

# FLORIMA Manual

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## 1 Introduction

This is game facilitator's manual for the FLORIMA Flood Risk Management game.

The lesson setup is explained in section 2. It details the objective and use, preparation, introduction, playing, and debriefing of the game.

The game rules are explained in section 3. It details the goals, roles, start, flow, and end of the game.

## 2 Lesson setup

### 2.1 Objective and use

The learning objective of the game is to give students insight into the tensions that play a role in flood risk management by having them experience some of those tensions.

The game is intended for high school students of around 15 to 16 years of age. It is meant to be played during one 45 minute class. It is played with multiple groups of 4 students each.

### 2.2 Preparation

Before students enter the classroom:

1. Print the game materials and cut them.
2. Arrange tables that can accommodate 4 chairs.
3. Place a game board in the middle of each table.
4. Place stacks of 12 bills each of 1, 2, 3 and 4 million near each game board (the 'bank').
5. Place a rule overview sheets near each game board.
6. Place a casualties card near each game board.
7. Place 8 tokens and 6 levee reinforcement strips near each game board.
8. Give a measures card to each player.



For best effect, an A3 colour printer is recommended for the game board, and an A4 colour printer is recommended for the rest of the materials. However, the game board can also be printed on A4, and all materials (including the game board) can be printed in grey-scale on a black-and-white printer without loss of information.

One game consists of the following materials:

- 1 game board;
- 12 bills of 1 million;
- 12 bills of 2 million;
- 12 bills of 3 million;
- 12 bills of 4 million;
- 4 measures cards;
- 6 levee reinforcement strips;
- 8 tokens;
- 1 casualties card;
- 1 rules overview.

It is recommended that the teacher is the game facilitator. The game facilitator needs:

- a scenario (examples are included in appendix B);
- a results table (an example is included in appendix C);
- a stopwatch.

Have the students form groups of 4 players each. Each group decides who the player is for each area on their game board. All players then sit near their areas.

## 2.3 Introduction

Before beginning the game, the game facilitator should introduce the students to the background of the game, the general rules and aspects of the game, and the possible player actions in the game. One way to do this is to read the game introduction (provided in appendix A) to the students.

## 2.4 Playing

After the introduction, the game facilitator can begin the game. The game rules are given in section 3.

## 2.5 Debriefing

The game facilitator begins the debriefing by writing down the results on the blackboard (an example of a results table is given in appendix C). This gives the students an idea of their performance. Each group will have one or more “winner(s)” in terms of money and one or more groups will have the highest total amount of money. One or more groups will have the lowest casualties score.

It is important for students to realise that there’s not a single good strategy that is always effective. There’s no single way to find a balance between reducing the chance of flooding and the effects of flooding. There will always be tension between the wishes of the individual and the wishes of the community.

So with the results, the game facilitator could discuss the following tensions:

- **Economy versus casualties:** The game facilitator can find out that players sacrificed people for money.



- **Individual versus cooperative:** The game facilitator can compare the levels of cooperation between the groups to show that more cooperation gives better results.
- **Preventing flooding versus preventing the effects of flooding:** The game facilitator can compare the approaches used in the groups to reduce risk and effect. Risk is reduced by the measures Levee Reinforcement, Water Retention Area, and Channel Widening. Effect is reduced by the measures Calamity Preparation, Emergency Services, and Fund.

As the students have experienced the tensions first-hand while playing the game and have subsequently related them to real-world flood risk management, they should gain the insight that these tensions are an unavoidable part of flood risk management.

## 3 Game rules

### 3.1 Goals

- Each group should get as few collective casualties due to flooding as possible.
- Each player should earn individually as much money as possible.

### 3.2 Roles

This game is for groups of 4 players and each player in a group gets a role:

1. **Industry:** Earns a maximum of **5 million** per turn with **2 casualties** during a flood.
2. **Nature:** Earns a maximum of **3 million** per turn with **2 casualties** during a flood.
3. **Rural:** Earns a maximum of **4 million** per turn with **2 casualties** during a flood.
4. **Urban:** Earns a maximum of **4 million** per turn with **4 casualties** during a flood.

### 3.3 Start

1. Each player takes a starting capital of 4 million.
2. Each fund is provided with a starting capital of 4 million.
3. The game facilitator selects one of the scenarios from appendix B (recommended is the third scenario).
4. The game facilitator begins the game by announcing the water level of the first round from the selected scenario.

