



# AQUAPONICS BOARD GAME

## Instructions



**It is a game in which each player must achieve a minimum production of 100 food units in each round to sustain his/her community.**

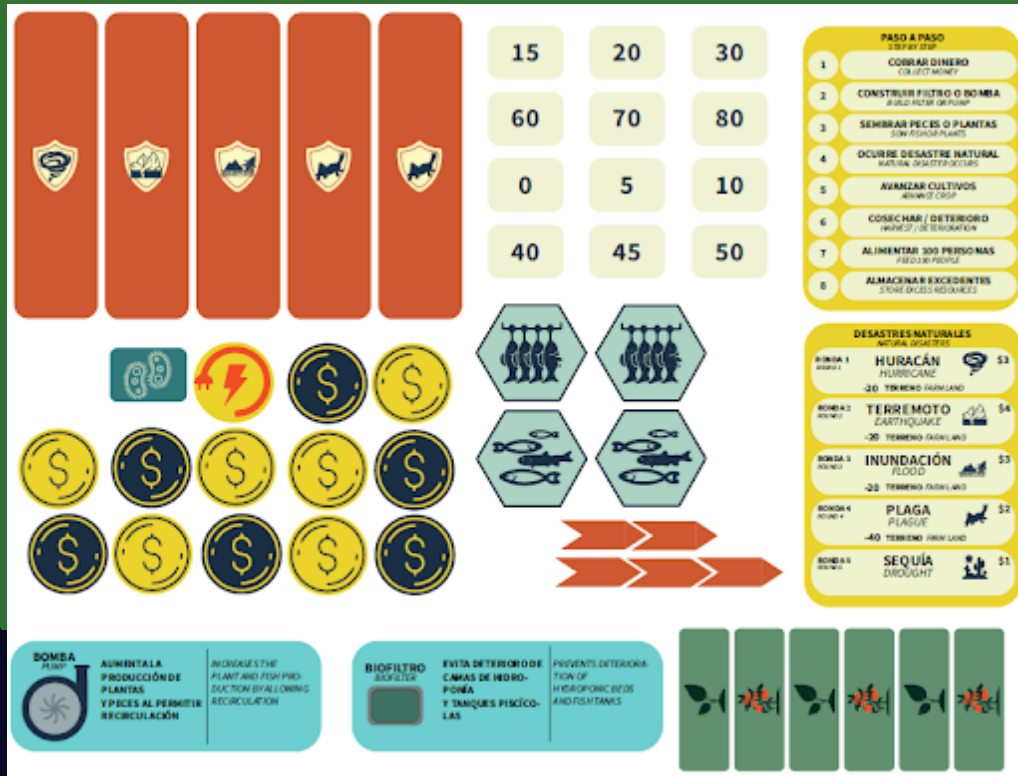
**It's a decision-making role-playing game.**

**To transition from a traditional land-based farming model to an aquaponic production system.**





In the first round, the player has 5 lines of crops cultivated on land (traditional cultivation), and each of these provides 20 food units, which is enough for a population of 100 people. However, natural disasters will occur in each round, systematically disabling the cultivation areas. Therefore, it is necessary to migrate to a new food production system, in this case, aquaponics. In this way, the player will be able to compensate for the food deficit of traditional farming by integrating fish production in tanks with the production of vegetables in hydroponics and integrating the two production systems through water recirculation and a bacteria culture that transforms fish waste into nutrients for the plants.



Once the player has successfully implemented the aquaponics system, he or she will be able to produce food for 100 or more people, which means that selling excess food can generate new resources for his or her community. However, if the player fails to produce at least 100 food units in each round, he or she must start the game over. AQUAPONICS is not a competitive game; instead, each player faces the challenges proposed by the game. However, it can be played in a group where cooperation between players is crucial to winning.

