CULTiVATE

Co-Designing Food Sharing Innovation for Resilience

D5.1: Three Serious Games Prototypes
WP 5, Citizen Engagement

Authors: Txell Blanco, Ana-Maria Gatejel, Lucie Sovova, Oona Morrow, Jessica Duncan

With contributions from Alice Stepien, Beatrice Bossi, Kelly Nguyen, Manon Bernard, Roy Leeuwerink and Sem Reimink

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Three Serious Games Prototypes

Txell Blanco, Ana-Maria Gatejel, Lucie Sovova,
Oona Morrow, Jessica Duncan

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Table 1: Glossary of key terms

Term	Definition
Citizen engagement	*Citizen engagement here refers to any individual or group activity addressing issues of public concern, specifically food sharing practices and initiatives. Citizen engagement moves beyond the formal definition of citizens to include all peoples working together or working alone on political and non-political activities and actions to advance food sharing.*
Food Sharing	*Food sharing involves collective actions around food and food related items, spaces, skills and knowledge. It can take place between friends, families, neighbours, communities and strangers across the food system from growing, cooking and eating, to surplus food redistribution.*
Serious Games	*Serious games are games designed for a specific purpose, which often relates to addressing societal challenges. As such, serious games are games that integrate learning and entertainment, but their main goal is not entertainment.*
Co-creation	*Co-creation refers to a method of collectively designing elements of serious games. The approach focusses processes and context to inform the objectives and format of the game, rather than on the specific design style.*

1. Introduction: Serious games for citizen engagement

1.1. Aim of the report

The aim of this report is to present three prototypes of serious games that have been co-created and designed specifically to engage citizens in different aspects of food sharing. To align with the CULTIVATE project, each game has the ambition to address different dimensions of food sharing. Game #1, for instance, is addressing the topic of "cooking and eating together" in an edible city, game #2 is addressing the topic of "growing together" in a community garden, game #3 addresses all three dimensions of food sharing, including "surplus food redistribution".

An additional game has been developed beyond the proposed scope, and it is also presented in this report. Unlike the other games, this one teaches about "Food Sharing", "composting" and "where food comes from" to younger children.

It is important to note that the report presents prototypes and not final games.

What is Cultivate?

CULTIVATE is a four-year Innovation Action funded by the EU Horizon Europe (GA No. 101083377) and designed to support sustainable urban and peri-urban (UPU) food sharing and help transform urban food systems towards more just and sustainable. CULTIVATE will co-design a ground-breaking online social innovation support platform – The Food Sharing Compass – with food sharing initiatives (FSIs), local authorities, food supply actors, researchers and citizens in order to: map, track and monitor UPU food sharing landscapes; identify the costs, benefits and impacts of FSIs; help actors navigate governance architectures and ensure appropriate policies and regulations of food sharing; support increased citizen engagement in UPU food sharing; and create a community of practice for FSIs. Working collaboratively with multiple actors, CULTIVATE will develop more sustainable, resilient and healthy UPU food systems supporting inclusive climate mitigation and adaptation ambitions of the EU.

What is food sharing?

Food sharing involves collective actions around food and food related items, spaces, skills, and knowledge. It can take place between friends, families, neighbours, communities, and strangers across the food system from growing, cooking, and eating to surplus food redistribution. In CULTIVATE we focus on food sharing beyond friends and family, and specifically initiatives explicitly set up to share food. We call these food sharing initiatives (FSIs). FSIs adopt different organisational forms, including co-operatives and social enterprises, charities and for-profits and can be community, private sector or state-led. Examples include, seed libraries, community gardens, food related co-operatives, community kitchens, and surplus food redistribution organisations.

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Rationale for the report

Within CULTIVATE, Wageningen University works closely with the Municipality of Utrecht (The Netherlands), and specifically the neighbourhood of Rijnvliet. Rijnvliet was designed as an edible neighbourhood and includes a food forest, as a public green space. The Municipality has an interest in expanding citizen engagement in the food forest. Food forests are forest-based polyculture systems based on perennial plants and characterized by trees, featuring multi strata designs that include different size trees, shrubs, and ground cover (Albrecht and Wiek, 2021a, 2021b). According to the published literature, by seeking to foster biodiversity and multifunctionality, food forests can bring a host of potential benefits and services to people, food systems, and the environment (Albrecht and Wiek, 2021a, 2021b).

It is in this context that we have developed four serious game prototypes to facilitate citizen engagement. Serious games are defined here as games designed and played for specific reasons beyond entertainment (de Suarez et al., 2012). Often, these games aim to address elements of societal challenges (Aubert et al., 2019). Said otherwise, serious games are games that integrate learning and entertainment, but their main goal is not entertainment (de Suarez et al., 2012). Research shows that serious games can be useful tools to explore complex topics in safe(r) spaces (Rodela et al., 2019). This is in part because serious games allow players to explore and experience different perspectives or the implications of different decisions with the idea that they can reflect and learn from this. Serious games can be used to achieve a variety of objectives, including research and data collection, raising awareness, fostering shared understanding, social learning, and decision support. They can also be used to facilitate more inclusive discussions across a plurality of stakeholders (Rodela and Speelman, 2023).

1.2. Structure of this report

In what follows, we introduce the method of game co-creation that was employed to inform the serious game prototypes. We then present four game prototypes to engage citizens in elements of food sharing.

The first game – *Let's eat! Collective memories of an edible city*— has been designed to address the theme of Eating Together. Through a sharing of recipes associated with personal food memories, neighbours explore an edible neighbourhood together to create new recipes together.

The second game – *Common Ground* – addresses the theme of Growing Together. Players design and take decisions related to a community garden. Through game play they learn about gardening but also about what it takes to grow food together in ways that engage citizens.

The third game – *Future Food Sharing* – brings the insights from the **CULTIVATE** project together in a card deck that guides players through various quests to achieve more sustainable futures informed by food sharing. The game includes elements of the three food sharing themes.

The final game – *Oma komt eraan! (Grandma is coming)* – builds on the theme of Eating Together but specifically targets children. Through this quick and cooperative game, children learn about wild edible plants as they race to make a recipe for their grandmother.

All four games include elements of surplus food redistribution.

After presenting the four prototypes we present an overview of the different methods of data collection that informed the development of the first three games.

2.   How do we co-create a game?

Designing serious games can be challenging. Designers need to find a balance between entertainment and learning, as serious games can be less engaging when 'fun' is not prioritized.

But how to make fun games that are also well informed by the complexities of food sharing?

In our process, we made use of game co-creation as a strategy to co-create games with key Food Sharing Initiatives (FSIs) and relevant stakeholders (see Figure 1). In this way, we anticipate that the resulting games will more effectively meet the needs and interests of our FSI target groups, and in turn better stimulate citizen engagement.

Figure 1: Stakeholders engage in game co-creation in Utrecht

In our co-creation process, we focused specifically on FSIs and stakeholders in the Municipality of Utrecht. We triangulated the results of the workshops with literature on food sharing and discussions with project partners to ensure that the games were relevant outside of the Utrecht context. All games were tested and adapted through iterative testing. The resulting game prototypes will be further tested and adapted beyond Utrecht during the project's replication phase. The games are also being designed not only as physical games (i.e. traditional board games or card games), but also as print-and-play games that can be easily downloaded through the

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CULTIVATE compass. In this way, the games are not reliant on digital environments to be played and can be easily brought to other places.

In setting up the methods for game co-creation (see Figure 2 for the timeline), we organized three workshops with Food Sharing Initiatives (FSIs), policy makers and other stakeholders. We describe these workshops in more detail in section 7. Broadly, the ambition of these workshops was to provide guidance, input and structure, as well as to gather data, share ideas and knowledge, and work with participants on game ideas. The workshops also made space for reflecting and translating the results of discussions into useful game design inputs. In between the workshops, we tested the games to keep refining the play. This testing engaged different stakeholders, but also relied heavily on the Team at Wageningen University.

Each of the three workshops was designed to be different: addressing the specific needs and stage of the game design process. For instance, the first workshop was the kick off from the co-creation. Here we were able to meet many FSIs from Utrecht involved in the three types of food sharing that inform **CULTIVATE** (i.e. eating and cooking together, growing together, and surplus food redistribution). After this broad and inclusive kick-off workshop, we chose to hold co-creation workshops with specific FSI's in order to deepen our questions and focus the games.

We elaborate further on the data collection methods used for each specific date in section 7 of this report.

Figure 2: Trajectory of game co-creation
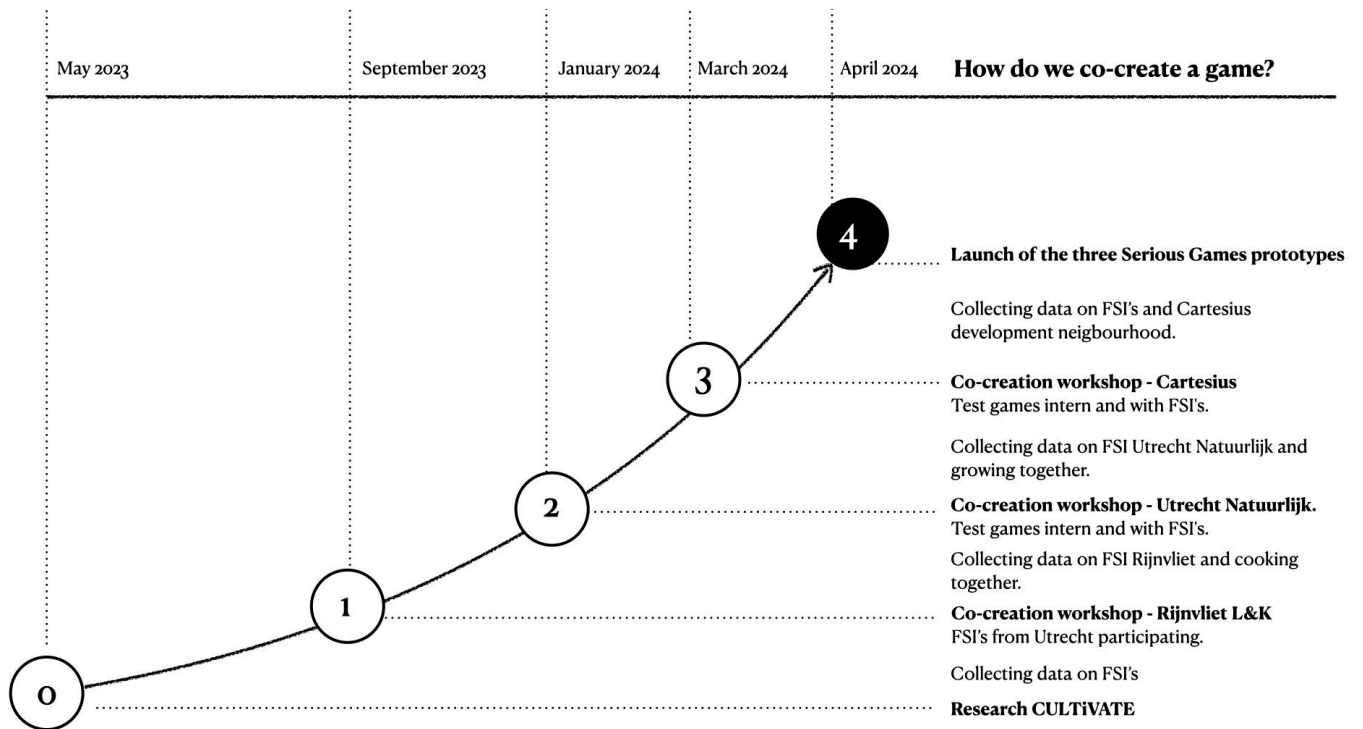
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Figure 3: Structuring game co-creation sessions.
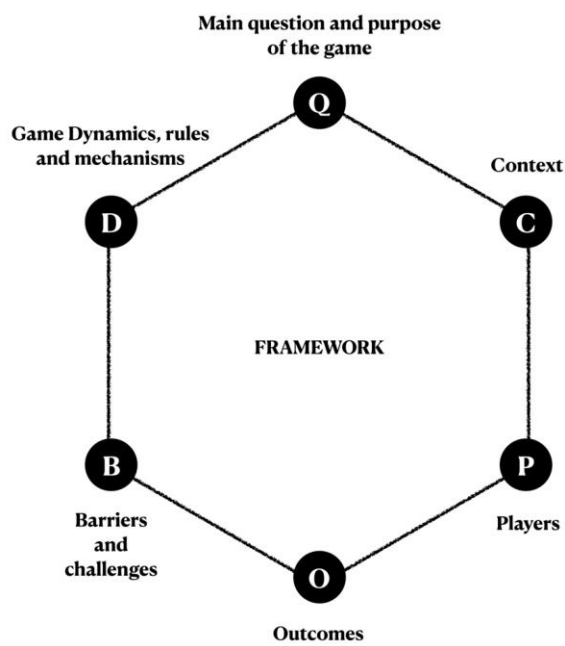
How do we co-create a game?

