PAMCoBA

Precision **A**griculture– **M**ethodology for **C**ost **B**enefit **A**nalysis

User Manual for the webtool

http://tool.pamcoba.eu/

A tool developed by

University of Kopenhagen

University of Bologna

Swiss Federal Research Station

Realized by:

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Content

1 What can you calculate with PAMCoBA?

PAMCoBA is a web tool which can be used by means of a web browser. Firefox or Chrome are the preferable browsers to be used.

PAMCoBA calculates the profitability of precision agriculture technologies taking into account costs and benefits of different technologies.
It replies to questions like the following ones:

- Is it profitable to invest for an auto steered tractor with RTK-GPS if I can decrease the fertilizer-input and the spray inputs of 3 % because of reduced overlaps?
- Is it profitable to switch to CTF (Controlled Traffic Farming) if I reach an yield increase of 5 %

The strength of the tool is the fact, that you can combine different technologies attribute inputs like fertilizer and pesticides include yield changes and calculate their profit.

2 1st Screen: Language, Login, Country and Crops

2.1 Language, saved input data, login and selection of crops

On the homepage the adequate language, default values of different countries (Denmark, Switzerland, Italy, Greece), the login and saved values from previous calculations can be chosen (see chapter 6).

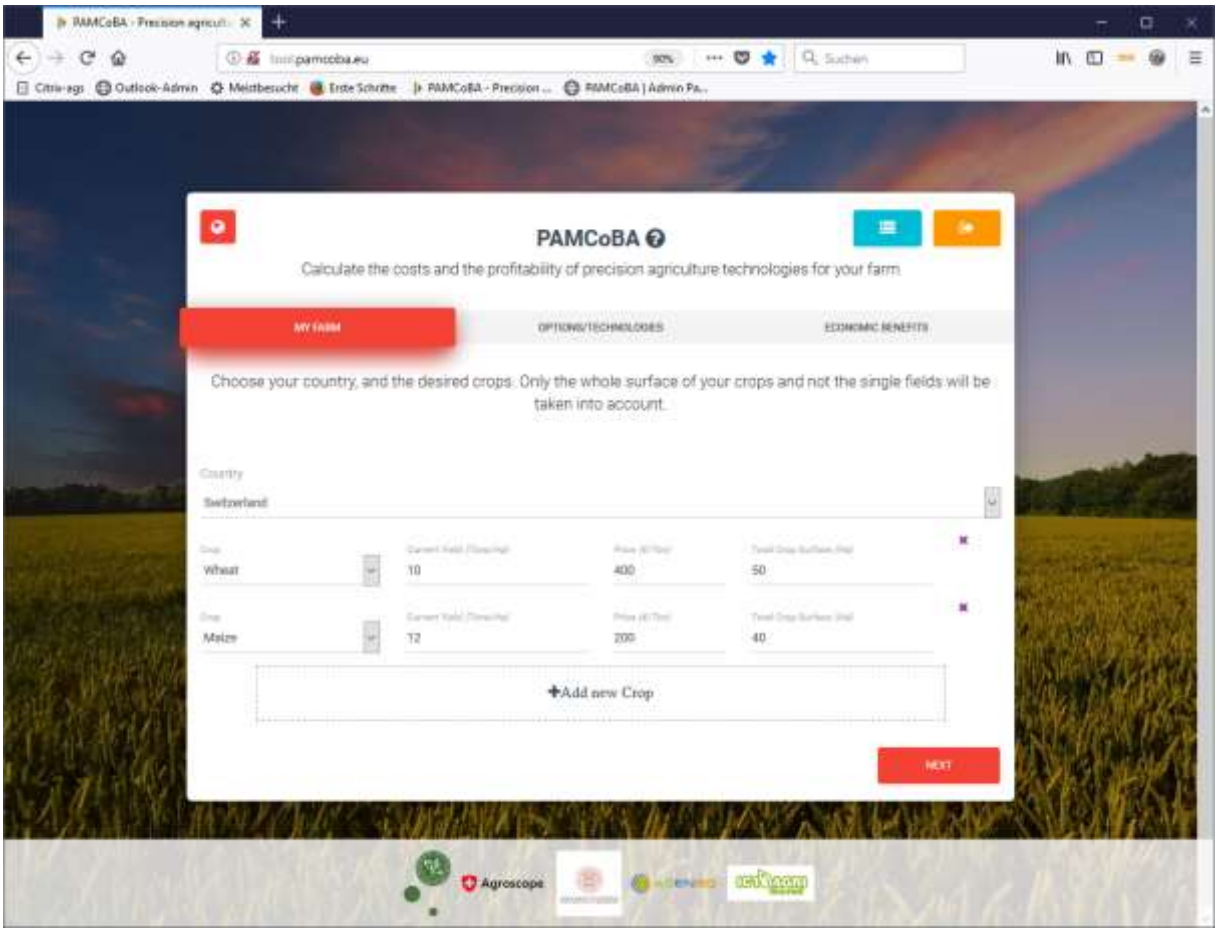


Figure 1 Homepage of PAMCoBA

Figure 2 Top of 1st screen

- press the red world-symbol “Change language” on top left to choose your preferred language
- to view your saved input data press the blue symbol “Show saved runs” (top right)
- to register/login press the yellow symbol “Login” (see chapter 6)

Start a calculation by choosing your preferred country and continue with the selection of one or more crops:
Enter a least one crop. To add a crop, press “+ Add new crop” and indicate your average crop yield per hectare, the price you get for your crops (€/ha) and the total crop surface (ha).

3 2nd main screen: Selection of options and operations

