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CHAPTER

DECISION MAKING WITH EXCEL

CHAPTER PLAN

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5.1 WHAT-IF ANALYSIS

Imagine that you are a cycle manufacturer who manufactures 2000 cycles per annum at a unit cost of ₹ 800. You have two options to sell them, selling to approved stockists at a unit price of ₹ 1100 or selling in open market for a unit price of ₹ 1200. There is a fixed cost of production ₹ 100000. Currently you sell 40% of your production in the open market.

As a businessman you may think of various situations that you may encounter in future because of changes in any of the variables that affect your profits. Some of them may be:

- (1) What percentage of units produced you should sell in open market in order to achieve a target profit?
- (2) If sales price per unit in open market assumes a number of hypothesized prices how will it affect your total profit?
- (3) If we vary both sales price per unit in open market and the proportion sold in open market how will it affect your total profit?
- (4) What will happen to profits if more than two variables change?

To answer such problems we may use **What-if-analysis** tool of excel.

The use of What-If Analysis tools in Excel allows you changing the values in cells to see how those changes will affect the outcome of formulas on the worksheet.

There are three kinds of What-If Analysis tools:

- (1) Goal Seek,
- (2) Data Tables, and
- (3) Scenario Manager.

5.1.1 Goal Seek

If you know your target and you want to find out what should be the value of an input to achieve the desired result, you may use goal seek.

For the current business situation, the profit earned is ₹ 460000. If you wish to know what percentage of units produced should be sold in open market in order to make a profit of ₹ 500000, you may use goal seek.

You need to remember that goal seek can suggest changes in one variable only.

Figure 5.1 shows you the formula to achieve the current profit.

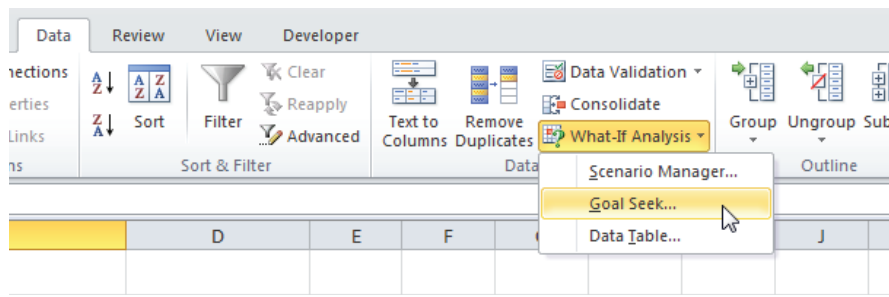
	A	B	C	D	E	F
1		Cycle store				
2						
3		Total No of cycles Manufactured	% of cycles sold in open market			
4		2000	0.4			
5						
6			Number of cycles sold	Sales price per unit	Cost price per unit	Profit Per Unit
7		Sold in open market	=B4*C4	1200	800	=D7-E7
8		Sold to stockists	=B4*(1-C4)	1000	800	=D8-E8
9		Fixed Cost	100000			
10			Total Profit	=SUMPRODUCT(C7:C8,F7:F8)-D9		
11						

FIGURE: 5.1

*The alternative formula to determine the total profit could be =C7*F7+C8*F8-D9*

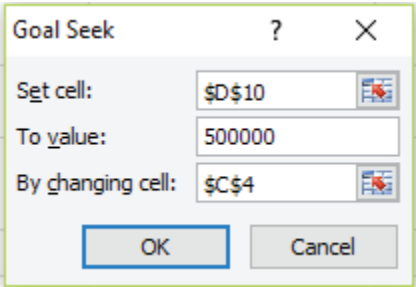
To determine the proportion required to be sold in open market to achieve the profit of ₹ 500000, follow the following steps:

1. On the Data tab, click What-If Analysis and then click Goal Seek.



The Goal Seek dialog box appears.

- 2. Select cell D10, the cell with the output formula in ‘set cell’ box.
- 3. Click in the ‘To value’ box and type the desired output ₹ 500000.
- 4. Click in the ‘By changing cell’ box and select cell C4, the cell with the variable that you want to change.
- 5. Click OK.



	A	B	C	D	E	F
1		Cycle store				
2						
3		Total No of cycles				
4		Manufactured	% of cycles sold in open market			
5		2000	50%			
6						
7			Number of cycles sold	Sales price per unit	Cost price per unit	Profit Per Unit
8		Sold in open market	1000	₹ 1,200.00	₹ 800.00	₹ 400.00
9		Sold to stockists	1000	₹ 1,000.00	₹ 800.00	₹ 200.00
10			Fixed Cost	₹ 100,000.00		
			Total Profit	₹500,000		

FIGURE 5.2

Excel suggests that if you 50% of your cycles produced to open market you will earn a profit of ₹ 500000.