Main question and purpose of the game

Q

Game Dynamics, rules and mechanisms

Context

D

C

FRAMEWORK

B

P

Barriers and challenges

Players

O

Outcomes

Main question and goal of the game	Players
Question Why For whom	Real player/role player Interests Powers Weaknesses...
Context	**Outcomes**
Local facts / Global examples Policy and environmental regulations Fantasy Scale and land use...	Future scenarios Stories New coalitions Toolbox...
Barriers and challenges	**Game dynamics, rules and mechanisms**
Unpredictable / Predictable events Obstacles Goals to achieve Deadlines...	Duration Number of players Number of game rounds Rules of the game Digital or tabletop game How to end it: Scoring, voting, awards ceremony...

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Game #1: Let's Eat!
Collective memories of an edible city

Get to know your new neighbours as well as your edible environment. Push your creativity and enhance your knowledge! Together you will create a collective recipe book.

Players: 4-10
Age: 10-100
Play time: 30 - 140 min

3.   Game Prototype #1: Let's eat! Collective memories of an edible city

3.1. Introduction game prototype #1

Title: Let's eat! Collective memories of an edible city

Focus: Eating and cooking together with foraged and non-foraged produces.

Goal of the game: To get to know your new neighbours as well as your edible environment and push you to be creative and share knowledge. Together you will create a collective recipe book.

Purpose in relation to FSI: How to stimulate citizens to learn about their edible environment, the one planned by the government (edible landscapes) and interact with it for several purposes: cooking from it, taking care of it, meeting people in it and around the table while playing/eating.

Target group: Anyone from 10 to 100, especially residents of a new developed area nearby a park or public garden with edible plants.

Number of players: 4 to 10 players is the number of players recommended.

Amount of time needed to play: Short version: 30 or 45 minutes, depending on the number of players. Long version: 2 hours.

Design method: Co-creation workshops, data collection, inspirational games, testing.

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3.2. Game Design

Figure 4: Game #1 emerging

"Let's eat! Collective memories of an edible city" is a game designed to stimulate citizens to gather food from their neighbourhood and make collective recipes. Through the game, players learn about edible plants and different ways to preserve and process these foods.

Goal

The goal of "Let's eat! Collective food memories of an edible city" is to get to know your new neighbours as well as your edible environment and push you to be creative and share knowledge to create a collective recipe book.

The setting

The ideal way to play the game is around a dinner table, with food partially made from local ingredients that grows in the neighbourhood. The game host will invite two neighbours from the same street or close by that he/she/they do not know to play. The reason? Get to know each other and the neighbourhood.

There are two phases of the game, first phase is sharing food memories and recipes with the participants. That will happen while food is being eaten, in a very relaxed way.

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Second phase is to adapt those recipes to the ingredients that can be found in the edible neighborhood and then go wild picking on the gameboard, which represents the neighborhood's edible streets. This is intentional to gain "safe practice" in wild picking in a low-stakes environment. That can help people overcome some of the barriers to wild picking, such as seasonality and dealing with an immature food forest with little of harvest.

3.3. Play book

In this section we provide an overview of the game play book. It is important to note that now that the prototypes have been co-created, tested and refined, we will be working with game designers and illustrators to sharpen and clarify the rules and the game itself.

Preface
This game is meant to be played as you share a meal with your neighbours. The hosting household is the game leader and is encouraged to prepare a dinner with local ingredients. The idea is that the hosting household invites two neighbours from the same street or close by. At the end of the game, the most seasonal recipe will win the honour to host the next game, cook the recipe and invite two more neighbours to play. Recipes are written down and left in the game box as a neighbourhood recipe book emerges!

Introduction
In this game you play as a resident of a specific street in an edible neighbourhood. You will play this game collaboratively with other neighbours from adjacent streets. The game board features the neighbourhood with streets and edible plants.

The goal is not only to learn about edible plants, but also to create a sense of community with other players. You do this by sharing your own food memories and related recipes with one another.

Collectively, you adapt the recipes with the food you find in your neighbourhood. As you collect food you share your recipes with the group, and you learn from one another. The more ingredients you find while you move around your neighbourhood, the stronger the identity of the community and the more points you win as a collective. Over 8 rounds, meaning two years which is four seasons per year, your objective is to collect as many ingredients as possible to cook your food memories.

But what are food memories? Food memories can be about:
- Eating habits
- Youth food culture
- Climate and food
- Food festivities
- Family food traditions
- Food as a political act
- The most unusual food
- Eating with strangers
- Healthy diet

Food memory quest cards are included in the game to help players share their food memories and related recipes.

General overview: setting up

Before you start sharing memories and recipes with each other let's take few minutes to get to know the plants on your street. Each player is playing one street and will be the specialist of what you can eat there, allowing them to help other players find food and localize recipes. The information about the edible plants on your street is on your street envelop, together with plant props that you can place on your street for others to see. Place them randomly as you wish. Each player has also a pawn. The pawn will be used in phase two of the game to go foraging.

Game Components

→ **Gameboard** (Figure 6):

- 10x Rijnvliet streets with several spaces on each street representing the steps you make when foraging. Players can place their Wild plant props in spaces on their streets to be foraged during the game. Each street has a personal colour, which is the same as your pawn. Some spaces have the letter "K" written in it, if you fall on this space, you should take a Chance Card (see explanation below).

- A round counter representing the seasons. Before playing you can decide how many years you want to play. When playing 2 years your round counter will be counting 8 rounds.

- 1x Ingredients Bank: here you can place the Wild plant props you have foraged.

- 3x Neighbourhood Sharing Cabinets: here you can collect wild picking points and share long shelf-life products made by players.

- Representative buildings such as School and Cultural Centre

→ **Neighbour Pawn** showing the colour of the street they belong to

→ **9-sided dice** (which includes the number 0) to navigate the gameboard and forage edible plants.

→ **Street envelopes**, each containing Wild picking Cards and Wild Plant Props connected to your street. In total there will be 10 streets and 35 wild plant cards and props (around 3 plants x street). There are "growing everywhere" plants as well, such as nettles, those are placed outside the street spaces.

→ **Food Memory Quest Cards:** x9 different food memory questions being (Figure 7):

- Eating habits
- Youth food culture
- Climate and food
- Food festivities
- Family food traditions
- Food as a political act
- The most unusual food
- Eating with strangers
- Healthy diet

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→ **Wild picking cards:** informative cards about edible plants growing in your street, with information about appearance, picking seasons, taste and recipe tips. The appearance is shown as a botanical drawing.

→ **Wild Plant Props:** Props to place on the board are double sided, one side shows the name, other side shows the appearance. The appearance is shown as a picture taken from a certain distance (within a context). This way we see the same plant in both zoom in and zoom out situations. Each street has around 3 plants to place, and each plant is also represented 3 times (3 props per type of plant), the reason is that you may pick the same plant twice, but always leave a third for animals. The props are turned upside down when recipes are localized and therefore activated. This way players know what to pick in phase two. (Figure 8)

→ **Wild Picking Points:** You can win extra moves on your picking journey, giving you more flexibility when going foraging. (Figure 8)

→ **Chance Cards:** You might take a Chance card (Figure 8) while you are foraging depending on if you fall with your pawn on a "K" street space or if your 9-size dice mentioned above scores "0". Chanced circumstances can be:

Neighborhood is full of trash: skip a round cleaning.

It's that time of the year, prune your trees: take one picking point from your neighborhood sharing cupboard.

There is a plague of insects eating your ingredients: take one ingredient away from your community ingredient bank.

Seasonality, you are too late picking, your food is rotten: take picking points out of the neighborhood sharing cupboard.

This year is too dry: no good harvest, skip a round.

This year is too wet: no good harvest, skip a round.

This year has been very good for harvesting: you win a picking point for the community and the possibility to use the same ingredient 3 times!

Your job has increased salary, and you don't need to work that hard, you will win one more day a week to rest and take care of your neighborhood: you win a picking point.

Your local "food forest ranger" is pruning for you: nothing happens to you, keep playing.

Your child has learnt new food skills at school!: nothing happens to you, keep playing.

Your cultural center has planted new trees: you win a wild picking point.

→ **Long-Shelf-Life Props:** You can win extra wild picking points if your recipe involves long shelf-life recipes such as: Jam, Syrup, Liqueur, Oils, Juice, Preserves, Flour… etc. You can share your Long-Shelf food with others by placing this prop on the "Sharing Cabinets" and wild picking points will help you or others to be more flexible on taking foraging steps. (Figure 8)

→ **Local Recipes napkin:** your food memory / recipe collection place. Don't forget to use a cutlery-pen (Figure 5) to eat while writing on the napkin! At the end of each game session these recipes will be uploaded through a QR code as a picture to an online platform.