**Game board**

Select the game board where you can easily distinguish each element of the game:





# AQUAPONICS

**HIDROPONÍA**  
HYDROPONICS

10 (15)\*

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**BOMBA**  
PUMP

**BIOFILTRO**  
BIOFILTER

**PISCÍCOLA**  
FISH TANK

50 (70)\*

**SILO**  
SILO

**ALIMENTO**  
FOOD

**BOMBA**  
PUMP

**BIOFILTRO**  
BIOFILTER

**TERRENO**  
FARM LAND

20

20

20

20

**PRODUCCIÓN**  
PRODUCTION

min 100 =  +  +  +

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BIOFILTER

**TERRENO**  
FARM LAND

20

20

**PRODUCCIÓN**  
PRODUCTION

min 100 = 70 + 30 +  + 40

Description of Game pieces



## Description of game pieces

Action card per round: This card contains the actions the player must make in each round, such as how much money the player receives per round, the natural disaster he/she faces, and the loss of crops cultivated on land due to natural disasters that occur in each round of the game.

DESASTRES NATURALES		NATURAL DISASTERS	
RONDA 1	HURACÁN HURRICANE	\$3	
RONDA 2	TERREMOTO EARTHQUAKE	\$4	
RONDA 3	INUNDACIÓN FLOOD	\$3	
RONDA 4	PLAGA PLAGUE	\$2	
RONDA 5	SEQUÍA DROUGHT	\$1	

**Money:** In each round, the money that each player receives is specified.

**Type of natural disaster**

**Loss associated with crops cultivated on land:** Until the third round, only one crop line cultivated on land is lost, equivalent to a decrease of 20. In the fourth round, two crop lines cultivated on land are lost, equivalent to a decrease of 40; and in the fifth round, there will be no more crop lines cultivated on land.

## Natural disasters

The occurrence of a natural disaster disables a cultivation line that produces 20 food units. Therefore, each line will be covered with a card corresponding to each natural disaster.



## Game of pieces

### COINS



Each coin has a value of \$1. These are used to purchase supplies such as energy for the water pumping system, bacteria for the biofilter, seedlings for the hydroponic system, or fingerlings for the fish tanks (aquaculture).

### ENERGY

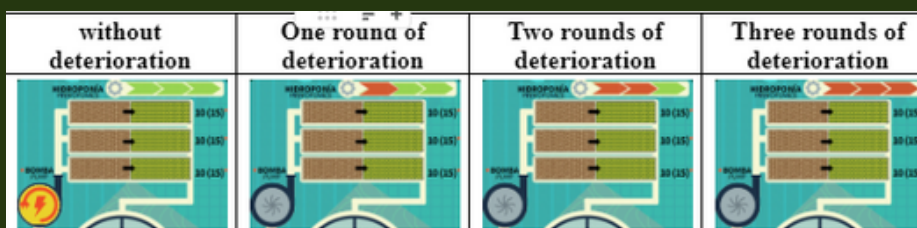


This item is priced at \$1 and initiates the water recirculation system by pumping. Once the power is installed, the Pump will operate continuously, improving the production of the Hydroponic systems by 10 to 15 food units.

## Life cycles without energy

Each orange game piece represents the degree of deterioration of the Hydroponic System. So, if there is no pumping, it could operate for a maximum of three rounds and then be out of service due to deterioration. When there is no power for the pumping system, each of the three hydroponic systems will produce 10 food units. So when the power is turned on, 15 food units will be produced in the hydroponic system.

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### GAME PIECE



### BACTERIA

This item is priced at \$1 and represents the bacteria in the Biofilter, which are responsible for transforming waste from the fish tanks into nutrients for the hydroponic system. Once the bacteria are incorporated, the Biofilter will operate permanently, preventing the deterioration of the hydroponic and aquaculture systems.



## Life cycles without biofilter

Each orange game piece represents the degree of deterioration of the Aquaculture System. So, if there are no bacteria in the biofilter, the system will show deterioration. So, it can operate without activating the bacteria for a maximum of two rounds. Then it will stop working due to deterioration. When there are no bacteria for the biofilter, the fish tanks will produce 50 food units every two rounds. Having bacteria will allow 70 food units to be produced in the fish tanks.



## Hidroponic cultivation

Each orange game piece represents the degree of deterioration of the Hydroponic System. So, if there is no pumping, it could operate for a maximum of three rounds and then be out of service due to deterioration. When there is no power for the pumping system, each of the three hydroponic systems will produce 10 food units. So when the power is turned on, 15 food units will be produced in the hydroponic system.