### 3.4 Flow

1. The game facilitator begins each round by announcing the water level for that round. The water level for each round is shown on the selected scenario. It is recommended to announce the second round after 5 minutes, and the following rounds after 3 minutes. It is also recommended to announce the last minute and the last 20 seconds before the round is over. If all groups are done then the game facilitator may decide to start the next round earlier. The game ends after 8 rounds. Rounds 9 and 10 are optional. If the groups are becoming passive because they have reached an optimal state, the game facilitator may decide to skip the last or the last two rounds. It is important that the game facilitator never discloses how long the entire game takes or how many rounds the game takes.
2. The game facilitator should remind the players that their first action should be to figure out their income, their expenses and any casualties. The game facilitator could use the following lines, after the water level has been announced:



- a) "First of all, add 1 million to the fund pile."
  - b) "Determine the number of casualties in your area."
  - c) "Determine your income."
  - d) "Determine the costs of your measures."
  - e) "Determine which of your measures are now void."
3. The fund gets 1 million from the bank.
  4. The players receive money from the bank:
    - If the area of a player is not flooded, then that player receives the money that is indicated on his or her area.
    - If the area of a player is flooded, then that player does not receive any money unless a measure changes this.
  5. The players mark off casualties on their group's casualties card:
    - If the area of a player is not flooded, then that player does not mark off any casualties.
    - If the area of a player is flooded, then that player marks off the casualties that are indicated on his or her area unless a measure changes this.
  6. The players handle the upkeep of their measures. Certain measures cost an amount of money each round, or may be voided. This is indicated on the measures card.
  7. The players may decide to use their money to take measures. A player can only take measures for his or her own area, but may provide other players in the group with money to take measures. Any player or combination of players from a group may take the Channel Widening or the Water Retention Area measures. The available measures are:
    - **Calamity Preparation**
      - **Use:** A token is placed on the box "Calamity Preparation" on the player's area on the game board.
      - **Costs:** 3 million. Maintenance 1 million per turn, except when a flooding event occurs.
      - **Effect:** Player receives 2 million and one less casualty during a flooding event.
      - **Terms:** Applies to one area. Measure can be cancelled by player.
    - **Emergency Services**
      - **Use:** A token is placed on the box "Emergency Services" on the player's area on the game board.
      - **Costs:** 5 million. Maintenance 1 million per turn, except when a flooding event occurs.
      - **Effect:** No casualties during a flooding event.
      - **Terms:** Applies to one area. Measure can be cancelled by player. Measure is voided after flooding.
    - **Fund**
      - **Use:** A token is placed on the box "Fund" on the player's area on the game board.
      - **Costs:** 7 million into the fund. Afterwards 1 million into the fund per turn, except when a flooding event occurs.
      - **Effect:** After a flooding event, the fund is divided between all flooded players that have taken the Fund measure.
      - **Terms:** Applies to one area. Measure cannot be cancelled. Measure is voided after flooding.
    - **Levee Reinforcements**



- **Use:** A levee reinforcement strip is placed on a levee on the player’s area on the game board.
- **Costs:** 9 million per levee.
- **Effect:** When all borders of an area have been reinforced, then the area will be protected for a water level of 1.
- **Terms:** Applies to one area. Measure cannot be cancelled.
- **Water Retention Area**
  - **Use:** A token is placed on the box “Water Retention Area” on the game board.
  - **Costs:** 18 million.
  - **Effect:** The water level of 3 is decreased with 1 water level.
  - **Terms:** Applies to all areas. Measure cannot be cancelled.
- **Channel Widening**
  - **Use:** A token is placed on the box “Channel Widening” on the game board.
  - **Costs:** 36 million.
  - **Effect:** The water level of 0, 1, and 2 is decreased with 1 water level.
  - **Terms:** Applies to all areas. Measure cannot be cancelled.

8. The game continues with the next round at step 1.

### 3.5 End

1. All players freeze their actions immediately. Make sure no one grabs the fund pile!
2. All players count their money.
3. Each group counts their total amount of casualties.
4. Each group report to the game facilitator the casualty count and how much money each player has left. The game facilitator writes down these figures on the blackboard in a results table like the example supplied in appendix C.
5. The game facilitator begins the debriefing.



## Appendix A: Game introduction

Today we are going to play a nice game about floods and the risks that come with trying to manage flooding, both before and after it happens. In short, this game is about flood risk management. On every table you see a map with 4 areas: industry, rural, nature and urban. Every table has 4 players. Every player is responsible for one of the areas. Your goal as a player is to earn the most money individually and to have the least amount of casualties as a group.

But first, what's this all about? Basically, flood risk management is about taking measures to prevent flooding and to reduce the losses caused by flooding. When taking measures, it is important to weigh the costs against the benefits of each measure. This is what makes flood risk management a complex system: people are dependent on each other to be able to take measures and since there are many possible measures to take, it is difficult to determine which measures you should take specifically in the first place.

