Funded by Horizon 2020 & Horizon Europe

Game rules

Version 1 - march 2025

I. Game principle

The game is based on the **control of pests and diseases** that evolve according to climatic factors and agronomic practices. The game follows the crop cycle. The players are farmers or advisors who must make decisions based on this evolution. They are divided into **two or more teams**.

The aim of the game is both to ensure satisfactory production **in terms of yield and quality**, while maintaining a **low level of impact** from the crop protection practices used.

IPMGAME is now available in 3 versions:

- **Simplified**, designed to be played quickly by familiarizing oneself with the methods available in a given cropping sector or production;

- **Basic**, more complete, with finer management, production and impact indicators for more in-depth games;

- **Advanced**, incorporating new features for more realistic gameplay.

But be warned, the game is not a model. Its aim is to get the players talking to each other and to the game master about integrated protection and alternative methods. To this end, we have appended scenarios for using the three versions on offer.

Print & play

To play, you need to print out the game elements available below. We recommend that you print :

- In A3 format: the game boards and the 'pests' rulers;
- In A4 format, 4 slides per page: the 'methods' cards, the 'meteo-evolution' cards and the 'weather' cards for printing;
- In A4 format, 2 slides per page: 'climatic zone' cards.

II. Game content

The game contains a number of necessary materials, specific to each culture:

- 3 Game boards: 1 multi-player dashboard, 2 management boards (1 for simplified versions; 1 for other versions);
- Pest rulers: 1 pack of rulers for each crop;
- Climate zone' cards: 1 standard card and 4 cards for 4 climate zones per production period;
- Weather' cards: 2 packs of 7 cards for randomly selecting the weather;
- Methods' cards: 1 pack of cards per player - team for the simplified version and 1 pack for the basic and advanced versions; some cards can only be played in the advanced version or as an option to the basic version.
    - o The 'Apple Tree' pack contains 40 'methods' cards
    - o The 'Vine' pack contains 39 'method' cards
    - o ...

1) Game boards

Dashboards

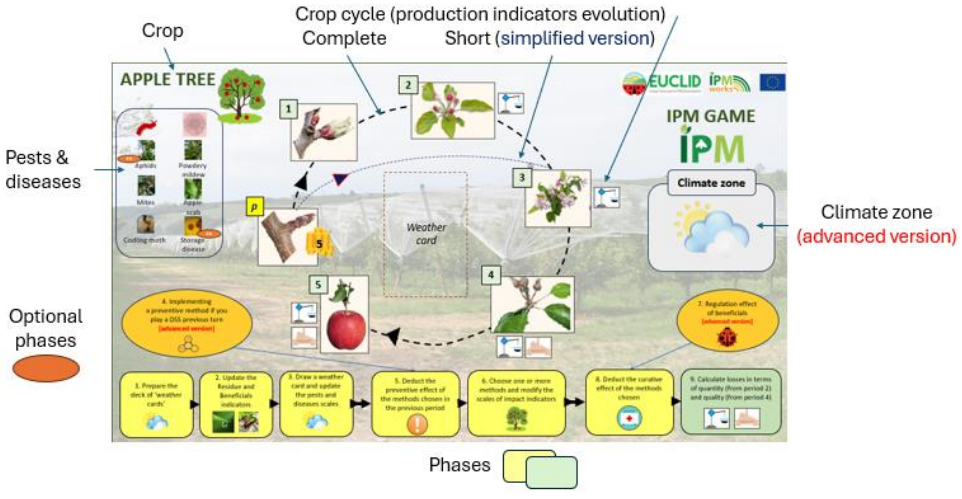
For each of the crops featured in the game, the first board [B1] shows the crop cycle, and the steps to be taken at each stage.

The second board [B2] includes management, production and impact indicators.

Finally, a third [B3] is created according to the pests chosen by the players from a pool of the most problematic pests in the crop.

B1 : multiplayer board

It describes the cycle of the crop concerned, as well as the game phases to be followed per period. It allows you to position the weather map for each period.

