Harvest Havoc:
The Battle for Sustenance

Course: FSE32306_2023_5
Date: 3 May 2024
Coach: Vera Bekkers
Course coordinator: Federico Andreotti

Authors:
Denise Baur [1463993]
Fanny Bourgeois [1345966]
Taco Van Gemert [1414291]
Ine Hikspoors [1320807]
Haochen Li [1363956]
Arjan Rijkenhuizen [1048681]

Table of content

Game concept

Game challenge – welcome to the battle of sustenance !

Many nations heavily rely on imported food to enjoy a diverse range of options at relatively low prices. However, this dependence also exposes them to heightened **vulnerability in times of conflicts** abroad. Such conflicts have the potential to disrupt a country's production capabilities and impede transportation routes, thereby diminishing its food supply. Consequently, this directly influences global market offerings and prices. Given the abrupt onset of these challenges, it becomes imperative to formulate strategies aimed at mitigating their impact on food security.

To shed light on this critical issue, players are invited to govern a fictious country and safeguard the food security of their populace amid looming conflicts. Beyond this individual objective, players also have the opportunity to assist other nations in meeting their food requirements, recognizing that some countries may encounter greater challenges based on their unique characteristics.

Through gameplay, players will gain a deeper understanding of the different possible impacts of conflicts on **food security** and **biodiversity**. They will experience how instability can disproportionately affect less stable or resource-deficient countries, while also recognizing the indirect consequences on the wealthier nations, notably through migration patterns.

Game characteristics

This serious game asks players to role-play and it includes an **asymmetric** component as different countries have different resources and requirements to feed their population. The players can decide to **cooperate** to help the more vulnerable players and to solve potential global challenges.

The schedule for a game session is as follows:

- Preparing the game: 5 minutes
- Introduction and instructions: 5 minutes
- Playing the game: 30 minutes
- Debriefing and Reflection: 10 minutes

For optimal gameplay, **3 to 6 players** are required, accompanied **by 1 facilitator and 3 observers**. The observers will make pictures, collect quotes and data regarding the steps each player makes.

While the game was initially developed with policymakers in mind, it also offers valuable insights for other stakeholders within the food system. Larger food companies, for instance, stand to benefit from understanding the potential ramifications of external conflicts on their supply chains. By contemplating strategies for scenarios where ingredient sourcing becomes compromised, companies can proactively mitigate risks and ensure continuity in their food production processes.

Setup

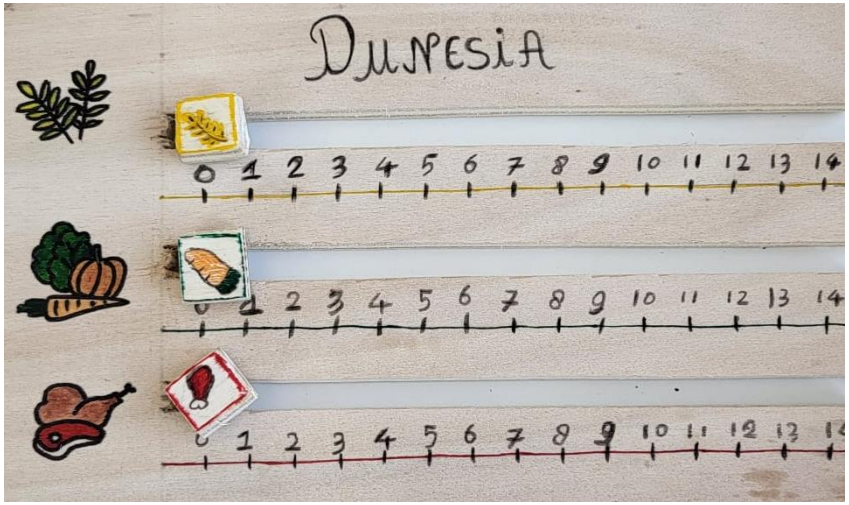
Game items

Game board: with 3 countries represented. Each country has a certain number of plots on the board that could provide grains, greens (fruits and vegetables) or livestock. Additionally, there are forest areas which could be transformed into farmland. On the board, there is also the World Trade Organization (WTO) in which the prices of the products will be visualised during the game.

Tokens:

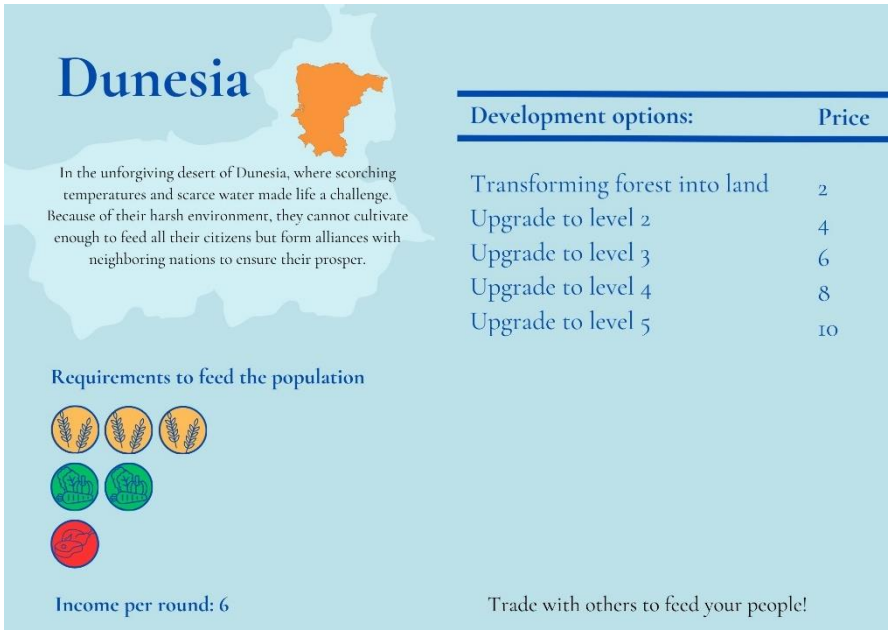
- Round iron tokens for money (distributed each round and the amount depend on settled value)
- Yellow coin for a grain unit
- Red coin for a livestock product unit
- Green coin for green unit (vegetables and fruits)

Wooden board: each country receives a wooden board on which the players are able to show the amount of production they have for each crop.



Dice: to show the current level of the field plots (one per plot) and one dice to role once at the beginning of the game.

Cards: every country has a card with a country description, the requirements to feed the population the country and the prices of the development options for the plots.



