SUN Bowen
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Python Project Results

Part 1: Conventional Agriculture

In Part 1 we focus on conventional farming and we would like to see the results for total yield, cost of production, turnover and profit. The table below summarizes our findings:

Crop	Total Yield	Cost of Production	Turnover	Profit
Durum Wheat	18	6480	4896	-1584
Soft Wheat	24	5136	4392	-744
Rapeseed	4	1353	1720	368
Winter Barley	28	6048	5180	-868
Sunflower	14	6958	5712	-1246
Peas	26	7904	5538	-2366
Maize	21	4326	3570	-756

We can observe the profit it negative for nearly all crops except Rapeseed with a value of 368. We can consider that all crops are equally unprofitable if they are negative therefore if we were to make a recommendation to Tom, he should continue with Rapeseed crops but rethink his production of all other crops.

Part 2: Organic Farming

For the selling prices of Sebastien's crops, we get the following results:

Selling Price Durum wheat: 2970.24
Selling Price Soft wheat: 2141.1
Selling Price Rapeseed: 1397.5
Selling Price Winter barley: 2886.0
Selling Price Sunflower: 7956.0
Selling Price Peas: 2769.0
Selling Price Maize: 2386.8

The following table summarizes the profits for each crop:

Crop	**Profit**
Durum Wheat	-54
Soft Wheat	215
Rapeseed	522
Winter Barley	294
Sunflower	501
Peas	-271
Maize	162

Using the *define* function we see which crops are unprofitable: Durum wheat and Peas.

We conclude that for organic farming, the unprofitable crops are Durum Wheat and Peas. We can also see the number of unprofitable crops in organic farming is considerably smaller than the number of unprofitable crops for conventional farming.

We can also see that profit margins in organic farming are fairly low, perhaps due to cost of materials used for this type of farming.

Part 3 (optional): Transition Costs

The following table (as displayed in Python) shows us all of the different costs associated with transition agriculture.

----------Data in transition agriculture----------

Crops	Surface	Yield	Production Costs	Selling Price	Profit
Durum wheat	3.0	2.8	360.0	272.0	-739.2
Soft wheat	3.0	3.0	214.0	183.0	-279.0
Rapeseed	1.0	2.5	338.0	430.0	230.0
Winter barley	4.0	3.0	216.0	185.0	-372.0
Sunflower	6.0	2.5	497.0	408.0	-1335.0
Peas	5.0	2.0	304.0	213.0	-910.0
Maize	2.0	5.4	206.0	170.0	-388.8
Total	-	-	-	-	-3794.0

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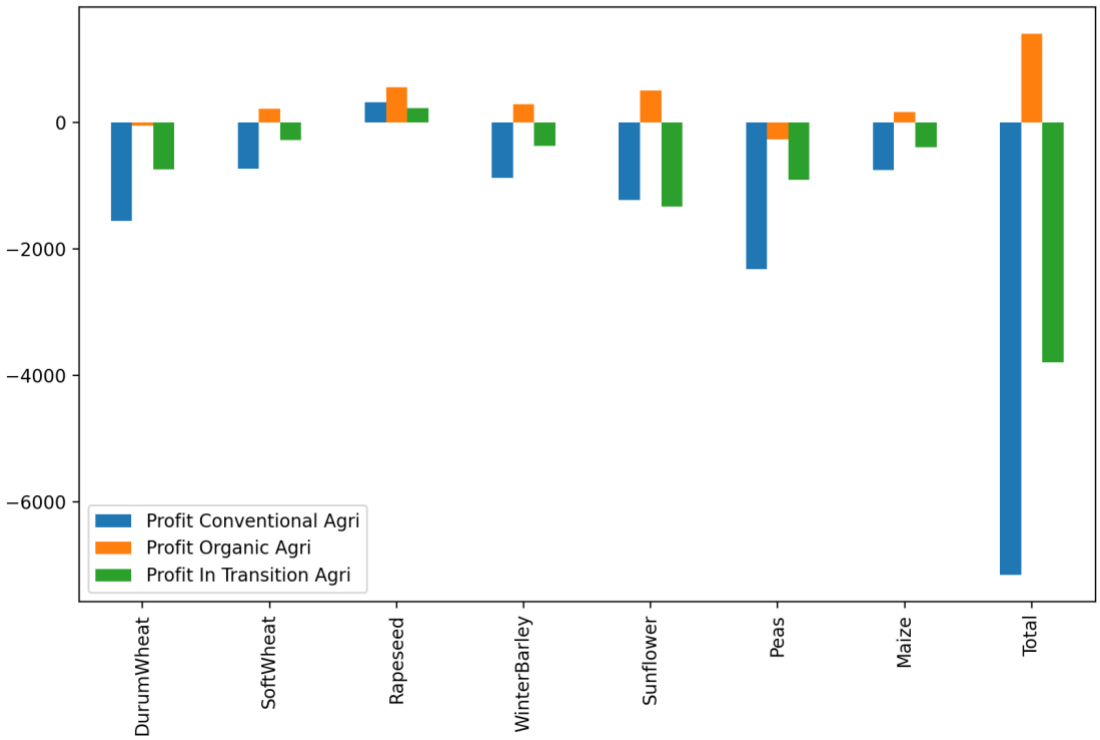
----------Profit comparison----------

Crops	Profit Conventional Agri	Profit Organic Agri	Profit In Transition Agri
Durum Wheat	-1557.6	-53.8	-739.2
Soft Wheat	-734.7	215.1	-279.0
Rapeseed	322.0	552.5	230.0
Winter Barley	-880.4	294.0	-372.0
Sunflower	-1228.2	501.0	-1335.0
Peas	-2320.5	-271.0	-910.0
Maize	-756.0	162.0	-388.8
Total	-7155.4	1399.8	-3794.0

By comparing the conventional and organic, we get a total profit for Tom = -7155.2 and a total profit for Sebastien = 1399. By transitioning from conventional to organic farming, the farmer loses -3794.
Using Pandas and Matplotlib, we create the following graph showing us the profits in each type of agriculture.



As the histogram shows us, most crops in the conventional farming have a negative profit, especially peas. Except there's a slight profit for Rapeseed, but it's still not enough to cover the loss. In the meantime, in the organic farm, Sebastien gained a profit even though it's not an immense amount compared to the loss of Tom's farm or the cost of turning the farm into organic. In conclusion, the organic farm has a better result, and farmers like Tom are in a difficult situation. It may be a strategic move for Tom to turn his farm into an organic one to avoid continuing to lose money. However, the transition farm cost could still be an expensive investment for Tom, and it needs at least a few years to be paid back.