3.1 Selection of options

Select one or more options. By clicking on “Option 1” you select it and it’s frame becomes red, if you click again, you unselect it. Only the selected options will be available later on. You can select one or more options for a calculation.
Attention: If you change the selection of options later on, then you restart the selection process.

Figure 3 2nd main screen for the selection of options. Here Option 1 and 3 have been selected (frame is red).

Only the operations and technologies for the selected options will be displayed. In the example below, the ones for option 2 are not presented, as this option hasn’t been chosen.

Figure 4 Selection of the different operations and technologies by the user.

3.2 Selection of operations and technologies

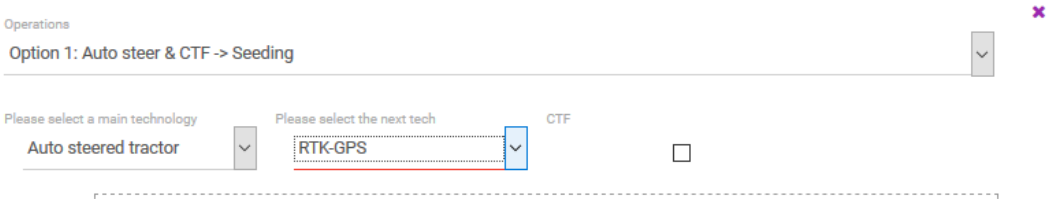


Figure 5 Selection of operations and technologies

- ➔ Fill out all drop down lists (ex. if you do not select a GPS in Figure 5, then this option will not be calculated. No warning will appear. The checkbox “CTF” (Controlled Traffic Farming) can be chosen optionally.
- ➔ Be aware that only the benefit of each single operation will calculated. That means that costs and benefit of the auto steered tractor and RTK-GPS only will be calculated for the seeding operation. If you want to calculate the use for all operations, then you have to select all the desired operations for which you would like to use the tractor:
  Auto steer & CTF → Seeding
  Auto steer & CTF → Fertilisation
  Auto steer & CTF → Spraying
- ➔ As the extra costs for the auto steered tractor and the ones for the RTK-GPS, the investment costs of CTF will be included only once. In the costs you can choose the extra costs for CTF- (Default 20’000 €).
- ➔ Checkbox “CTF”: If you check it once for one operation then the investment costs will be taken into account (default is 20’000 €). In addition the benefit of this operation will be calculated. If you check it for 2 operations, then the investment remains 20’000 € but the benefit for 2 operations will be taken into account (see chapter 4.1).