Scenario cards where the conflicts and their impacts are explained to the facilitator. The regular event cards are yellow. The events that only happen in certain situations are orange. For instance, if one country does not reach the food requirements or when all the forest has been converted into farmland.

Observer guides: explains what the observers need to do during the game (appendix 1).

Starting situation of each country

Initial parameters	Tropivia (based on Brazil)	Grainia (based on Ukraine)	Dunesia (based on Congo)
Amount of grain plots and the level of production	1 plot with level 5	2 plots with level 4	1 plot with level 1
Amount of livestock plots and the level of production	1 plot with level 5	0 plot	0 plot
Amount of green plots and the level of production	1 plot with level 4 and 1 plot with level 3	1 plot with level 2	1 plot with level 1
Forest plot	3	2	1
Income per round	10	8	6

Initial requirements to feed the population	Tropivia (based on Brazil)	Grainia (based on Ukraine)	Dunesia (based on Congo)
Amount of grains	9	6	3
Amount of livestock	3	2	1
Amount of greens	6	4	2

How to play

Main goal for the players: feed your population!

Ideally 1 team of 2 players will be assigned to 1 country. Each country starts with a **certain number of forest and field plots**. The field plots have different **level of production** leading to a higher or smaller production each round. In the beginning of each round, they will receive their **income** and **food resources** based on their amount of plots and the production level (e.g. 2 plots of grain with level 3, will provide 6 grain units). The level of production per plot can go from level 1 up to level 5.

When it is their turn to play, they can choose to:

- **Trade with the WTO**, which prices are fixed at the beginning of each round. They can sell their food resources for coins or buy them.
- **Trade with other players**.
- **Invest** in their **field plots upgrading** them to a higher level. Prices are exponential and fixed for the entire game (see profile country card).
- **Invest** transforming their **forest plot into farmland.**
- **Store** their food production and money for the next round.
- **Change their food plot type for another**. Note that in this case, they will have start from the level one of production the new type of production.

At the end of each round every player needs to feed their population by giving the food requirements (differing per country) to the facilitator.

Scenario for each round

First round: the WTO prices start at 1 unit of money for every food resource. The prices will be announced at the beginning of each round. After this the players are invited to roll the dice to determine who will start to trade with the others. The team that gets the highest number will start, then the other team and so on, clockwise. The players will receive their production, trade, potentially develop and give the food requirements to the facilitator. They can directly add the food resources on their country profile card to facilitate the visualisation of what they still need to acquire to fulfil their food requirements.

Second round: the first conflict will impact the WTO prices. By rolling the dice it will be decided which unit will keep a market price of 1 unit of money and which will increase to two units of money. The rest stays the same as the first round.

Third round: the conflict continues having an influence on the game but now every country receives half of their income for this round. The rest stays the same as the first round.

Fourth round: a new conflict happens and each plot produces one less unit of food. For instance a level 3 plot of grains produces only 2 grain units for this round. The rest stays the same as the first round.

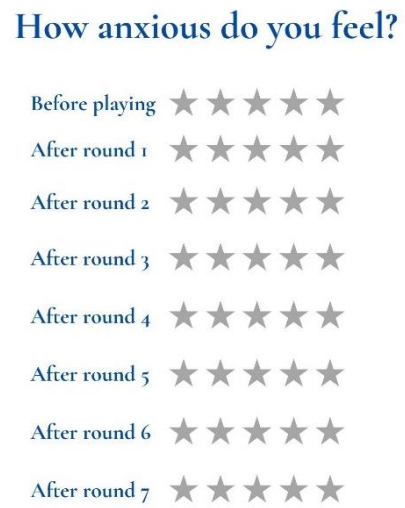
Fifth round: The prices go up and a subsidy needs to be provided to the residents. For instance Dunesia needs to pay 1 extra money unit. The rest stays the same as the first round.

During the rounds the events might be replaced by special event cards. This depends on the way the players perform. Notably events are for example and environmental crises if too many forest are cut down, or refugees in case Dunesia does not manage to meet their requirements

Debriefing

The debriefing consists of the following questions which will be asked by the facilitator and/or observers. To help the players in the discussion process, the data collected by the observers will be used when it is relevant. The type and order of questions are based on the method recommended by the group ComMod (Hassenforder et al., 2020).

1. How are you **feeling** now? And how did you feel while playing? Any frustrations as individuals players and as a team?
   To answer the question more easily a card is developed on which the players can record how anxious they felt for meeting the requirements for their population.



2. A. Which **strategies** did you choose? B. Would you say you were more collaborating, or selfish? C. Would you play any different when playing again? D. Key moment when it changed (strategy and objective)?
3. How do you think **biodiversity** were impacted by the conflicts? Extension VS intensification, what did you choose? Why?
4. What did you **learn** through this game? What do you think was our **objective** for making you play?
5. How **realistic** is the game? Any **improvements** that we could make?

Behind the game

Challenge definition

Food security is a goal that every country wants to achieve and is part of the 17 Sustainable Development Goals (Sustainable Development Goals, n.d.). The **interconnection** between countries allows to compensate the **limitations** of some countries in the production and the food availability. This relationship and food security are however highly influenced by **conflicts**. Conflicts can destabilize food production, distribution networks, and markets, leading to food shortages, price spikes, and even famine. These disruptions worsen existing **vulnerabilities**, particularly in regions already facing food insecurity due to poverty, environmental degradation, or other factors (FAO, IFAD, UNICEF, WFP and WHO, 2023).

The difficulties of supplying enough food to each country, while conflicts are happening, is represented in the game as different production opportunities of the countries and as new events happening at each round.

In this game we try to mimic the difficulties of ensuring food security , especially the most vulnerable countries, during conflict. This is done first of all by the inequal distribution of resources between the three countries within the game. While all countries can meet their requirements without problems in the base situation, the various conflicts that happen throughout the game show the way conflict disproportionally affects certain countries.

The three **countries** within the game and their characteristics are inspired by the countries of Brazil, Ukraine and Congo but adjusted a bit for gamification purposes.

Different **mechanisms of conflicts** and impacts on the worlds were studied to make the game more realistic, and the various scenarios were based on these(Alexander et al., 2023; Sesay, 2004).

Based on the EAT-lancet recommendations and the current diet (Willett et al.,2019), we chose to focus on **three main food types**: fruits and vegetables, grains and animal sourced protein.