SEEDLINGS  
PLANTS TO HARVEST

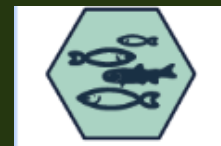


Each game piece costs \$1 and represents the stocking of fingerlings (young fish) in the fish tank (aquaculture). It is possible to buy one fingerling game piece each round. After two rounds, the fish will be ready for harvest and produce 50 food units and 70 when the bacteria have been incorporated into the biofilter.

## Fish tank cultivation

Each game piece costs \$1 and represents the stocking of fingerlings (young fish) in the fish tank (aquaculture). It is possible to buy one fingerling game piece each round. So, the fish will be ready for harvest after two rounds and produce 50 food units and 70 when the bacteria have been incorporated into the biofilter.

FINGERLINGS



FISH TO HARVEST



## Calculator

At the end of each round, the player will count the food production in his/her system, which must be at least 100 food units to move on to the next round. Otherwise, he/she must start the game over. When the player manages to produce more than 100 food units, the excess can be stored in the Silo, where it can be used in the next round of the game.

GAME PIECES

15	20	30
60	70	80
0	5	10
40	45	50



## Steps to play

GAME PIECES



On this card, the player follows each step corresponding to an action in the game.



- 1. Receive money:** Each player receives a number of coins corresponding to what the rounds description Card indicates. In the first round, he or she receives \$3, corresponding to 3 coins. The player may use all the money received in the round or save it for subsequent rounds.
- 2. Build filter or pump:** If desired, the player may purchase bacteria or energy to power the biofilter or pump. Bacteria and energy each cost \$1 per unit and must be purchased only once in the game. Once energy or bacteria is installed, the biofilter or pump will become operational.
- 3. Plant fish or plants:** If the player wishes, he/she may purchase Seedlings or Fingerlings to culture them. Each Seedling and Fingerling game piece costs \$1. The player has up to 3 Hydroponic beds; this means that he/she can culture up to a maximum of 3 Seedling game pieces per round and 1 Fish Tank; that is, he/she can cultivate up to a maximum of 1 Fingerling game piece per round.
- 4. Natural disaster occurs:** The natural disaster cards corresponding to each round must cover the crops on the Land, symbolizing the loss of these crops. In the case of the first round, a hurricane will pass through the game, eliminating a bed of Land crops, equivalent to a decrease of 20 food units in Land production.
- 5. Advance crops:** In this step, the Seedlings are transformed into plants, and the corresponding game pieces must be advanced in the hydroponic system. Likewise, the fingerlings will move to the next square, and if they were in the second position of the Fish Farming system, they will transform into Fish and will move to the last position of the Tank.
- 6. Harvesting/deterioration:** Once the crops are advanced, a life cycle game piece is removed from both the Hydroponic System and the Fish System if the bacteria for the biofilter have not been acquired. The hydroponic and fish systems cannot be allowed to lose all of their life cycle game pieces; therefore, a maximum of two life cycle game pieces must be lost in the hydroponic system and one in the fish system. Suppose the life cycle game pieces have run out in either system. In that case, it stops working instantly, and the game must, therefore, continue with the system that is currently functioning.
- 7. Feed 100 persons:** The production of the Hydroponic System must be added up (using production game pieces) according to the number of Plant game pieces (maximum 3 game pieces). Similarly, the production of the Fish Farming System according to the number of Fish game pieces (maximum 1 game piece), the production of the Farming System on land (20 for each line not covered by a natural disaster), and the food stored in the Silo. If the total sum of production is less than 100, the player has lost the game. However, if the production is 100 or higher, the player continues in the game for the next round. Note that the production of plants and fish increases if there is energy for the pump.
- 8. Store Surplus:** If the total production is higher than 100, the surplus is stored in the Silo. If, for example, the player produced 105, the surplus corresponds to 5, and a game piece with that value is placed in the Silo to be counted in the next round

## Examples

- Lucía has started the game. She has received her game board and pieces. Round 1 begins.

