

Rules of the game « IWM in Arable crops »

I. Object

The game is based on the **evolution of weeds** according to climatic and agronomic factors by following the cycle of crops and rotations. The actors are farmers or advisers who must take decisions based on this evolution. They will be split into **two or more teams**.

The objective of the game is both to ensure a sufficient **quality and quantity** of the production, while maintaining a low level of toxicological and ecotoxicological indicators and **while minimizing the harmfulness of weeds**.

II. Components

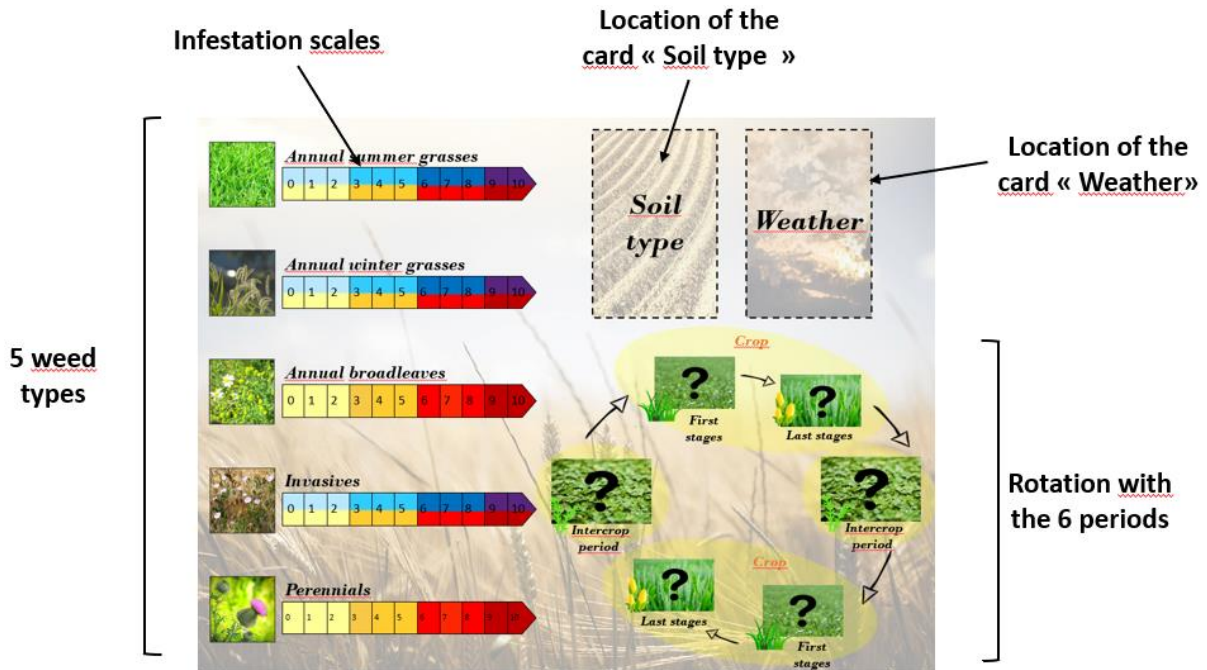
1) Do it yourself

The game material, available on the website, is to be printed and prepared. It contains :

