

02 Data Collection on the farm

Introduction

There are many ways to collect data from farms. The generated questionnaires can be used online or printed as analogue sheets. As internet connection is sometimes unavailable or slow, offline methods should always be available.

Preparation

Before going to the farm, all collectors should be aware of the data needed, the collection tools, and the strategy. Each participating student should have access to the data collection sheets and information.

Data Collection Procedure

The suggested structure of procedure is to do data collection together with the farmer directly on the farm. Afterwards, the collected data will be processed and calculated into Gross Margins. The end result of the calculations should be available in local currency and in the size of one hectare or one acre per year. The choice of acre or hectare as a unit of measurement is an individual decision, based on what is most commonly used in your country. Once the decision has been made, you should stick to this measurement and not switch back and forth between hectares and acres. This will ensure that the gross margins are easily comparable.

Calculation of Gross Margins

Gross margins are calculated over the course of a year. This means that annual crops, which are grown once a year, are measured once. For crops that require a shorter growing season, you have to multiply this by the number of possible cycles per year. In the end, we get figures for how much money we can make in a year on a plot of 1 hectare or 1 acre. So we need the same time frame for all crops to ensure comparability.

Data Collection Methods

One way of collecting information is to ask for all information to be given per hectare and year. Examples are the amount of yield, fertiliser, and herbicides. This method results in less calculation work for the collector in the follow-up of the collection. On the other hand, it is very difficult for farmers and employees to know and calculate this figure. So the second way of collecting data is to ask all the questions per plot on the farm. This gives a structured overview of the activities carried out and the money spent. At the end, you can easily divide the result by the size of the plot and also get the gross margin per hectare or acre and year.

Sample Data Collection Sheet

A sample data collection sheet is shown and used in the following part of the video. These are created in Microsoft Excel and can be completed directly there or printed and filled on paper.

Data Entry

The first row should contain the farm and field data. This will ensure that everyone knows where the data belongs, even after a long period of inactivity. The data includes the name of the farm, which in this example is X Y Z. The parcel used, "Riverside", is also noted. The size of this parcel is 1.2 ha. The survey was carried out in the year 2024 and the data are related to the rainy season. This is optional, depending on the weather in your country. But at least the date of collection should be noted. It also mentions which crop and, more precisely, which variety was grown there. In the example, it is potatoes of the variety Cipira chosen by the farmer.

Structured Questionnaire

The standard information is followed by a structured questionnaire. It is recommended that you talk to the farmer about the cultivation process, from soil preparation at the beginning to harvesting at the end. For each step of the process, ask how it is done, what labour and how many hours it takes, and what it costs.

Overview of Tasks, Costs, and Time

The result is an overview of all the tasks, costs, and time spent. It is like documenting a single crop production process. This will lead to a simple gross margin, which will be defined more precisely in further steps.

Gross Margin Production

Within gross margin production, the costs of own factors such as labour costs, own land costs, and own capital costs are neglected at the beginning. This is because these are opportunity costs. This means that when the process is profitable, the farmer starts earning money for his own inputs. In later calculations, these opportunity costs will be included, but not at the beginning.

It is different with the costs of external factors such as labour and services. If people are employed or hire services that can be directly addressed to a production process, this must also be included in the gross margin calculation. The following calculation uses this method.

Example: Growing Potatoes

The following example is based on growing potatoes. Some crop production processes require different amounts of labour and also different amounts of chemicals. This example shows the overall structure as it is done and needs to be adapted for each individual process on each farm.

Glyphosate Application: The farmer explains that he used glyphosate to clear the field at the beginning of the growing season. The spraying was done by himself in 3 hours. He needed 2.4 litres for the whole field and each litre cost 3000. After entering all the information, multiply 2.4 litres by 3000 per litre, which gives a total of 7200.

Field Cleaning: The next step in the growing process was to clean the plot. This was done by a contractor who agreed to do it for 50000 per hectare. Because of the field size of 1.2 ha, the farmer had to pay 60000 for cleaning the field.

Soil Ploughing: After cleaning the field, the soil was ploughed on 30 March. This was done by the farm workers, who are not members of the family, so they are external workers. It took them 60 hours in total and they were paid 2000 per hour. The farmer paid a total of 120000. In addition, he used 2 hours of his own family labour. Also, a small tillage machine was used for some parts, so there was an additional cost of fuel for 15000. The total cost of the tillage operation was 135000 plus two hours of own labour.

