

## Getting started

At the start of the game, each player chooses one of the coloured cars and places it on one of the parking spots: the car serves as a token, the parking spot is the starting point for the game. During the game, you play with game pieces (buildings and cows) of the same colour as your car.

At the start, you'll receive two currency notes of each denomination (in total 1.760,-); the rest of the play money remains with the bank. One of the participating players serves as a banker.



The risk cards are placed in the middle of the game board. Are you playing the game as a truly serious game, then use the blue risk cards only. Have you played the game multiple times and does it no longer hold any secrets for you? Then the magenta risk cards may be a good addition: these cards add a playful element to the game and allow you to mess up your opponent's strategies.



The person who throws the highest value with the D6-dice starts with the game. Before the tokens are placed on the board and the actual game starts, each player is alternately allowed to build three objects. These have to be paid for to the bank. Next, each player throws the D6-dice to determine how many spaces his or her car may be moved clockwise along the levee. No two cars are allowed concurrently at the same space; if there is already an opponent's car on your space, move your car to the next available space.

Each space contains an icon. Each icon refers to a type of action that is explained on following pages.



- Construct a building or implement adaptation measures



- Receive income



- Draw a risk card



- Construct a sea or river barrier



### Building mounds

Mounds are hillocks of 1,5 meter height that can be placed on each lot in the polder. You can use a mound either to raise the ground level of a building or as a refuge for cows. Positioned underneath a building, the building's ground level is raised with 1,5 meter; in this case, the mound cannot serve as a refuge. If used as a refuge for cows, it serves not only your own cows but also any cows on the other 3 lots within the lot quadrant. Once the mound is built, the building on top of it or the cows in the lot quadrant are only at risk of flooding if the water level exceeds 1,5 meter. Please note: you do not have to move the cows in the lot quadrant to benefit from the mound. Building a mound costs 50,- play money, payable to the bank.



### Rainwater storage

Rainwater storage provides a central location for storing excess water in case of rainstorms. As a result, the water level in case of rainfall can be lowered with 50 cm in a lot quadrant with a rainwater storage in it. You cannot build on top of a rainwater storage nor use it for your cows; as a result, a maximum of 3 lots with buildings or cows in a lot quadrant can benefit from a rainwater storage. You can place multiple rainwater storage facilities in a lot quadrant and combine the effects. Suppose there are 3 rainwater storage facilities, any building or cow on the 4th lot will benefit from a reduction of the water level of 150 cm in case of a rainstorm. Building a rainwater storage facility costs 50,- play money, payable to the bank.



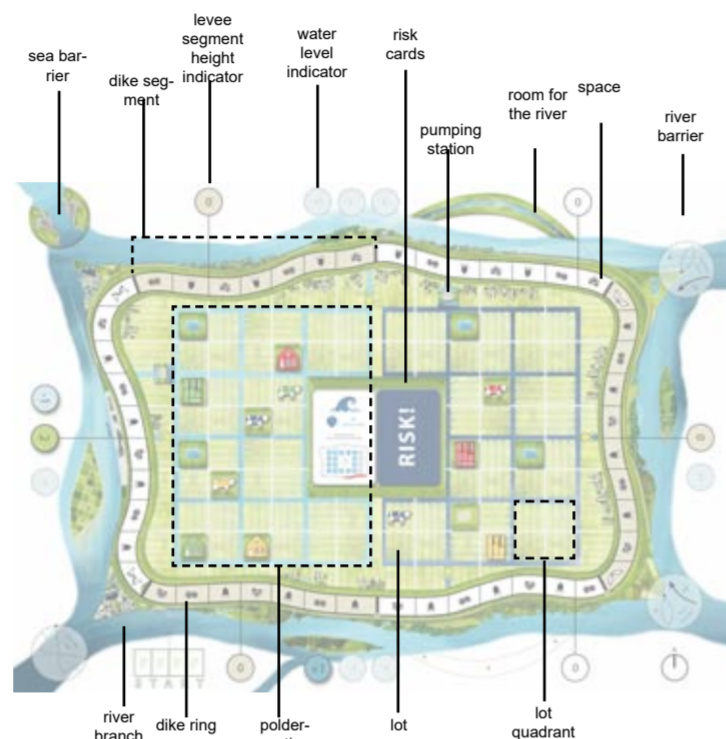
### Room for the river

Room for the river improves the river's capacity and lowers the water level by adding a bypass. There are two predefined locations on the game board where such a bypass can be created. The bypass will cause the water level along the dike segment to drop with 1 meter. Implementing the room for the river bypass costs 200,- play money, payable to the bank.