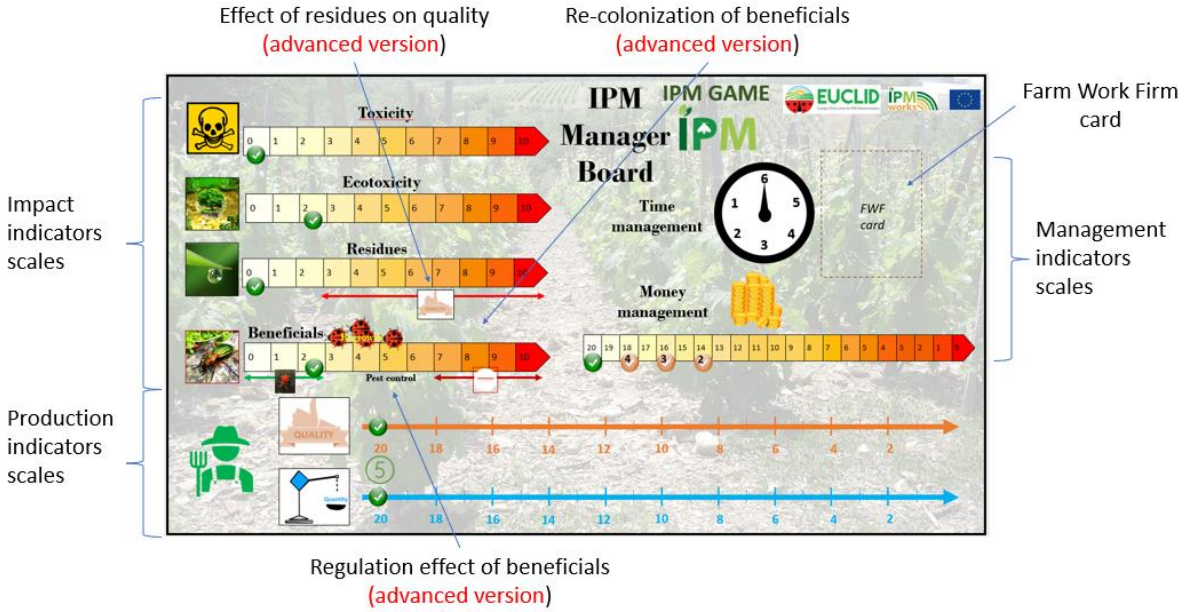


B2 : management board

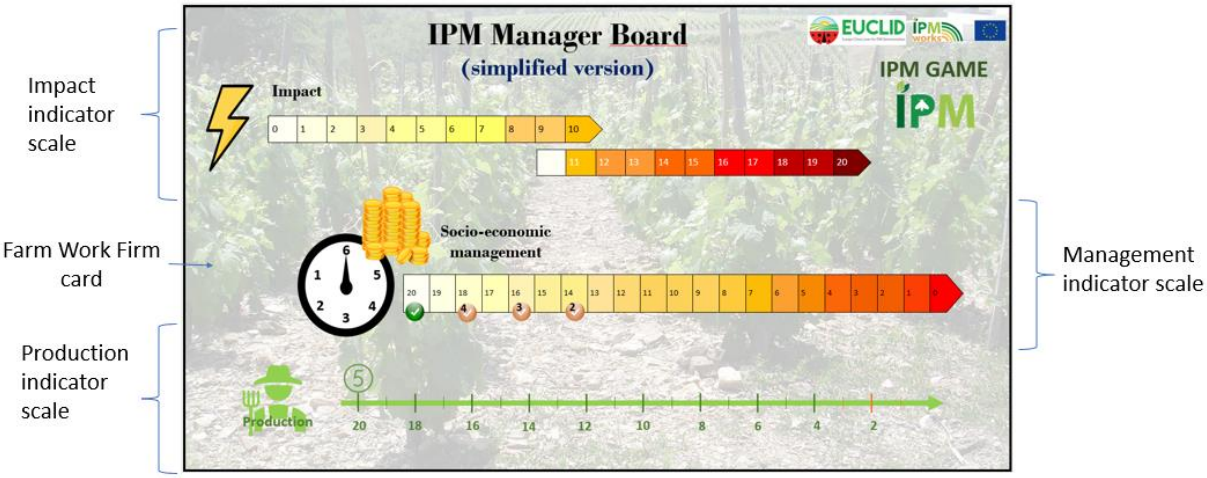
It enables all indicators to be kept up to date for each team of players.

It includes management, production and impact indicators.

It can be used to position the ETA card (basic and advanced versions), which saves a unit of time.

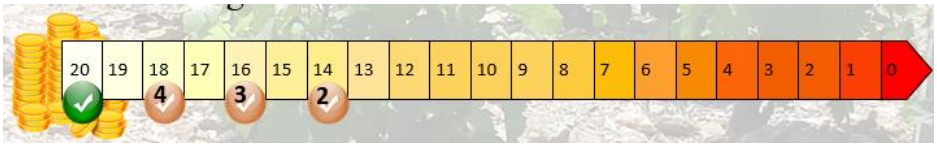


The simplified version includes adapted indicators:



1/ Money and time unit indicators:

Money: each unit spent on implementation is subtracted on the following scale :



Time: 6 units are available per period. 1 additional unit can be obtained if the FWF (Farm Work Firm) card is played.