1. Lucía receives \$3, represented by 3 coins.
2. With that money, she has decided to buy Energy (\$1), starting the functioning of the Pump. This means her production from Hydroponic farming is now 15, and 70 from her Fish farming. She has \$2 left.
3. Lucía has purchased 2 Seedling game pieces (\$1 each). She has placed each Seedling game piece on one of the Hydroponic cultivation beds (brown). Two of the three Hydroponic cultivation beds have been planted. She has spent all of her money this round.
4. As she is in the first round, a Hurricane has occurred as a natural disaster. Lucía places the hurricane game piece covering the left line of crops on Land.
5. It is time to advance the crops. Lucia replaces the Seedling game pieces with the Plant game pieces and places them on the right position (space) of the Hydroponic cultivation beds (green color). Two of the three Hydroponic cultivation beds have produced Plants. Since there are no Fingerlings, no game pieces have been moved to any position in the Fish Farming system.
6. It is time to harvest. Lucía has 80 production points or food units from Land cultivation (since one of the cultivation lines on land was destroyed by the hurricane) and 30 points from the Hydroponics system. These 30 points are represented by two Plant game pieces, each with a production equivalent to 15 points since the Pump is running. If the Pump had not been on, each plant game piece would have represented only 10 points. Lucia removes one orange Life Cycle game piece from the Hydroponics system and the Fish system since she did not buy bacteria for the Biofilter at the start of the round; now, she only has two life cycles left for the Hydroponics system, and one life cycle left for the Fish system. Lucía has no Fish production and has nothing stored in the Silo. Therefore, her production is:



- A. FISH FARM = 0
- B. HYDROPONICS = 30
- C. SILO = 0
- D. LAND = 80

- Lucía must feed 100 people each round; this time, her total production is 110, so she can continue in the game.
- The surplus of Lucía is 10, so she places the game piece with the number 10 in the Silo to store that amount of food for the next round.

## Examples

- Felipe has started the game. He has received his game board and pieces. Round 1 begins.

- Felipe receives \$3, represented in 3 coins.
- With that money, he has decided to buy Bacteria (\$1), putting the Biofilter into operation. This means the Hydroponic and Fish Farming systems no longer deteriorate, so he will not have to remove life cycle game pieces. He has \$2 left.
- Felipe has bought 1 Seedling game piece (\$1) and 1 Fingerling game piece (\$1).  
The Seedling game piece has been placed in one of the Hydroponic cultivation beds (brown) and the Fingerling game piece has been placed in the first position of the Fish Farming system tank. One of the three Hydroponic cultivation beds and the Fish Farming Tank have been planted. He has spent all his money in this round.
- As it is the first round, a Hurricane occurs as a natural disaster. Felipe places the hurricane game piece covering the left line of crops on Land.
- It is time to advance the crops. Felipe replaces the Seedling game piece with a Plant game piece and places it on the right position (space) of the Hydroponic cultivation bed (green). One of the three Hydroponic cultivation beds has produced Plants. Since there is a Fingerling game piece, it has been moved to the middle position of the tank in the Fish Farm system, but it has not yet changed to a Fish game piece.
- It is time to harvest. Felipe has 80 production points from the Land (since one of the cultivation lines on land was destroyed by the hurricane) and 10 points from the Hydroponics system. These 10 points are represented by the Plant game piece, with a production equivalent to 10 points since the Pump is not running. If the pump had been on, each plant game piece would have represented 15 points. Felipe must not remove any red Life Cycle game pieces from the Hydroponics or the Fish systems because his Biofilter is running. Therefore, his Hydroponics and Fish systems can operate indefinitely. Felipe has no Fish production yet; his Fingerlings have not finished turning into Fish. There is one round left for that to happen, and he has nothing stored in the Silo.

- Therefore, his production is:

- A. FISH FARM = 0
- B. HYDROPONICS = 10
- C. SILO = 0
- D. LAND = 80

- Felipe must feed 100 people in each round. This time, his total production is 90, so he cannot continue in the game.
- There is no surplus, so in the Silo, he must put the game piece with the number 0. In any case, Felipe is out of the game.

**And finally, please have fun learning how to produce food in an Aquaponics system.**



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