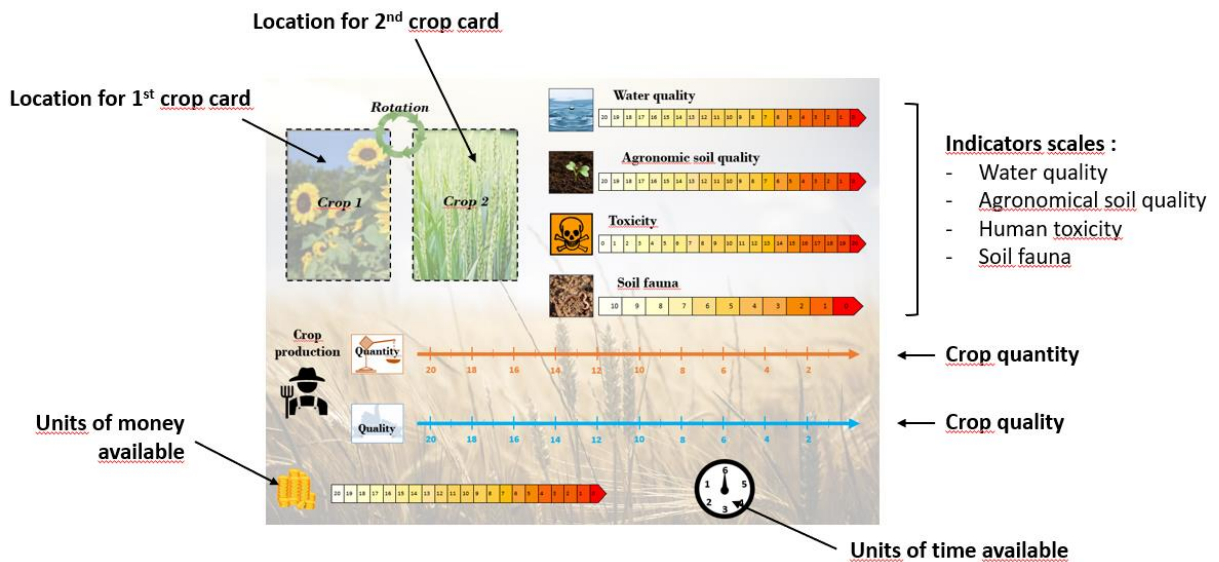
- 1 common board
- 1 player board, one per player - team
- "Soil type" cards = 3
- "Weather" cards = 6 (2 per type of weather)
- "Crop" Cards = 4 (2 per type of crop) per player - team
- "Measure" Cards = 31 per player - team
- 1 "Game turn" summary to visualize the phases of each period

2) Game boards

This game contains a first common board on which crop rotation and 5 categories of problematic weeds are represented. Locations are also provided to indicate the type of soil present on the farm (one type for the entire game) as well as the weather (one card per game turn).



Each team has its own player board « indicator dashboard »:

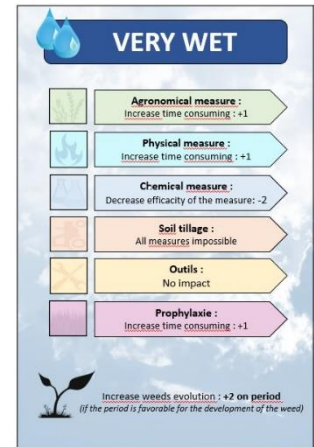


3) Cards

a) « Weather » cards

With three different climatic conditions (“dry”, “wet” and “very wet”), they are drawn at the start of each new period. They can impact:

- 1) Control measures: increase in time, increase in cost, decrease or increase in efficiency, inability to perform, etc.
- 2) Weeds infestation pressure : Increase in pressure up to +2 (if the period is favorable [evolution ≠ 0] for the development of the weed).

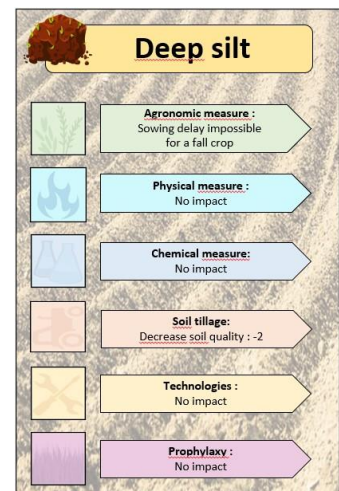


b) « Soil type » cards

The "Soil types" cards, three in number, represent the type of soil present in the chosen farm :

- 1) Soil with deep silt
- 2) Clay-limestone soil
- 3) Clay soil

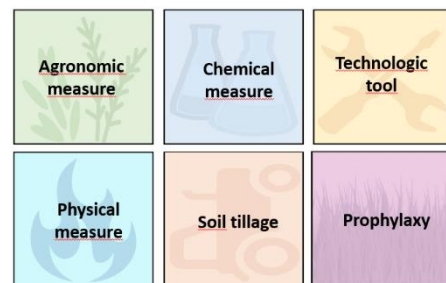
This card must be chosen (or drawn at random) by all players at the start of the game for the entire game. The type of soil will impact the management of weeds on the farm: obligation or impossibility of carrying out methods, impact on agronomic indicators, etc.