In the simplified version, only one scale is used.

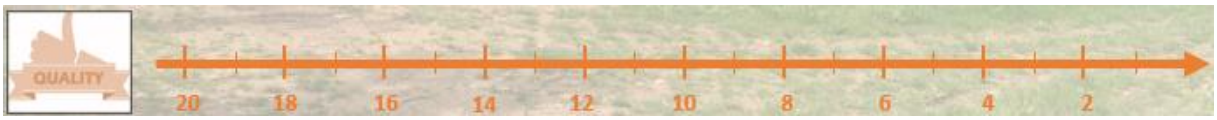
2/ Production indicators:

Production indicators are affected by the pressure scale of each pest, whatever the version of the game [see B3].

- Simplified version: a single global indicator

- Basic and advanced versions: two indicators :
  - Yield - Quantity

  - Quality



3/ Impact indicators:

In the basic and advanced versions, 4 health-environment indicators measure the impact of players' practices on these parameters. These indicators change according to the values shown on the method cards.

- Toxicity
- Ecotoxicity
- Résidues
- Beneficials




In the advanced version,

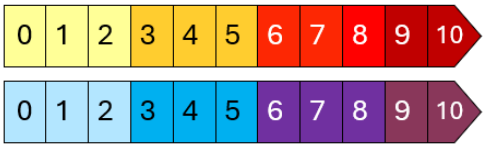
- points can be retrieved concerning residues and beneficials ;
- beneficials can have regulating effects on pests and diseases, depending on the level on the scale.

In the simplified version, a single indicator is used. 

P3 : Pests pressure

- Pressure scale : used directly in basic and simplified versions; its evolution depends on the weather and the method cards played.

4 colors indicate pressure level: low, medium, high, very high



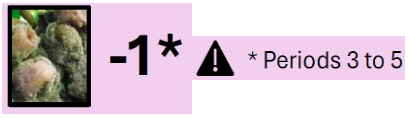
The “warm colors” scale affects quality.

The “cold color” scale affects yield and quantity.

Some pests or diseases have a double scale, influencing both indicators.

Some pests are only present for part of the crop cycle. This is specified in several places in the game: the ‘pests’ ruler, the ‘weather - changes’ cards and the game board.

Example: gray mould on vines > present only from periods 3 to 5. This implies no change in the other periods, 1 and 2.



In the simplified version, a single scale is used.

Pressure level has an impact on (simplified version) or (basic and advanced versions) production indicator(s).

- Risk scale (used in advanced version only):

In the advanced version, weather influences risk scales first, not pressure scales.

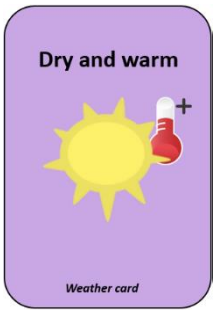
Then the level on the risk scale will influence the pressure scale of the pest.

2) Cards

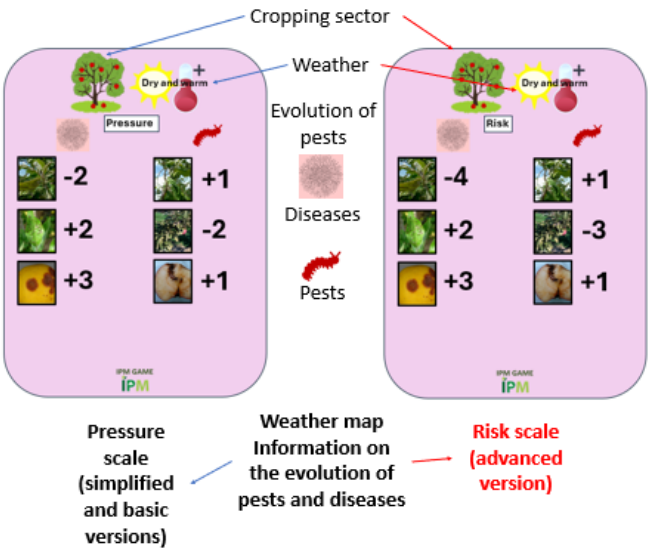
The game includes a set of “weather-evolution” cards and “method” cards for each crop.

a) “Weather cards":

The game features 7 weather conditions with different ratios.
“Simplified” weather cards allow you to randomly select in each period.



“Full” weather-evolution cards provide information on pressure trends (simplified & basic versions) and risk (advanced version).