## Who wins?

The game ends either if one of the players goes broke or no risk cards are left. In that moment, the value of each player's possessions is calculated (buildings, cows and play money). The player with most possessions (highest total value) wins.

While playing the game, you can employ different strategies for water safety and climate adaptation. At the end of the game, spend some time together to reflect on the strategies followed and try to find out what was effective or not. Try another approach next time to see if things turn out to be different..



### Pumping station

A pumping station can pump rainwater from a polder section or lower the water level in case of flooding. Each pumping station provides the capacity to lower water levels in a polder section with 10 centimetres. In case of multiple pumping stations in a polder section, the capacity can be added: if your polder section counts 3 pumping stations, the water level for all 10 lot quadrants (40 lots) is lowered with 30 cm. Building a pumping station costs 100,- play money, payable to the bank.



### Levee (dike) reinforcement

By building levees (dikes), the polder can be protected against high river water levels. Increasing the height of a levee reduces the chance of flooding. The dike ring is divided in 6 different dike segments that can be independently reinforced.

1 You may reinforce a dike segment of your choice upon a building/adaptation turn. You may reinforce only one segment at a time; reinforcement means increasing the height with 1 meter. A maximum of 3 reinforcements for each dike segment is possible throughout the game, leading to a maximum height of 3 meters. Implementing levee reinforcement costs 100,- play money, payable to the bank.

2 You can administer the height of a dike segment by laying a levee height counter with the correct value 1, 2 or 3 meter) on the levee segment height indicator on the board.



### Insurance

Insurance ensures that any damages from flooding or rainfall are fully reimbursed. Whenever you play this card, you effectively do not suffer from any losses. The insurance card is valid for one event only. Once you have used the card, it has to be returned to the bank. You can buy an insurance card as often as you like, as long as its available: there is a maximum of 3 insurance cards in the game. Getting an insurance card costs 1.000,- play money, payable to the bank.

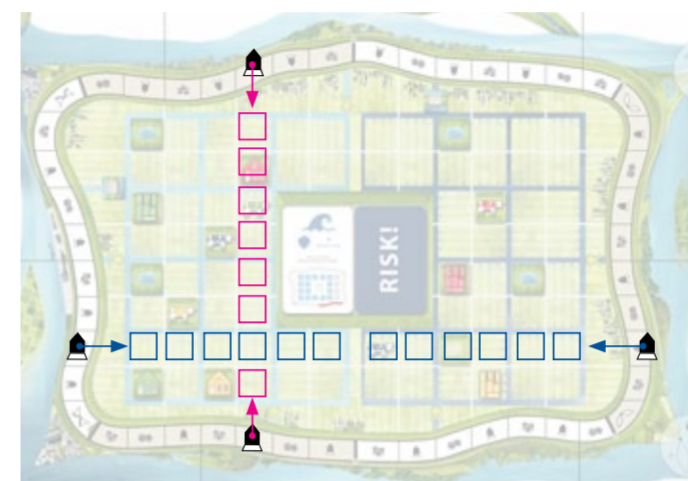


## Building

When your car arrives at a space with a 'building/adaptation' icon, you can choose between buying new buildings or cows and protecting your existing possessions (see instructions regarding adaptation).

If you choose to build, you can choose to construct an office building (500,- play money) or house (200,- play money), or buy a cow (100,- play money). Always payable to the bank.

You can place your new office, building or cow on a free lot in the row adjacent to your car.



## Income

When your car arrives at a space with an 'income' icon, you as well as all other players receive income from the bank. Income is easily calculated: for each office building, you receive 50,- play money; for each house, you receive 20,- play money; for each cow, you receive 10,- play money.

