0% | 20.0% | 20.0% | 20.0% | 20.0% | |
| 2-Player Buffer | 7 | 7 | 11 | 13 | 9 | 47 |
| 4-Player Buffer | -1 | -1 | 7 | 11 | 3 | 19 |
| 6-Player Buffer | -9 | -9 | 3 | 9 | -3 | -9 |

| V2 Resource Deck | | | | | | |
|------------------|-------|-------|--------|-------|-------|-------------|
| | Soil | Water | Veggie | Fruit | Grain | Total Cards |
| Number of Cards | 28 | 28 | 14 | 9 | 22 | 101 |
| Distribution % | 27.7% | 27.7% | 13.9% | 8.9% | 21.8% | |
| 2-Player Buffer | 20 | 20 | 10 | 7 | 16 | 73 |
| 4-Player Buffer | 12 | 12 | 6 | 5 | 10 | 45 |
| 6-Player Buffer | 4 | 4 | 2 | 3 | 4 | 17 |

| Resource Ratio Analysis | | | | | | |
|---|-------|-------|--------|-------|-------|--|
| | Soil | Water | Veggie | Fruit | Grain | |
| V1 Deck: Needing Resources to Resources Available Ratio | 1:3.8 | 1:3.8 | 1:7.5 | 1:15 | 1:5 | |
| V2 Deck: Needing Resources to Resources Available Ratio | 1:7 | 1:7 | 1:7 | 1:9 | 1:7.3 | |

| Sabotage Card Impact Poll | | Poll Data | | | | | Total | Overall |
|---------------------------|------------------------------|-----------|----|----|----|----|--------|---------|
| Card Name | Effect | P1 | P2 | P3 | P4 | P5 | Impact | Impact |
| Drought | Lose 2 Water | 8 | 3 | 4 | 4 | 4 | 23 | 4.6 |
| Wheat Shortage | Lose 2 Grain | 3 | 6 | 5 | 3 | 5 | 22 | 4.4 |
| Flooding | Lose 2 Soil | 6 | 4 | 3 | 5 | 3 | 21 | 4.2 |
| Bird | Lose 2 Fruit | 4 | 8 | 7 | 8 | 7 | 34 | 6.8 |
| Bug Infestation | Lose 2 Veggie | 7 | 7 | 6 | 7 | 6 | 33 | 6.6 |
| Steal Resources | Take 2 Resources | 2 | 2 | 2 | 2 | 2 | 10 | 2 |
| Resource Pile | Roll to take from pile (1-6) | 1 | 1 | 1 | 1 | 1 | 5 | 1 |
| Hitch a Ride | Move to Bakery/Field | 5 | 5 | 8 | 6 | 8 | 32 | 6.4 |

| V1 Sabotage Deck | | |
|--------------------|-----------|----------------|
| Card Name | Amount | Distribution % |
| Drought | 3 | 13% |
| Wheat Shortage | 3 | 13% |
| Flooding | 3 | 13% |
| Bird | 3 | 13% |
| Bug Infestation | 3 | 13% |
| Steal Resources | 3 | 13% |
| Resource Pile | 3 | 13% |
| Hitch a Ride | 3 | 13% |
| Total Cards | 24 | |

| V2 Sabotage Deck | | | |
|--------------------|-----------|----------------|------------|
| Card Name | Amount | Distribution % | Multiplier |
| Drought | 5 | 14% | 1 |
| Wheat Shortage | 4 | 14% | 1 |
| Flooding | 4 | 13% | 1 |
| Bird | 3 | 11% | 0.5 |
| Bug Infestation | 3 | 10% | 0.5 |
| Steal Resources | 4 | 12% | 2 |
| Resource Pile | 2 | 6% | 2 |
| Hitch a Ride | 6 | 20% | 1 |
| Total Cards | 32 | | |

testers ranked their experiences with each sabotage from most to least impactful on gameplay. The results gave us an *Overall Impact Score* which was then used to distribute the cards amongst the deck. The lower impact cards would be more prevalent, while higher impact cards would become rarer.

However balanced this impact strategy makes the deck, we still believe this deck needs improvements. Sabotage impact on gameplay is not the only metric that you can evaluate a particular move. There are many other qualitative factors such as how much fun it is to play onto your opponent and how much fun it is to be on the receiving end of said card. There is still room for improvement.

Other Quantitative Analyses

These are more calculations that have been made that do not directly influence balancing or gameplay decisions but are important elements of our game to keep in mind when we add or change anything.

- Board Tile distribution
- Tile Effect distribution (collecting resources, losing resources, creating product, etc.)
- Tile Quality distribution (positive, neutral, negative spaces)
- Average number of rolls per Board Tour (how many rolls to go around the board)
- Average resources gained per Board Tour
- Average resources lost per Board Tour
- Average net resources per Board Tour
- Average Sabotage Cards gained per Board Tour
- Average number of Board Tours to game completion

Some cells are marked with a red triangle. These notes go into more depth about the calculations and decisions we made.

