



Moderator guidelines

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Overview

Introduction	<p>The Flood Resilience Game is an educational game that allows players to experience, explore, and learn about the flood risk and resilience of communities in river valleys. The game is designed to help participants - such as NGO staff working on flood-focused programs - to identify novel policies and strategies which improve flood resilience.</p> <p>The game is set in a community living in an area exposed to floods, occurring with different severity. Players take roles of members of different citizen groups (workers, farmers, entrepreneur, financial services agent), local government and water board officials. Players' decisions and actions focus on what happens before flood, and impact their outcomes following the flood.</p> <p>Each round players can learn and perform specific Flood Resilience Actions, based on the Zurich Flood Resilience Measurement tool. Flood Resilience Actions increase flood resilience for specific citizens or the whole community.</p>						
Gameplay	<p>The game is played over 4 rounds. Each round represents a period between floods - one or more years in real life. At the end of each round a flood occurs. Players don't know how severe the flood will be before it occurs. After the flood, they receive information about the flood severity on each parcel on the map. The last round represents a longer period - corresponding to 10-25 years in real life. At the end participants reflect on their final results.</p> <p>The direct interactions between players create a rich experience that can be discussed, analysed and lead to concrete conclusions and actions. This allows players to explore vulnerabilities and capacities leading to an advanced understanding of interdependencies and the potential for working together.</p>						
Technical details	<table> <tr> <td data-bbox="252 1585 331 1619"><i>Time</i></td><td data-bbox="355 1585 1465 1659">2-4 hours (depending on the number of players, and on the length of the debriefing)</td></tr> <tr> <td data-bbox="220 1693 331 1727"><i>Players</i></td><td data-bbox="355 1693 1465 1727">8-16</td></tr> <tr> <td data-bbox="220 1760 331 1794"><i>Setting</i></td><td data-bbox="355 1760 1465 1839">Table (at least 1x2m) Chair for each participant</td></tr> </table>	<i>Time</i>	2-4 hours (depending on the number of players, and on the length of the debriefing)	<i>Players</i>	8-16	<i>Setting</i>	Table (at least 1x2m) Chair for each participant
<i>Time</i>	2-4 hours (depending on the number of players, and on the length of the debriefing)						
<i>Players</i>	8-16						
<i>Setting</i>	Table (at least 1x2m) Chair for each participant						
Creators	<p>The game was developed by the Centre for Systems Solutions - CRS and International Institute for Applied Systems Analysis - IIASA, with funding from the Zurich Flood Resilience Alliance.</p>						

Game components

For the starters, please take a moment to get familiar with the game materials.

Map

Infrastructure cards

FOOD MARKET

	Food Consumption
No damage	3
Flood damage	4
Flood damage	6

WATER SUPPLY

	Water Consumption
No damage	2
Flood damage	3
Flood damage	5

HOSPITAL

Visit Health Clinic		Flood Accident
3	No damage	-3
4		-4
5		-5

SCHOOL

No damage	Send your child to school
	4
Flood damage	5
Flood damage	7

IRRIGATION SYSTEM

	Costs for Farmers
No damage	2
Flood damage	3
Flood damage	4
Flood damage	5
Flood damage	7

POWER STATION

	Costs for Entrepreneur & Financial Services
No damage	2
Flood damage	3
Flood damage	4
Flood damage	5
Flood damage	7

ROAD

	Costs for Workers
No damage	3
Flood damage	4
Flood damage	5
Flood damage	7
Flood damage	9