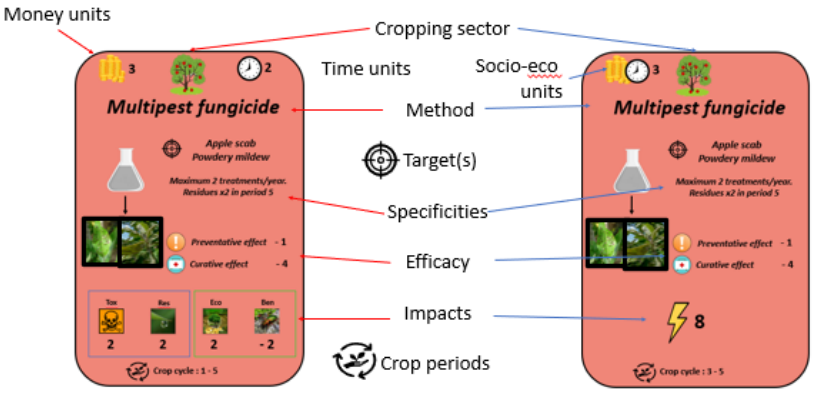


The weather cards are drawn at the beginning of each new period and modify the pressure positively or negatively depending on the pest. Some pests are only present for part of the cycle and will only evolve during these periods. The impact of these pests will therefore be nil during periods when the pest is not present.

b) « IPM measure cards »

These cards enable you to tackle pests and diseases with preventive and/or curative effects.

Pesticide-type methods are highlighted in red, technological methods in blue, and biocontrol methods in green.



Each method, **targeting one or more pests (target)**, has a **cost in time and money**, a **period of use** and **impact effects** (toxicity, ecotoxicity, residues and beneficials).

These methods can generally be used several times in a game, or even per period. Additional information can modify the parameters of these maps (number of uses, cost, time, impact on residues, associations with other methods, etc.).

A set of cards is specific to each crop.

An IPM measure card therefore includes all the information needed for the game: targets, management, impact and effectiveness indicators, periods of use, etc..

The symbol  means that the method can be used preventively before period 1 of the crop.

The symbol  means that the card is not compatible in an Organic Farming game. These cards cannot be played if this option is chosen.

There are also cards with special features relating to methods.

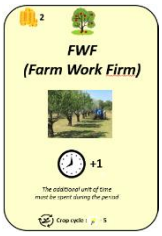
 Some cards have certain limitations or additional information:

- Limitation on the number of ways to play the card
- Limitations on weather conditions
- Increased costs under certain conditions
- Increased impact on residues

- Tool to be used in combination

- Prevent primary installation : the card allows the first progression of a pest to be ignored

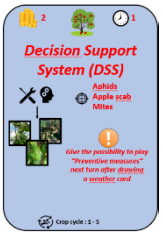
c) Special IPM measure cards :



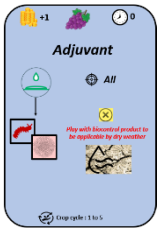
- FWF – Farm work firm (advanced version) :
  The farmer calls in a FWF (Farm Work Firm) which saves one unit of time, bringing the total to 7 units for the period, at a cost of 2 units of money.

- Associated treatments :
  This card is added when you carry out double applications of products of the same type (biocontrol or pesticides).
  This card indicates that in this case, you recover 1 unit of time because the applications are simultaneous.

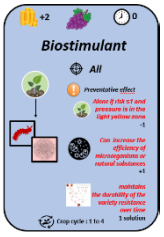
- Combination of biocontrol and half-dose of copper :
  This card is added when you carry out an application with a biocontrol product combined with copper.
  It indicates that in this case, you recover 1 unit of time because the applications are simultaneous and that the impact of copper is reduced because it is applied, in this case, at half-dose.



- DSS (advanced version) :
  The player places this card in a preventive position to have the opportunity to play a card with a preventive effect in the next period after the weather forecast has been drawn.



- Adjuvant
  The player can play this card to enable biocontrol products to be applied in more difficult conditions (dry weather).



- Biostimulant (advanced version) :
  The player can play this card for different purposes:
  - Alone: for an indirect effect if the pressure is in the lowest zone (light yellow) and the risk is ≤ 1;
  - In combination with a biocontrol method for a synergistic effect;
  - In combination with a resistant variety : reinforces plant immunity.

The card deck for the simplified version contains only:

- a socio-economic indicator representing time and money
- an impact indicator that covers all effects on health and the environment

III. Installing the game

1) Choice of the game version

Players can choose between 3 versions: simplified, basic and advanced. They are of increasing complexity, incorporating new features and components into the game. As a result, the time it takes to set up a game also increases.

a) Simplified version

It is designed to be played quickly, in less than an hour. It introduces the general mechanics of the game.