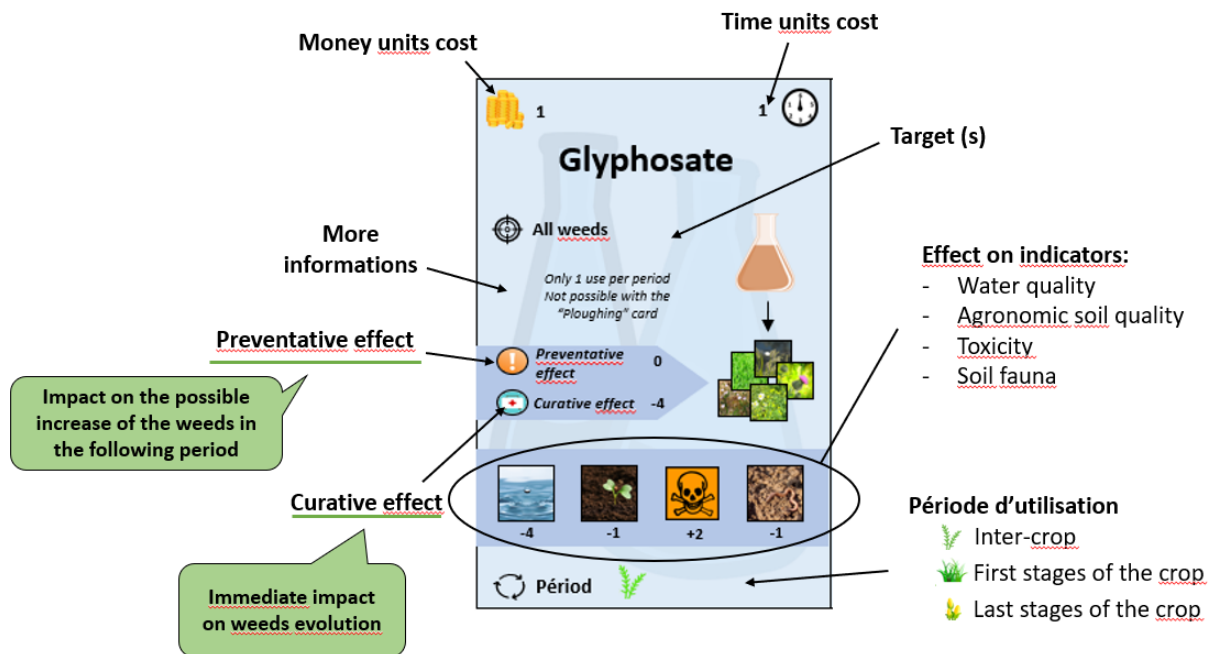
c) « Measures » cards

These cards make it possible to tackle weeds with a preventive and / or curative effect. Each type of measure is differentiated by the color of the card :

- 1) Agronomical measure
- 2) Chemical measure
- 3) Technologic tool
- 4) Physical measure
- 5) Soil tillage
- 6) Prophylaxy



There is one mixed card (chemical measure + soil tillage).



Each method, **targeting one or more weeds (target)**, has a **cost in time and money**, a **period of use** and **effects on indicators** of toxicity, water quality, agronomic quality of the soil and soil fauna. These methods can generally be used multiple times in the game. Additional information can modify the parameters of these cards (number of uses, associations with other methods, etc.).

d) « Crops » cards

The crops were divided into two main categories corresponding to the seasonal periods of sowing: autumn and spring.