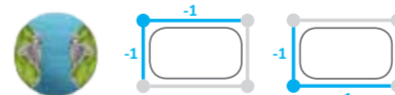


### Barriers

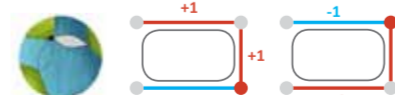
In case of a storm surge or high river discharges, barriers block the water flow and thus ensure that water levels do not rise too much. There are two types of barriers: sea-barriers and river barriers (flipper). You can choose to build a barrier when your car arrives at a space with a 'barrier' icon (at the edges of the dike ring). The sea and river barriers have different effects.



Sea barrier: You can build a sea barrier only if the majority of players agrees with you. In that case, all players, including any players that disagree, need to pay their share. Building the sea barrier costs 500,- play money per player, payable to the bank. The sea barrier closes the connection to open sea and ensures a lower water level in connected river branches.



River barrier: You can build this barrier individually. It costs 500,- play money, payable to the bank. The river barrier diverts the water to one branch, which will face a water level increase of 1 meter. The other branch will have the benefit of a lower water level, -1 meter.



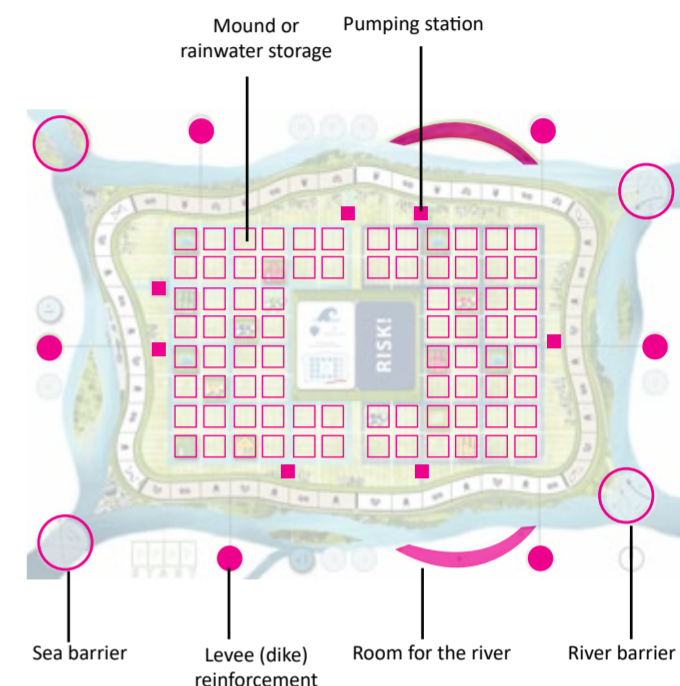
You can administer the water level decrease or increase on the game board by laying a blue water level counter (-1 or +1) at the designated spot near the correct river branch.



## Adaptation

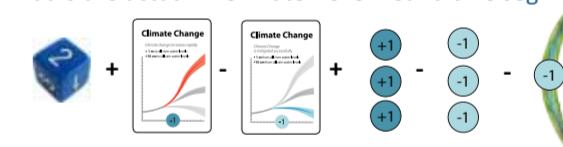
When your car arrives at a space with a 'building/adaptation' icon, you can choose between buying new buildings or cows (see instructions regarding building) and protecting your existing possessions.

For protection, different adaptation measures can be implemented: you can reduce the chance of flooding by building barriers, creating room for the river or reinforcing levees; you can also reduce the damage from flooding by installing pumping stations, building mounds, creating rainwater storage or getting insurance. The costs associated with adaptation measures are to be paid to the bank (for an overview of costs, see reverse side of this leaflet). Below all options are described in more detail.

