Diagrammatic representation of data – uses and limitations – simple, Multiple,

Component and percentage bar diagrams – pie chart

Diagrams

Diagrams are various geometrical shape such as bars, circles etc. Diagrams are based on scale but are not confined to points or lines. They are more attractive and easier to understand than graphs.

Merits

1. Most of the people are attracted by diagrams.
2. Technical Knowledge or education is not necessary.
3. Time and effort required are less.
4. Diagrams show the data in proper perspective.
5. Diagrams leave a lasting impression.
6. Language is not a barrier.
7. Widely used tool.

Demerits (or) limitations

1. Diagrams are approximations.
2. Minute differences in values cannot be represented properly in diagrams.
3. Large differences in values spoil the look of the diagram.
4. Some of the diagrams can be drawn by experts only. eg. Pie chart.
5. Different scales portray different pictures to laymen.

Types of Diagrams

The important diagrams are

1. Simple Bar diagram.
2. Multiple Bar diagram.
3. Component Bar diagram.
4. Percentage Bar diagram.

5. Pie chart
6. Pictogram
7. Statistical maps or cartograms.

In all the diagrams and graphs, the groups or classes are represented on the x-axis and the volumes or frequencies are represented in the y-axis.

Simple Bar diagram

If the classification is based on attributes and if the attributes are to be compared with respect to a single character we use simple bar diagram.

Example

1. The area under different crops in a state.
2. The food grain production of different years.
3. The yield performance of different varieties of a crop.
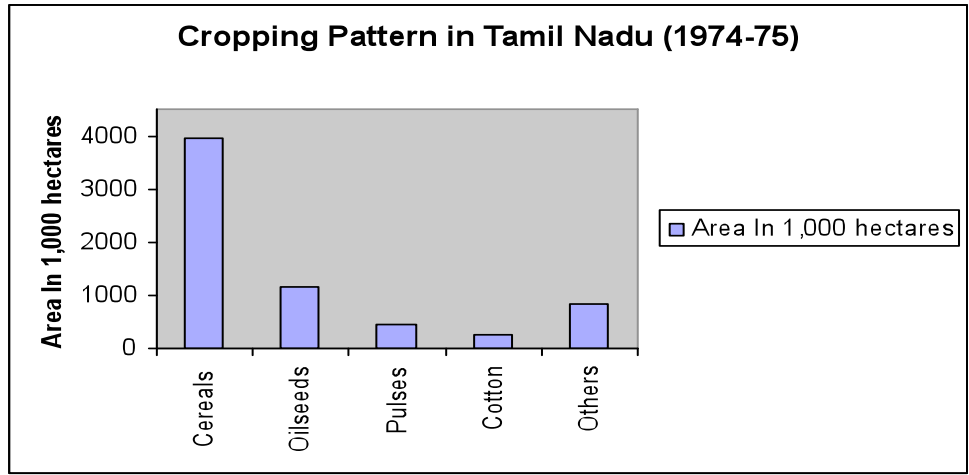4. The effect of different treatments etc.

Simple bar diagrams Consists of vertical bars of equal width. The heights of these bars are proportional to the volume or magnitude of the attribute. All bars stand on the same baseline. The bars are separated from each others by equal intervals. The bars may be coloured or marked.

Example

The cropping pattern in Tamil Nadu in the year 1974-75 was as follows.

Crops	Area In 1,000 hectares
Cereals	3940
Oilseeds	1165
Pulses	464
Cotton	249
Others	822

The simple bar diagram for this data is given below.

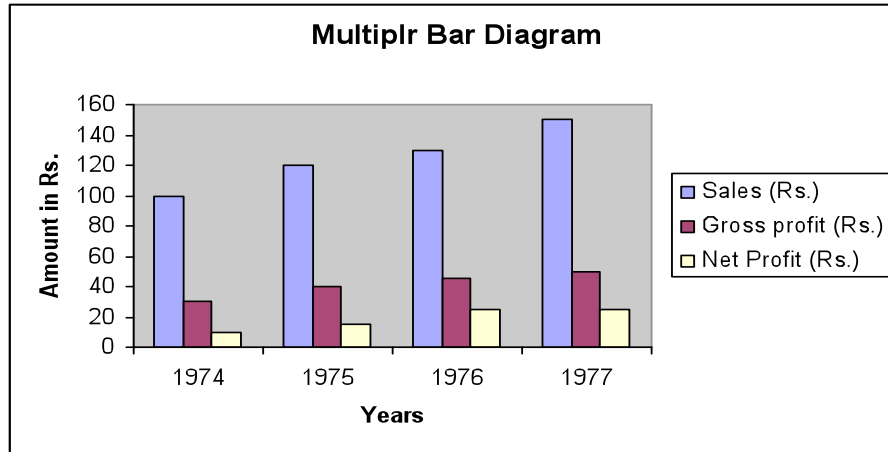**Cropping Pattern in Tamil Nadu (1974-75)**

Multiple bar diagram

If the data is classified by attributes and if two or more characters or groups are to be compared within each attribute we use multiple bar diagrams. If only two characters are to be compared within each attribute, then the resultant bar diagram used is known as double bar diagram.