The **WTO** is the main organisation that is facilitating the trades agreements between countries (Narlika, 2005). It covers 98% of the world trades. Ministries and ambassador delegates from 164 countries are part of this organisation. They promote a fairer and more competitive market which aims to help worldwide food security (WTO, 2024). That's why we chose to introduce it in the game as a central actor on the board.

Actors and Resources

Looking at the reality of our current food system, it is **globalised** to the point where the actors taking part in handling the food that reaches our table are with many and are spread far apart. This means our **food sovereignty is limited** and conflicts that we do not take part in can still affect the prices and availability of our food (Holleman et al., 2017). The actors influencing food security are **farmers**, **policy makers**, **retailers**, **upstream facilitators** like fertilizer producers and more (Duncan &,Margulis, 2016). In some regions, those can be grouped together when they are part of the same cultural identity and are aware of each other's struggles. There are endless amounts of resources these actors need to be able to provide food since the value chains of the products have extended very wide (Amanor, 2019). The food security build up from several factors: the population sets the requirements; the available agricultural land; and the investment capabilities (Premanandh, 2011). Each region could differentiate and specialise in certain food groups, meaning conflicts disproportionally affect their food security. The closing of the food insecurity gap presently requires very regionally specific strategies (Briones Alonso et al., 2018).

In the game we are limiting the complexity by using a **simplified amount of food groups** (grains, vegetables/fruits and protein products) in addition to money as a trading and development tool which simplifies most resources needed to produce the food groups. The actors are grouped together by cultural identity and their regional proximity, resulting in different countries with different population, available land and investment capabilities. This should result in different strategies and perspectives when playing which is our main objective (Figure 1).

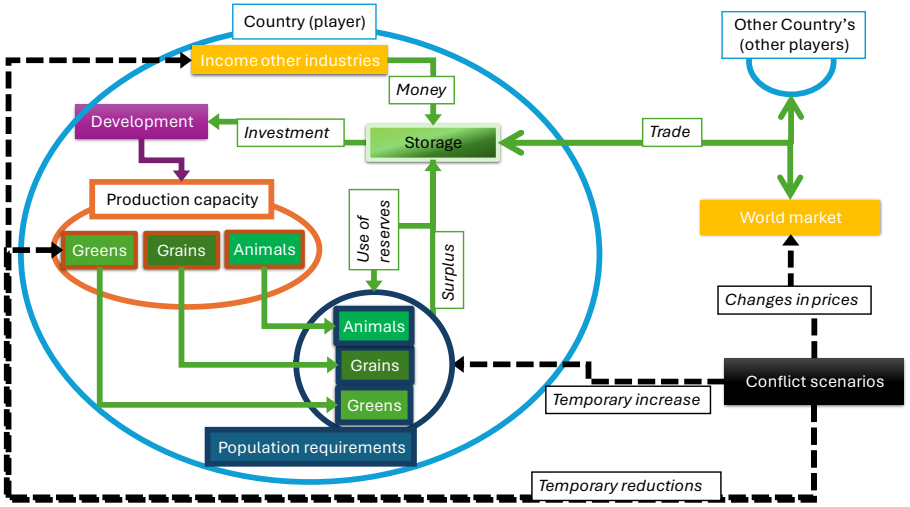


Figure 1: Interactions visualised from point of view of 1 player, what processes go on insides how interactions are possible with others, resources are indicated in different shades of green. Staring from income at the top, they can use it to develop their production capacity, production of resources is first used to meet the requirements of the people in the country and any surplus can be stored in addition to the money not used in a turn. All things in storage can be used to trade with the world market using the current prices indicated on the board. This will change over turns due to conflicts in the rest of the world. These conflicts can also affect production and requirements of countries.

Dynamics and interactions

The social ecological system the game is situated in is highly simplified with only 3 food groups together indicating the requirements of the population. In player receive food and use for population and generally some money. The main recourse that can be used in various ways Is money visualized in figure 2. Those are also the possible strategies a player can use to play their country.

The objectives for the players are not set in stone since they can be seen more as suggestions. In reality the system does not collapse all at once if threshold has been crossed but there are signs and feedback on the population indicating danger and problems if the current management is continued, those risks are also indicated with the strategies in figure 2. The requirements of the population are based on keeping the population stable, this is given a prominent role in the game since it is also currently the most prominent objective in global discourse. When this requirement is not met, the feedback introduces an extra scenario based on problems arising when the current population becomes unhappy and decides to emigrate, the requirements of other countries will go up.

In the same way as the population requirements the land use is optional, and only when the threshold of cutdown forest has been reached a feedback loop is activated of a decreased production on those field that used to be forest.

In this way players experience that conflict from outside the regions affects their decision making and might force them to make hard decisions, with the objectives they can choose themselves. By exploring different options and their potential impact on food security, and simulating real-world scenarios, players can gain insights into the effectiveness of different interventions and policies.

The game is balanced in a way that at least 1 bad feedback loop is activated. Depending on the players actions this might be refugees, climate issues, or debt (which right now is only possible to be caused by lending from other players, or decreased biodiversity).

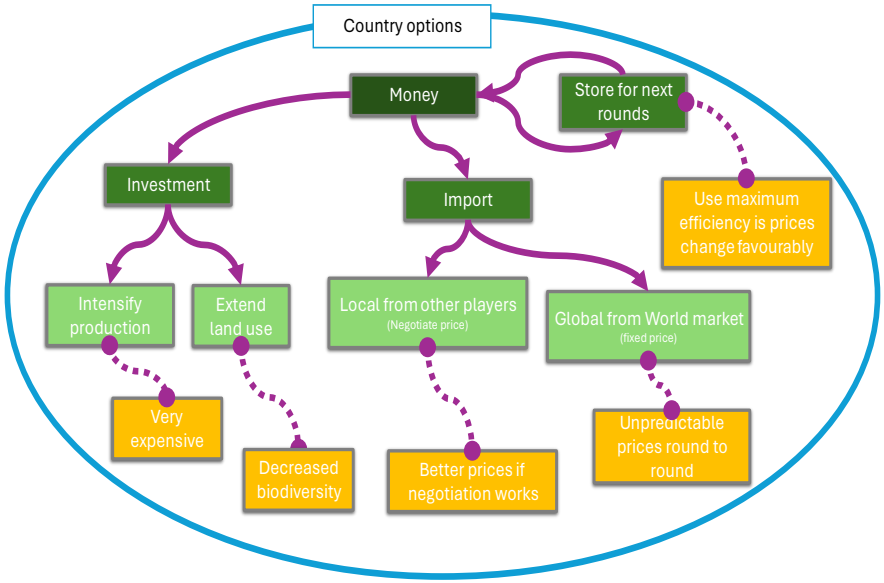


Figure 2: The choices for each player that can be made depending on their own objectives. Money (dark green) is used to facilitate the choice and can be used for the green options which are subdivided in strategies (light green), trade offs corresponding with choices are in yellow.