It focuses on training in integrated protection:

- Understanding the methods available to tackle crop pests and diseases;

- Understanding the principles of integrated pest management (IPM) and the combination of control methods.

This version is perfectly suited to introductory training or presentation sessions on IPM.

However, it can also be used in sequences where the emphasis is on learning about new control methods.

b) Basic version

It is more comprehensive, with more periods and different indicators to be taken into account.

It therefore emphasises the unintended effects of the methods and the need to take account of their impact in the context of integrated protection.

It also makes it possible to distinguish between effects on yield and quality.

It can therefore be incorporated into training or presentation sessions designed to raise awareness of the impact of plant protection practices on health and the environment but also on the various principles of integrated protection.

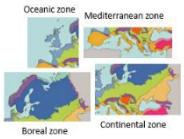
By integrating options from the advanced version into a basic version, you can add complexity (see below).

c) Advanced version

It incorporates new functions for more complex games, taking into account characteristics relating to:

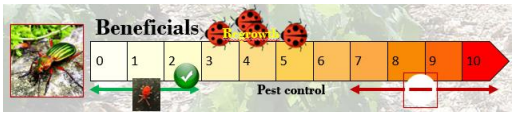
- The onset of pest attacks
  > risk scale (see page 5)

- The importance of climate on their development
  > climatic zones (see page 10)



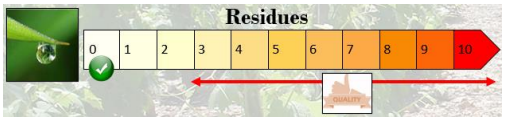
- The judicious implementation of preventive methods using DSSs (Decision Support Systems)
  > DSS card (see page 7)

- The importance of preserving beneficial organisms using appropriate methods
  > Beneficials indicator scale (see page 14)



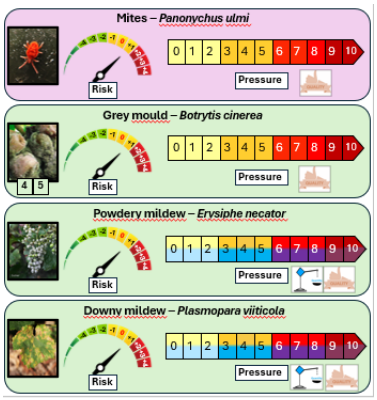
- The importance of controlling residues of plant protection products for harvest quality.

> Residues indicator scale (see page 15)



The scenarios in the appendix will help you choose the right version for your needs and position this version in a learning sequence.

2) Choice of pests and diseases



The players agree on the pests to be managed during the game and place each of the pressure and risk scales for each pest in front of each team.

Example : The players decided to organise the game around 4 pests: 3 diseases and 1 pest.

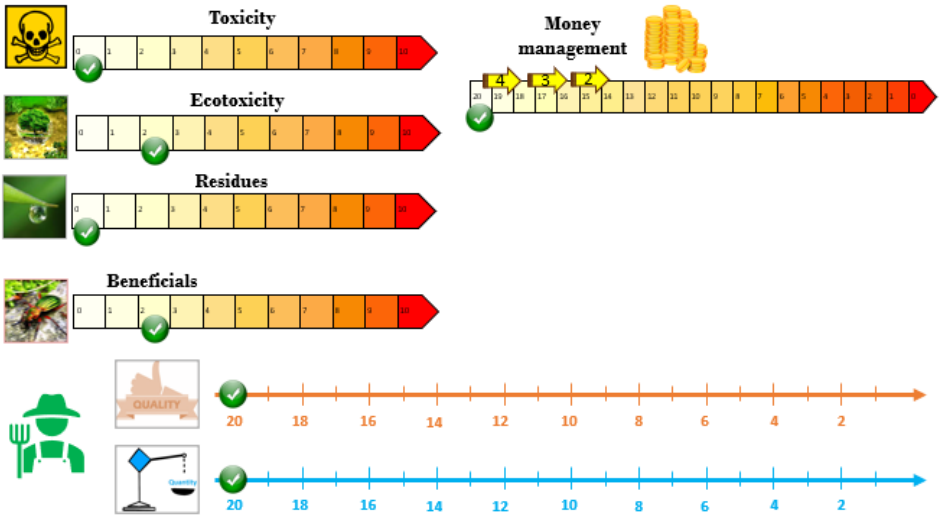
Pressure and risk indicators are set to '0' except where indicated by ✓.

Next, select the 'methods' cards for the chosen pests, discarding the others. These will make up the pool of cards to be prepared for each round, by selecting those that can be played during the period in question.

3) Setting up the boards

The various boards are set up in front of the players.