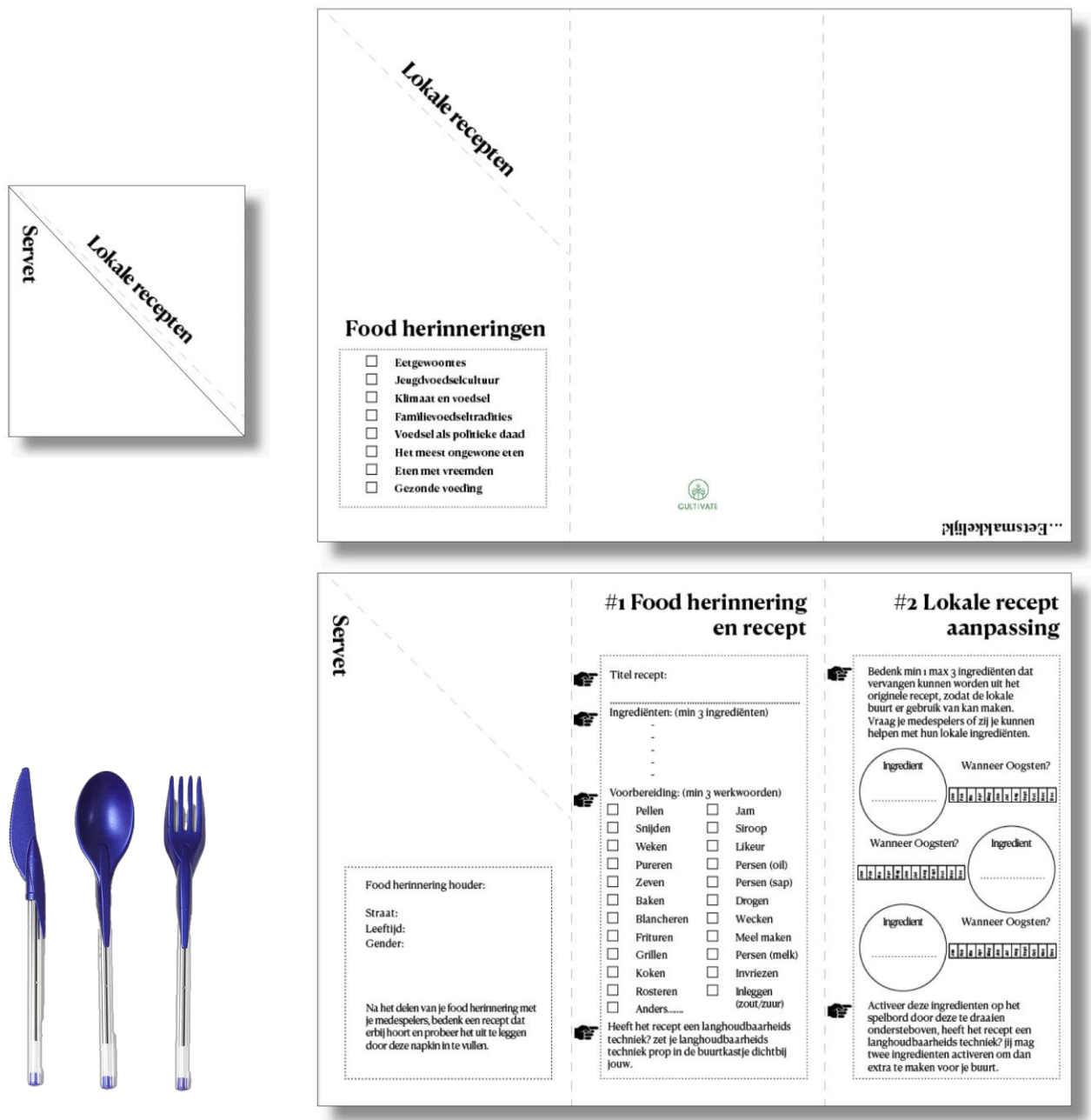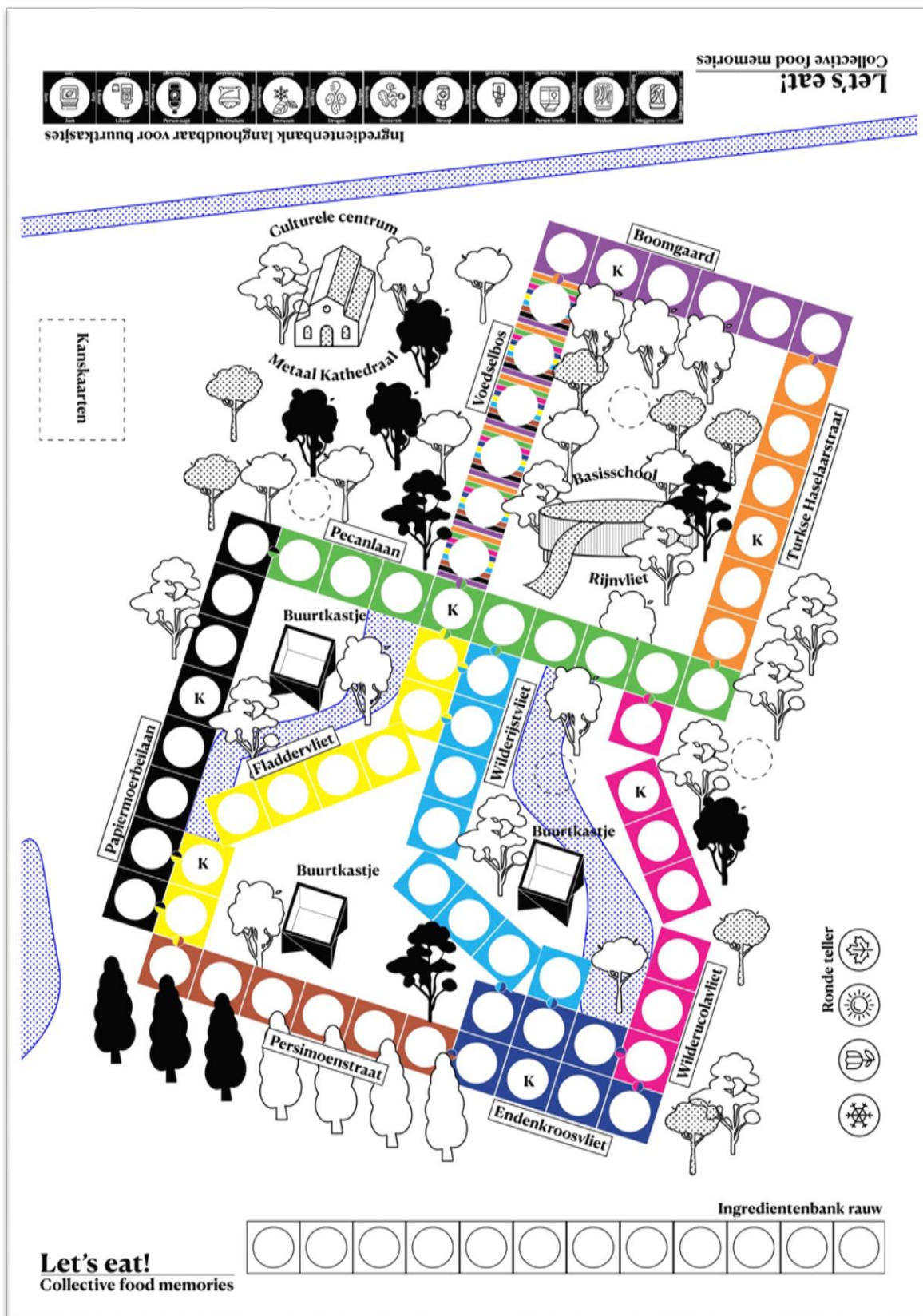Figure 5: Template for the recipe napkin

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Figure 6: Let's eat gameboard.

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Figure 7: Let's eat card deck: 8x food memory quests cards, 36x wild picking cards

Food memory quest cards

Wild picking cards

Figure 8: Components of Let's eat game.

Wild plant props (image side)

Wild plant props (text side)

Long-shelf life props

Chance cards

Game Play

Phase 1: Food memories and recipes (while eating)

#0 Choose a street and place on it your Wild Plants Props
You represent a neighbour in that street. Because you live there, you know your plants and how to take care of them. Take a moment to read your "**Wild Picking Cards**" containing information about your edible plants. Place the "**Wild Plant Props"** (image above) representing your edible plants on your street (choose any location on your street but not K). Place your Pawn at one of the beginnings of your street.

*Notice that you have 3x the same ingredient, and you have 3 ingredients, meaning 9x **Wild plant props**. Place 3x on top of each other at the **Wild picking point** containing the same ingredient on one step of your street.*

#1 Food Memory & Recipe
Take a "**Food memory quest card**": Read it aloud.
Answer that quest explaining your memory to the other players and use the "**Local Recipes napkin**" to write down the recipe related to that food memory.

#2 Local Recipe Adaptation
To help adapt the recipe related to your food memory to locally grown ingredients, other players might pitch the wild edible plants growing on their street to you. Let other players explain why they think an edible plant from their street is a good replacement for an ingredient in your recipe, then choose those plants you think can work best in your localized recipe. Once you choose those plants, turn the "**Wild plant prop**" representing them on the gameboard upside down, this way you activate these plants for the foraging phase of the game.

If your recipe involves long shelf-life processing, you might take the **representative "long shelf-life prop"** and place it on the "**sharing cabinet**" together with "**1x wild picking point**". Since you are planning to share your long shelf-life food in the sharing cabinet you should activate 2x the same ingredient, so that you have enough to make a bigger batch.

Be aware:
Players might answer as many food memory quests as they wish, depending on how much time players want to spend on this phase of the game. You can decide to stop when you finish your meal and before the dessert starts. Ideally each player has at least answered one food memory quest card each, but sharing fewer memories can speed up the tempo if you want to move to the next phase of play.

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Phase 2: Wild picking (before the dessert)

#3 Wild Picking
Round one starts, it is winter. You can see several plants are activated on the gameboard to be picked, but players can only pick those whose edible parts grow in the winter. Everyone is standing with their pawns at one of the beginnings of their streets. Everyone rolls their dices at the same time and moves their pawns towards those ingredients growing in the winter. You can move either to one side or the other side of the street and jump to other streets, but the number of steps you take is determined by the score you have rolled on your dice. If your dice score is "0" you must take a "**Chance Card**". You should take a Chance card as well if your pawn falls on a step with a "K" written in it (see gameboard).

If your dice score gives you enough steps to fall on top of that activated edible wild plant (remember activated plants are the ones turned upside down) that also grows in the winter, you can collect that "**Wild plant prop**" and place it in the ingredients bank on the gameboard.

If you fall very near to that Wild plant (one step behind or beyond), you can have a look at the "**sharing cabinet**". If you find a "**wild picking point**" in the sharing cabinet, you can discuss with your neighbours if you can use it to win one extra step that brings you to collect that ingredient. When collecting that ingredient, place it in the Ingredient Bank on the gameboard.

If you fall on top of an activated edible wild plant that grows in another season than winter, then you cannot collect that Wild plant prop yet.

If you fall on top of an activated edible wild plant that is twice turned upside down (because the person who activated wanted to pick a bigger amount of that ingredient to create a long shelf-life product, such as jam or liqueur with it), you can collect both **Wild plant props** and place one of them into the **long shelf-life ingredient bank in the gameboard**, and one into the **sharing cabinet**.

Once everyone has moved their pawns, it's time for round two: spring. Again, you all roll your dices (each player has their own dice) at the same time and move with your pawns toward those activated wild plants growing edible ingredients in the spring. The same story repeats.

Be aware, we are helping each other to collect ingredients for recipes, it doesn't matter who created that recipe, it's about helping each other.
Each player should move their pawns in each round always, even if you are not collecting any ingredients, you can strategically move towards a wild plant prop that you could collect for the next season.
If you don't remember in which season ingredients grow, ask your neighbours. Help each other in this wild picking journey. The more ingredients you pick after two years of picking, the better!
Remember to keep track of the rounds with the round counter. After 8 rounds look at your Ingredients Bank and see how you scored as a group.

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#4 Reflecting and choosing the next recipe to cook / play.

Let's have dessert and discuss:

- Who wants to host next game session and which recipe will be made depending on the season and availability of ingredients in the neighbourhood?

- Which recipes are players interested in preparing before then?

- What have you learned today?

- What would you like to share in the sharing cabinets next time?

- Are there tasty edible plants you know growing in your street which are not mapped in the game? Let us know! This information can be also uploaded through the QR code into the online platform.

3.4. Game Testing

We had several test games during the process of developing the game. Every two weeks with our internal team in Wageningen and one more time in Rijnvliet, at the house of a neighbour. The lessons learned from the tests were very diverse.

At first, the game actions were mostly focussing on developing recipes from collective memories, but even when we tried to reflect the reality of the neighbourhood on the gameboard by showing the existing edible plants growing in each street, the relation between the recipes and the gameboard was still missing.

For this reason, we decided we should go wild picking the recipe ingredients on the gameboard! This way extra action was added to the game. Testing with colleagues was good in terms of testing mechanics but it remained difficult to see how this might work in the setting of a household with real food involved. We needed to test the game for real, with citizens, with food, with foraged food!