Future research

This game allows players to experience the complexities of keeping food security when facing conflicts. Through interactive storytelling and gameplay mechanics, players can develop empathy for the individuals and communities affected by food insecurity in conflicts. Exploring different options and their potential impact on food security, and simulating real-world scenarios, players **can gain insights into the effectiveness of different interventions.**

As many models, this game is a **simplification of reality** and there are aspects that are not implemented or simplified. For instance, each country can potentially produce all the three food types (vegetables, livestock and grains). This would not be possible in the real word, some countries just cannot produce everything they need like Quatar for instance (Amhamed et al., 2023). Also, the value of the resources is not realistic, each resource is the same price at the beginning. This can be implemented in the game by giving **limitations to each country** on what they can produce based on the climate or the access to agricultural inputs, like fertilizer and water.

Another assumption in the game is that all countries follow the **same diet**. However, rich countries consume usually more meat than poor countries, while other countries rely more on other food (Delgado, 2003). Therefore, **food requirements could be changed**, taking into account this diversity in terms of diet. More options could be given to each player to, for example, substitute one livestock with two vegetables.

For the duration of the game, the **population size** remains the same except in the scenario with refugees. Thus, we could include population growth every few rounds to be more realistic.

To increase the **complexity** of food distribution during conflict condition, more scenario could be added.

References

Alexander, P., Arneth, A., Henry, R., Maire, J., Rabin, S., & Rounsevell, M. D. A. (2023). High energy and fertilizer prices are more damaging than food export curtailment from Ukraine and Russia for food prices, health and the environment. Nature Food, 4(1),

Amanor, K. S. (2019). Global Value Chains and Agribusiness in Africa: Upgrading or Capturing Smallholder Production? *Agrarian South: Journal of Political Economy*, *8*(1–2), 30–63. https://doi.org/10.1177/2277976019838144

Amhamed, A., Genidi, N., Abotaleb, A., Sodiq, A., Abdullatif, Y. M., Hushari, M., & Al-Kuwari, M. (2023). Food security strategy to enhance food self-sufficiency and overcome international food supply chain crisis: the state of Qatar as a case study. Green Technology, Resilience and Sustainability, 3(1). https://doi.org/10.1007/s44173-023-00012-8

Briones Alonso, E., Cockx, L., & Swinnen, J. (2018). Culture and food security. *Global Food Security*, *17*, 113–127. https://doi.org/10.1016/j.gfs.2018.02.002

Delgado, C. L. (2003). Rising consumption of meat and milk in developing countries has created a new food revolution. the Journal of Nutrition/the Journal of Nutrition, 133(11), 3907S-3910S. https://doi.org/10.1093/jn/133.11.3907s

Duncan, J., & Margulis, M. (2016). *Global Food Security Governance* (pp. 270–295). https://doi.org/10.4337/9781803921044.ch55

FAO, IFAD, UNICEF, WFP and WHO. 2023. The State of Food Security and Nutrition in the World 2023. Urbanization, agrifood systems transformation and healthy diets across the rural–urban continuum. Rome, FAO. https://doi.org/10.4060/cc3017en

Hassenforder E., Dray A., Daré W's. 2020. Manuel d'observation des jeux sérieux. CIRAD, Montpellier, 68 p. Hassenforder_2020_ComMod-Manuel-Observation-Jeux-Sérieux.pdf

Holleman, C., Jackson, J., Sánchez, M. V., & Vos, R. (Eds.). (2017). *Sowing the seeds of peace for food security. Disentangling the nexus between conflict, food security and peace*.

Narlikar, A. (2005). The World Trade Organization: a very short introduction (Vol. 135). Oxford University Press, USA. https://www.wto.org/

Premanandh, J. (2011). Factors affecting food security and contribution of modern technologies in food sustainability. *Journal of the Science of Food and Agriculture*, *91*(15), 2707–2714. https://doi.org/10.1002/jsfa.4666

Sesay, F. L. (2004). Conflict in neighbouring (developing) countries: Direct and indirect effects on economic growth (Working Paper 68). TIGER Working Paper Series.

Sustainable development goals. (n.d.). UNDP. https://www.undp.org/sustainable-development-goals

Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., ... & Murray, C. J. (2019). Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. The lancet, 393(10170), 447-492.

Appendix

Appendix 1: Observer guides

OBSERVER GUIDES

3 observers are required to take notes during the game:

One person in charge of the **quantitative data**. He/she will fill the excel sheet while playing (See below a screenshot of how the excel sheet looks like). It is about reporting:

- the resources (money and food) per team each round.
- the number of trades and agreements per team.
- the number of forest plot left after each round.

2 persons will be focused on taking notes of the **qualitative data**. This means:

- the verbatim (feeling, anxiousness, decisions, arguments).
- the position of the players (help others, accumulate resources, take a lot of space in the conversation, convince other players...).
- how trades and agreements are made.
- If players discuss about the preservation of forest plot and the intensification/extensification.

Note that the data collected can be used in the **debriefing** to help players reflect on the game. All the chosen indicators have been carefully chosen to lead the players to reach the learning goals of the game.

Appendix 2: Game design process

Objective of the serious game

This initial part was difficult to define initially, but once we found the idea we didn't change it anymore. So, throughout the designing process the challenge and the objective of the game didn't change, we wanted that the players understand the difficulties of planning and food secure everyone in a war environment.

Objective of the players

To identify the objective of the single player of the game we had first to agree on few aspects. First, the idea was to play the conflict in one country and to have multiple stakeholders to have an impact in the decision of one country and how to collaborate to sustain the population. However, we soon agreed that the international interaction would represent better the conflict scenario and multiple aspects and difficulties of different countries could be included. So, we decided to play on an international level. Another aspect was the identification of the stakeholders, where initially we wanted to include several for each country, so to have policy maker, NGO and farmers as actor for one country and so to have included also the internal interaction of a country. But we soon realized it was not a good idea since it might make the game more complex. Therefore, we decided to have just one stakeholder per country that would represent it at best. We all agreed that the policy maker would be the best option, as they have higher power compared to for example farmers, and they usually have a good overview of the country needs and activities.