Infrastructure markers

Local government infrastructure markers

Water board infrastructure markers

Levees

Player house cards

ENTREPRENEUR - HOUSE

No damage	1	Maintenance costs
Flood damage	2	
	3	
	4	
	5	



FARMER 1 - HOUSE

No damage	1	Maintenance costs
Flood damage	2	
	3	
	4	
	5	



FARMER 2 - HOUSE

No damage	1	Maintenance costs
Flood damage	2	
	3	
	4	
	5	



FINANCIAL SERVICES - HOUSE

No damage	1	Maintenance costs
Flood damage	2	
	3	
	4	
	5	



WORKER 1 - HOUSE

No damage	1	Maintenance costs
Flood damage	2	
	3	
	4	
	5	



WORKER 2 - HOUSE

No damage	1	Maintenance costs
Flood damage	2	
	3	
	4	
	5	



Action units



Flood damage tokens



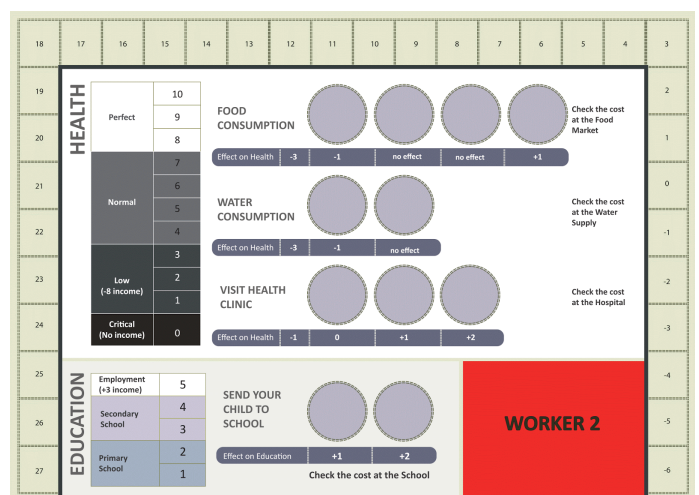
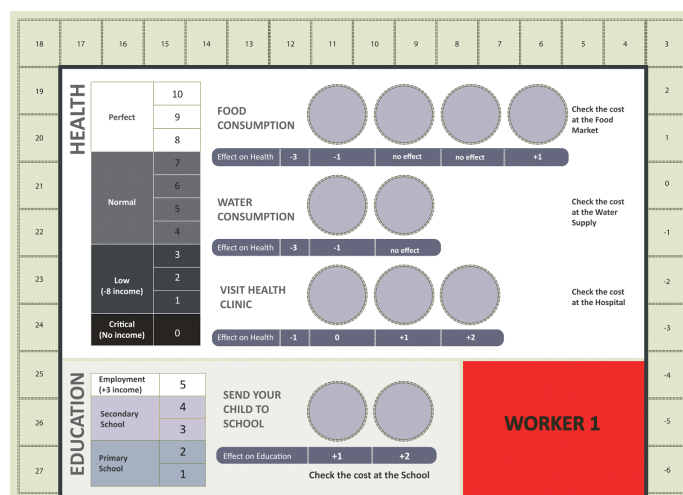
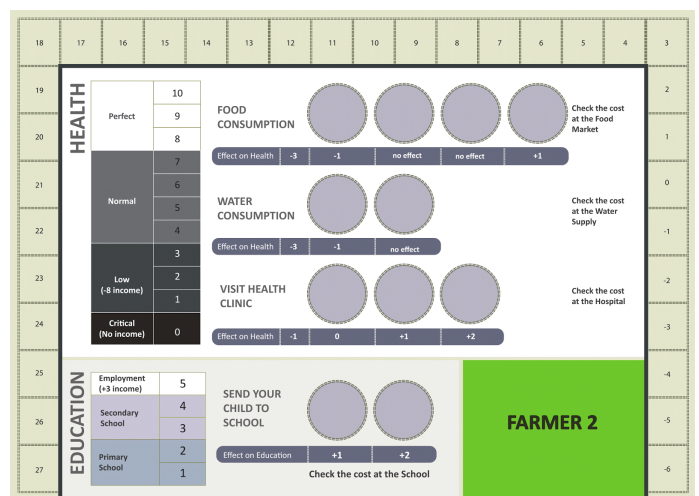
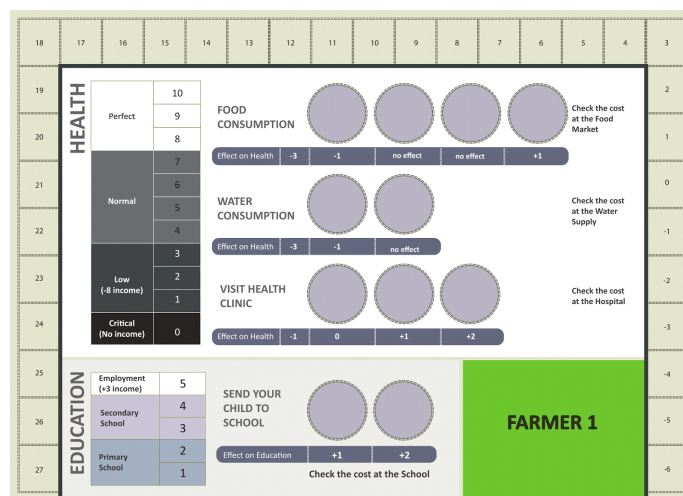
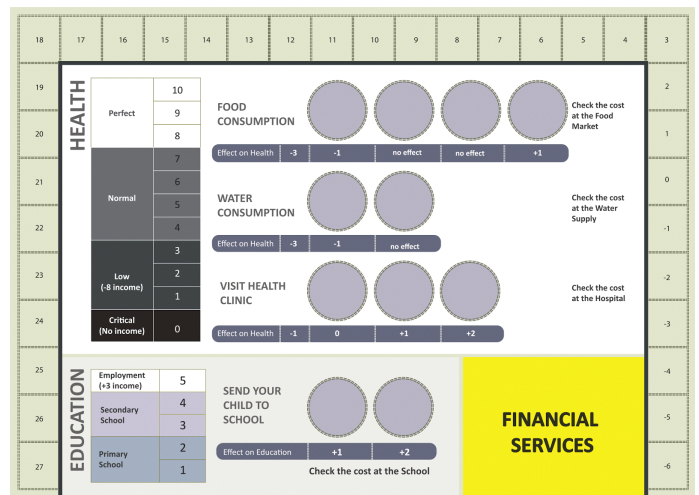
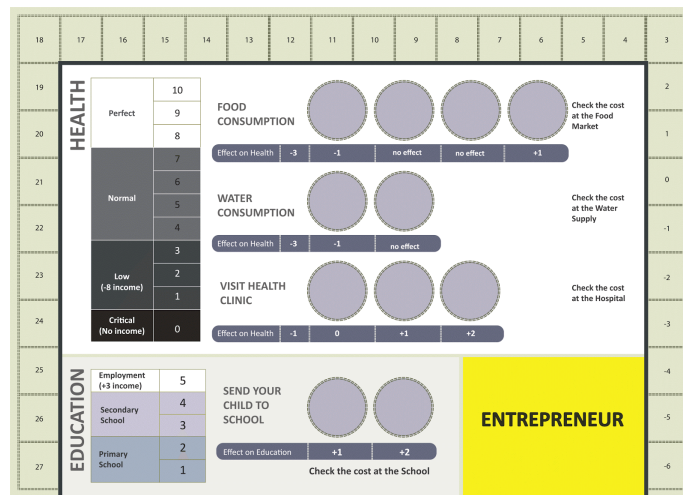
Risk map

Risk Map









1 ROAD					
		4 Entrepreneur House			
2	3		5	6	7
8 Farmer 1 House	9 Worker 1 House	10 Entrepreneur Assets	11 Worker 2 House	12 Food Market	13 Financial Services House
	15 Farmer 1 Assets	16 Irrigation System	17 Farmer 2 Assets	18 Hospital	19 Power Station
		22 Water Supply	23 Farmer 2 House	24 School	
20	21				25


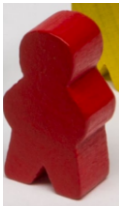

Player boards






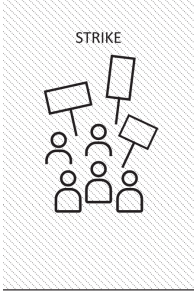


LOCAL GOVERNMENT				
Budget per round: 25				
Local Government employees salaries	<div> <div></div> <div></div> <div></div> </div>			
Job satisfaction	outraged	upset	unhappy	satisfied
Number of strikes	4	2	1	0
When employees are not satisfied they may strike which will affect one of the infrastructures managed by you. If this happens you cannot repair or improve that infrastructure.				




WATER BOARD			
Budget per round: 16			
Water Board employees salaries	<div> <div></div> <div></div> </div>		
Job satisfaction	outraged	upset	satisfied
Number of strikes	2	1	0
When employees are not satisfied they may strike which will affect one of the infrastructures managed by you. If this happens you cannot repair or improve that infrastructure.			





Assets & contracts		
<div>ENTREPRENEUR - ASSETS</div> <div> <div> <div>No damage</div> <div>24</div> <div>Income</div> </div> <div> <div>Flood damage</div> <div>18</div> </div> <div> <div>12</div> </div> <div> <div>6</div> </div> <div> <div>0</div> </div> </div> <div>  </div>	<div>FARMER 1 - FARM</div> <div> <div> <div>No damage</div> <div>22</div> <div>Income</div> </div> <div> <div>Flood damage</div> <div>17</div> </div> <div> <div>12</div> </div> <div> <div>7</div> </div> <div> <div>0</div> </div> </div> <div>  </div>	<div>FARMER 2 - FARM</div> <div> <div> <div>No damage</div> <div>24</div> <div>Income</div> </div> <div> <div>Flood damage</div> <div>18</div> </div> <div> <div>11</div> </div> <div> <div>5</div> </div> <div> <div>0</div> </div> </div> <div>  </div>
<div>FINANCIAL SERVICES CONTRACT</div> <div>  </div> <div>20 action units per round</div>	<div>WORKER 1 CONTRACT</div> <div>  </div> <div>22 action units per round</div>	<div>WORKER 2 CONTRACT</div> <div>  </div> <div>20 action units per round</div>

Health indicators		
		
Farmer	Worker	Entrepreneur / Financial services

























Education indicators		
		
Farmer	Worker	Entrepreneur / Financial services

Strike cards - example	Strike marker
<div> <div>  </div> <div> <div>STRIKE</div>  <div>Hospital</div> </div> </div>	

Accident cards - example	Citizen income marker
<div> <div>  </div> <div> <div>FLOOD ACCIDENT</div>  <div>ENTREPRENEUR</div> </div> </div>	

Loan agreements	School enrolment	Graduation diplomas
<div>  <div>LOAN CERTIFICATE</div> <div>10</div> <div>Interest rate: 1</div> <div>Place this card in front of you.</div> </div> <div>  <div>LOAN CERTIFICATE</div> <div>10</div> <div>Interest rate: 2</div> <div>Place this card in front of you.</div> </div>	<div>SCHOOL ENROLMENT</div> <div> <div></div> <div>write your child's name here</div> </div>	<div>  <div>GRADUATION DIPLOMA</div> <div>Primary School</div> </div> <div>  <div>GRADUATION DIPLOMA</div> <div>Secondary School</div> </div>