So how does the game work? Pay close attention. The game is based on rounds. Each round takes a couple of minutes. I'll announce 20 seconds before the next round is about to begin. On the board you see an indicator of the water level. I begin each round by announcing the water level. One of you then places the token on that level. If the water level is -1 (low) or 0 (normal), then no area is flooded. If the water level is 1 (high), 2 (very high) or 3 (extreme), then areas can be flooded. After I've announced the water level, it's up to you all to determine how much money you get. If your area is not flooded, then you receive the income that is mentioned on the board in your area. Industry gets 5 million, rural gets 4 million, nature gets 3 million and urban gets 4 million from the bank. If it is flooded, then you don't receive any income. Moreover, you all then cross off the casualties you have on the casualties card which is on the table. The number of casualties in your area is mentioned on the board in your area next to your income. Industry has 2 casualties, rural has 2 casualties, nature has 2 casualties and urban has 4 casualties when flooded. After you have determined your income and casualties, you can take some measures. Have a look at the measures card now:

- **Emergency Services** allows you to save lives. It costs 5 million initially and 1 million every turn, which you pay the bank. Once your area is flooded, this measure is voided.
- **Calamity Preparation** allows you to save one of your citizens and receive 2 million when your area is flooded. This measure is not voided after flooding.
- **Channel Widening** decreases the announced water level by one, for the water levels 0, 1 and 2. So, it applies to all areas.
- **Water Retention Area** decreases the announced water level by one, for the water level of 3. So, this applies to all areas as well.
- **Levee Reinforcements** protect your area against the water level of 1 (high). But beware, industry and urban need two levees, while nature and agriculture only have one to reinforce. Reinforce your levee by paying the bank the amount due and placing the piece of paper on your levee to represent the reinforcement.
- **Fund** is a form of insurance. By paying a one-time fee you are guaranteed the amount that is in the fund when your area is flooded. If other players decided to buy themselves in for 7 million in the Fund, then the first one that is flooded gets the money. If more two or more players are eligible to get the money, the money is of course divided among them. The fund is filled each round by the bank and the players that participate in the fund.

When you take measures, always place a token on the corresponding place on the board. Keep good track of what everyone does and what happens, so no one gets more money than allowed! You'll notice that the measures you take have an effect on your income and the number of casualties. So make sure you keep a careful track of the effects of your measures!

While you have a specific role in the game, you are of course free to collaborate to try to get the money you need to take the measures you want to take.



So, keep in mind, your goal as a player is to earn the most money individually and to have the least amount of casualties as a group.

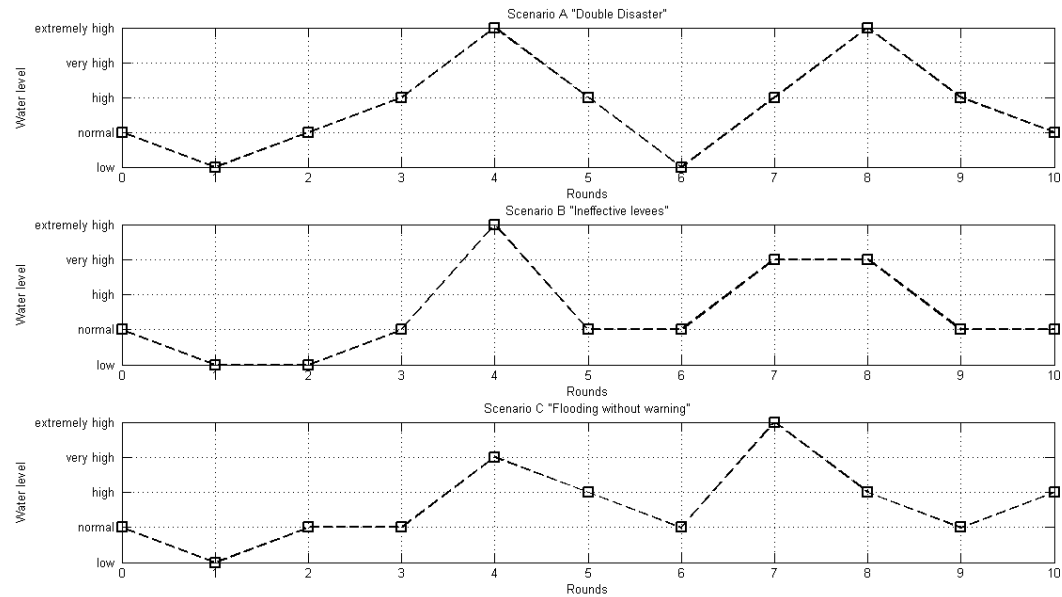
Are there any questions at this time? *Respond to questions if needed.*

Let's start the game by letting each of you taking 4 million as starting capital. Then put 4 million starting capital in the Fund.

Ok, is everyone ready?

Good luck! I'll start the game by announcing the first round.

## Appendix B: Scenario roundgraphs



## Appendix C: Example of results table

	Casualties	Score industry	Score urban	Score rural	Score nature
Group 1					
Group 2					
Group 3					
Group 4					
Group 5					
Group 6					
Group 7					
Group 8					