Place each team's counters in their initial position ✓ to the left of the different scales. The indicator counter is set to 2 for the 'ecotox' and 'beneficials' scales.



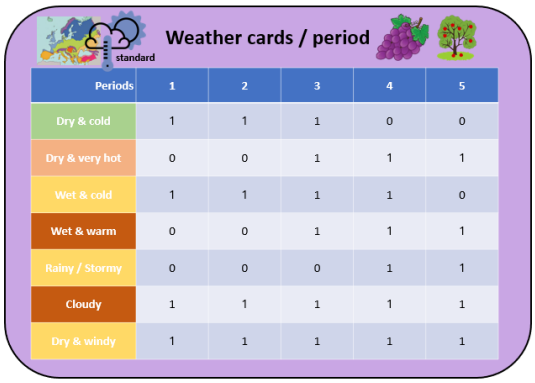
During the game, each team will have 20 units of money for the duration of the game for 5 to 6 pests and diseases, and 6 units of time for each period.

The initial number of money units is adjusted according to the number of pests:

Number of pests	5 ou 6	4	3	2
Money units	20	18	16	14

4) Setting up climatic characteristics

In the simplified and basic versions, players place the standard board

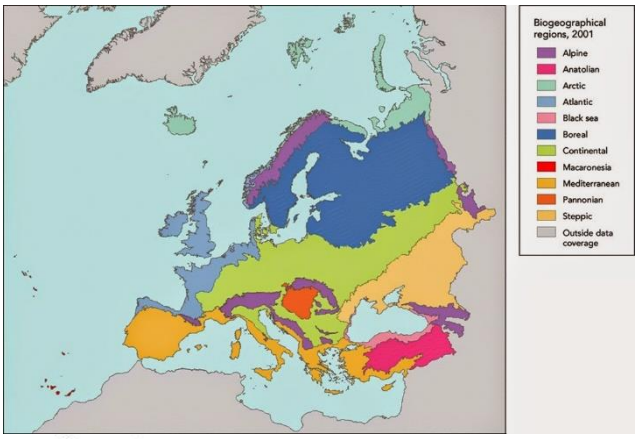


Periods	1	2	3	4	5
Dry & cold	1	1	1	0	0
Dry & very hot	0	0	1	1	1
Wet & cold	1	1	1	1	0
Wet & warm	0	0	1	1	1
Rainy / Stormy	0	0	0	1	1
Cloudy	1	1	1	1	1
Dry & windy	1	1	1	1	1

Climate zones (advanced version only)

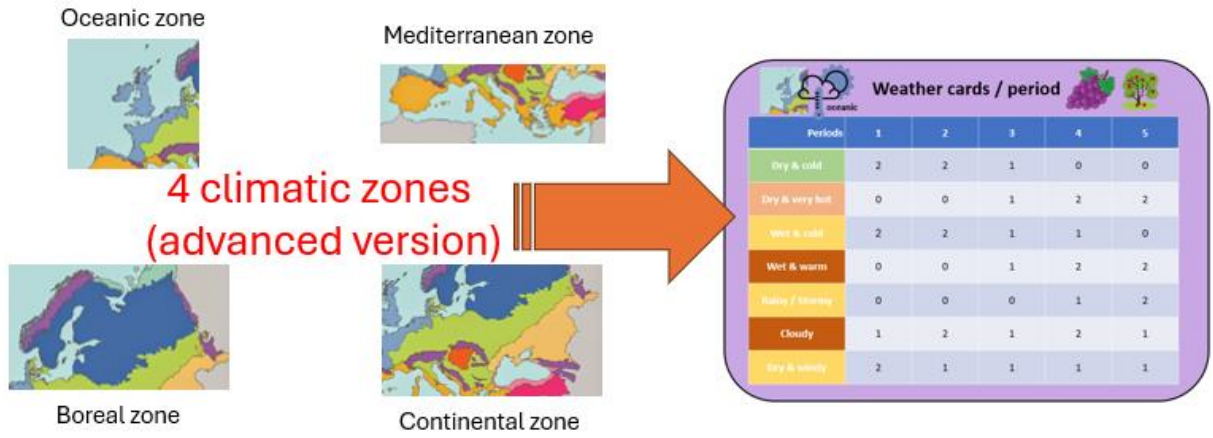
Europe is divided into 11 climate zones as shown on the map below.

The game has been developed for 4 climate zones: Atlantic, Boreal, Continental and Mediterranean.



In the advanced version, players place the table for their climate zone.

For each crop, a distribution of the weather cards by climate zone is provided.