Actions

<div>HOME/ASSET RETROFITTING & ADAPTATION</div> <div></div> <div>Protects against 2 flood damage</div>	<div>LEARN EARLY WARNING SYSTEM</div> <div></div> <div>If EWS is active, you receive the boosted versions of:</div> <div><div> Learn emergency response</div><div> Plan emergency home/asset protection</div></div>	<div>LEARN EMERGENCY RESPONSE</div> <div></div> <div>Health impact of flood accident is reduced by 2</div>	<div>LEARN EMERGENCY RESPONSE</div> <div></div> <div>Flood accident immunity  Early Warning System boost</div>
<div>PLAN EMERGENCY HOME/ASSET PROTECTION</div> <div></div> <div>Protects against 1 flood damage</div>	<div>PLAN EMERGENCY HOME/ASSET PROTECTION</div> <div></div> <div>Protects against 2 flood damage Early Warning System boost</div>	<div>ESTABLISH FLOOD RECONSTRUCTION BUDGET</div> <div></div> <div>Local Government</div> <div><div>Player</div><div>Player</div><div>Player</div></div>	<div>INVEST IN REFORESTATION UPSTREAM</div> <div></div> <div>Flood damage is reduced by 1 in all parcels</div>
<div>LEARN HOW TO USE EARLY WARNING SYSTEM</div> <div></div> <div>If EWS is active, you receive the boosted version of</div> <div><div> Plan Emergency Infrastructure Protection</div></div>	<div>PERMANENT INFRASTRUCTURE PROTECTION WORKS</div> <div></div> <div>Protects against 2 flood damage</div>	<div>INSURANCE</div> <div></div>	<div>CREATE A FLOOD RETENTION POND SCHEME</div> <div></div> <div>Flood damage is reduced by 2 in all parcels</div>
<div>PLAN EMERGENCY INFRASTRUCTURE PROTECTION</div> <div></div> <div>Protects against 1 flood damage</div>	<div>PLAN EMERGENCY INFRASTRUCTURE PROTECTION</div> <div></div> <div>Protects against 2 flood damage Early Warning System boost</div>	<div>DEVELOP EARLY WARNING SYSTEM</div> <div></div> <div>Boosts:</div> <div><div> Learn emergency response</div><div> Plan emergency home/asset protection</div><div> Plan emergency infrastructure protection</div></div>	<div>LEARN HOW TO USE EARLY WARNING SYSTEM</div> <div></div> <div>If EWS is active, you receive the boosted version of</div> <div><div> Plan Emergency Infrastructure Protection</div></div>

Roles

There are two main types of the roles in the game: citizens and authorities.

Citizens	They make a living by working their farms, working in the factories, or running their own entrepreneurship.
<i>Action units & income</i>	Some of the citizens have assets that bring them income, others work on fixed contract in the city. The income is represented by the action units. Each citizen bears costs of gaining income depending on the state of different public infrastructure. Each citizen owns a house that needs to be maintained.
<i>Basic needs</i>	Citizens use their action units to satisfy their basic needs - food consumption, water consumption and visiting health clinic.
<i>Health</i>	If the needs are not fulfilled, the citizen's health will drop. The health can also drop because of flood accidents. If the health is below certain level, citizen's income is lowered. The citizens can increase their health by using their action units for going to the health clinic or increasing .
<i>Education</i>	Each citizen has children that can be sent to school. Citizens have to use their action units to do that.
<hr/>	
	There are 6 different citizen roles:
<i>Farmer 1</i> <i>Farmer 2</i>	Have assets that bring them income. Their costs of gaining income depend on the state of the irrigation system. The assets of the farmers have different vulnerability to flood damage.
<i>Worker 1</i> <i>Worker 2</i>	Have fixed contract. Their costs of gaining income depend on the state of the road. Worker 1 earns slightly more than Worker 2.
<i>Entrepreneur</i>	Have assets that bring them income. Their costs of gaining income depend the state of the power station.
<i>Financial Services</i>	Have fixed contract. Sell the loans to other roles & collects the interest from them. Their costs of gaining income depend the state of the power station.
<hr/>	
Authorities	They maintain the local infrastructure and implement community-wide flood solutions. Each round they receive fixed budget (in action units).
<hr/>	

	Each round they have to pay salaries to the infrastructure employees. If they won't do that, the employees will strike (do not confuse infrastructure employees with the players!).
	There are 2 different authorities roles:
<i>Local government</i>	Maintains the hospital, the school, the food market, the road and the power station.
<i>Water board</i>	Maintains the water supply and the irrigation system. Has the flood risk maps.

Specific game procedures are explained later in this document.

Game protocol

Each round of the game consist of 6 phases.

Each phase of rounds 1-3 consist of following steps:

Phase 1: Income & needs

1. Incomes calculation
2. Incomes payment
3. Needs fulfilling (citizens) & salaries payment (authorities)
4. Protest cards based on low salaries (authorities)
5. Update of indicators (citizens)
6. School graduation
7. Clearing the used action units

Phase 2: Community meeting

- Moderator gives participants information about new actions that became available this round
- Participants discuss their plans

Phase 3: Operations

- Participants perform the actions they discussed during the community meeting

Phase 4: Flood

1. Moderator adds damage on plots and levees
2. Flood accident

Phase 5: Coping

- Players can remove up to 1 damage from their parcels

Phase 6: Summary

- Moderator explains what happened
- Moderator summarizes the "state of the valley"

The round 4 is played differently - we will cover it later in this document (*Running the game* section).

On the next pages you will find the information about the procedures that repeat in each round.

We strongly recommend using game materials and performing described actions with them while reading this document.

Later in this document we will cover how to run the game round by round, and the round-specific actions.

Phase 1: Income & needs

1. Income calculation
2. Income payment

In the game, action units represent income. Action units work both as time unit and money unit. They are used by all roles. Each role can give their action units to other roles without restrictions.

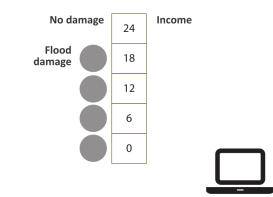
Action units are acquired differently by different roles.

Authorities <i>Local government</i> <i>Water board</i>	They have fixed budgets and they receive the same amount of action units each round.
Citizens	
<i>Farmer 1</i> <i>Farmer 2</i> <i>Entrepreneur</i>	They earn action units using assets. Assets are located on parcels in the valley and can be damaged by floods. Damaged assets generate less income depending on the damage level.
<i>Worker 1</i> <i>Worker 2</i> <i>Financial services</i>	Both workers and financial services earn action units from their contracts. Contracts are fixed and flood damage doesn't influence their amount. In addition, financial services receives the interest rate from the loans he/she sells.
<i>Costs</i>	Each citizen has to pay the costs of gaining the income. The amount of the costs is determined by the state of the infrastructure that the citizen uses for his/her work. The more damaged the specific infrastructure is, the bigger are the costs.
<i>House - costs of maintenance</i>	Each citizen has to pay costs of maintenance of his/her house. The amount of the costs is determined by the state of the house. The more damaged the house is, the bigger are the costs.
<i>Low health</i> <i>Critical health</i>	The citizen's income can be additionally lowered if his/her health is low. If the health level is critical, the citizen doesn't receive any income.