Once we establisced that we defined the objective of each player which is to assure in each round that the population is fed, and they are food secure.

Actors

Initially we identified as actors six different countries and the world market. The different countries where meat to represent different conditions and difficulties. We referred to six countries that are real and for different reasons:

- Brazil: high population, and high production, middle income
- Argentina: similar to Brazil, but less production
- Nederland: small population, middle income and production.
- Quatar: small population, high income and very low production.
- Ukraine: medium population and income, but high production of one specific product
- Congo: high population, low production and low income.

It is interesting to have all these multiple countries, but it would make the game more complicated and to have an overview of each country on the game would then be complicated, so we narrowed down the number of countries to three: Brazil, Ukraine and Congo. These three are good representatives of real countries and they are very different so more aspects of the food security can be shown.

An additional actor is the world market. This actor is not played by external players, but from the facilitators, however, is still an actor in the food market. As representative of real world market we chose the WTO, as it is the main organisation that is facilitating the trades agreements between countries (Narlika, 2005).

Resources

The initial idea for resources was to have food, money and fertilizer. But we soon realized, that it would be important to represent the different countries capacities to produce certain type of food. Additionally, we saw the necessity to represent the different food needs of the population. So, the food was then separated into proteins, vegetables and grains. Fertilizer was one of the resources, that we initially wanted to add to also represent the agricultural inputs that have an impact on the efficiency and the amount of food that can be produced. However, we decided to leave it out, as there are potentially many essential factors that determine the level of production.

Dynamics and Interactions

This one was the most difficult part to decide, and many changes were made contemporaneously. First decision that we took was that the players could not have an influence on the existing wars. So, the moves that they would take would not cause or reduce the conflicts. Another decision was to allow player to trade with each other freely, so any options are excepted. The only fixed price is the one offered by the World Market.

The food and money exchange follow the classical market dynamics. With the money that you have you can buy the different resources or invest in the “production plots”.

To represent the different production potential of each country and also to include the environmental aspect we introduced the “production or natural plots”, which are area of production and area of forest or natural land. This way we could include also the effects of conflicts on the natural area and the different production opportunities of the different countries.

Initially we wanted to introduce the conflict scenarios as cards that randomly each player receives and so each country would be affected by

a conflict differently. However, to reduce the random factors, we decided to have one scenario per round, decided by the facilitator, and that affects all at the same way and time. The food and money was additionally regulated, by the conflict scenario at the beginning of each round. So, beside the main transaction between the countries, the owned resources where regulated by the scenarios.

Further research

The future research changed based on what we could include in the game and which idea we had to give up. Many more interaction and characteristics could be added to the game (see section Future Research) and to each country to make it more realistic, but this goes always at the expenses of try to make a game simple.

Appendix 3: Dynamics and Interactions posters

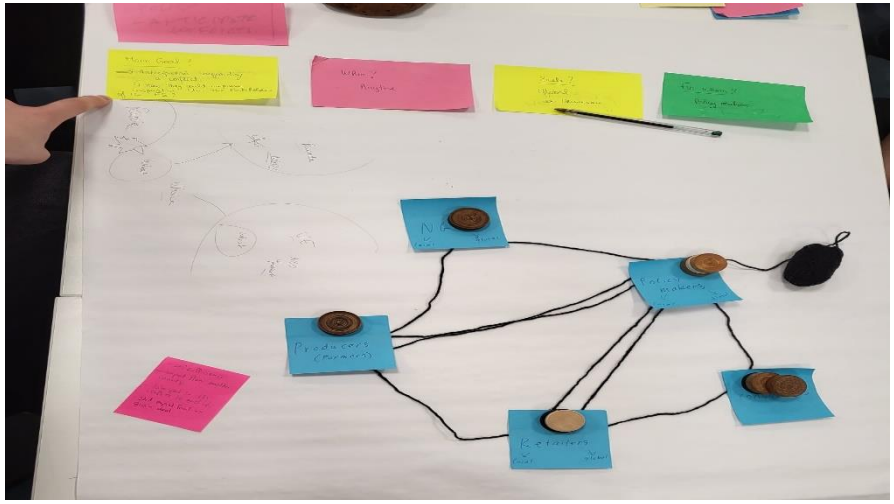


Figure 3: Second concept map interactions between players, objectives and actors within countries, later simplified and combined into 1 country.

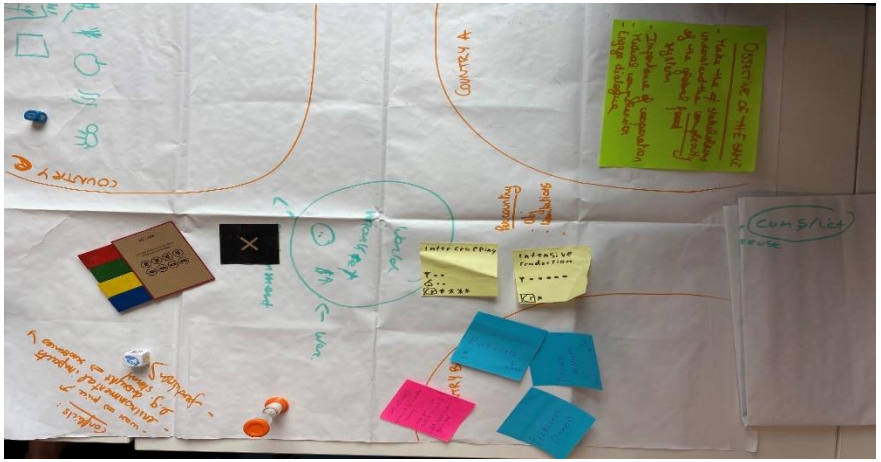


Figure 4: Third concept mainly of the board with all interactions and recourses used in the

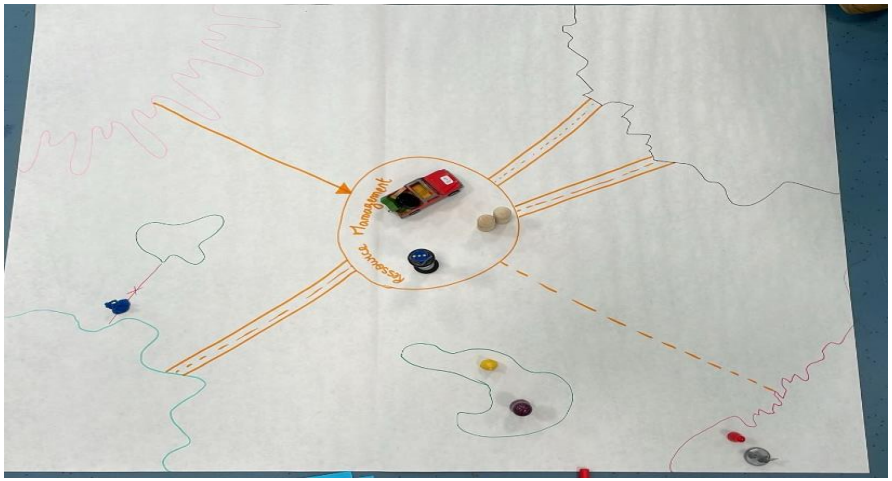


Figure 5: First concept map of interactions between players. In this case restrictions would be placed on trade between countries and WM, access is not equal for each country.