On the 17th of January 2024, we went "wild picking" in the neighbourhood to find out how easy or difficult should it be for one household to play the full version of the game. It was important to see where food could be foraged and what ingredients we could cook with. On the 18th of January, two residents of Rijnvliet, the food forest ranger and the game designer spent an interesting evening cooking and playing the game. The collective memories were shared while eating. This worked well. After eating the meal, we went "wild picking" on the gameboard, and the game worked well and was appreciated by residents. Making a version of the game for youth was discussed.

On the 7th of February 2024 we tested the game with colleagues from Rural Sociology Group. This time we tried to see if we could play the game with more than 8 players in less than one hour. In this iteration, we played without the food memories and the meals. We wanted to test if a shorter, more generic version of the game could be developed and whether it would still be fun and interesting.

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We tested two dynamics. One was choosing two players to share their recipes (and not all of them), while all of them should give them hints on where to localize their ingredients, and then go wild picking.

The other dynamic was the other way around, first players went wild picking and then they built a recipe together. In both cases it was clear that good facilitation was required. Without a game master the dynamic was difficult for so many players to follow. We will continue to experiment with this more generic version of the game during the replication phase of the project (2025-26).

Figure 9: Testing the game in Rijnvliet

Adapting the game

We had a meeting with the city of Utrecht on the 6ᵗʰ of March 2024 to discuss adapting the game to share with Rijnvliet residents. We found out that we need one game session to train people to be the first game masters and then at least three organised and communicated game sessions to play in different settings. We decided on the following target audiences and sessions:

1. The new social housing project: This will open in May, but we took the decision to wait at least two months to play with neighbours as not everyone is moving at the same time. This will also be a nice moment to explore the food forest.
2. Kasvio restaurant: As Mari Pitkanen suggested, we could organise a Monday session in her restaurant with all interested neighbours.
3. In the streets (picnic table) on a warm evening in spring targeting mostly people who own homes in the neighbourhood.

After these sessions, 10 x game boxes could be printed and will stay in the neighbourhood. The idea is that they will travel from one home to another, collecting recipes that will be shared during the next Lab&Kitchen (September 2024).

Before finalizing the game with professional illustrators and designers, we will have one more game session with young people organised together with DOCK (a local youth organization) to adapt the game for the youth.

Figure 10: Game testing session at Wageningen University

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Game #2: Common ground

Negotiate resources and risks within a community garden with your mates, humans and non-humans.

Players: 2-9
Age: 10-100
Play time: 30-140 min

4. Game Prototype #2: Common Ground

4.1. Introduction game prototype #2

Title: Common Ground

Focus: Growing and managing a community garden, with humans and non-humans actors.

Goal of the game: Learning about topics of gardening as well as how to negotiate with other players resources and battle risks.

Purpose in relation to FSI: Introduce volunteers and potential initiators of a garden with the challenges of starting and managing a community garden.

Target group: Anyone from 10 to 100, especially volunteers of a garden who wants to understand the different stages of a community garden life.

Number of players: 2 to 9 players is the number of players recommended.

Amount of time needed to play: Short version: 30 or 45 minutes, depending on the number of players. Long version: 2 hours.

Design method: Co-creation workshops, data collection, inspirational games, testing.

4.2. Game Design

Common Ground is a game that can support community garden initiators in negotiating resources and risks within a community garden.

We designed this game to address the challenges co-creation workshop participants identified around community gardens, particularly in later stages (so after the first year). The game is best played with a diverse group of players.

The game is designed around three existing community gardens in the city of Utrecht but can be easily adapted to other contexts. It is a game to play at the table and to inspire the decisions being taken at the real community gardens. This game also includes some elements of redistributing surplus food, and cooking and eating together.

Goal

The aim of "Common Ground" game is to maintain the health of the garden: the social and ecological dimensions.

The game is meant to prompt reflections on how to ensure that we (people, animals, and nature) continue to work together to ensure the continuity of the garden.

4.3. Play book

Introduction:

"Common ground" is a mixed group of humans and non-humans that interact in a communal garden with the aim to maintain the symbiotic balance of this fruitful ecosystem.

In this garden people grow vegetables, animals live in harmony, the soil is taken care of, and the neighbourhood is invited to cook, eat and celebrate the cycle of life. It is a little paradise in the centre of the city… but when external factors (such as poor air quality, low soil fertility and biodiversity, lack of support, time, or climate events) interrupt the harmony of the garden, all the actors involved need to take action.

How do we ensure that WE (people, animals, and nature) continue to work together to guarantee the continuity of our green paradise?

It is a game to play at the table, preferably in a garden where people want to learn about managing and enjoying a garden together.

Game elements

→ **Gameboard**: Inspired by the three urban gardens of Utrecht Natuurlijk, the three game boards shows three sizes of gardens in three very different locations in the city: (Figure 12)

- o **Size L**: De Klopvaart urban garden is a large garden on the edge of the city with surrounding industry and agricultural fields. The closest neighborhood is a residential area with a lot of vegetation but with great social challenges; Of all the neighborhoods in Utrecht, this is where people feel the least safe (survey 2021, municipality of Utrecht). The most frequently mentioned reasons are a history of assaults on women that made them feel more vulnerable, loitering youth and drug nuisance. With these features in this location, what type of garden would you like to set up here? How do you plan to attract people to this remote but attractive green oasis?

  Choose 4 players on your team (at least one human and one non-human) and a garden management objective.

- o **Size M:** Stadstuin Zuilen is a medium-sized garden on the outskirts of the city, surrounded by a sports club, fields and agricultural villages. City volunteers may have to travel a longer distance to get there, but the green surroundings and spacious grounds offer plenty of possibilities for setting up a special garden. Do you prefer a productive garden with a lot of harvest? Or perhaps a natural environment on the outskirts of the city? Or are you in the middle? And who do you participate with in this project?

  Choose 3 players on your team (at least one human and one non-human) and a garden management objective.

- **Size S:** Stadstuin Kanaalweg is a small-sized garden for gardening enthusiasts closed to the city center. Here it's not so much about making a big harvest... diversity and social cohesion seem to fit better into this little plot. Finding volunteers will not be a problem as there are many organizations in the area such as the "Voorkamer", among others, with a wide and diverse network. But what is the purpose of your garden? What type of landscape do you want to add to the sometimes scarce green city of Utrecht?

  Choose 2 players on your team (at least one human and one non-human) and a garden management objective.

→ **Round counter and goal cards**: Cards representing different garden management activities, such as permaculture (with more biodiversity than harvest), ecological (with equal biodiversity than harvest) or conventional (with more harvest than biodiversity) garden managements, which will be the goal each team has to choose to follow. Besides this this card serves as a round counter for game dynamics. (Figure 11)

→ **Game props**: Garden tiles representing different landscape types on one side, on the other side each garden type scoring, being +B (Biodiversity) or +O (harvesting). (Figure 12)

→ **Game cards**: Cards representing different topics being: (Figure 13)

- Roles
- Garden Supplies
- Risks
- Activities
- Crops

→ **Resources coins**.

- Water
- Compost

Figure 11: Round counter and goal cards (Double side)

PERMACULTURE GARDEN

Nature comes first in your vegetable garden!
By minimally tilling the soil you are counteracting the natural situation. This may yield less yield in the garden's first years, but much more biodiversity than your neighbor's garden. A natural paradise for people and animals!

369 earthworms x m2

ECOLOGICAL GARDEN

In your vegetable garden you do not use external inputs. In this way you maintain the ecosystem, which means that your yield is in balance with biodiversity.

202 earthworms x m2

CONVENTIONAL GARDEN

In your vegetable garden you do not use pesticides, but you do use fertilizers to supplement the soil with substances that are needed for optimal plant growth. This produces more yield in the first years, but it is at the expense of biodiversity.

189 earthworms x m2

PERMACULTURE GARDEN

+B +B Biodiversiteit	+O Oogst
#1: Winter Spring Resources and powers	#1: Summer Autum Crops
#2: Winter Spring Risks and activities	#2: Summer Autum Crops
#3: Winter Spring Risks and activities	#3: Summer Autum In this turn you get an extra +0 harvest point, because you have managed your +B well.
Verzamel even +B en +O	

ECOLOGICAL GARDEN

+B Biodiversiteit	+O Oogst
#1: Winter Spring Resources and powers	#1: Summer Autum Crops
#2: Winter Spring Risks and activities	#2: Summer Autum Crops
#3: Winter Spring Risks and activities	#3: Summer Autum Crops
Verzamel even +B en +O	

CONVENTIONAL GARDEN

+B Biodiversiteit	+O +O Oogst
#1: Winter Spring Resources and powers	#1: Summer Autum Crops
#2: Winter Spring Risks and activities	#2: Summer Autum Crops
#3: Winter Spring In this area you should mainly collect +B because your soil is starting to be depleted and no harvest is possible.	#3: Summer Autum In this area you should mainly collect +B because your soil is starting to be depleted and no harvest is possible.
Verzamel even +B en +O	

We are testing this kind of labels, for instance, "Conventional Garden" could be otherwise called: "Non-organic fertilizers garden", or "Synthetic garden".

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Figure 12: Gameboards and props

Gameboards

Game props

Game props (scoring side)
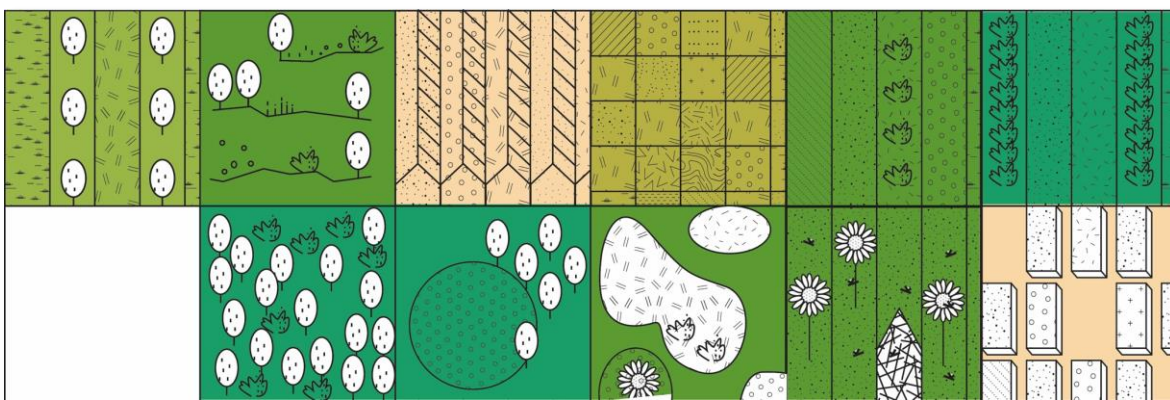
Game props (landscape side)

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Figure 13: Game cards and Game play

Card set: Roles, Garden Supplies, Risks, Activities and Crops.

Game play

You can play this game with minimum 2 players and maximum 9, depending on if you play one location or several. If you are playing several locations, you will be collaborating with your team, but you are competing with the other locations. Several play rounds represent the different years a garden experiences from setting it up, to maintaining it, with a total of three years. In case you play a single garden, you will be collaborating with your team members to achieve the goal you decided as a team to follow (garden management goal cards). Once you have gone through the 3 years of gardening you will discover if you have achieved this goal by the number of tiles that you could turn upside down, revealing the type of landscape your garden has become. In case all gardens play at the same time, the winner will be the garden with the best story on how they became the garden they are.

#1 Preparation:
Choose a location (gameboard S, M or L) and your team members depending on the requirements of your location (min 1 human and 1 non-human). Discuss with your team what kind of garden management you prefer (Permaculture ++B/+O, conventional +B/++O or ecological +B /+O). That will set the goal of your team for the rest of the game.

Each team member has one of the 5 powers, being Time, Knowledge, Network, Nature, Space. You can use these powers to gain "resources" or combat risks. Place two stones on each member, these represent "water and compost" and with those you can plant crops. Be aware that they are still, don't use them all at once.