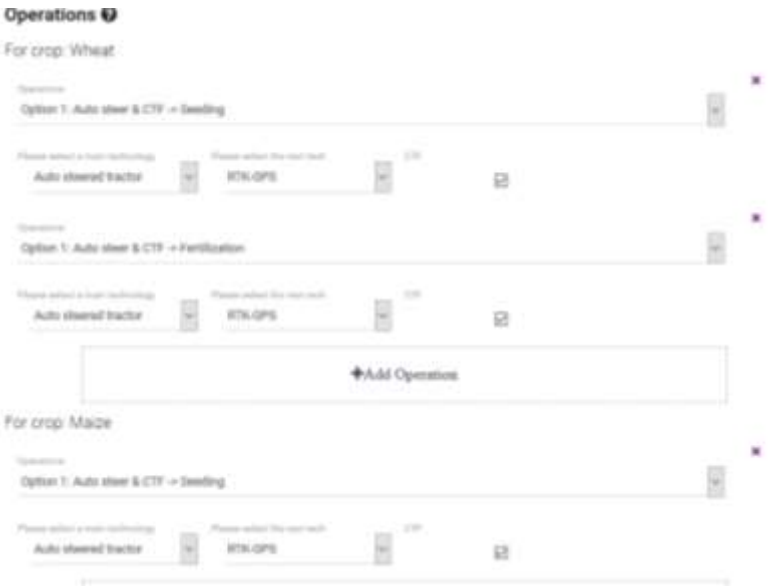


Figure 6 Selection of the different operations. You can choose freely the different operations

In the example of Figure 6 the following costs are taken into account:

- Extra investment costs and benefits of one auto steered tractor for wheat and maize (it's the same tractor)
- Costs and benefit of one RTK-GPS
- Extra costs and benefit of CTF (Controlled traffic Farming)
- No extra cost for the fertilizer spreader and seeder as these are standard machines.

4 3rd main screen to select costs and benefits

4.1 Yield benefits and decrease of inputs

On the next screen you see the parameters which are proposed by the tool to be used. If you would like to change these parameters click the "lock" and enter your own numbers.

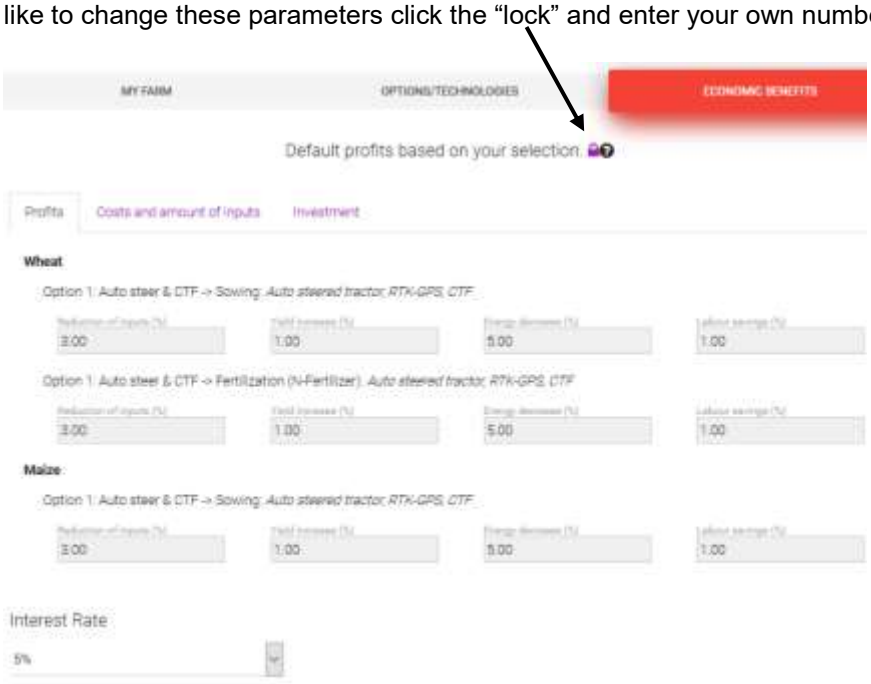


Figure 7 Parameters used for each operation. With these selections, 3 % of seed and 3 % of fertilizer are reduced, the wheat yield will totally increase by 1 + 1 = 2 %, energy decrease for sowing and for fertilization of wheat is 5 %, and labour savings are 1 % for each operation.

4.2 Costs and amount of inputs

For each chosen option and operation the parameters of the inputs are calculated. Seeding has one treatment, fertilization of wheat has 3 treatments.
The amount of N-fertilizer is indicated for one treatment. So 70 kg x 3 = 210 kg of fertilizer totally which are calculated by the system. In this example the indicated price is 0.3 €/kg fertilizer. So if you indicate a reduction of overlaps of 3 % then you can economize 3 % of fertilizer = 210 kg/ha * 0.3 €/kg *0.03 = 1.89 €/ha.