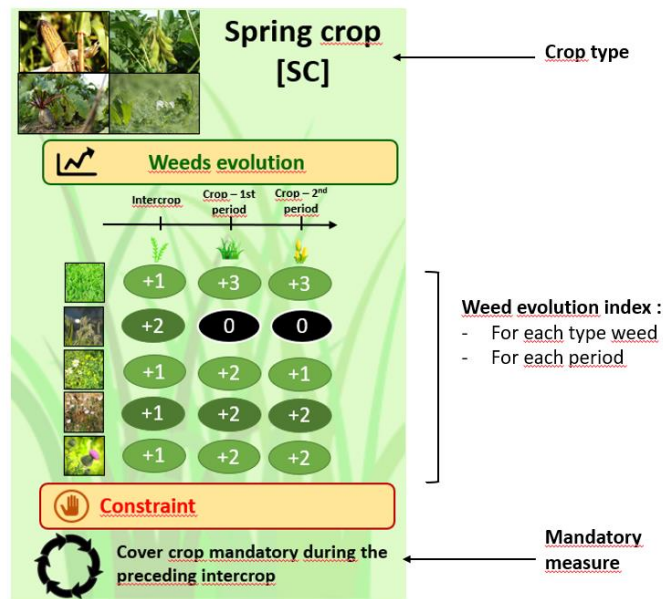
The first type of culture will be chosen jointly between the players or drawn by lot. The choice of the second type will be made during the second interculture by each player or team independently.

Four rotations are therefore possible:

- Autumn crop followed by an autumn crop;
- Autumn crop followed by a spring crop;
- Spring crop followed by a spring crop;
- Spring crop followed by an autumn crop.

Rotations have only an influence on one measure card : the "intercropping" card in inter-crop period.

This card cannot be played during intercropping if the second crop is a fall crop and must be played if the second crop is a spring crop.



III. Progress of the game

1) Game setup

Place the tokens of each team in the initial position to the left of the different indicator scales.

During the game, each team will have 20 units of money for the duration of the game, and 6 units of time for each period.

The players must collectively choose (or draw lots) a type of ground common to both teams, which will be definitive for the duration of the game. Place the card on the main board.

Players choose at what intercrop period (autumn or spring) they want to start crop rotation. Position the corresponding card on the team-specific board.

2) Sequence of play

In the "interculture" turn:

- 1) Choose the crop to be implemented among those available, and position it on the specific player board;

Then for each of the periods of the rotation: For each period of the rotation:

- 1) Draw a weather card and place it on the main board
- 2) Update the scale for each weed type taking into account:
 - The type of crop cultivated over the period
 - Weather
 - The method implemented previously (preventive effect) [except on turn 1 – 1st intercrop]

- 3) Each player or team chooses one or more control measures among those available, taking into account:
 - The limit of the number of points available in time and money
 - The period
 - The weather
 - The type of the soil
- 4) Each player or team modifies the indicator scales (Water quality, Agronomic quality of the soil, Toxicity, Soil fauna) according to the effect of the methods selected
- 5) Deduce the curative effect of the method on weed pressure levels.
- 6) Calculate the losses in quantity and quality and modify the indicators on adapted scales (see following paragraph).

IV. Calculation of losses in quality and quantity

1) Quality

Depending on the period and the crop type considered, the quality is impacted by **grasses (summer, autumn)** and **invasive weeds**. Refer to the corresponding “crop” card.

Only during the **2nd period of cultivation**, the loss is calculated by accumulating the points corresponding to each weed by following the scale below:

- Light blue : 0 points
- Blue : 1 points
- Dark blue : 2 points
- Purple : 3 points

Example : If the weed pressure levels are respectively 4, 7, and 3 for summer grasses, fall grasses and invasives, the quality loss will be $1 + 2 + 1 = 4$ points.

2) Quantity

Depending on the period and the crop type considered, the quality is impacted by all weed types.

Selon la période et la culture considérée, la quantité est impactée par toutes les adventices présentes. Refer to the corresponding “crop type” card.

During the two periods of the crop, the loss is calculated by carrying out the accumulation of the points corresponding to each weed type by following the scale below:

- Yellow : 0 points
- Orange : 1 points
- Red : 2 points
- Dark red : 3 points

Exemple : If the weed pressure levels are respectively 7, 4, 1, 3, and 2, the quantity loss will be $2 + 1 + 0 + 1 + 0 = 4$ loss points.

V. Calculation of the final score

The final score is calculated at the **end of the game**. It takes into account the number of points obtained on the different indicator scales: Soil quality, Water quality, Toxicity, Soil fauna, Quality and Quantity.

Final score =

3x (Quantity points + Quality points)

+ 2x Soil fauna points

- (Soil quality points + Water quality points + Toxicity points)