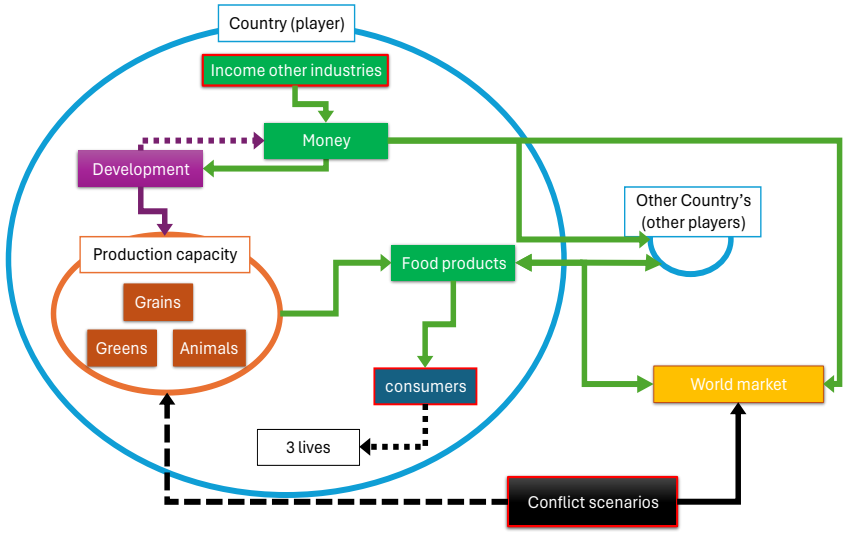


Figure 3: Fourth concept of interactions between players using the resources.

Appendix 4: Notes interview

We had the change to interview Myriam Grillot on the 29th of April (2024) to explain the game to her and get some feedback before the main event. While it wasn't possible to play the game with her we did get some valuable tips and ideas from her already. It was not possible to incorporate all of these into our game already, we think these could be helpful for any future research as well.

Advice and ideas from Myriam Grillot

- Use the notes of the observers for the debriefing (trade, biodiversity) -> 2 observers
- If pairs of 2 people in team -> any struggle in the country? -> debriefing
- Idea of the thumbs for how they feel
- Ask them for their objective during the game (middle and end)
- Policy makers would play their own country? Are policy makers the right target?
- 4 countries to have a pur balance in the game?
- Dunesia might not be very fun to play? Make a bonus for a country in difficulty (especially Dunesia) or a bonus for trading with poor country (unknown for the players)? Or extra plot?
- Introduce population growth?
- Dictature events? No trade anymore
- Corruption event and then malus to a country (e.g. disappearance of a resource within your country)
- Include the fertilizers expense in the game?
- A country could choose to get a loan in exchange (or not) of doing something for the environment for example (UN intervention) -> help Dunesia
- Give awards to players who have keep their forest, made a lot of trades with others...
- Too much difference between the country?
- Different prices for each country because of agreements btw countries (way too high or low)
- Prepare very well the rules for the players
- Prioritize
- Malus for richer country -> higher meat consumption
- Mention our interview in appendix -> refer to it when using their ideas

Appendix 5: Notes first play tests

Play test 1

The first play test was done internally within the group once we had an initial design and we finished a first attempt at calibrating the numbers and the way scenarios should affect the game, in excel. One thing that became apparent through this test was that the game was initially too easy and there were too many resources accessible to the players, resulting in no real consequences being felt off the conflict. We were quite positive over the general concept, and the way the various scenarios would influence the game play, and could potentially force players into certain directions. Additionally we realised we wanted to simplify the production/ investment process a little bit. Where we initially had ideas of including more limitations per country to mimic the real world constraints better, we decided against it too make it easier, and faster for players to grasp the various options that they had.

Play test 2

For the second play test we were lucky that Federico and Vera were willing to give our game a try. This was a nice first trial run that gave us some valuable insights in how people that didn't know what scenarios and events were going to happen would actually play the game. This is also gave us our first interesting quotes such as "why would you cut down the forest" and "I will give you money but you have to invest, otherwise you'll just keep asking every time". This is also where we got the feedback of improving the design to make it more visible what the requirements are, and how much countries produce in total per round. Additionally, the idea of including a questionnaire asking the players about their anxiety per round was coined here by Federico as a way to link better to the debriefing.