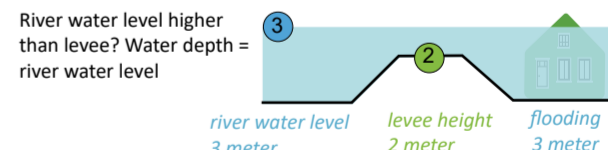
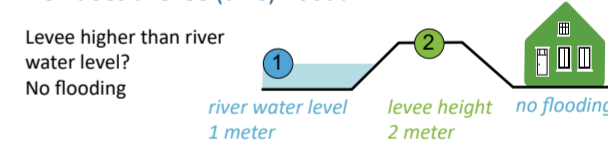


### Example calculations

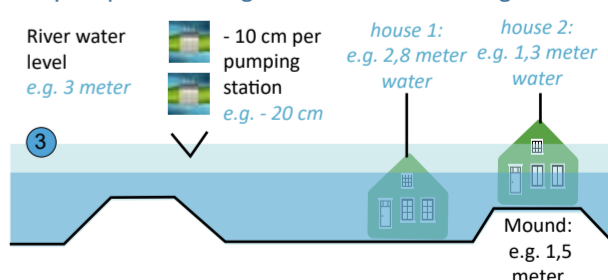
What is the actual river water level near a dike segment?



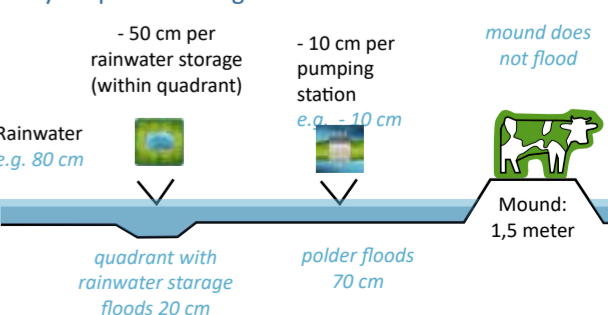
When does a levee (dike) flood?



Will your possessions get flooded in case of high water?



Will your possessions get flooded in case of a rainstorm?



# CLIMATE ADAPTATION GAME

The water challenge

English tutorial can be found at:  
www.climateadaptationgame.com



Construction	Costs	Income	Water depth	Damage
	100,-	10,-	30-100 cm	10,-
			> 1 meter	remove cow
			> 2 meter	remove cow
	200,-	20,-	30-100 cm	20,-
			> 1 meter	50,-
			> 2 meter	remove building
	500,-	50,-	30-100 cm	50,-
			> 1 meter	100,-
			> 2 meter	remove building

A tailored version of this game for a specific region?  
Look for possibilities at:  
www.climateadaptationgame.com

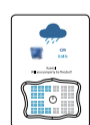
**Defacto**  
Urban & Landscape design

Adaptation	Measure	Costs	Sphere of influence	Effect	Effect on floodwater depth	Effective against
	Mound	50,-		Provides an increased ground level for any building located on it, or a place of refuge for all cows in the lot quadrant.	- 1,5 meter	
	Rainwater storage	50,-		Allows storage of up to 50 cm of rainwater in the lot quadrant.	- 50 cm	
	Pumping station	100,-		Each pumping station lowers the water level in the polder section it is located at.	- 10 cm	
	Levee	100,-		Allows reinforcement of a levee by increasing the height of a dike segment with 1 meter, up to a maximum of 3 meters.	Lowers the chance of flooding	
	Room for the river	200,-		Room for the river lowers the water level in rivers with 1 meter.	- 1 meter	
	Sea barrier	500,- per player		The sea barrier lowers the water level of river branches protected by it with 1 meter.	- 1 meter	
	River barrier	500,-		The river barrier lowers the water level of river branches downstream of the barrier with 1 meter and increases the water level of branches that serve as bypasses with 1 meter.	- /+ 1 meter	
	Insurance	1.000,-		In case of flooding, all damages are waived. You are free to choose a flooding event for compensation. The card is valid only once.	No damages as a result of a flooding event.	

## Risk

As soon as your car reaches a space with a risk icon, you have to draw a risk card. From the deck in the middle of the board, you draw the uppermost card, turn it around and lay it down next to the deck so that everyone can see the card. There are different types of risks, such as a rainstorm, the bursting of a dike or the failure of a storm barrier. The risk cards are described in more detail below.

### Rainstorm



Cards with a rainstorm indicate which of the parcels are hit: blue parcels are at risk of flooding from heavy rainfall.



The amount of rainfall is determined by throwing the D100-dice. Its numbers indicate the amount of water in centimetres. For example, 10 indicates 10 centimetres of water.