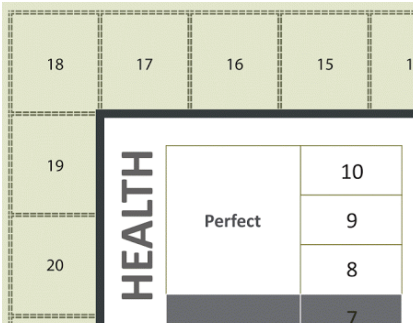
See the examples of how citizen's income is calculated on the next pages (you will find all income calculation instructions with other instructions for players).

Income calculation - Entrepreneur

ENTREPRENEUR - ASSETS

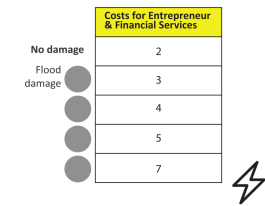


1. Player checks current income on his/her assets card on the map.



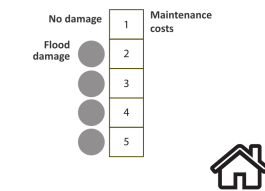
2. Player sets the marker on his/her income track according to his/her current income value. Player checks his/her health level: if it's low, player earns less. If it's critical, player earns nothing.

POWER STATION



3. Player checks current costs for entrepreneur on power station card. Then, player subtracts the costs from his/her income and updates the income track.

ENTREPRENEUR - HOUSE



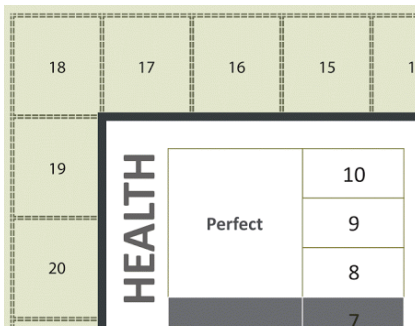
4. Player checks current maintenance costs of his/her house. Then, player subtracts the costs from his/her income and updates the income track.

WORKER 1
CONTRACT



22
action units per round

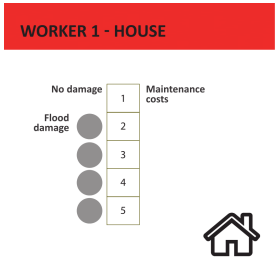
1. Player checks his/her current income on his/her contract card.



2. Player sets the marker on his/her income track according to his/her current income value. Player checks his/her health level: if it's low, player earns less. If it's critical, player earns nothing.



3. Player checks current costs for workers on road card. Then, player subtracts the costs from his/her income and update the income track.

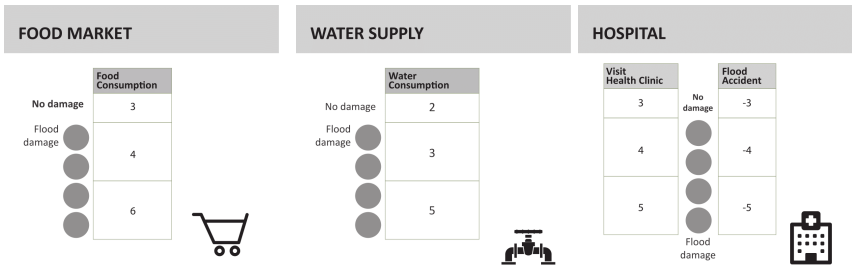


4. Player checks current maintenance costs of his/her house. Then, player subtracts the costs from his/her income and updates the income track.

Phase 1: Income & needs

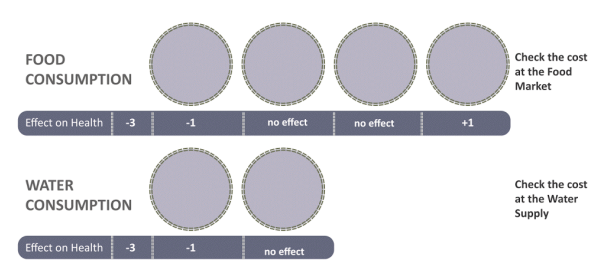
3. Needs fulfilling (citizens) & salaries payment (authorities)

Citizens check the price of food consumption (on the food market card), water consumption (on the water supply card), and visiting health clinic (on the hospital card).

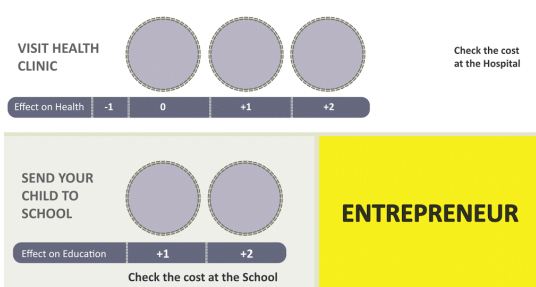


They decide how much food and water they want to consume and how often they visit the health clinic, then place the adequate amount of action units on their boards in food consumption, water consumption and visit health clinic sections.

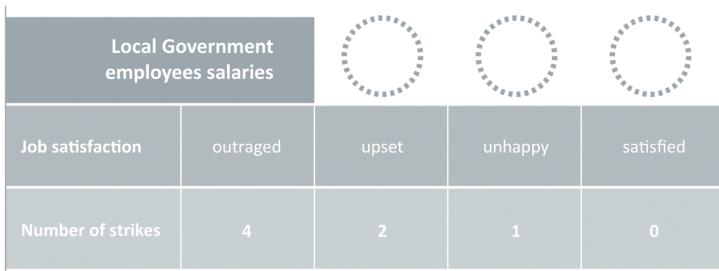
One slot represents one price unit! This means that if e.g. food consumption costs 3 action units, then the citizen has to place 3 action units on each slot to reach the desired effect.



If they wish, they can send their children to school. They check the price on the school. Then, they place the adequate amount of action units in specific sections.



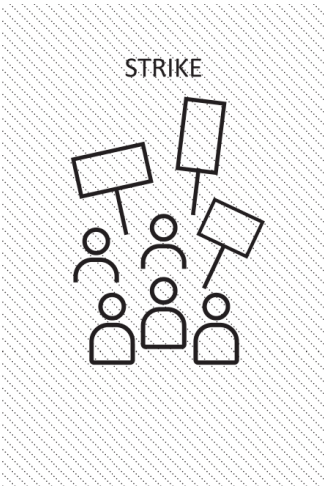
Water board and local government pay the salaries to the infrastructure employees. They have to place a fixed rate of 2 action units on each salary slot they want to fill.



Phase 1: Income & needs

4. Strike cards based on low salaries (authorities)

If the water board or the local government haven't paid enough the infrastructure employees, they strike. In result, strike cards are drawn. Player then cannot repair or improve the selected infrastructure.



5. Update of indicators (citizens)

HEALTH

Perfect	10
	9
	8
Normal	7
	6
	5
	4
Low (-8 income)	3
	2
	1
Critical (No income)	0

Citizens update their health and education tracks according to their food consumption and water consumption. E.g. if 2 slots of the food consumption are filled, then it has no effect on health; if only 1 slot is filled, then player has subtract 1 level of health; etc.

EDUCATION

Employment (+3 income)	5
Secondary School	4
	3
Primary School	2
	1

6. School graduation

If player's child graduated from one school to another, give the player the graduation diploma.

7. Clearing the used action units

Moderator asks players to take the used action units from the board.