Appendix 6: Noteworthy pictures of design process

Figure 9: Counting boards prototypes 1-5-2024

Figure 7: Second test run with coach and coordinator 25-04-2024

Figure 8: Setting up at Plus Ultra 2 2-5-2024

Figure 10: Final day testing 2-5-2024

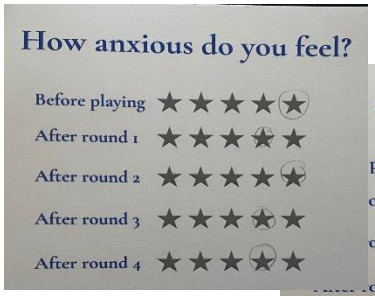


Figure 6: Stress levels Dunesia 2-5-2024

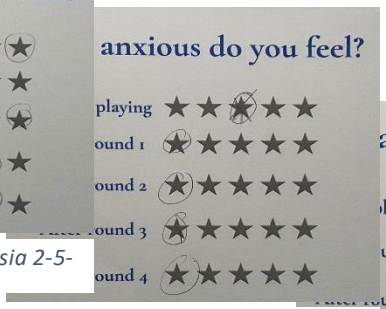


Figure 6: Stress levels Grania 2-5-2024

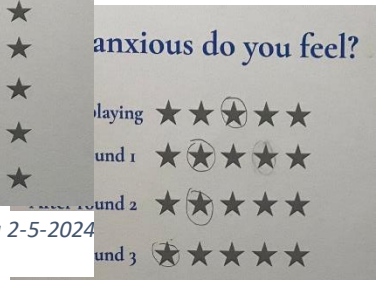
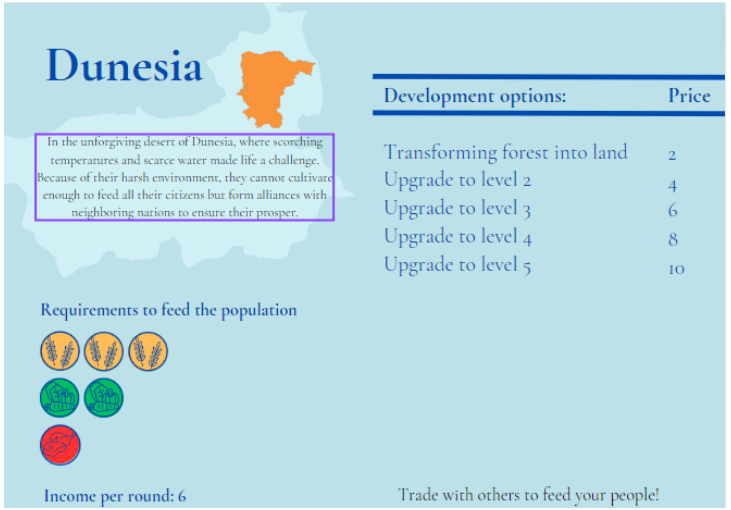
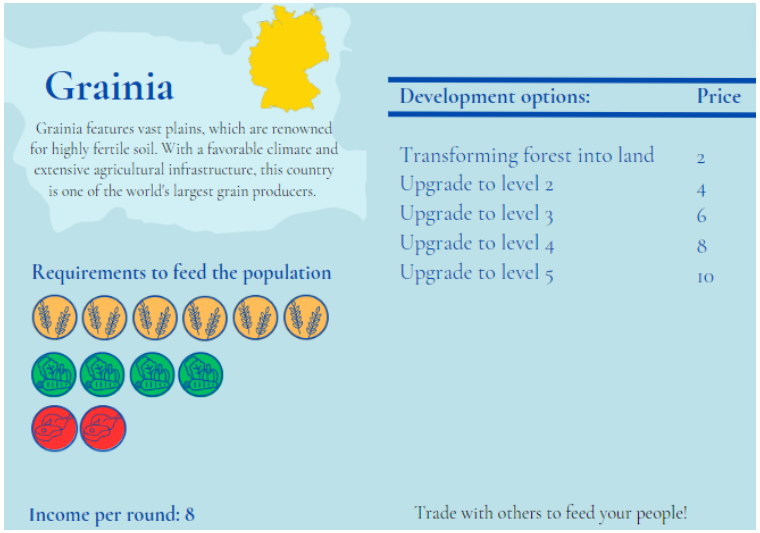


Figure 6: Stress levels Tropivia 2-5-2024

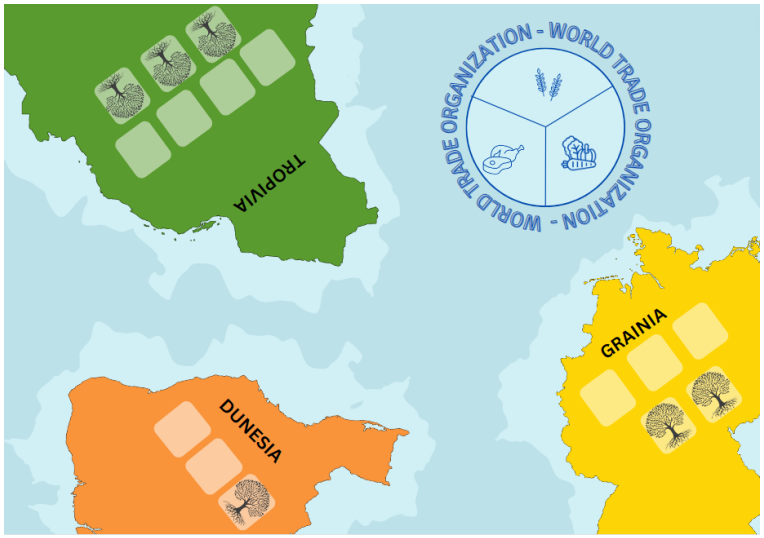
Appendix 7: Game material

7.1 Country profiles





7.2: The board



7.3: Scenario cards

Scenario Card

Conflict on Proelium

A conflict has erupted between various countries on the continent of Proelium. This continent contributes a significant portion to the global food production

The world market prices are doubled
Throw with the dice to decide which foc type stays at the current value.

1-2: Greens
3-4: Grains
5-6: livestock

Scenario Card

Trade relations with Proelium

The conflict on Proelium continues. A big part of your industry was reliant on trade with countries from this continent, which is now halted.

All players receive half of their income (for one round)

Scenario Card

Limited fertlizer availability

The conflict on has spread and fertlizer production has suffered. Due to limited access production goes down.

Each plot produces one less unit

Scenario Card

Increased gass prices

The conflict continued and has cause the gas prices to go up significantly and your population is getting dissatisfied with the costs

Pay a subsidie to reduce the burden on your people.

Dunesia: 1 coin
Grainia: 2 coins
Tropivia: 3 coins

Scenario Card

Climate crisis

Severe deforestation on your continent has led to extreme weather events.

All players loose 2 plots for this round

Scenario Card

Unrest in Neighbouring country

One of your neighbours was unable to feed their population and the unrest let to increased refugees in your country

Produce 2 extra units of all food types.

Scenario Card

UN intervention

The UN has noticed the unrest in your country and decided to intervene by giving you a choice

You receive money from the UN BUT, you need to convert to/ keep one plot of forest.

(you are able to turn this down)

Appendix 7: Individual mini reflections

Facilitation and debriefing – Fanny Bourgeois

Facilitation

The facilitator is such an important role in the serious game. He must be very clear, be on time and able to manage the people all through the game. He is the one who is also motivating people and can add a bit more fun to the game, especially while explaining the story line. In our group project, we wanted to make his task a bit easier, giving him event cards to read out loud and avoid getting lost. It was successful and I think that way, the game is easily reproducible even for someone who does not know the game very well.