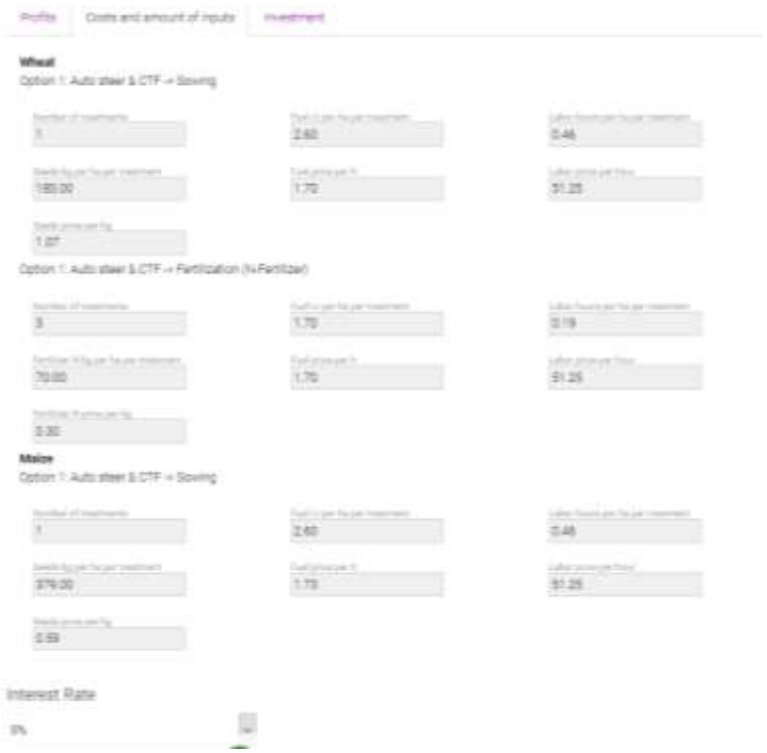


Figure 8 Selection of the costs an amounts of inputs.

4.3 Investment

On the last screen the extra investments of the precision farming equipment are displayed. All other investment and equipment costs are not taken into account as they are considered as standard equipment! The idea is to allow to calculate the difference of a standard farming equipment compared to a precision farming equipment.
Ex. In the example below it is calculated, that an auto steered tractor needs an extra investment of 13’000 € and a RTK-GPS of 3000 €. The realization of CTF need extra investment of 20’000 €.
These costs will be amortised within 8 years. The interest rate can be chosen by the user.
All these costs are only taken into account once for all chosen operations.
The yearly costs are in the case below 800 € to pay each year for the RTK correction signal.
For increasing farm sizes a scale factor is calculated. That means that the initial investment will be multiplied by the scale factor indicated below. In the example below this will be
(13’000 + 3000 +20’000) * 1

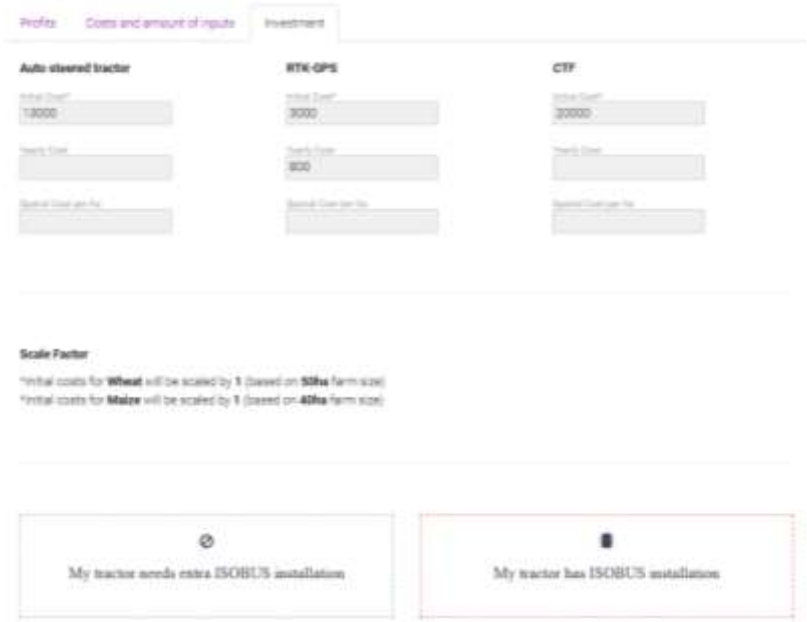


Figure 9 Selection of the investments.

