Sensitivity Analysis

What is sensitivity Analysis

- It is a tool that used to analyse how the different set of independent variables affect a specific dependent variable under certain specific conditions/ assumptions and boundaries.
- It determines how target variables are affected based on the changes in input variables
- It also known as what – if/ simulation analysis
- It used in different fields (Geography, Biology, engineering, economics ,etc.)
- Where the output is the function of several inputs and the exact relationship between inputs and output are not well understood
- It shows what happen if some or this/ those is/are changed/ absent

What is sensitivity Analysis

- The objective of conducting sensitivity analysis is to learn how much a certain factor impacts the value of a particular business
- It is the first step to risk analysis.
- A sensitivity analysis is carried out after calculating the gross margin
- It allows the farmer and the adviser to assess the financial impact of something going wrong, and therefore the risks to the farm business.

The optimal level of profitability of a service or product can be assessed by calculating it under various different scenarios, and particularly those which would have a negative impact on total revenues and production costs.

Possible options to consider include:

- Volume of sales to be lower or increase (ex. 10, 20 or 30%)
- Sales price to be lower or increase (ex. 10, 20, 30%)
- Increase in raw materials cost (10,20, 30%)
- Delayed or partial availability of certain crucial inputs (labour shortage, fertilizer shortage etc.);
- Crop losses (insects, weather, fire etc.).

Analyzing the different impacts will show the key areas of vulnerability and consider the safety measures to set in place in order to minimize negative effects.

Example: insurance, regular controls, early warning systems etc.

Because

- Farm income is highly sensitive to reduction in yields (due to water shortage, pests and diseases) and crop prices.
- If yields decrease , crop income reduces
- If crop prices are half their current values, crop income drops by certain percentage
- When crop prices decrease, irrigated vegetable farming is no longer profitable.
- As the input cost deceased the outcome is high
- As the input quality increases also the outcome increased

Why Sensitivity Analysis

- Costs and benefits are subject to uncertainty and may vary from the base case
- Ii is an analytical framework for dealing with uncertainty.
- The objective is to reduce the likelihood of undertaking bad outcomes
- It help to make predictions/ forecasting in the cost, yield and price or outcomes
- It used to determine how changes in one variable affect the outcome
- It act as an in-depth study of all the variables
- It allows decision makers to identify where there they can make improvements in the future
- It allows for the ability to make sound decisions about organization’s economy or investment
- It is important to make informed decisions

Limitation of Sensitivity Analysis

The out come are all based on assumptions b/c:

- The variables are based on historical data
- It is not exactly accurate and there may be room for error

So we should consider this and be sure the data is correct or not

Type of Sensitivity Analysis

1. Qualitative
2. Quantitative
   - Lay out in excel
   - Direct and Indirect methods
   - Tables, charts and graphs
   - Linear and non linear correlation

The area of our Analysis

Dependent variable = A function of Independent variable

In our case the dependent variables are:

- Volume of product
- Quality of product
- Price of product

The independent variables are:

- Inputs in type and quantity, price, quality, availability
- Labor
- Season
- Agro ecology
- Land size
- Input application (Technology- best practice)
- Etc..

- What should be fulfilled in each business(onion, Tomato etc)

Or what are the right production model/ function of our crops

Agronomy practice

- What are the corrective actions if our assumptions are failed

Example of analysis in Excel