Debriefing process

The debriefing cannot be improvised. It must be well thought out in order to reach the objectives of the game. In our group project, the serious game mainly aims to make people cooperate, understand trade off (e.g. between food security and biodiversity) that they might face because of a conflict and understand each other's struggles when facing an unpredictable conflict. We chose questions for our debriefing following the guide from ComMod (Hassenforder et al., 2020). First, asking for feelings/emotions, then event, explanations, connection to reality and finally asking for game improvement advice. Observers' notes can really be helpful and need to be used. The way of managing this part is crucial, especially to make all the participants express their response. I think using participative methods such as making people raise their thumbs down, middle or up is a nice way to do so. Making people move in the room (right or left) depending on if they agree or not could also be nice. This way, they could express where they stand and observe other participants' response.

The facilitator is a key person in the game and in the debriefing process. Knowing well the game is essential and being able to speak and manage a group as well. A course of 'speaking in public' could help to improve those skills.

Game design – Ine Hikspoors

While crafting the game, we encountered frequent instances of miscommunication regarding new ideas and game elements. However, we discovered that assigning names to game elements and physically laying them out on the table facilitated smoother idea-sharing sessions. For instance, we started to draw out the plots and tokens. Additionally, regular game testing proved indispensable in evaluating the mechanics, scenarios, and difficulty levels. This iterative process also enabled us to brainstorm essential rules effectively, fostering the emergence of new game elements through active playtesting.

A significant takeaway from this experience is the efficacy of starting with tangible creation and gameplay to generate new ideas for game elements. Simultaneously, we recognized the importance of minimizing game components to maintain simplicity, allowing us to delve deeper into complex scenarios while ensuring clarity. For example, illustrating how a country's inability to produce sufficient food impacts wealthier nations through migration added depth to the game's message. This iterative refinement process not only enhanced gameplay but also reinforced the game's thematic resonance.

From concept to playable: Taco van Gemert

It was very interesting to see the time and effort it takes to go from a very interesting concept, to an actually playable game. At a certain point we started to have a clear idea of the direction we wanted to take with the game, and the various interactions, and were overflowing with ways to make the game more interesting or complex. Yet, when we were working on making the game actually playable, and balanced, we realized how many different factors have to fit together. In our case this revolved mainly around the resources. How many resources should a country have, and how much should something cost to make it interesting? And how harsh should a certain scenario affect the players to get the desired results? This took quite a while to get right, and in the end, no matter how much time you look at an excel sheet, the only way to know is by playing.

This just play, also revolves around including new elements. When having a lot of ideas ready, we realized we were not all thinking about certain elements in the same way. By just playing and discussing how something should be effected, and what elements to include things became a lot more tangible and got everyone on the same page again. For me then what I learned was that sometimes it is best to just start playing, even when something is not finished yet. By getting a feel for the concept it is a lot easier to get an idea on whether you are going in the right direction or not. It is then always easier to add to it. I also think this translates to many thinks in life where sometimes you just need to get started and improve along the way.

Conceptual model –Denise Baur

I was positively surprised to how we approached this phase of the game project. In many cases we had a lot of ideas and it was confusing on what we should include, which actors, which resources, or how will the actors interact with each other. We decided to consider all the ideas and we always had someone taking note of each session and this was essential to not forget anyone's idea but also to have an overview of the possibilities. I often happen that some ideas were first discarded but eventually we could include them in the game. This would be a big take home message, to consider all the opinion and especially write them down, as they can become useful in the future. A good strategy is to take notes and structure them well. To improve this skill, I think it would be useful to prepare a sort of table and to write the different topic under the specific section. This way going back to the notes it will be easier to understand, what the ideas referees to and to have each topic grouped together.

Another essential element to develop the model, to gather new ideas and to organize the project is to have external feedback from professors or interviewers. This can help a lot and we can gather information from someone that has different point of view and has different approaches. In the development of our game, this part was very helpful. In this case, we had an interview with one PhD student and the information received were very interesting, however those couldn't be implemented, but more added to the further research section, as the game was already finished. I think in this case it would have been interesting to have the interview earlier in the game development. It could have maybe simplified some o

Game design – Haochen Li

Developing the serious game about food security in conflicts is an enlightening process. During game design, the part that leaves me deep impression is how to effectively translate knowledge and information into gameplay mechanics.

My personal take-home message is keeping the balance between engaging gameplay and simulating real-world scenarios. While the primary goal of the game is to educate players and raise awareness of real-world conflict, it is equally important to ensure that the gameplay is enjoyable and easy. So, we unwillingly ignore many real-world interconnections when designing our game. For instance, affluent nations could have higher meat consumption, the resource prices can be adjusted based on the inter-country agreements, nations can apply for loans in exchange for eco-friendly actions. Ideas such as population growth or drop due to the conflicts, dictatorship events affecting trade, or corruption leading to resource loss, we also do not include them to keep our game less than 40 minutes.

Last but not least, inviting different players to test the game is also important. Gathering feedback from diverse players allows us to refine the game design and increase the gameplay experience. When we tested our game with Federico and Vera, we found there are still many changes to make our game better.

During our course, l learned that there are many researchers working on serious games, including WUR Games Hub; GAMAE, INRAE; and our Interviewee, Myriam Grillot. I would like to learn more about game design through their website or communication.

Conceptual model - Arjan Rijkenhuizen

During the making of Harvest Havoc I have experienced quite some struggles with time pressure and the conceptual model behind the game. The entire course we learned and used many different useful models for specific cases which were very specific in the results and outputs. In the CiFoS case we also got to experience the game related to the model we used in class, which showed the results of a game based on real measured data. Of course this was highly simplified but it still set a high bar to reach. The verification of the data used in the game is very difficult when you try to get the main objective across within the multiple constraints one has, design time, playing time, a balanced game, keep choice in player hands and others. Normally I am more accustomed to go back between consecutive parts of projects if mistakes are made that influence the result. Early on in the group work part is realized that in these 3 weeks there was minimal opportunities to go back which meant compromises on the ideal balance of a proper game and an accurate model. Since the methods started from the dynamics model onwards and ended with the game design we compromised heavily on the model behind the game resources. This push forward was of course necessary with the time constraints and pushed me to take the lead on several occasions to drop my own imaginations of what I wanted to see in the game and instead pushing forward to visualize the ideas of others so we could come to a consensus and go on to the next part. It is always hard to take into account other perspectives, for example I am willing to sit in a room for hours on end learning a complicated game, and others don't want that. So making a good game from my perspective is not accessible for everyone, and that is what serious games should be. It is meant to be playable for everyone and this course helped me learn how to scrap and focus so the important parts remain without redundancy.