Phase 2: Community meeting

Moderator explains the players what actions they can take in this round. Players discuss your plans with other players, if they wish.

Read the "All actions list" document to see all available actions and learn how they work.

Phase 3: Operations

Players perform the actions they decided to do.

Read the "All actions list" document to see all available actions and learn how they work.

Phase 4: Flood

1. Moderator places the damage tokens on the map plots according to the scenario for the current round (not on the damage tracks of the cards!).

Round 1

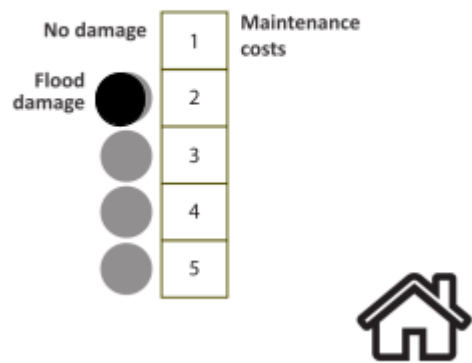
1					
2	3	4	5	6	7
8	9	10 1	11 1	12	13
14	15	16	17	18 2	19
20	21	22	23	24	25

According to the scenario above, the damage tokens will be placed:

- 1 damage token on plot no. 10,
- 1 damage token on plot no. 11,
- 2 damage tokens on plot no. 18.

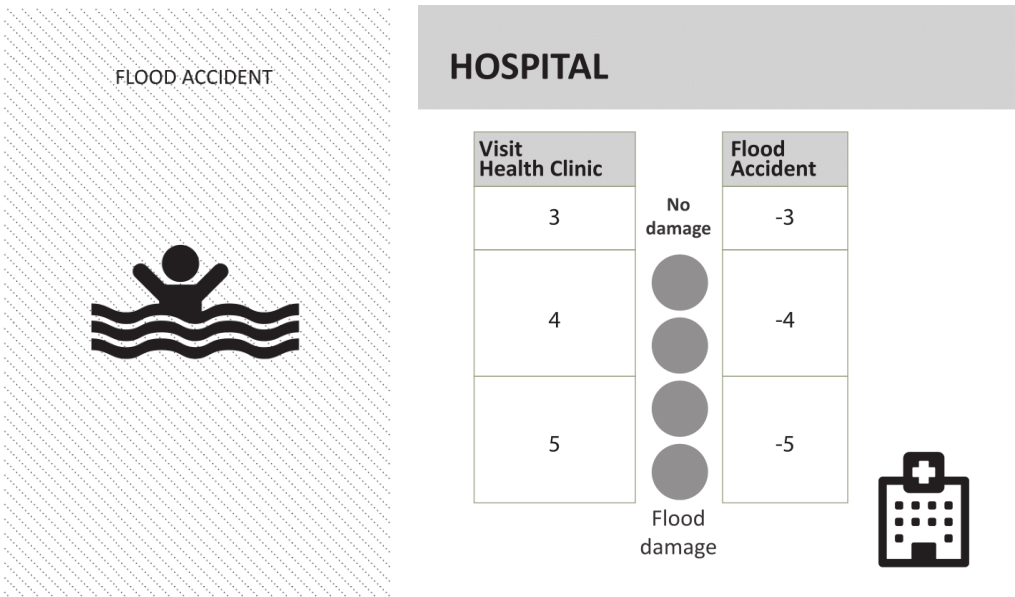
2. After placing all damage tokens on the map, the moderator do as follows:
- if the plot is empty, moderator removes the damage token from it,
 - if the plot has an unprotected house, an unprotected infrastructure, or an unprotected asset on it then moderator moves the damage tokens to the **flood damage** track of the card, starting with the top of the track:

ENTREPRENEUR - HOUSE



- if the plot has protection, then the moderator takes as many damage tokens from the plot, as is the protection value;
For example, if the flood damage is 2, but there is Plan emergency home/asset protection action (which protects against 1 damage) on the plot, then the moderator takes out 1 damage token off the plot and only the remaining token is placed on the damage track.
- NOTE: Remove the protection action cards that have dotted border while doing that. The solid-border actions stay on the map all the time.

3. After distributing the damage tokens, the moderator draws as many accidents cards, as indicated by scenario for this round. Players affected by the accident will receive the health damage according to the state of the Hospital.



Phase 5: Coping

Player can remove only 1 damage token from each parcel (paying for that!). Moderator has to make sure that they follow that rule.

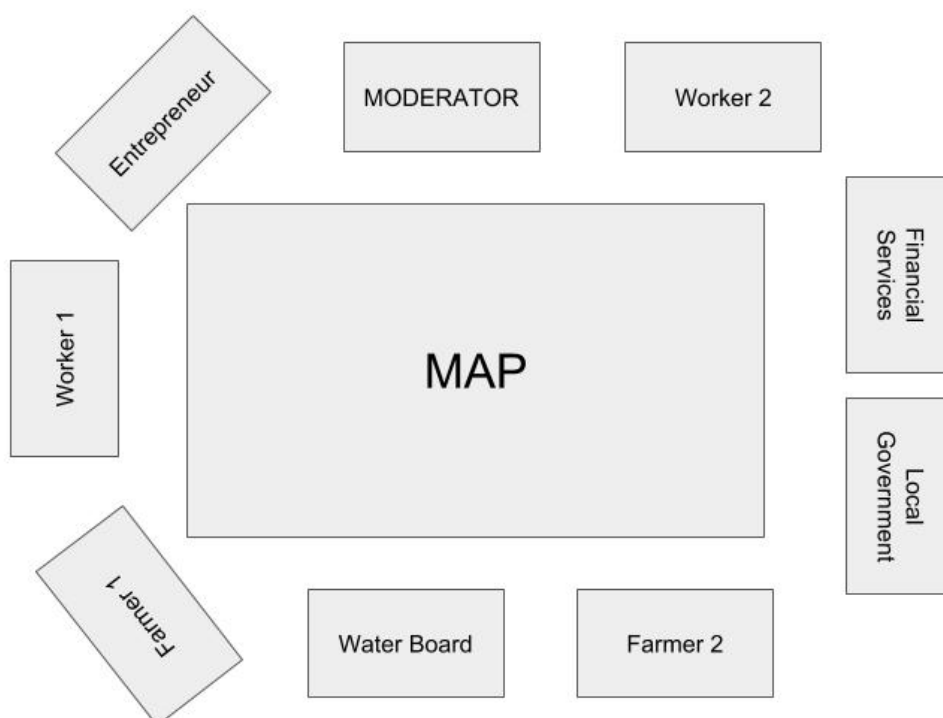
Phase 6: Summary

The moderator explains what happened during the other phases and summarize current state of the community.