5.1.2 Data Tables

If you wish to analyze impact of different values for one or two variables on the outcome in an excel sheet you can safely make use **Data Tables**. If you want analyze the impact on profits earned if the proportion sold in open market assumes values of 30%, 40%, 50%, 60%, 80%, etc. you can use data table.

Here we cannot use goal seek. Goal seek allows us to determine the value of an input that will enable us achieving our targets. Whereas, in the present

scenario we want to see how our profits will be turn out as a response to the values assumed for the input(s). A data table quickly tries out different values of inputs in the formulas and determines the output. You can create a one variable data table or a two variable data table.

Presently we have assumed changes in one variable only therefore we need to make one variable data table.

One Variable Data Table

To create a one variable data table, execute the following steps.

- 1. Type the different percentages in column A.
- 2. Select cell B12 and type =D10 (refer to the output cell).
- 3. Select the range A12:B17.

	A	B	C	D	E	F
1		Cycle store				
2						
3		Total No of cycles Manufactured	% of cycles sold in open market			
4		2000	50%			
5						
6			Number of cycles sold	Sales price per unit	Cost price per unit	Profit Per Unit
7		Sold in open market	1000	₹ 1,200.00	₹ 800.00	₹ 400.00
8		Sold to stockists	1000	₹ 1,000.00	₹ 800.00	₹ 200.00
9			Fixed Cost	₹ 100,000.00		
10			Total Profit	₹500,000		
11						
12		₹500,000				
13	30%					
14	40%					
15	50%					
16	60%					
17	80%					

FIGURE 5.3

- 4. On the Data tab, click What-If Analysis and select Data Table from the list.

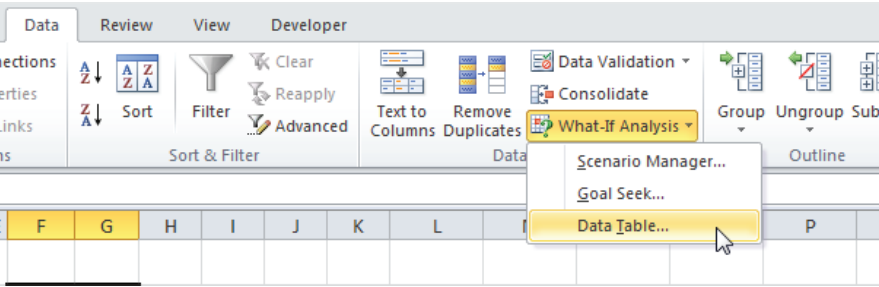
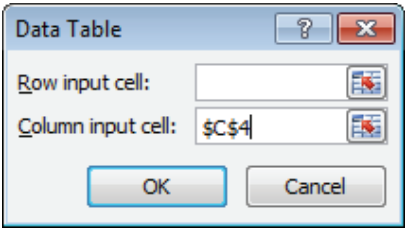


FIGURE 5.4

- 5. Click in the 'Column input cell' box (since we have entered the different percentages in a column) and select cell C4.

You need to select cell C4 because the percentage of cycles sold in the open market is being referred in the formula from C4 (% sold in the open market). Considering the formula entered in the cell B12, excel now knows that it should replace cell C4 with different values of proportion sold to calculate the total profit. Since there is only one variable assuming different values leave the Row input cell blank. Had the inputs been arranged in rows we would have entered cell C4 in 'Row input cell' and left the 'column input cell' box blank.



- 6. Click OK to get the results.

	A	B	C	D	E	F
1		Cycle store				
2						
3		Total No of cycles				
4		Manufactured	% of cycles sold in open market			
5		2000	50%			
6						
7			Number of cycles sold	Sales price per unit	Cost price per unit	Profit Per Unit
8		Sold in open market	1000	₹ 1,200.00	₹ 800.00	₹ 400.00
9		Sold to stockists	1000	₹ 1,000.00	₹ 800.00	₹ 200.00
10			Fixed Cost	₹ 100,000.00		
11			Total Profit	₹500,000		
12						
13		30%	₹500,000			
14		40%	₹420,000			
15		50%	₹460,000			
16		60%	₹500,000			
17		80%	₹540,000			

FIGURE 5.5

Two Variable Data Table

Suppose that you are expecting changes in units sold in open market the unit price and assume values of ₹ 1400, ₹ 1200, ₹ 1150, ₹ 1100 and ₹ 1050 respectively. To see the impact on profits of changes in proportion sold in open market and the changes in unit price both you can create a two variable data table.

Execute the following steps:

- 1. Type the different unit Prices in row 12 starting from cell B12.
- 2. Type the different percentages in column A starting from cell A13.
- 3. Select cell A12 and type =D10 (refer to the cell containing formula to compute the total profit as we did earlier).
- 4. Select the range A12:F17.