Planting Potatoes: On the first of April, the farmer decided to plant the potatoes. So he bought 1.56 tonnes of seed potatoes from a certified seller. One ton cost 500000. This multiplied by 1.56 tonnes is 780000 and an additional 3900 was charged for transport to the farm. During the planting, a fertiliser called Yara Mila was added in a quantity of 120 kg. Each kg costs 450. Also 3000 kg of chicken manure was added at a cost of 70 per kg. The labour for planting and fertilising was 60 hours of hired labour at a cost of 2000 per hour. In addition, the farmer spent six hours of his own time on the planting process.

Herbicide Application: Two weeks after planting, the farmer decided to apply herbicide to control weeds. He used 1.8 litres, costing 4200 per unit. In total, he spent 3 hours of his own time.

Fungicide Application: After a further two weeks, the first fungicide application was made. This used 2.7 litres at a cost of 3800 per litre and also three hours of family time.

Fertiliser Application: On second of June a new fertilizer application was necessary to assure the proper growth of the potatoes. The farmer bought KAS fertilizer with ingredients of 27% Nitrogen. He applied 125 kilograms which cost 800 each. Additionally, he hired 7 hours contract workers to distribute the fertilizer on the field. Because of the more easy work compared to tillage he agreed on a wage per hour of 1500. Additionally, he worked 2 hours himself to help at the application.

Second Fungicide Application: After one and a half months, on 18th of July, the next fungicide application was necessary. Therefore 2.5 litres with a price of 4200 per litre were needed. The farmer himself took 3 hours for spraying.

Harvesting: On 5th of August the harvesting of all potatoes was done. This took 50 hours hired labour with a wage of 1500 per hour. In total 75000 were spent and additionally 2 hours own labour for supervision were necessary.

Sorting and Packing: Two days later the workers sorted and packed the potatoes for 15 hours with each hour at a cost of 1000. The farm family themselves sorted for 7

hours within their own time. Additionally, 90 pieces of sacks and material were necessary. Each cost 500, so total 45000 other costs are required.

Calculation of Costs

All activities and costs from preparation until the harvest are covered now. Then the sums for the parcel can be calculated, which is basically just adding up the single values. We also are interested in seeing the costs per hectare, so we divide the costs per parcel by the parcel size, which is 1.2 ha.

Yield and Revenue

Now we will leave this part as it is and move on to the next step. The total yield for the whole plot was 16.5 tonnes. We would like to know how this yield was sold or used. So the farmer tells us the record he has kept.

Revenue Calculation:

- On 5 August, 9 tonnes of ware potatoes were sold directly from the field to a trader. The price here is 200000 per tonne.
- Three days later, the farmer sold 6.5 tonnes of ware potatoes sorted in bags to individual customers. Here a higher price of 220000 could be achieved.
- One tonne of the harvest was kept by the farmer's family for their own consumption. Here the price of 200000 was used as a market reference. Although the farmer uses the potatoes for his own consumption and does not pay any money for them, the fictitious price must be used in the calculation. Although the farmer uses the potatoes for his own consumption and does not pay any money for them, the fictitious price must be used in the calculation. This is because the potatoes have a value that is obtained through crop production and this value must be included in the calculation. All the market prices multiplied by the quantity sold give revenue.
- Adding these gives a total revenue of 3430000 for the riverside plot.
- Divided by the size of 1.2 hectares gives a revenue of 2858333 per hectare.

Now that all the details of the production process have been collected, we are ready to complete the data collection for this potato growing process. The next step of processing the data and converting it into gross margins can be done together at the university as a lecture or workshop.

Input/Output in crop production (for one parcel)

Farm: <i>XYZ</i>	Parcel name: <i>Riverside</i>
Size: <i>1,2</i> ha	Year/season: <i>2024, rain season</i>
	Crop(s) and Variety: <i>Potato, CIPIRA</i>