Each gameboard also has risks and powers. Choose the risk and power cards from the deck that correspond to this location. You cannot start planting crops when risk is still there unless you combat the risk either by:
        -Using team member powers.
        -Pitching your strategy on how to combat the risk to team members and letting them vote if they agree on your idea.
        -Gaining extra powers by exchanging your water and compost points. Be aware you will have fewer points to plant crops in the summer. Discuss this with your team members.

#2 Landscape:
Choose with your team members the landscape you want to have in your garden. You can do this by choosing the tiles (scoring side) depending on the amount of tiles your garden needs and the amount of +B (Biodiversity) and +O (Harvest). Make sure you don't turn them; you should only see the +B and +O in it. Place them on your gameboard. After each year round you can start revealing the tiles landscapes by turning them upside down depending on how many +B and +O will you gain planting crops.

#3 Round 1: Start gaining forces (extra powers) or resources (garden supplies)
It's the first year of your garden, you need to gain extra forces and garden supplies to set up your garden and start planting. You do this by randomly laying 4 cards of each theme (extra powers and garden supplies) on the table. Each team member takes a turn choosing either garden supplies (if they can pay with their own powers) or extra powers.

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You may only negotiate 1 card each turn. Some garden supplies will give you +W (water) or +C (compost) as points which might be useful in the future season round to plant crops. Each team should at least have one "seeds" garden supply to start the next season (round).

#4 Round 2: Once everyone has taken a turn and gained at least essential supplies, the planting season begins

Don't worry if you as a player haven't won any supplies: it's a game about teamwork and your extra power can be useful in future rounds.

To start planting crops use the resources (water and compost) that each player received at the beginning of the game. Make sure you choose crops according to the amount of +B and +O needed (some crops will be less abundant when harvesting, but if you have a permaculture garden that might not be big issue).

After everyone has took a turn, you can as a team start harvesting. You harvest by turning over the tiles according to the amount of +B and +O your planted crops contained, revealing the landscape underneath.

#5 Round 3: After harvesting winter season starts, preparation period

Which risks do you encounter and what activities are you planning in your garden?

You may now reveal 1 risk card and 4 activity cards...

Each team member will either fight the danger or do an activity depending on:

- Some risks can be addressed depending on who's in your team, in that case you can easily deliver an activity and win a participation point.

- Some activities combat risks (such as activity "cooking together" risk "surplus food"), if it happens that this activity is within the four shown cards and the rest of the game members agree on your proposal, you combat the risk and win a "participation point".

- Sometimes there is no activity within the shown cards to combat the risk, in that case you can make a solution up to combat risk, if everyone agrees then you combat the risk.

- If you decide not to combat the risk but do an activity, then you win a participation point but loose one of your +w or +c points.

When you have as a team +4 participation points, you can exchange them for +w or +c which can help you plant your crops in the next season.

        -Be aware, you cannot do some activities if you don't have some garden supplies, if you don't have them yet, you can use your turn to buy them, but in that case, you lose +1 participation point from the team because you cannot combat the risk. Still the next player could use that activity.

#6 Last round: After three years of gardening the game is over.

Your team has done well with their garden if they have been able to make enough +B and +O to reveal all the tiles from the gameboard (turned them upside down). This has been successful when they have been able to carry out enough forces, resources, crops and activities. In addition, each team will share their own experience with each other and the teams will vote for the best stories. That can, for example, solve a tight situation.

4.4. Game Testing

This game hasn't been tested yet by volunteers of Utrecht Natuurlijk but has been tested internally at Wageningen University. That has revealed different interesting changes such as choosing the tiles not by its landscape but just the amount of +B and +O, giving the players a surprise element when they are turned upside down. A rewarding feeling.

Adapting

More crossovers (exception rules) should be made such as:

- This activity card "pruning" can only be used when "tools" gardening supply is in the team.

As a rewarding, each landscape should also have a description such as:

- A pond is an exciting element in the garden, it can supply water in the dryer periods, and it is also the favourite habitat for frogs, which are the best enemies of snails. Your crops will be saved and well hydrated with this refreshing element in your garden.

We still have to decide if we want integrate themes of accessibility and social issues in the game, such as open fences to make gardens public and therefore accessible for the neighbourhood, or working with special groups of volunteers which needs more guidance time or some other collaborations with nearby organisations, such as schools.

The requirements of each garden (L, M, S) can be clearer shown on the gameboard, such as: "this garden is lacking biodiversity, you need to plant more trees or perennial plants before you start gardening." Or "this garden has some distance to communities. How to attract volunteers? You need to find a volunteer before you start gardening."

Figure 14: The Common Ground game design process.

Game #3: Future Food Sharing

Explore Food Sharing scenarios and imagine Food Sharing futures.

Players: 1-6
Age: 10-100
Play time: 10- 140 min

5. Game Prototype #3: Future Food Sharing

5.1. Introduction Game prototype #3

Title: Future Food Sharing

Focus: Eating & Cooking Together, Growing Together and Surplus Food Redistribution.

Goal of the game: To collectively explore dynamics and challenges of food sharing through a series of prompts. The game has a secondary goal of integrating outcomes of the CULTIVATE project (i.e. Food Sharing Dictionary; Menu of Good Governance; Library of Citizen Engagement).

Purpose in relation to FSI: To explore dilemmas, challenges and opportunities across food sharing.

Target group: Citizens interested or engaged in food sharing initiatives as well as policy makers. This is really a BROAD game that can be adapted and played by diverse groups.

Number of players: from 2-6 is ideal but the deck can be played solo or you can bring in several actors.

Amount of time needed to play: from 10 min to 2 hours.

Design method: Co-creation workshops, data collection, inspirational games, testing.

5.2. Game Design

Goal

The goal of Future Food Sharing is exploration and discussion that mobilizes imaginative futures and action. A set of cards informed by real-world examples and research serve as prompts towards this end. Future Food Sharing is designed to immerse players in the dynamics, opportunities and tensions associated with food sharing. The game helps players explore food sharing scenarios and imaging food sharing futures. By engaging with diverse perspectives and tools, players collaborate to explore innovative solutions and foster meaningful dialogue around building more resilient and equitable food systems. The game aims to integrate the findings from the **CULTIVATE** project into an engaging, dynamic game.

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Game elements

The card deck includes 5 types of cards:

→ Quest Cards: Set out challenges or problems for players to address using the four other card types as prompts, stimulating critical futures thinking and imagination.

→ Activity Cards (SHARECITY200): Present players with real-world sharing initiatives as scenarios, inviting them to analyze, adapt, or expand upon these examples to address current challenges in food sharing.

→ Concept Cards (Food Sharing Dictionary): Introduce key concepts and definitions related to food sharing dynamics, stimulating discussion and deepening players' understanding of relevant principles and frameworks.

→ Engagement Cards (Library of Citizen Engagement): Provide players with tools and techniques for engaging stakeholders, fostering community participation, and building consensus around food sharing initiatives.

→ Governance Cards (Menu of Good Governance): Offer strategies and principles for effective governance and decision-making in food sharing contexts, guiding players in navigating complex regulatory, institutional, and policy issues.

Designed by artists with a broad user-base in mind, where possible, QR codes will be added to specific cards to link to the resources in the **CULTIVATE** Compass.

Figure 15: Engagement cards with Quest Cards in the middle.

5.3. Play book

The game is deliberately designed with "light" rules or guidelines to give players the space to create and co-create new rules in practice, if useful to them.
We also plan to develop a few variations of the instructions to guide players.

Variation1: Quest-ioning

1. A quest card is randomly selected.

2. Players take a moment to reflect on the quest. They then take turns sharing ideas on how to achieve the quest and what challenges they may encounter along the way.

3. Each player can then select 1 card from each of the other 4 card types (Activity, Concept, Engagement, Governance)

4. Players then discuss the quest again from the perspective of their cards.

   o   What activity do they wish to engage with to achieve their quest and why?
   o   What concepts are most helpful for deepening their understanding of the quest?
   o   How can they best engage citizens in their quest?
   o   What elements of governance are most useful for managing their quest?

Facilitate open discussions where players can share insights, ask questions, and propose creative solutions, drawing connections between the cards and real-world experiences.
Players are encouraged to collaborate and draw upon their collective knowledge, skills, and perspectives to address the challenges and opportunities presented by the cards.

We emphasize the importance of active listening, empathy, and respectful communication in the discussion but note that finding consensus or agreement is not the goal. In fact, making visible disagreements, or competing visions can be a very useful outcome.

In the end, the card game fosters cooperation and exploration, encouraging players to collaboratively navigate challenges and opportunities related to sustainable food sharing. Through open-ended gameplay and discussions, the game serves as a catalyst for deepening understanding and generating thoughtful dialogue around the complexities of food sharing dynamics and their implications for building more sustainable communities.

Note: as we continue to develop the cards, as as new knowledge emerges from the CULTIVATE project, new play variations will be developed and tested.

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5.4. Game testing

We are in the process of developing the game and testing as we go, following the methods described above. On 25th of April of 2024, we tested a version of the game at the conference *Reinventing the City*. The version we tested focused on linking challenges related to food sharing with elements from the Library of Citizen Engagement.

Figure 16: A close up of the test session during AMS conference: Reinventing the City 2024
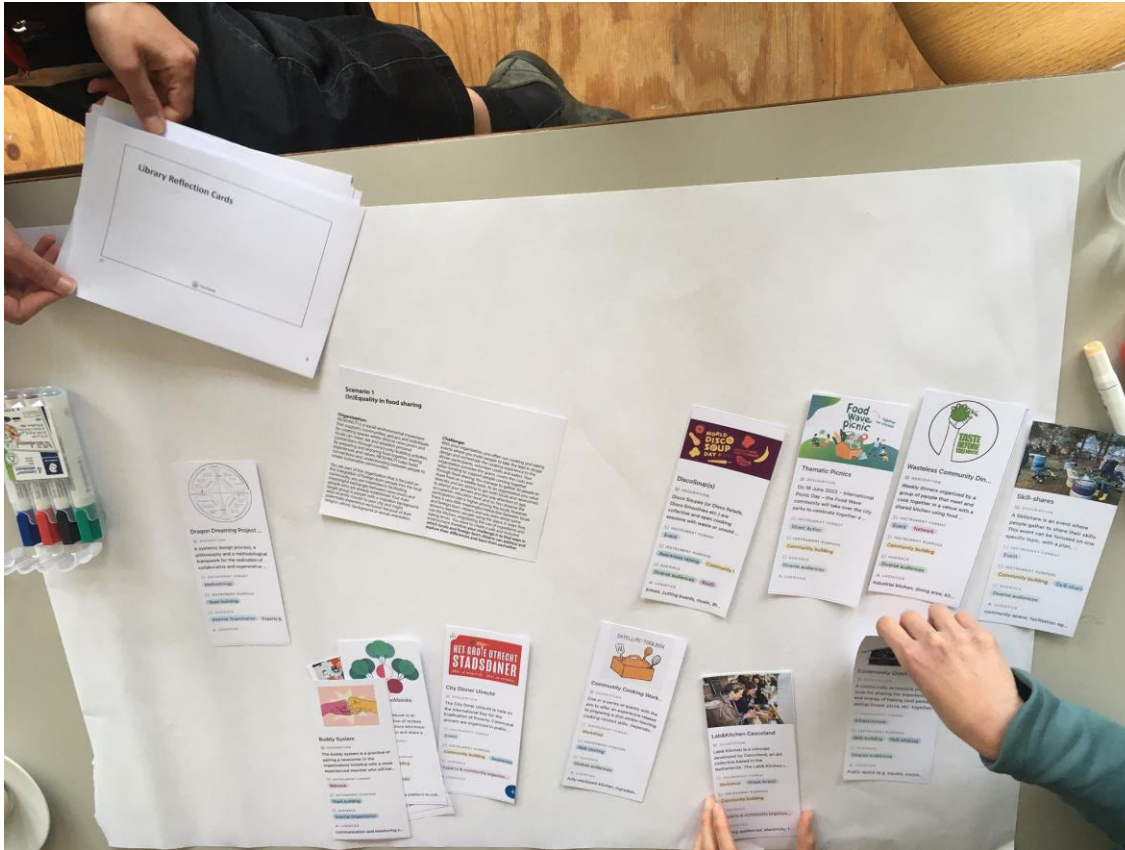
Adapting

As we continue to develop and test the game, it will be adapted, also as more results emerge from the **CULTIVATE** project and the replication process.