5) Preparing the first packs of cards

The period indicator is set to P .

a) Preparing the first pile of 'method' cards

The players select the 'methods' cards with a P at the base of the card for the 'pre-cycle' round. Only these cards can be played during this round.

b) Preparing the first pile of 'weather' cards

The players select the number for each type of card, with the help of the chosen weather card, in order to make the random draw in the 1st round. No weather card is drawn in round P .

- *Example: for an oceanic climate, the selection is as follows:*

- 2 'cold and dry' cards
- 2 'cold and wet' cards
- 1 'cloudy' card
- 2 'dry and windy' cards

IV. Playing the game

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

1) Pre-cycle - vegetative rest

This phase allows preventive methods to be implemented before sowing (annual crops) or before vegetation resumes (perennial crops), according to a time limit (basic and advanced versions) or a limited number of 3 methods (simplified version).

Choose one or more preventive methods before the start of the growing cycle, within the limit of the number of time and money units available. Players have a credit of 5 money units for this round. If they spend more than this, they will start spending their available silver units for the whole game. If they spend less than 5, the units are lost:

The following actions are then required:

1. Modify impact indicator scales according to the effect of selected methods
2. The preventive effect will be deducted in the next round, based on pest pressure levels (simplified and basic versions) or risk levels (advanced version).

2) Vegetative periods

- Simplified version: go directly to period 3
- Basic and advanced versions: go to period 1

Schedule for each period

1. Move the 'period' token forward. Prepare the deck of "weather cards" and select the 'methods' cards available for the period in question.
2. Update Residue and Beneficials indicators (advanced version)
3. Draw a weather card and update the scales, taking into account the preventive effect of the previous period.
4. Take account of crop specificities (e.g. grapevine: influence of budworm on grey mould development).
5. Choose one or more control methods from those available at the period.
6. Modify impact indicator scales according to the effect of selected methods.
7. Deduce the curative effect on pest pressure levels; keep preventive and multi-period method cards to take into account during the next period.
8. Calculate yield and quality losses
    - Quantity - yields from period 2,

- And quality from period 4

V. Phase characteristics for each period

1) Change the period and prepare the decks of cards

Advance the period indicator.

- In the simplified version, the number of periods is as follows: p > 3 > 4 > 5

- In the basic and advanced versions the number of periods is complete: p > 1 > 2 > 3 > 4 > 5

Methods' cards:

In each round, the method cards relating to the period are selected and the others discarded.

Weather cards :

In the simplified and basic versions, a standard distribution map is used to prepare the weather map pack at the start of each period.

In the advanced version, distribution tables by climatic zone are available.

2) Update of the 'Residue' indicator (except simplified version)

Any residues of plant protection products contained in plants are diluted over time. Therefore, at each period, the indicator is reduced by 1 level

Update of the 'Beneficials' indicator (except simplified version)

If they are not too badly affected, populations of beneficial insects can recolonise the area. Also, in each period, the indicator is updated according to the following table:

Beneficials population	0 à 2	3 & 4	5	> 5
Recolonisation level	Maximum level > none	Very positive > level 2	Positive > -1 level	none

3) Random weather draw

At each period, a weather card is randomly drawn from the desk defined in phase 1 (standard or a climate zone)..

Each weather card has an impact on pest trends:

- Pressure (simplified and basic versions): changes are directly impacted by the **pressure scales** for each pest;

- Risk (advanced version): changes are first impacted on the **risk scale**; then, the pressure of the pest evolves according to the level of risk.

4) Implementing a DSS [advanced version]

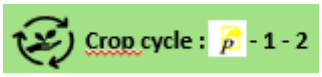
From turn 2, players may decide to implement a DSS; to do so, they played the DSS card in the previous turn. They can implement a preventive method against a pest or disease affected by the DSS.

5) Consideration of preventive methods implemented

The value of the preventive effects of the methods implemented in the previous round or using the DSS (advanced version) is deducted for each of the pests concerned.

6) Choosing methods and updating dashboards

Only methods that can be used during this period are available.



example : you can play this card, at periods 'p', 1 and 2 only.

Each player-team can choose from these methods, whether preventive or curative, within the limit of the units of time and money available.

An additional time unit can be saved by playing the 'FWF' (Farm Work Firm) card .

In the advanced version, they can also play the DSS (Decision Support System) card to be able to play a method card with preventive effects the following turn, after drawing the weather card.