Inputs/Costs

Date	Name/purpose/use of input	Quantity	Unit (size)	Price per unit	Seed	Fertil./Manure	Chemicals	Fuel/Electr	Transport	Hired lab/serv.	Other	Total	Family lab.	unit
03.03.	<i>Glyphosate application</i>	<i>2,4</i>	<i>l</i>	<i>3.000</i>			<i>7.200</i>					<i>7.200</i>	<i>3 hours</i>	
25.03.	<i>Field cleaning</i>	<i>1,2</i>	<i>ha</i>	<i>50.000</i>						<i>60.000</i>		<i>60.000</i>		
30.03.	<i>Tilling</i>	<i>60</i>	<i>hours</i>	<i>2.000</i>				<i>15.000</i>		<i>120.000</i>		<i>135.000</i>	<i>2 hours</i>	
01.04.	<i>Planting: Seed</i>	<i>1,56</i>	<i>t</i>	<i>500.000</i>	<i>780.000</i>				<i>3.900</i>			<i>783.900</i>		
	<i>+ Yara Mila</i>	<i>120</i>	<i>kg</i>	<i>450</i>		<i>54.000</i>			<i>2.400</i>			<i>56.400</i>		
	<i>+ chicken manure</i>	<i>3000</i>	<i>kg</i>	<i>250</i>		<i>750.000</i>			<i>30.000</i>			<i>780.000</i>		
	<i>+ labour</i>	<i>60</i>	<i>hours</i>	<i>2.000</i>						<i>90.000</i>		<i>90.000</i>	<i>6 hours</i>	
15.04.	<i>Herbicide application</i>	<i>1,8</i>	<i>l</i>	<i>4.200</i>			<i>7.560</i>					<i>7.560</i>	<i>3 hours</i>	
30.05.	<i>Fungicide application</i>	<i>2,7</i>	<i>l</i>	<i>3.800</i>			<i>10.260</i>					<i>10.260</i>	<i>3 hours</i>	
02.06.	<i>Fertilizer KAS (27%N)</i>	<i>125</i>	<i>kg</i>	<i>400</i>		<i>50.000</i>						<i>50.000</i>		
	<i>+ labour</i>	<i>7</i>	<i>hours</i>	<i>1.500</i>						<i>10.500</i>		<i>10.500</i>	<i>2 hours</i>	
18.07.	<i>Fungicide application</i>	<i>2,5</i>	<i>l</i>	<i>4.200</i>			<i>10.500</i>					<i>10.500</i>	<i>3 hours</i>	
05.08.	<i>Harvesting</i>	<i>50</i>	<i>hours</i>	<i>1.500</i>						<i>75.000</i>		<i>75.000</i>	<i>2 hours</i>	
07.08.	<i>Sorting, packaging</i>	<i>15</i>	<i>hours</i>	<i>1.000</i>						<i>15.000</i>		<i>15.000</i>	<i>7 hours</i>	
	<i>+ sacks, material</i>	<i>90</i>	<i>pieces</i>	<i>500</i>							<i>45.000</i>	<i>45.000</i>		
Total for parcel					<i>780.000</i>	<i>854.000</i>	<i>35.520</i>	<i>15.000</i>	<i>36.300</i>	<i>370.500</i>	<i>45.000</i>	<i>2.136.320</i>	<i>31 hours</i>	
Total per ha:					<i>650.000</i>	<i>711.667</i>	<i>29.600</i>	<i>12.500</i>	<i>30.250</i>	<i>308.750</i>	<i>37.500</i>	<i>1.780.267</i>	<i>26 hours</i>	

Yield (Please list the harvesting days)

Date	Remarks	Quantity	Unit (t, kg, etc.)
<i>05.08.</i>		<i>9</i>	<i>t</i>
<i>05.08.</i>		<i>6,5</i>	<i>t</i>
<i>05.08.</i>		<i>1</i>	<i>t</i>
Total:		<i>16,5</i>	<i>t</i>
Total per ha:		<i>13,75</i>	<i>t</i>

Use of yield (Please list when yield was sold, given away, lost, etc.)

Date	Use of yield *)	Quantity	Unit	Price/Value	Revenue
<i>05.08.</i>	<i>sold as consumption</i>	<i>9</i>	<i>t</i>	<i>200000</i>	<i>1.800.000</i>
<i>08.08.</i>	<i>sold as consumption</i>	<i>6,5</i>	<i>t</i>	<i>220000</i>	<i>1.430.000</i>
<i>08.08.</i>	<i>kept for home consum</i>	<i>1</i>	<i>t</i>	<i>200000</i>	<i>200.000</i>
Total:				<i>3.430.000</i>	
Total per ha:				<i>2.858.333</i>	

*) specify: sold as..., sold to..., kept for seed, home consumption, given as gift, lost, etc