Game #4: Oma komt eraan!

Gather ingredients that can be found in the food forest, to make a nice dish for grandma who is coming to visit you at home.

Players: 1-4
Age: 6-10
Play time: 15 min

6. Game Prototype #4: Oma komt eraan!

6.1. Introduction Game prototype #4

Title: Oma komt eraan!

Focus: Cooking with foraged and non-foraged produces; food redistribution.

Goal of the game: To gather ingredients that can be found in the food forest, to make a nice dish for grandma who is coming to visit you at home. The trick is that you need to make the recipe before grandma arrives at your house.

Purpose in relation to FSI: To teach children about food sharing, composting and where food comes from.

Target group: Children from 6 to 10 years old.

Number of players: 1-3 players

Amount of time needed to play: 20 minutes.

Design method: workshops, literature review, inspirational games, testing.

Oma komt eraan! (Grandma is on her way!) has the goal of engaging and educating children, specifically from the *Rijnvliet* neighbourhood in Utrecht. The development of this game followed a different methodology that the other three games. For this game, a team of Bachelor students from the Honours programme of Wageningen University was tasked with developing a game to get children to engage with food forests and harvesting wild foods. To do this they research game design and food sharing, participated in game co-design workshops and participated in events in Rijnvliet. The team includes: Alice Stepien, Beatrice Bossi, Kelly Nguyen, Manon Bernard, Roy Leeuwerink and Sem Reimink.

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Figure 17: A close up of a first iteration of the Oma Komt Eraan game

The game has been designed to teach young children, aged around 6 -10 years old, about food forests and food sharing. Specifically, they learn that food does not only come from the supermarket in exchange for money. As such, the goal of the game is to gather ingredients that can be found in the food forest, to make a nice dish for grandma who is coming to visit you home. The trick is that you need to make the recipe before grandma arrives at your house.

Working together with the **CULTiVATE** team, the students created an exciting, fast-paced and (semi) educational board game. Through the game, children (and anyone else who plays) will be introduced to the concept of the food forest, and they will see the possibilities that a food forest offers to local inhabitants. More specifically, the game has been designed for, and tested and played by, the inhabitants of the (edible) neighbourhood *Rijnvliet* in Utrecht. This game shares many parallels with Game 1 in that it uses the food forest as a model and aims to educate players not only on the foods available in the food forest, but also how to use them to make tasty dishes.

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While *Oma komt eraan!* was designed around Rijnvliet, the ambition is that it can be played by other children. In this way we would like to educate children on food sharing and basic gardening concepts – in food forests such as Rijnvliet, as well as other cities and communities. For this to be possible the students sought a design that would allow an easy distribution of the game – a print and play version made available via PDF.

Access to the game PDF, allows multiple prints in case the board or pieces get damaged or lost. The print and play version could be an important aspect of promoting the boardgame as an online resource (e.g. in the Citizen Engagement Library), that could easily be shared between teachers or parents.

6.2. Game Design

Literature review
In preparation for designing the game, we read several resources on food sharing, food forests and game design. There were also meetings in the neighbourhood and several rounds of designing and testing.

Cooperation with the Food Forest Teacher
During the process of the game design – the issue of the target group was determined. Adults are often more aware of social issues and solutions, however they are not an easily accessible group. Children attend schools, through which the board game can be introduced. After contacting the food forest teacher of the primary school in Rijnvliet, we got a clearer image of the food forest's role in the neighbourhood, level of knowledge on plants among children, gardening and opportunities of the food forest, and the lessons given in the school to educate the children on these concepts.

The majority of primary school aged children either have a very basic knowledge on plants or do not have any knowledge at all – for example they cannot identify simple plants or trees or have problems associating fruits with certain plants. They do show a major interest in plants that are edible or have edible fruits. The lessons concerning the food forest teach students about the availability of foods in the food forest and the functioning of ecosystems. The children are encouraged to actively participate in these lessons and broaden their knowledge – often games or other activities are used to either introduce or reinforce concepts and ideas. Overall, these lessons are positively received by the students.

The food forest teacher hopes that the children will not be the only ones that will benefit from these lessons. It is expected that the children that participate in these lessons further share their knowledge about both the food forest and plants with their parents and elder siblings. In this way people that have less access to information about the food forest can also gain knowledge.

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Discussions and decisions

After much deliberation, we agreed on the sustainability and food sharing topics that the game needs to deliver, as well as its close resemblance to the real fruit forest to stimulate the bond between the players and the Utrecht fruit forest. We also decided to make a 20-minutes game that focuses on collaboration over competition, since we wanted it to be as educational and informative as possible, but in a simple and comprehensive manner for the children. This is aligned with the outcome of the first game co-creation workshop that one of the honours students attended.

Figure 18: Game design session of Wageningen Honours students
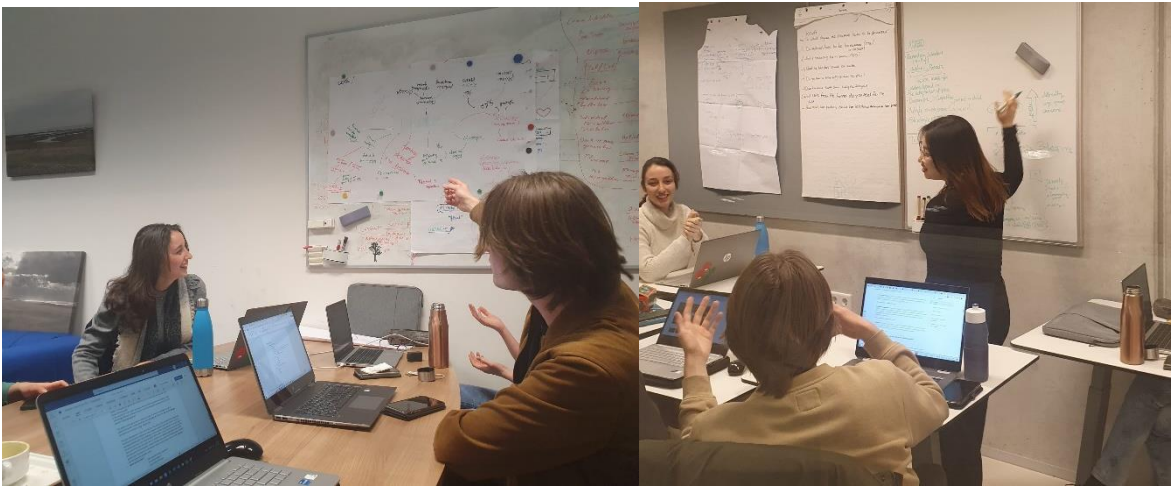
Game Design Day

To advance the game design, a game-design day was organised, in the style of a hackathon. The goal was to put together the ideas and learning and to finish the day with a draft version of a game. We kept track of the game goals and mechanics on the board and used a poster with post-it notes to write about the different components and steps of the game. We also discussed existing games targeting kids to make sure the game was appropriate for our target audience.

The morning was dedicated to 'building' a working game: from the rough starting idea we started playing, and implemented the components, their amounts, and new rules as questions and struggles arose during each round. We kept track of all of that on the post-its, used the different components and pieces we had to represent the different each part of the game.

In the afternoon we moved on to crafting the actual pieces of the game and think of what we would like the design to be. We made drawings of the cards, a draft of the board, the grandmas and we tried to make the crops (coin like pieces with FIMO), however after brainstorming practicalities and other options (the FIMO didn't turn out so well), buying pre-made crops took us down a rabbit hole of safe sizing (toys should be large enough so that they can't be swallowed by children), 3D printing would take a lot of time and require us to paint every single piece. In the end, we decided to go for printed images of the crops. Since the idea is to make a print and play version of the game available online, this turned out to be the best option.

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Figure 19: Game design day at Wageningen University

6.3. Play book

Welcome to the amazing food forest!

Are you ready to embark on an incredible quest? Your beloved grandmother is on her way, and she loves your cooking!

But there's a catch – you need to gather all the ingredients for her favourite recipe from the shared food forest before she arrives. Fortunately, you don't have to do it alone, but you can work together as a team. It's a race against time to create a mouthwatering surprise for Grandma! So, grab your aprons and let the adventure begin!

Goal: The goal is to gather the ingredients for the recipe from the food forest and make a dish, before your grandmother arrives.

Figure 20: Example of trial recipe cards

Equipment:

- 1xFood forest map
- 1xCrops dice
- 1xEvent dice
- 3xBaskets (1xrecipe, 1xcommunity, 1xcompost)
- 1xGrandma token
- 6xLettuce
- 6xTomato
- 6xCarrot
- 6xRadish
- 6xAlmond

Set up:

1. Position Grandma token on the Starting Point of the Food Forest Board.
2. Arrange the Recipe Basket, Food Sharing Basket and Compost Basket on the board.
3. Distribute the Veggies tokens on the map.
4. Read the recipe you will prepare for Grandma to discover what ingredients you need to pick together from the Food Forest.

How to play:

On your turn, roll the Event Dice. This can have three different outcomes:

- Bug Alarm! A pest arrives in the garden and eats 1 vegetable.
- Grandma is coming: Grandma will move forward 1 step.
- Pick 1 item: the player picks 1 item from the Food Forest and places it in the common basket of the recipe.

If the outcome of the event dice was Bug Alarm OR Pick 1 Item, roll the Crop Dice. This will tell you which crop to pick from the Food Forest to add to your Recipe Basket or which crop will need to go to waste because of the bug and be put into the Compost Bin. If you pick a crop that you do not need for your recipe (i.e. you need one Lettuce and you already have it in your Recipe Basket) you can put it in the Community Basket.

If you have 3 items in the Community Basket you can trade them for a item of your choice!

If you have 5 items in the Compost, you can use the compost to plant 1 new crop out of the crops that you had in the compost. The other 4 items disappear from the game.

How to win:

To win the game, you need to collect all the ingredients to prepare the recipe before Grandma arrives at your house. The game is lost if grandma arrives before you collect what you need for the recipe, or if you are unable to complete the recipe.

Figure 21: First iteration of the board game and pieces

6.4. Game testing

Neighbour's Day Excursion

In September 2023, we received an invitation to collaborate with the Rijnvliet Neighbourhood Day. This is an event where the residents were introduced and invited to different community activities which are related to the food forest, such as vendors selling tea and jam made from the fruits and honey from the forest, arts-and-crafts workshop teaching people sustainable housekeeping tips, or second-hand clothing and items vendors. We participated with the first version of our boardgame, where we introduced and test-played the game with families and kids. While attempting to pique their interest about the food forest through a more visual and exciting manner with the colourful figurines, cards, and boards, we observed how user-friendly and interactive the game was for its players.

Figure 22: Children complete the evaluation form for the game

We recorded the playing duration, winning/losing streak, level of distraction, and how the child interacts with the elements of the game. We also prepared a survey to get feedback from the players, including questions about the difficulty of the game, what they learnt after, and how they felt throughout the game. Our booth was quite a success, attracting many attendees, and we got some valuable insights. We designed a simple feedback form that kids could complete, even if they had limited literacy skills.

