

## Introduction to Python Project



## Introduction:

France is the first country in the European Union contributing the most to agricultural production. According to the Ministry of Europe and Foreign Affairs, the most important production corresponds to arable crops, which represents 20% of French agriculture. The field crops sector is made up of cereals (wheat, barley, corn, etc.), oilseeds (sunflower, rapeseed, etc.) and protein crops (peas, etc.).

There are two types of agriculture. Conventional farming, which is the most common, and organic farming. The latter only represented one million hectares in 2012, or 3.7% of French agricultural land.

We are going to look at two farmers. Tom works in conventional agriculture while Sébastien is certified in organic farming.

The objective of this exercise is to create a program using Python that studies the economic activity of Tom and Sébastien.

## Part 1: conventional agriculture

Tom is a farmer. He owns a field of 25 hectares (ha) on which he produces different crops of different surfaces.

The data are summarized in the table below. They come from various reports from France AgriMer and chambres d'agriculture.

For all the exercise, we will keep one decimal. Be careful to round data when it is needed.

*Table 1: Surface, yield, production costs and selling prices for field crops in conventional agriculture*

Crops	Surface (in ha)	Yield (in t/ha)	Production costs (in €/tonne)	Selling price (in €/tonne)
Durum wheat	3	5,9	360	272
Soft wheat	3	7,9	214	183
Rapeseed	1	3,5	338	430
Winter barley	4	7,1	216	185
Sunflower	6	2,3	497	408
Peas	5	5,1	304	213
Maize	2	10,5	206	170

- Using Python, create a .txt file with all the figures from the table above

For each culture:

- With Python, create a new .txt file where all your calculations will be saved. You can name it "conventional\_agriculture.txt".
- Calculate and display total yield, total cost of production and turnover.
- Deduct the profit. Display it.
- Using a function, give the most profitable and least profitable crop. (expected: crops names and their profits)
- Sort crops in descending order of profit.

## Part 2: organic agriculture

We are now interested in Sébastien, an organic farmer.

Sébastien also owns a 25 hectares field on which he produces the same crops, but in organic farming.

*Table 2: Surface and yield for field crops in organic farming*

Crops	Surface (in ha)	Yield (in t/ha)
Durum wheat	3	2,8
Soft wheat	3	3,2
Rapeseed	1	2,5
Winter barley	4	3,0
Sunflower	6	2,5
Peas	5	2,0
Maize	2	5,4

It is considered that the areas for each crop are identical and the production costs are unchanged. We admit that the selling prices in organic farming are 30% higher than those in conventional farming.

The table above summarizes the yields of each crop in organic farming.

- Create the table in a .txt file and import these data in Python. Keep in mind you need data from the previous table.
- With Python, create a .txt file to save your results. You can name it "organic\_farming.txt"
- Display the selling prices of each crop in organic farming.
- Calculate the profit for each crop of Sébastien
- Using a function, display crops that are not profitable. (expected: crops names and their profits)
- Sort crops in ascending order of profit.

## Part 3: comparison between conventional and organic agriculture

We want to compare the results between Tom and Sébastien.

- Calculate and display the total profit of all crops for Tom and Sébastien.
- Compare Tom's results to Sébastien's. Display a message indicating who, between Tom or Sebastian, has the best results
- (optional) Create a button with the message "Who has better results?". When you click on it, it displays the related name.

### **For Further:**

This part is optional.

In France, it takes 3 years to be certified in organic farming. During these years, the farmer has the same cost production. He sells his production at the conventional agriculture price but with the organic yield.

In this last part, we want to determine the cost of transition.

- In a new .txt file, calculate yield loss between conventional agriculture and organic farming. Display it in percentage.
- Calculate the profit for one year of change.
- Display the total profit for 3 years.
- Try to display a graphic with all the data between conventional agriculture, organic farming and in transition agriculture.

Good luck!

### **Sources:**

Figures and data in the introduction: <https://ue.delegfrance.org/l-agriculture-francaise-en-3038>

Tables of yields and production costs of field crops in conventional agriculture (average for the years 2010-2011-2012) – 2015: [https://chambres-agriculture.fr/fileadmin/user\\_upload/National/FAL\\_commun/publications/National/Casdar/Couts\\_production\\_grandes\\_cultures.pdf](https://chambres-agriculture.fr/fileadmin/user_upload/National/FAL_commun/publications/National/Casdar/Couts_production_grandes_cultures.pdf)

Selling price tables for field crops in conventional agriculture:  
<https://www.franceagrimer.fr/fam/content/download/22281/document/11+Enqu%C3%AAt+prix+au+producteurs-1er+trimestre+2012-13.pdf?version=8>

Table yields of field crops in organic farming:  
[https://www.franceagrimer.fr/content/download/7147/41754/file/repart\\_var\\_bio062011.pdf](https://www.franceagrimer.fr/content/download/7147/41754/file/repart_var_bio062011.pdf)