Refer to the file **Quantitative Analysis.xlsx** for more information and raw data/calculations.

| Specific Tile Distribution | | | | |
|---|-------------------|------------------|---------------------------|--------------------------|
| Tile Name | Effect | Tile Quality | Amount | Distribution % |
| Start | Roll Again | Neutral | 1 | 4% |
| Field | Plant | Neutral/Pos | 5 | 18% |
| Bakery | Bake | Neutral/Pos | 4 | 14% |
| P/U One | Add 1 Resource | Pos | 7 | 25% |
| P/U Two | Add 2 Resources | Pos | 3 | 11% |
| Lose One | Lose 1 Resource | Neg | 3 | 11% |
| Sabotage | P/U Sabotage | Pos | 4 | 14% |
| Discard Pile | Add 1-6 Resources | Pos | 1 | 4% |
| Total Spaces | | | 28 | |
| Effect Tile Distribution | | | | |
| Tile Effect | Amount | Distribution % | | |
| Roll Again | 1 | 4% | | |
| Create Product | 9 | 32% | | |
| Gain Resources | 11 | 39% | | |
| Lose Resources | 3 | 11% | | |
| Gain Sabotage | 4 | 14% | | |
| Pos/Neutral/Neg Tile Quality Distribution | | | | |
| Tile Quality | Amount Early-Game | Amount Late-Game | Distribution % Early-Game | Distribution % Late-Game |
| Positive | 15 | 24 | 54% | 86% |
| Neutral | 10 | 1 | 36% | 4% |
| Negative | 3 | 3 | 11% | 11% |

| Board Tour | | | |
|--|------------|-----------------------------------|------------------------|
| Average Roll | 3.5 | | |
| Turns per Board Tour | 8 | | |
| Average Resources Gained per Board Tour | | | |
| Resource Collection Method | Amount | Chance | Avg. Amount/Board Tour |
| P/U One Resource | 1 | 25% | 2 |
| P/U Two Resources | 2 | 11% | 1.7 |
| Discard Pile | 3.5 | 4% | 1 |
| Total Amount | | | 4.7 |
| Average Resources Lost per Board Tour | | | |
| Resource Discarding Method | Amount | Chance | Avg. Amount/Board Tour |
| Lose One Resource | -1 | 11% | -0.9 |
| Get Sabotaged | -2 | 12% | -1.8 |
| Total Amount | | | -2.7 |
| Average Net Resources per Board Tour | | Average Board Tours to Completion | |
| Method of the Resources | Amount | Net Resources per Tour | |
| Gained Resources | 4.7 | % of certainty | 80% |
| Lost Resources | -2.70 | Resources Required | 14 |
| Net Resources | 2.0 | Tours to Completion | 8.7 |
| Average Sabotage Cards Gained per Board Tour | | | |
| Sabotage Collection Method | Amount | Chance | Avg. Amount/Board Tour |
| Sabotage Tile | 1 | 14% | 1.1 |
| Total Amount | | | 1.1 |

Game Dynamics

Our game dynamics encourage players to make decisions that progresses them towards winning them the game and hindering others towards their own progress. The options of gaining resources and creating food products out of them cater towards completing your goal card, while the sabotage mechanic helps stifle others' ability to complete their own goal card. The rules of the game help balance those mechanics (e.g. restricting how many resources can be picked up).

The main strategy that seemed to work through our playtesting was to not draw any attention to yourself and to make friends, not enemies. The person with the most cards had the most sabotages played against them, and if anyone held a grudge against you, then you were focused by them consistently throughout the game. This strategy involves saving your sabotage cards for use in only the direst of situations, and trading with others to promote friendship. As our game is mainly based on luck, there isn't any strategy to gaining fewer cards. However, there are always ways to make it appear that you have fewer cards to your opponents.

Trade-offs and Dilemmas

Throughout the play of game, the player encounters several trade-offs and dilemmas that they must decide on during major events. In the case of our sabotage dynamic, you can either play the card immediately upon pickup and hinder players immediately or hold it until someone lands on a field or bakery and strike them down when they attempt to create a food product.

Trading is another trade-off system that is incorporated in our game; it's right in the name! You are trading one card that might benefit the opponent while also receiving one that benefits you. However, you might be giving up a resource that you'll need later. You need to weigh how much you need this card over the one you're giving up.

You will encounter a dilemma when you land on a "lose a resource" tile. You can choose between any resource you have, but you must discard one resource tile. In the first half of play, this dilemma forces you to strategize which food products you want to focus on growing first, and discard resources relating to food products that you will create later. However, in late game scenarios, when you already have one or two food products produced, this dilemma is minimized as you can discard any excess resources that you no longer need to produce the remaining food products.

Length of Play Session

During our playtesting, our sessions lasted anywhere from 45mins to an 1h11mins with a group of five players. However, depending on the size of your group and how lucky/unlucky you get, we estimate this game can range anywhere from 30mins to 1h30mins.