From the feedback and testing we learned that the allowed number of turns were too few compared to the complexity or size of the mission, or that the rules can be overwhelming for some kids. From this feedback, we were able improve the game design. Further, the event was a chance for us to meet and discuss with other stakeholders of the project and spread the word about our product. We were really satisfied to see our game get showcased and played by the community residents for the first time.

Figure 23: Testing the game at Rijnvliet's Neighbourhood Day

Adapting

The current state of the board is supposed to have features resembling the Utrecht food forest (the river, the wooden bridge, the game area with the water well, the glass cathedral). The central path with big stones for grandma going towards the house, the different crops growing around. The initial idea was that the crops used in the game are represented "planted" for kids to recognise what they look like in the field, and the crops they harvest in the basket look like what they actually cook.

We are currently working with a designer to professionalise and finalise the game (both the board game and print-and-play versions).

Figure 24: Draft sketch of the re-designed game board
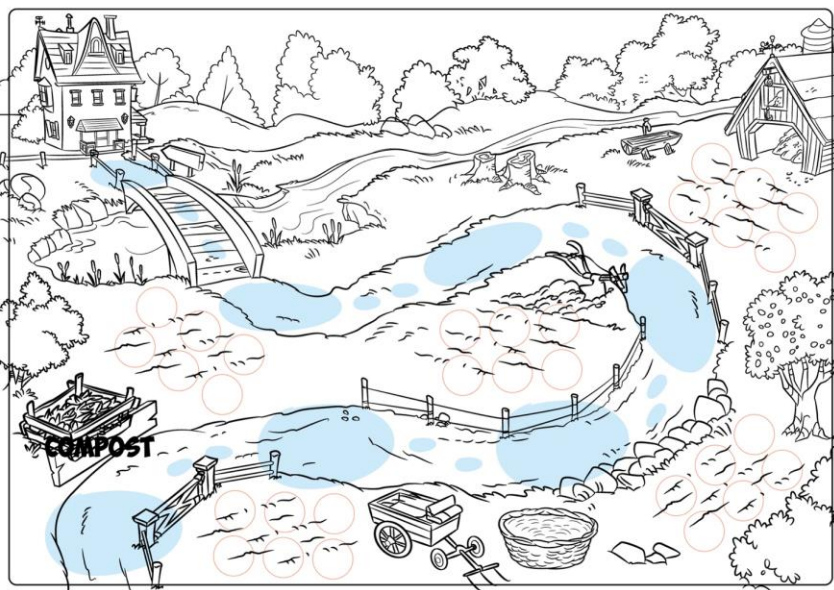
Figure 25: Final game board design
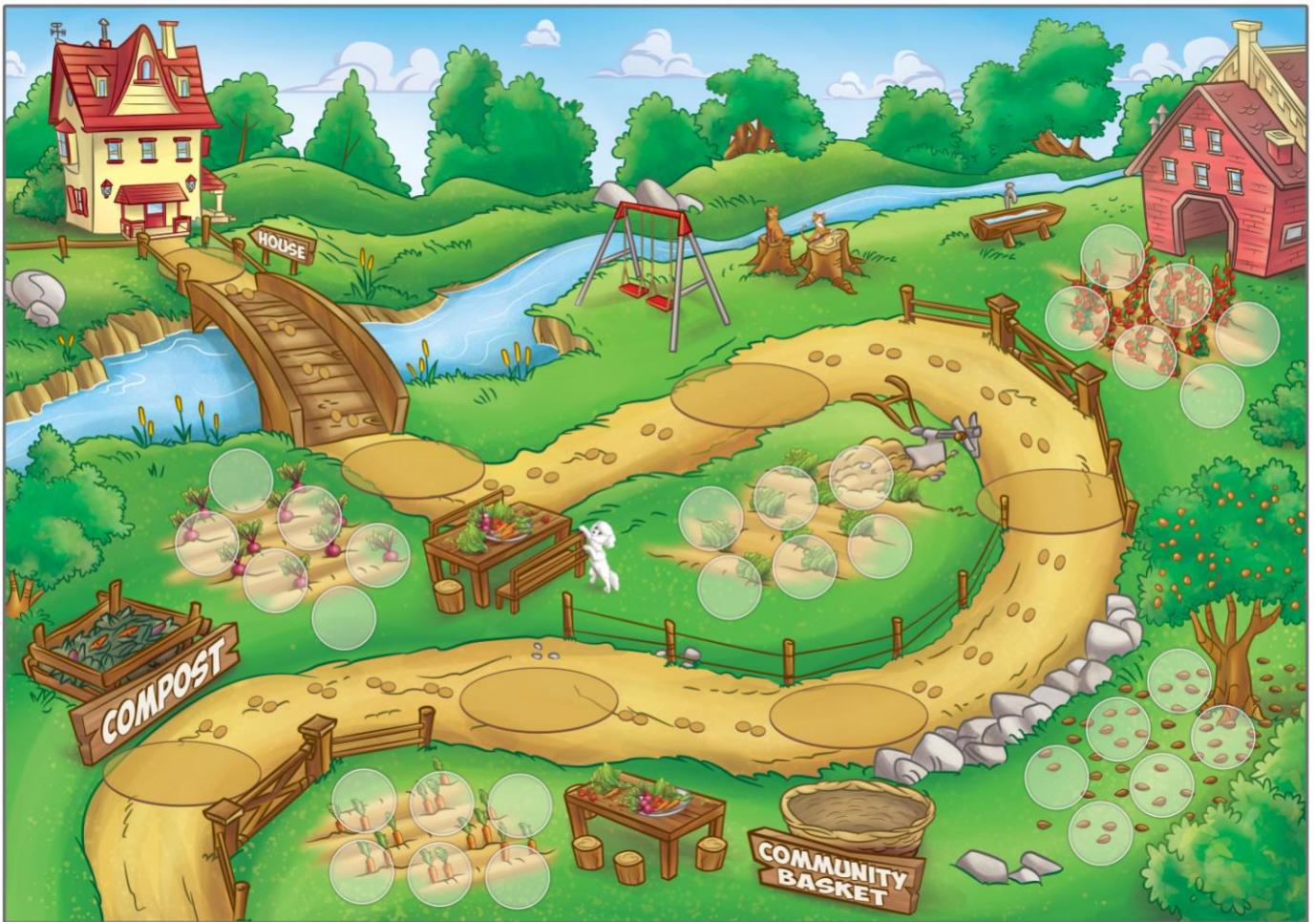
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Figure 26: Tokens, recipe cards and dice from the print and play version of the game

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7.Data collection

In this section we summarize the main elements of data collection that informed the game design

7.1 Let's eat

The first of the games to be designed addressed food sharing practices associated with eating and cooking together. Alongside the data collected during the kick-off game co-creation event, we also looked at other data that would help to develop the game: academic literature, policy documents about edible cities, geographical data, and street interviews.

The inspiration for the first game was the edible neighbourhood of Rijnvliet.

What is Rijnvliet?

Rijnvliet is a newly built, edible, neighbourhood in Utrecht with a food forest located next to it, a captivating feature that sets the district apart (Gemeente Utrecht, n.d.). The edible neighbourhood's public spaces host a diversity of edible plants and trees. The plants and trees not only provide the human residents with food, but also provide animals and other plants with food. Examples of crops growing in Rijnvliet are pears, various berries, leafy greens, carrots and a variety of nuts.

One challenge that Rijnvliet faces is engaging new inhabitants in actively participating and collaborating in the food forest. The land on which the neighbourhood is built was previously used for agriculture, so when the municipality built this new neighbourhood, it was decided with the former neighbours to pay homage to this history by incorporating a food forest. However, the food forest does not seem to be as relevant to newcomers in the area, therefore steps have to be taken to engage people with their neighbourhood. This is particularly important given that in the long term, it is anticipated that the inhabitants of Rijnvliet may need to co-manage food forest and all the other crops, trees and bushes themselves. Therefore, there was a need for the current project and game to focus on engaging the inhabitants in the life of the food forest.

Interviews on the street

In September 2023, the **CULTIVATE** project hosted a Lab&Kitchen in the neighbourhood, just on perimeter of the food forest in Rijnvliet. The Lab&Kitchen is a citizen engagement strategy, developed by the artist collective CascoLand. The Lab&Kitchen was in place for almost a month and ensured people were presented every day throughout the whole month to pick, cook and preserve food from the food forest together with local residents in order to get to know each other and the edible residential area better. They spoke to the food forest rangers, the artists of the Metaal Kathedraal, a cultural centre nearby Rijnvliet, and built "sharing cabinets" to start a real BuurtSuper where residents can share the neighborhood's harvest, pickled products and recipes with each other.

Figure 27: Sharing food at the Lab&Kitchen

We used the opportunity of the Lab&Kitchen to speak to the residents of Rijnvliet which, unlike the target group we reached during the workshop, are not yet active in food sharing. We reached them during the pizza evenings where the pizzas were made from ingredients found in the food forest and shared free of charge with neighbours.

We asked them what kind of game they might want to play. Contrary to what was collected during the "participants passport" exercise used during the first co-creation workshop, citizens of Rijnvliet stated that they would like to play a game that would help them gain knowledge about the plants that grow in their environment and what to do with them. Besides this, they expressed that they were indeed willing to play games as they live rather far away from the public facilities of a city. When the day gets dark, they usually stay indoors playing with their family. The question for us was: would they be interested in playing with neighbours?

At the end of the month, Cascoland organized a collective moment in the Sassefraslaan where local residents and Cascolanders prepared special dishes at nine tables with the yields from the neighbourhood and where everyone could come and taste. As the sun slowly set, residents, creatives, scientists and policymakers met and discussed the maintenance and future of this special, edible neighbourhood. The recipes from that day were bundled together with those of residents in 'Rijnvliet Recipes', the start of a growing neighbourhood cookbook.

Figure 28: Recipe book from Rijnvliet

With this game we really wanted to support and continue the work of Lab&Kitchen by representing the "sharing cabinets" in the game (see gameboard) and inspirational sharing recipes (long lasting) to stimulate the use of the edible neighborhood and cabinets in the real life. Besides this we would like to add recipes to the fledgling "Rijnvliet Recipes" neighborhood cookbook.

To further support the development of the game, we examined documents and engaged a few other sources of data.

First there was the ambition document for an 'Edible residential area Rijnvliet' developed by Felixx, a landscape architecture office. Felixx designed the edible neighbourhood of Rijnvliet and its food forest. In 2016, they wrote an ambition document in cooperation with De Zwarte 53on den Æ – Food Forestry Development and the municipality of Utrecht. It describes opportunities for the integration of the concept of Urban Food Forestry in the public space of the new neighbourhood Rijnvliet. This concept has been developed together with the inhabitants' group 'De Groene Longen van Rijnvliet' and the 'Metaal Kathedraal' cultural centre, both people who already lived and worked in the surrounding areas of the neighbourhood Rijnvliet. Within this document we see the plans for different streets to grow different edible plants depending on their position in relation to sun, wind and water conditions. Each street was designed to have its own ecosystem and identity. We took inspiration from this document in the design our gameboard.

Figure 29: Edible plants from ambition document of landscape architect FELIXX.