Preparing the game

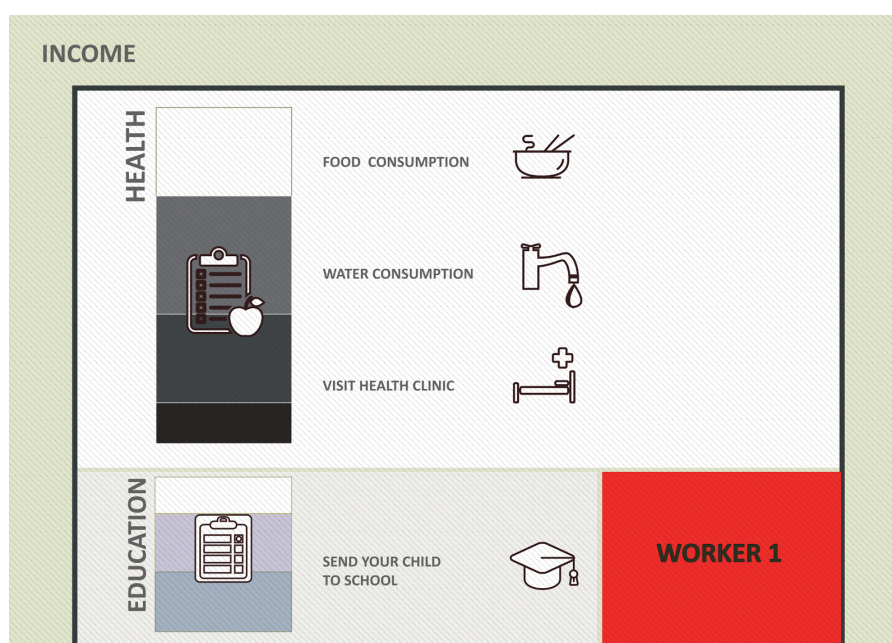
Arrange the table

1. Place the map on the table and arrange the player-boards according to the scheme:



Place the game presentation binder before you so you can read the sheets with the moderator info.

At the beginning of the game player-boards should be on the side with pictures:



2. Place the Worker Contracts next to both Workers' boards, and Financial Services Contract and 10 Loan agreements next to the Financial Services board.

3. Place the boxes with the Action Units (each denomination in separate box) near the map. Make sure that they can be easily reached by the players; you may even want to have 2 separate token sets placed on two sides of the table.

4. Prepare the map

Place the cards and pawns on the specific map tiles according to the initial setting and the guide below. Make sure that all the cards are on their "normal" side (NOT "improved").

Initial map setting:

1 ROAD					
2	3	4 Entrepreneur House	5	6	7
8 Farmer 1 House	9 Worker 1 House	10 Entrepreneur Assets	11 Worker 2 House	12 Food Market	13 Financial Services House
14 Farmer 1 Farm	15 Farmer 1 Farm	16 Irrigation System	17 Farmer 2 Farm	18 Hospital	19 Power Station
20	21	22 Water Supply	23 Farmer 2 House	24 School	25

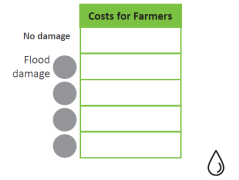
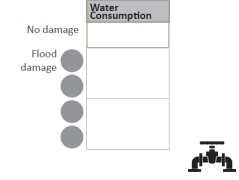
Tiles with infrastructure managed by the Local Government (each tile should contain one card and one pawn):

Tile	1	12	18	19	24
Infr.	Road	Food Market	Hospital	Power Station	School
Card	<div>ROAD</div> <div>Costs for Workers</div> <div>No damage</div> <div>Flood damage</div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div>	<div>FOOD MARKET</div> <div>Food Consumption</div> <div>No damage</div> <div>Flood damage</div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div>	<div>HOSPITAL</div> <div>Visit Health Clinic</div> <div>No damage</div> <div>Flood Accident</div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div>	<div>POWER STATION</div> <div>Costs for Entrepreneur & Financial Services</div> <div>No damage</div> <div>Flood damage</div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div>	<div>SCHOOL</div> <div>No damage</div> <div>Send your child to school</div> <div>Flood damage</div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div>

Pawns for the Local Government’s infrastructure look like this:



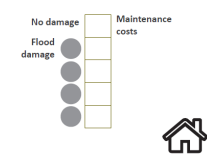
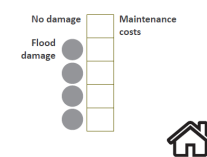
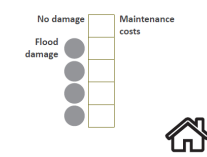
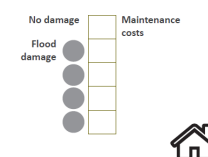
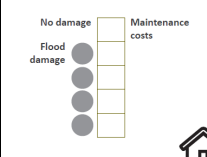
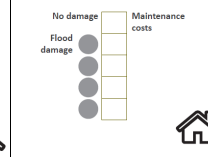
Tiles with infrastructure managed by the Water Board (each tile should contain one card and one pawn):

Tile	16	22
Infr.	Irrigation System	Water Supply
Card	<p>IRRIGATION SYSTEM</p> <p>Costs for Farmers</p> <p>No damage</p> <p>Flood damage</p> 	<p>WATER SUPPLY</p> <p>Water Consumption</p> <p>No damage</p> <p>Flood damage</p> 

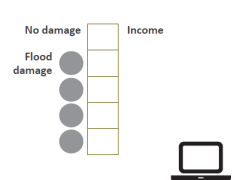
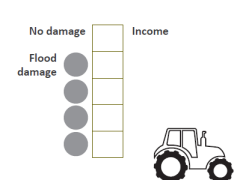
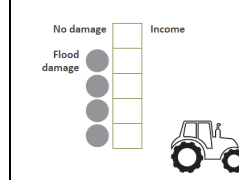
Pawns for the Water Board's infrastructure look like this:



Tiles with houses of citizens (each tile should contain one card - no pawns!):

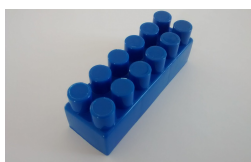
Tile	4	8	9	11	13	23
Role	Entrepreneur	Farmer 1	Worker 1	Worker 2	Financial Services	Farmer 2
Card	<p>ENTREPRENEUR - HOUSE</p> <p>No damage</p> <p>Flood damage</p> <p>Maintenance costs</p> 	<p>FARMER 1 - HOUSE</p> <p>No damage</p> <p>Flood damage</p> <p>Maintenance costs</p> 	<p>WORKER 1 - HOUSE</p> <p>No damage</p> <p>Flood damage</p> <p>Maintenance costs</p> 	<p>WORKER 2 - HOUSE</p> <p>No damage</p> <p>Flood damage</p> <p>Maintenance costs</p> 	<p>FINANCIAL SERVICES - HOUSE</p> <p>No damage</p> <p>Flood damage</p> <p>Maintenance costs</p> 	<p>FARMER 2 - HOUSE</p> <p>No damage</p> <p>Flood damage</p> <p>Maintenance costs</p> 

Some of the citizens (Farmers and Entrepreneur) have also asset cards that need to be placed on the map (no pawns here):

Tile	10	15	17
Infr.	Entrepreneur - Assets	Farmer 1 - Farm	Farmer 2 - Farm
Card	<p>ENTREPRENEUR - ASSETS</p> <p>No damage</p> <p>Flood damage</p> <p>Income</p> 	<p>FARMER 1 - FARM</p> <p>No damage</p> <p>Flood damage</p> <p>Income</p> 	<p>FARMER 2 - FARM</p> <p>No damage</p> <p>Flood damage</p> <p>Income</p> 

Finally, place 1 Levee marker on the map (somewhere near the river).