5 4th main screen: Results

The results are displayed on the last screen. Additionally a pdf-report can be downloaded. If you are logged in (see chapter 6), the results and input parameters can be saved by pressing the green button.

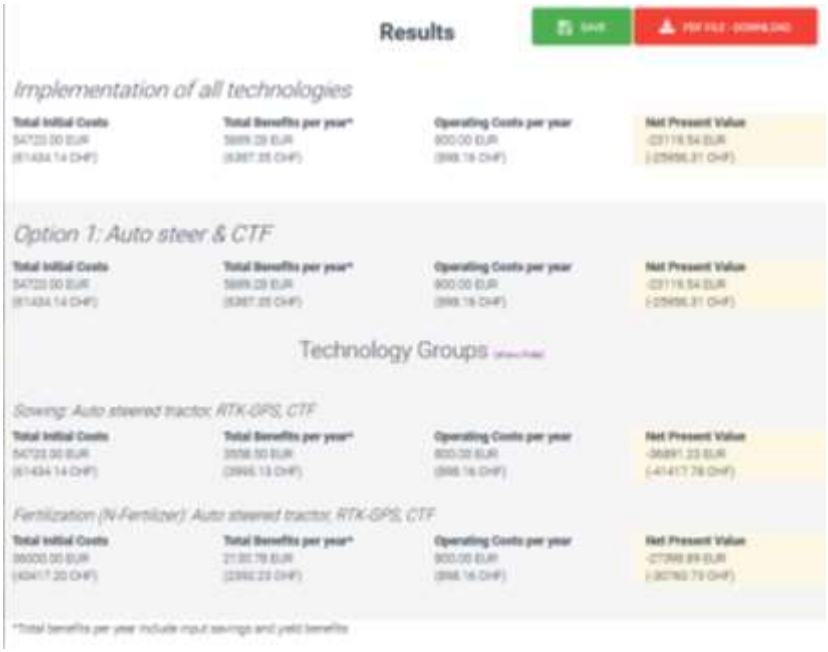


Figure 10 Final results of the calculations

The following results are calculated:
Total initial costs: Investment costs of the chosen technologies as displayed on investment
Total Benefits per year: input savings (seed, fertilizer, pesticides), yield benefits (if this is displayed)
Operating costs per year: These are the annually costs for RTK-licence etc. (extra variable costs)
Net present value: The NPV allows the user to calculate the profitability of a new investment in advance. Example: If the Net Present Value is greater than 0, then the investment is profitable. On the contrary, if the NPV is lower than 0, then the investment is not profitable.

6 Saving Results and Login

6.1 Login

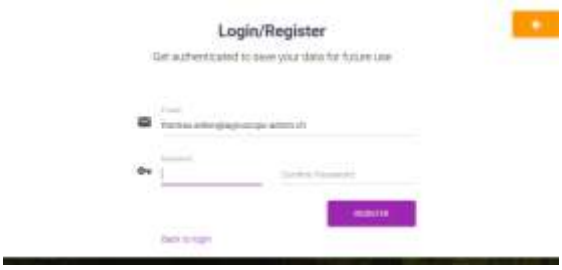
If you would like to save the data of your calculations, then you can register and create an account. This is not mandatory, you can use the tool without any login.

If you press the yellow button “Login/Register” on the homepage (1st screen), then you get on the register page:

Figure 11 Login screen

If you are not yet registered, then press “Register here!”

On this screen you can enter your registration data (email and password).



If you are logged in, then you can save your calculations at the end of a calculation at the “Result screen” (4th main screen) by selecting “SAVE”.

Figure 12 4th main screen allows to save the calculations including the input parameters

1st screen: If you press the blue button “Show saved runs” on the initial screen, then the saved runs “Historical data” are presented:

Figure 13 1st main screen where you can load saved data

You can select these data and reuse and modify these saved runs.

Figure 14 Saved data can be used again by pressing the green button