We also made us of territorial data made available by the Municipality of Utrecht about the edible trees of Rijnvliet and other trees in the city. We used this data to expand our knowledge about the neighbourhood and to enhance realism when creating the game. See: https://gu-geo.maps.arcgis.com/apps/webappviewer/index.html?id=bc75ae886d3d4fae8c7912cd4505136d

Figure 30: Neighbourhood edible tree map
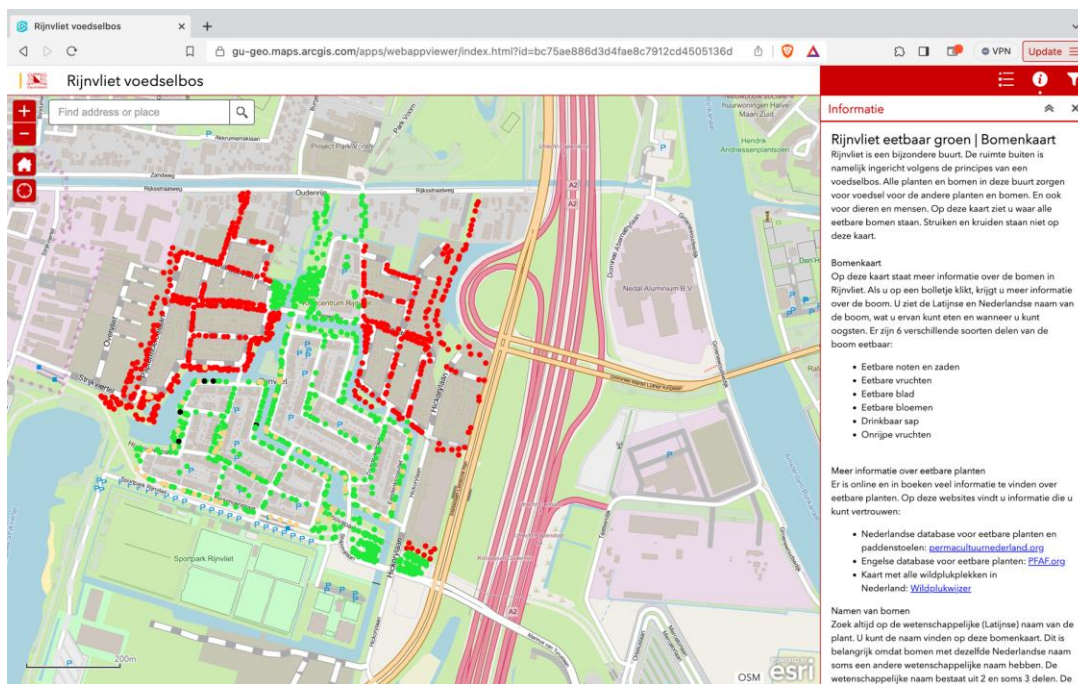
Inspiration

Interesting collaborative and skilful learning mechanisms from inspirational games and artworks:

"Hanabi": In this game players are working towards a common goal, make the best fire-work! To achieve that, they must give each other hints, as players don't see their own cards. It's a fun game even though it's not competitive. This "hint" idea We wanted to adapt the mechanic of giving hints to other players to our game.

"Dinner for tired and busy people": This is a real time game, designed by Jana Romanova. During an evening, several important questions circulating around why we are so busy and tired were posed to the participants in an effort to finally resolve them. As tired & busy people, participants were able to choose a question they can deeply relate to and share their experience with others who feel the same. By the end of the evening, the answer to their question was served to them in the form of a dish someone cooked for them, while they were cooking an answer to someone else's question. For our game we got inspired by the "real aspect" of this game, cooking as a tool to learn new skills, should be included.

For the design of the format of the game, we looked at the work of Superflux, an artist collective designing interactive installations to discuss uncertain futures. The one installation that spoke to us was *"Refugee for resurgence",* a dinner table for humans and non-humans.

We needed one more inspirational game, one that will teach us about story telling. We liked *"Amazing Tales"* because it really stimulates your mind to tell stories by making a script defined sometimes by a dice. Even if we didn't want to focus the game only to the story telling, we still found it useful to have some ready-made questions to discuss during the dinner. This was for us a reference to look at.

7.2 Common Ground

The second game prototype builds on the experiences of an organization that manages urban gardening in the city: Utrecht Natuurlijk. Together, through a workshop, it was decided to address the theme of growing together. The key issues emerging at the workshop are access to land (therefore, land is also a defining feature in the game), garden management (therefore the game entails a decision on different management styles depending on whether players want to give more importance to the harvest or the biodiversity of the garden), continuity of the garden and volunteer engagement (therefore the game entails some mechanisms representing this).

The format of the game is a board game, the playing board is modelled using maps of existing garden sites, we picked 3 Utrecht Natuurlijk locations for several reasons, this represents the reality of urban gardening as described by workshop participants.

Design Lab Agroforestry
The research of Design Lab Agroforestry about different types of agroforestry landscapes gave us some inspiration when applied in smaller scale community gardens. Because garden management is one of the important aspects of the game, we could let players design their garden. We could use these landscapes mentioned below in the game to add biodiversity and more layered landscape to the garden. We could also give each type of landscape a score, depending on which garden management the players have chosen from these typologies of landscapes, each contains an amount of +B (biodiversity) or +O (harvest) score system. (Score system still in de making)

-living fences	+B+B+B
-gardening in containers	+O
-row cultivation with mixed crops	+B+B+O
-Insect hotel in a flowery lawn	+B+B+O
-pixel crops	+B+O+O
-foodpark	+B+B+O+O
-greenhouse	+O+O
-food forest	+B+B+B+O
-pond	+B+B
-mixed soil use	+B+O
-row cultivation with woody plants	+B+O

Biodynamic agriculture & nutrition magazine
To understand what biodynamic gardening is and what kind of activities they mostly do, we looked at the national organisation of Biodynamic gardeners' magazine. They publish a yearly magazine with interviews and articles ranging from:

-the importance of size when setting up a community garden: max 2ha
-making biodynamic preparation
-biodynamic cooking
-how to deal with your neighbours about wind and pesticides

We might or might not use this information in the game.

Manual for setting up a neighbourhood vegetable garden (WUR)
Agricultural Research Service Foundation (DLO). Publication of Practical Research Plant & Environment, part of Wageningen UR developed a brochure commissioned by the Kenniskring Buurtmoestuinen Almere and the Science Shop of Wageningen UR (www.wageningenur.nl/ science shop): A manual for setting up a neighbourhood vegetable garden. This brochure has lots of personal tips not only on how to set it up, also how to maintain and ensure the continuity of the vegetable garden with tips such as giving appreciation and recognition to volunteers:

- Give compliments.
- Give certain people certain responsibilities.
- Offer facilities, such as work materials.
- Appreciate the qualities of this one person.
- Organize activities.

We looked at this document because one of the results of the co-creation workshops was about ways to assure continuity of the garden.

How natural and sustainable is your vegetable garden? (university of Ghent)
In this magazine we found very useful information about three 'ideal types' of vegetable garden management:

1. Permaculture gardens, with a continuously covered soil, minimal soil cultivation and imitation of the natural situation.
2. Ecological vegetable gardens, with as few external inputs as possible.
3. Vegetable gardens that make use of fertilizers, but without pesticides.

As we test the game, we continue to refine these ideal types and the labels we ascribe to them. We note that these labels might need to be adapted to different contexts.

Territorial data (maps)

As noted above, three of the ten Utrecht Natuurlijk locations were chosen as specific inspiration for game board templates. They were selected because they are "vegetable gardens" (not petting zoos as the others) with different sizes and surroundings. We must stress that surroundings are important when starting a community garden, knowing if the area feels safe for volunteers to go to, if there are enough schools and other community organisations that might be interested to be involved with, or the existing nature (thickets and trees) surrounding the garden might change the

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way initiators choose their strategy when starting a garden. Google Earth was used to further define the three gameboards representing the gardens.

Inspiration

The game design was inspired by a number of games and art works.

"Permaculturedesign.earth design deck"

This game has beautiful design elements for a permaculture garden (or any garden). The mechanics are free, you decide with your team. It's about designing together.

"Community garden the board game (TESSA)"

This game has very simple mechanics but very beautiful design. You must strategically think about getting enough resources before you start planting. It contains lots of crops to plant with beautiful drawings. You choose each turn how you want to spend your turn: finding resources, trading, or planting. To do so, you get to choose from 4 cards of the deck each time. We found adapting the mechanic in a more cooperative game to be useful in the game design.

"Play the city"

Play the City is a serious game company making games for spatial planning. Their games are very urban sensitive, meaning surroundings should affect actions of players. Informing players of complex issues in an accessible playful way lead players choose wisely their actions.

"Connected seeds"

The Connected Seeds Library is a community seed library that lives at Spitalfields City Farm. It was established by researchers at Queen Mary University of London in collaboration with staff and volunteers at the farm, as part of a research project exploring how digital technology can support more sustainable food growing in the city. We loved the personal identity of each gardener in this library. We'd like to include this in our gardens, still we would not know how.

7.3. Future Food Sharing

The third game connects the three themes of food sharing with a desire from participants in the co-design sessions to have a game that addresses the future of food systems. For this game we made use of the data described in sections above, but also turned to other outcomes of the CULTIVATE project (e.g. Food Sharing Dictionary; Library of Citizen Engagement, Menu of Good Governance). Given that work is still underway in the project, this game remains the least developed.

Inspiration

The game is inspired by existing card games such as *"Beautiful Trouble",* Beautiful Trouble is a strategy deck that includes key strategies and tactics that have inspired civic engagements. The deck is meant to enhance creativity and facilitate action as players learn, share, create together.

8. Conclusion and take away

The process of game co-creation has led to 3 serious game prototypes to facilitate citizen engagement in food sharing. It has also supported important learning and led to some key decisions and conclusions. To summarize:

1. It became evident from the co-design workshops that including the topic of "surplus food redistribution" in each game was important. For instance, in Game #1, players must think of recipes to preserve and share surplus food from trees and plants in the neighbourhood sharing cabinets. This reflects not only the large number of initiatives in this space but also points to the transversal and overlapping nature of these themes.

2. More than 3 co-creation moments are needed to sharpen the questions of the games and improve its playability, therefore:
> a. We are gathering in May 2024 with the youth of Rijnvliet to identify which games can we play with younger players and how to adapt them accordingly.

> b. We will gather with the stakeholders of the new neighbourhood in development in Utrecht – Cartesius – to discuss the organization of a game session about the future of food sharing.

3. We would like to keep in mind "inclusion" in our games. We need to consider how to reach people who are not yet interested in, or who cannot yet access food sharing. We will keep focusing on this in the coming months and try to identify ways to better design games and game sessions for this purpose.

4. A print-and-play version of each game should be made available. As well:
> a. Game #1 will also have a "delux" edition game box that we will give to the neighbourhood of Rijnvliet. This box will include the set of cards, gameboard and game elements representing a table and it's eating tools.

> b. Game #3 will also have a simple digital component so that it can be played easily online and can link to key outcomes of the project directly (e.g. Library of Citizen Engagement, Menu of Good Governance, Food Sharing Dictionary).

5. More than one designer is needed to help improve the games, this way each game will have its own identity. After delivering this report we will start our collaboration with illustrators and designers to further refine the games.

6. We are organising game sessions for each of the games at the end of the process, not only to test the final version of the game with key stakeholders, but also to work towards a result. In the case of game #1: we aim to collect recipes for the recipe book that is being organized by CASCOLAND through the Lab&Kitchen event in Rijnvliet. In the case of game #3: we would like to link the outcomes of the game session to the developments of the new healthy district of Cartesius.

To conclude, while the game prototypes presented in this report have been co-created with key stakeholders in the municipality of Utrecht, the CULTIVATE project aims to increase the public awareness and knowledge of, as well as participation in (urban) food sharing initiatives across Europe. The games have thus been designed with the aim of being both relevant to local residents, and also applicable to wider contexts. In the replication phase of the CULTIVATE project these games will be tested by players in other European cities, and further refined. Next steps could also include develop a way of collecting data from game play and evaluating the effectiveness of the games.

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