Once the methods have been chosen, the various scales need to be updated :

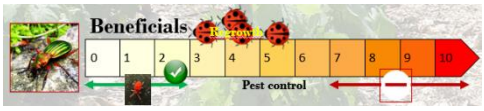
- Money units: deduct the cost of the methods used
- Time units: 6 units are allowed per turn; 7 with the 'FWF' card.
  or Socio-economic units for the simplified version
- Impact indicators: update the 4 indicators (only 1 for the simplified version) according to the data on the 'method' cards

7) Beneficials effect [advanced version]

Beneficials provide natural control of certain pests, as shown in the following table :

Impact on Beneficials	0	1 & 2	3 to 6	7 to 10
Control level	Very positive -2	Positive -1	None	Negative +1

The pests concerned are indicated on the P1 dashboard for each crop.



In the vineyard example opposite, beneficial insects can control mites.

8) Consideration of curative methods used

The value of the curative effects of the methods implemented in phase 6 is deducted for each of the pests concerned; the preventive and multi-period cards are retained for the following period.

9) Updating production indicators

Production indicators (quantity, quality) are updated according to pest pressure. The effects are cumulative.

- Simplified version: A single production indicator is adjusted.
- Basic and advanced versions: The 2 indicators are differentiated; each pest can have an impact on quality and/or quantity; for each crop, the impact of pests can be taken into account differently in terms of period.

The impact on production indicators depends on the period. A multiplying factor must be applied to losses, as shown in the table below:

Periods	p	1	2	3	4	5
	0	0	x1	x1	x2	x3
	0	0	0	0	x1	x2
	0	-	-	x1	x2	x3

c) Quantity [from period 2]

The loss is calculated by adding up the points corresponding to each pest on the 'cold colour' scale, using the scale below:

- Light blue: 0 points
- Blue: 1 point
- Purple: 2 points
- Garnet: 3 points

d) Quality [from period 4]

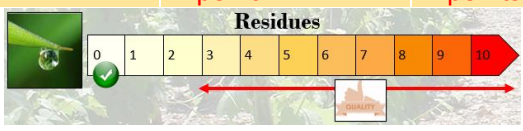
The loss is calculated by adding up the points corresponding to each pest on the 'warm colours' scale, using the scale below :

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

Quality losses are multiplied by 2 in round 5.

Added to this is the impact of residues (advanced version) on quality, according to the following scale :

Residues level	0 à 2	3 à 5	6 à 8	9 et 10
Quality loss	None	1 point	2 points	3 points



VI. Calculating the final score

The final score takes into account the number of points obtained on the different scales of production and impact indicators.

Basic & advanced version > **Final score = Quantity + Quality - Residues - Toxicity – Ecotoxicity - Beneficials**

Simplified version s > **Final score = Production – Impact**

A bonus of 5 points is awarded if the production indicators are a maximum of 20 units.

For more information

Ressources

Posters	https://ipmworks.net/posters/
Flyers & leaflets	https://ipmworks.net/leaflets/
Booklets	https://ipmworks.net/category/booklets/
Factsheets	https://ipmworks.net/category/fact-sheets/
Toolbox	https://ipmworks.net/toolbox/en/#/

➢ select

About IPMworks

IPMworks (full project name: “An EU-wide farm network demonstrating and promoting cost-effective IPM strategies”) is a H2020 financed project gathering 31 partners from 16 European countries, coordinated by the French National Research Institute for Agriculture, Food, and the Environment (INRAE).

The project objective is to promote the adoption of IPM strategies, based on an EU-wide network of farmers, who will progress further in the adoption of IPM through peer-to-peer learning and joint efforts, as well as demonstrate to other farmers that holistic IPM “works”; i.e. allows a low reliance on pesticides with better pest control, reduced costs, and enhanced profitability.

The project partners coordinate existing networks promoting IPM and launched new hubs of farms in regions or sectors where IPM pioneers were not yet engaged in relevant networks. Advisors

coordinating hubs have a major role in facilitating knowledge sharing, coaching farmers to find their own IPM solutions, and organizing local demonstration activities.

IPMworks stimulates access to the IPM DECISIONS platform and provides information on IPM methods. It will collect data for comparing IPM strategies and share results and dissemination material through channels widely used by farmers, broadcasting IPM success stories. It will organise training and produce training materials, targeting both farmers outside the network and advisory services, to prepare for the future dissemination of the peer-to-peer learning approach and the general adoption of IPM throughout the EU.

IPMworks coordinator: INRAE, France

Nicolas Munier-Jolain nicolas.munier-jolain@inrae.fr

About ACTA

ACTA is a French agricultural technical institute working on integrated protection. In particular, ACTA has developed the EcophytoPIC website, an official site on integrated protection containing numerous resources for advisers, farmers, teachers and trainers. ACTA is also developing educational games on integrated protection as part of its PICOH division.

Contact ecophytopic@acta.asso.fr

APPENDIX

Scenarios for using the game

Scenarios will be proposed as part of the European ADOPT IPM project.

This document will be updated at a later date.