The levee markers look like this:



5. Prepare the materials that you will hand to the players at the very beginning of the game - just after the introduction (refer to the *Game components* section):

- 6 School enrolments
- 1 Risk map
- 2 Farmer health indicators (green big man)
- 2 Worker health indicators (red big man)
- 2 Entrepreneur / Financial Services health indicators (yellow big man)
- 2 Farmer education indicators (green small man)
- 2 Worker education indicators (red small man)
- 2 Entrepreneur / Financial Services education indicators (yellow small man)
- 6 income markers (white cylinder)
- Folders for instructions
- Income calculation (each role has their own)
- Actions for 1st round (citizens have their own, LG has their own, WB has their own)

6. Prepare Action cards and Action descriptions per each round. Refer to the *All actions list* document for that. Make sure that you have easy access to them while you will be running the game.

7. Prepare other materials that you will use during the game (make sure that you have easy access to them while you will be running the game):

- Flood damage tokens
- Flood Accident cards
- Strike cards
- Strike markers
- Graduation diplomas

8. Place Game phases flipchart somewhere in the room (e.g. on the wall or on the flipchart stand).

That's all for the beginning of the game. Players will receive other materials later as you will explain them rules.



Running the game

Below you can find the information on what you should do as a moderator in each phase of the game.

Together with your materials you received the **game presentation binder**. It is recommended that you use it during the game (especially if you run the game for the first time). The game presentation contains all the information listed below and also the information for players.

Introduction

Introduce the players to key concepts of the game:

1. Players take roles of members of a community living in an area exposed to floods, occurring with different severity.
2. Roles - describe briefly who is who, point out the distinction between citizens and authorities (WB and LG) (details during the first round).
3. Floods - they may happen - they inflict damage.
 - a. History - more than 10 years ago - many floods.
 - b. Then levees were built - from that time floods were strongly reduced - everyone feels safe.
4. Actions that can be done by the players to protect against the damage (just mention them - details during the first round).
5. Tell the players about action units and explain briefly how to get them (more details during the first round)
6. Explain the health and education.

During the introduction use the presentation binder and refer to the pictures on player boards.

Just before the start

1. Ask players to flip their player boards (so the side with the numbers is up)
2. Give the citizens Health indicators. Ask them to place the Health indicators on the 7th health level (or 6th if you want to give them a tougher challenge).
3. Give the citizens Education indicators and School enrolment forms. Ask them to place the Education indicator on the 1st level of education and to fill in the forms with the child's name.

Round 1

Round 1 is when players get familiar with the detailed game rules. Make sure that you explain the rules clearly and that the players follow you.

Phase 1: Income and needs

1. Give citizens income markers and income calculation instruction.
2. Ask citizens to calculate their incomes (walk them slowly step by step using one citizen's board as an example). Make sure that they understand what they are doing. When finished ask them to collect their budget (action units). Ask Local government and Water board to take their budget (early in this step).
3. Remind the citizens that they have to fulfill their needs (food, water, health clinic). Remind them about education. Make sure that they don't update the health/education indicators yet!
4. Remind LG and WB that they have to pay salaries to their employees - otherwise they will strike.
5. Remind the players that they can take a loan from Financial Services.
6. Check LG and WB boards. If needed, draw strike cards and place the strike markers on the map. NOTE: You may want to avoid the strikes in Round 1. Make sure that LG and WB understand the consequences of lower salaries for their employees.
7. Give the players some time for decision-making (but it shouldn't take too long). Then ask if they're ready and ask them to update the health and education indicators.
8. Check if any citizen's child graduated. If that happened, then give the graduation diploma to that citizen.

Phase 2: Community meeting

1. Explain the players what actions they can take in this round (use the "All actions list" document).
2. Encourage players to discuss their plans.

Phase 3: Operations

- Sell the available action cards to the players (only for the current round!)
- Make sure that players are performing all the actions correctly

Phase 4: Flood

1. Announce the levee breach and place the damage token on the levees.
2. Place damage tokens on the map according to the flood map for this round (don't place them on damage tracks on the cards yet!).
3. Move the damage tokens to damage tracks or remove them if the tile is protected by an action. Remove the action cards that have dotted border while doing that.
4. Draw 1 flood accident card - these players will receive the health damage according to the state of the Hospital.

Phase 5: Coping

- Explain to the players that they can remove only 1 damage token from each parcel and make sure that they follow that rule.

Phase 6: Summary

- Explain what happened during the other phases and summarize current state of the community.

Round 2

New in this round:

Phase 1: Income & Needs

- Remind players about interest rate payments.
- If there is a strike, then draw strike cards.

Phase 2: Community meeting

- Remember to introduce new available actions!
- Make sure that players understand new available actions

Phase 4: Flood

- Announce that the levees were destroyed by the flood and remove the levees from the map!

Round 3

New in this round:

Phase 1: Income & Needs

- If there is a strike, then draw strike cards.

Phase 2: Community meeting

- Remember to introduce new available actions!
- Make sure that players understand new available actions

Round 4

Long round (15-25 years) - mechanics different than in previous rounds!!!

Start this round with explaining the difference.

Phase 1: Income & Needs

The same as in previous rounds

Phase 2: Community meeting

Long-term actions introduced: relocation, retention polder and reforestation

Phase 3: Operations

Short-term operations are not available. Only relocation, retention polder and reforestation can be implemented.

Phase 4: Flood

Instead of a flood a long term flood risk is calculated:

- Take risk map as a start
- For each plot calculate reduced risk by subtracting all gained protection (both for the whole area and for individual plots) from the original risk
- Put the appropriate amount of damage tokens (corresponding to reduced risk) on the plots adding them to the damage tracks

Phase 5: Coping

1 level of damage can be removed per plot using the regular damage removal price

Phase 6: Summary

Calculate citizens' revenues (using income token on the players-boards):

- Income (based on contracts or assets)
- Subtract house maintenance and relevant public infra costs
- Subtract water, food and health cost (minimum amount to reach "no effect" level; prices based on the state of relevant infra)
- Subtract interest payments + 1 additional AU per credit; Financial Services add amount equal to the total interest payment (without these additional AUs)

Resulting revenues are long-term expected revenues per period (the time corresponding to average time linked with rounds 1-3: 3-5 years); negative income means getting into the poverty trap.

Debriefing

Moderate the discussion after the game by asking questions and probing the answers of the participants, see table below for probing techniques. Don't impose your opinion on the participants. Try to encourage them to reflection about what happened in the game.

Make sure that each participant can have their say. During the debriefing use the following order of questions and activities:

Type of probe	Description of probe technique
Silent	Remain silent and allow the participant to think aloud.
Echo	Repeat the participant's point, encouraging them to develop it further.
Verbal agreement	Expresses interest in the participant's views with the use of phrases, such as 'uh-huh', or 'yes, okay'.
'Tell me more'	Clearly asks the participant to expand on a particular point or issue – without the use of echoing.
Long question	Ask a lengthier question that also suggests that a detailed response is sought.
Leading	Ask a question that encourages the participant to explain his or her reasoning.
'Baiting'	Give the impression that you are aware of certain information. This might prompt the participant to explain further.

1. Players and their emotions

You just finished the game. There were likely different emotions felt amongst the players. Allow them to let the emotions out. You can ask them, e.g:

- How was your game? Did you enjoy it? What happened?

2. Game results

Participants try to understand their results.

- What is the game result?
- What does this result mean in the game?

3. Players' motivations

Ask the players what their goals were in the game.

- What were your goals in the game?
- How did your goals change during the game?
- What helped? What made the game harder?

4. Consequences

This is the time to deepen the reflection about what happened in the game.

Start with asking the players what would they change.

- If you played the game again, what would you do differently?

Then ask them about their actions connected with different capitals. Write down which capitals were used, and which were not.