Rainstorms can lead to flooding, from a few centimetres up to a meter or more. Whether a rainstorm causes any damage depends on the amount of rainfall, the presence of any buildings or cows and any adaptation measures that may have been implemented. You estimate the amount of water on any given parcel using following formula:

$$\begin{aligned} & \text{centimetres of rainfall according to dice} \\ & - 50 \text{ cm for each water storage facility in a quadrant} \\ & - 10 \text{ cm for each pumping station in polder section} \\ & \hline & = \text{net amount of water (cm) on the parcel} \end{aligned}$$

On the next page, a table is included that shows any damages incurred per building or cow. Damages are to be paid to the bank by each owner of a building or cow that is affected. Any building or cow on a mound is unaffected by rainstorms.

## Flooding



Cards with waves indicate that the water level in rivers is high, leading to an increased risk of bursting of a dike and, subsequently, flooding of polders. Polders that are flooded are indicated in blue. River sections with high water levels are marked red.



The water levels are determined in two steps. First, the D6 dice is used to estimate the water level; numbers on the dice are water levels in meter. Second, this water level is corrected for any measures that have been implemented: for example, a seawall will affect the actual water level.

To estimate the actual water level including any measures, following calculation can be performed:



$$\begin{aligned} & \text{river water level as estimated using dice D6} \\ & \pm \text{ decrease/increase as a result of barriers} \\ & - \text{ decrease as a result of 'room for the river'} \\ & \pm \text{ changes as a result of climate change (risk map)} \end{aligned}$$

= actual river water level

If high river water levels actually lead to flooding depends on the height of dikes. If the actual river water level is higher than a dike segment, an area behind the dike segment will flood. The water depth is equal to the river water level.

The damage table in this leaflet indicates the amount of damage per building or cow. To compensate for this loss, a damage fee is paid to the bank. If a cow dies or a building suffers from irreparable damage, leading to removal from the board, the mound will remain in place and can subsequently be (re-)used by any player.

## Climate change

The amount of river discharge and rainwater is affected by climate change. There are many uncertainties as to how climate change will develop. Different models and scenarios are often employed to make estimations. Actual future climate change may be less strong than predicted, or worse.



If you draw the red climate change card, then climate change is occurring faster than forecast. For river water levels estimated using dice D6, +1 meter should be added. For rainfall water levels estimated using dice D100, +10 centimetre should be added.



If you draw the blue climate change card, then climate change is occurring slower than forecast. For river water levels estimated using dice D6, -1 meter should be subtracted. For rainfall water levels estimated using dice D100, -10 centimetre should be subtracted.

Any climate change cards drawn remain valid during the remainder of the game and apply to all players, and should therefore remain visible to everyone. If multiple climate change cards are drawn, the effects have to be accumulated.

### See barrier failure



There is always a remaining risk, however small, that a closeable barrier does not properly function. It may not close entirely, malfunction in some way, or closure may be too late to be fully effective.

If you draw the card 'sea barrier failure', this means that the barriers will malfunction the next time a risk card with high river water levels is drawn. The sea barriers in that case do not have any decreasing effect on water levels.

## Reflection card



The Climate Adaptation Game is a serious game. It provides lessons and ideas on developing water-safety strategies.

Whenever you draw the reflection card, have a conversation among all players: which strategy are we employing, even if unconsciously? Does the strategy somehow resemble a strategy pursued by a country, for example The Netherlands, Bangladesh or The United States? Is your strategy successful, or could it be wise to change course?

### Alternative start conditions?

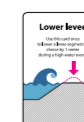
By default, you start the game with an uncultivated area, without any buildings and water management or adaptation measures. Would you like to start from a situation in which the area is already developed, with adaptation measures in place?

On www.climateadaptationgame.com you'll find alternative starting situations. For example situations that represent The Netherlands or Bangladesh.



### Playful cards: steal a mound

Whenever you draw this card, you may move an opponent's mound to a land parcel of your own choice. The card is valid only at the moment of drawing and only once.



### Playful cards: lower an opponent's levee

After having drawn this card, you may lower a levee of your choice with one meter whenever a risk card with a chance of flooding is drawn. The card is valid only once. You can play the card whenever you like.