- Human capital:
 - How did your health influenced your results?
 - Did you invest in education?
 - Did you learn emergency response or how to use the early warning system?
- Social capital:
 - Did you help each other?
 - Did you establish community reconstruction budget?
- Physical capital:
 - How did the state of the infrastructure influence your results throughout the game?
 - Did you make any improvements to the infrastructure or the houses?
- Natural capital:
 - Did you invest in reforestation?
- Financial capital:
 - Did you manage to accumulate some savings?
 - Did you insure any infrastructure? Which one and why?

Evaluation of players' decisions

- Which actions that you took reduced flood impacts, and which enabled you to avoid them totally?
- Which actions were more effective and efficient in the long run?

5. Real-life analogies

Start with explaining how the actions used in the game work in real life:

Action	How the action works in real life
Learn emergency response	Many NGOs and disaster groups invest heavily in teaching the community how to respond when a flood happens. This includes first aid training, and search and rescue training. It also includes making sure everyone understands how the early warning system works, and knows what to do when it is activated e.g. evacuation routes. By learning emergency response, deaths and injuries from floods can be reduced.
Plan emergency home/asset protection Plan emergency infrastructure protection	When people have some warning that a flood is coming, there are things they can do to protect their home/asset or the infrastructure they're responsible for. Emergency protection plans for homes, businesses and infrastructure include actions such as removing valuables or putting them high up, and sealing places where water might get in. It might also include the placement of temporary barriers such as sandbags or other temporary flood defense barriers. By putting in place an emergency protection plan, flood damage to homes, businesses and infrastructure can be

	reduced.
Remove damage from your house or assets Remove damage from infrastructure	If a house, assets or infrastructure are damaged by a flood, after the flood people often repair the damage. This includes removing mud deposits, replacing water-logged flooring, electrical repairs, and repairing damaged foundations, walls and roofs. By quickly repairing damage, people's lives and the economy can get back to normal quicker.
Save actions units for later (citizens) Save actions units for later (authorities)	If they are able, many people and authorities put aside savings or funds to be used in the event of a shock such as a flood. Savings or contingency funds can then be used to buffer the impacts of the flood by paying for repairs, or covering a period of reduced income or increased costs stemming from the flood.
Support the citizens (authorities)	Authorities, in this case the local government or water board, sometimes choose to spend their resources, to reduce risk or help communities recover from floods. For example, the government might help one or more citizens with repairs, or fund the 'learn how to use early warning system' action for all. They might do this only with their own resources, or with co-financing from citizens. Authorities might prioritize these flood resilience building actions on their own, or they might take this action in response to lobbying by communities.
Inform citizens about risk areas	Information about which areas are low, medium and high risk is essential for governments, businesses and citizens to make decisions about investing in risk reduction, or even relocating. If someone (such as the Water Board) has information about risk, sometimes they can choose to share it or not, and sometimes they are unable to share it. Freely available risk information is essential to help people make decisions which can increase their flood resilience.
Home/asset retrofitting & adaptation Permanent infrastructure protection works	By making modifications (retrofitting) to a home, business or infrastructure, its vulnerability to damage from flooding can be reduced. Houses, businesses and infrastructure can also be built so they are more adapted to flooding. Examples of this retrofitting or adaptation include raising the level buildings, physical barriers to inundation, water resistant and reinforced materials, and well maintained drainage around the asset. Investing today in retrofitting and adaptation protects the asset from future flood damage, thereby increasing flood resilience.
Mutual support	"Many hands make light work!" When community members help each other with repairs, they can get them done quicker and cheaper than if they had not helped each other out. Helping our neighbours, or 'social capital' is known to be a significant factor in resilience to flooding.
Establish flood reconstruction budget	After a flood has occurred, finding money to pay for repairs is often a challenge, even for governments. If government is responsible for an asset that the whole community depends on, then this hurts everyone's long-term well-being: if the health clinic is not repaired, then everyone's health suffers. If government joins together with proactive citizens and businesses, they can create a fund with reserves available for quickly repairing critical infrastructure after a flood. Quickly and fully repairing damage to

	critical infrastructure reduces long-term impacts on well-being, hence increases resilience to flooding.
Levees repair	Levees are a common flood risk reduction measure in many flood prone areas. When a levee is damaged or destroyed by a flood, it can be repaired so it continues to provide the level of protection as previously, or it can be abandoned. Levees often provide good flood protection - up to the level at which they are built, for example a 1 in 100 year event. It is important to note that levees can induce what is called the "levee effect" where people mistakenly believe that the levee-protected area is totally risk free. Because they believe the area is risk free, development behind the levee increases significantly. When a flood severe enough to overtop or damage the levee comes, all that development is then flooded.
Improve your house Improve infrastructure	Better quality buildings - either houses for citizens or infrastructure managed by authorities - not only withstand flood better, but they also improve the citizen's quality of life. Stronger, improved buildings do not wear out as quickly, so regular maintenance costs are lower. When authorities invest in infrastructure and lower its ongoing maintenance costs, then using that infrastructure becomes cheaper for citizens. Improvement and strengthening of buildings not only increases flood resilience, but also citizen's quality of life.
Develop Early Warning System Learn how to use Early Warning System	In situations where floods arrive quickly, an early warning system is critical. Early warning systems warn the flood-exposed population that a flood is coming, giving them adequate lead time to reach safe grounds with evacuation and protect their most important assets. An early warning system is not just about an alarm, but includes the human and social elements of people trusting the alarm and knowing how to respond. Early warning has a significant impact on lives lost and assets damaged during floods. A few hours warning can significantly reduce flood impact.
Buy insurance	When affordable, insurance can enhance flood resilience by providing ready access to resources for meeting needs, repairing damage and reconstruction after a flood.
Home or business relocation Infrastructure relocation	Some areas are at higher risk of flooding than others. If a home, business or infrastructure is located in a high risk area, then it may make sense to relocate. Relocation depends on the availability of a suitable piece of land in a lower risk area. Relocation is also very expensive. While relocation is expensive, it can pay off due to the lack of flood damages in the long-term. Relocating homes, businesses and infrastructure to suitable, low-risk areas can make a significant difference to flood resilience. It is essential to note that forced relocations of populations have often ended up violating people's rights, being very corrupt, and destroying solid communities. If relocation is an option, it must be wanted by the people being located, and they must be key decision-makers in the process.
Invest in reforestation upstream	In situations where deforestation has led to increased flood risk, reforestation in the upper river catchment can have significant impacts on reducing flood severity. Upstream forests slow runoff time by facilitating the capture of surface water. They also help

	slow erosion on slopes. Increasing this natural capital can have a significant impact on the flood resilience of communities right along the river.
Create a flood retention pond scheme	Retention ponds, together with other types of stormwater and floodwater retention or detention areas, work by providing a safe place for flood waters to flow to. Drainage channels divert water from the river to the retention area where it is safely stored. The use of locally appropriate and well-designed infrastructure such as retention ponds, can reduce the severity of flooding and thereby increase flood resilience.

Then ask players how these types of action might work in their regions:

- Which of the solutions presented during the game are or have been used in your region?
- Which of the solutions do you think would work very well in your region?
- Do you plan on implementing any of them? Why?
- Which of the solutions would not work in your region? Why?

6. Reflection

This is the last part of debriefing. Ask the players

- Which actions are most important in our opinion?
- Which important actions you can start to implement right now?
- Which important actions would you need to work with others to implement? Who?