The multiple bar diagram is simply the extension of simple bar diagram. For each attribute two or more bars representing separate characters or groups are to be placed side by side. Each bar within an attribute will be marked or coloured differently in order to distinguish them. Same type of marking or colouring should be done under each attribute. A footnote has to be given explaining the markings or colourings.

Example

Draw a multiple bar diagram for the following data which represented agricultural production for the priod from 2000-2004

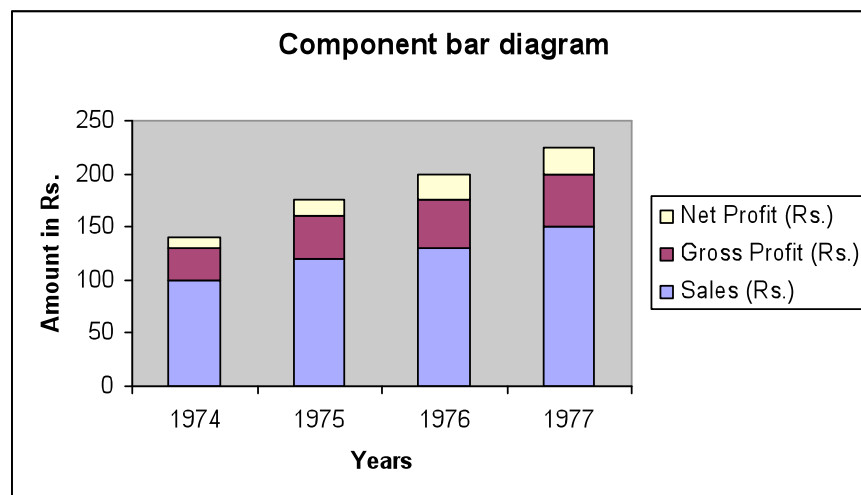| Year	Food grains (tones)	Vegetables (tones)	Others (tones)
2000	100	30	10
2001	120	40	15
2002	130	45	25
2003	150	50	25
2004			

Component bar diagram

This is also called sub – divided bar diagram. Instead of placing the bars for each component side by side we may place these one on top of the other. This will result in a component bar diagram.

Example:

Draw a component bar diagram for the following data

Year	Sales (Rs.)	Gross Profit (Rs.)	Net Profit (Rs.)
1974	100	30	10
1975	120	40	15
1976	130	45	25
1977	150	50	25

Percentage bar diagram

      Sometimes when the volumes of different attributes may be greatly different for making meaningful comparisons, the attributes are reduced to percentages. In that case each attribute will have 100 as its maximum volume. This sort of component bar chart is known as percentage bar diagram.
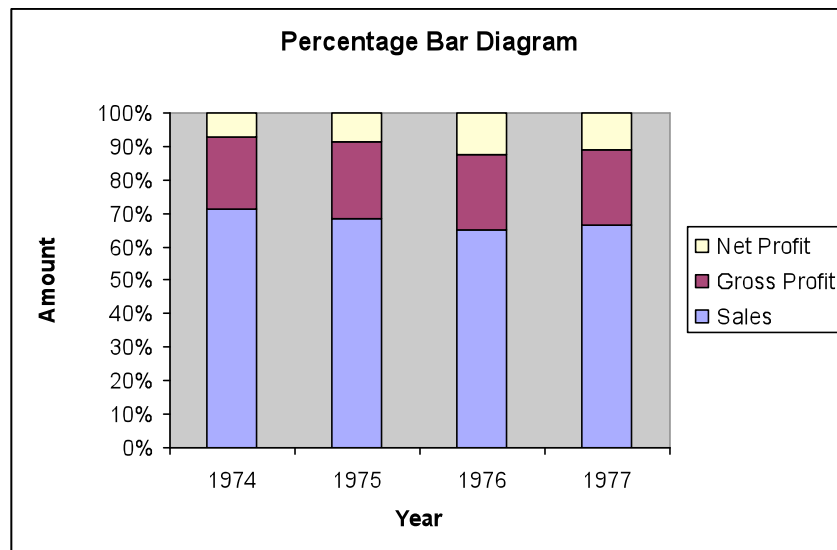
$$\text{Percentage} = \frac{\text{Actual value}}{\text{Total of the actual value}} \times 100 ,$$

Example:

Draw a Percentage bar diagram for the following data

Using the formula $\text{Percentage} = \dfrac{\text{Actual value}}{\text{Total of the actual value}} \times 100$, the above table is converted.

Year	Sales (Rs.)	Gross Profit (Rs.)	Net Profit (Rs.)
1974	71.43	21.43	7.14
1975	68.57	22.86	8.57
1976	65	22.5	12.5
1977	66.67	22.22	11.11

5

Pie chart / Pie Diagram

Pie diagram is a circular diagram. It may be used in place of bar diagrams. It consists of one or more circles which are divided into a number of sectors. In the construction of pie diagram the following steps are involved.

Step 1:

Whenever one set of actual value or percentage are given, find the corresponding angles in degrees using the following formula

$$\text{Angle} = \frac{\text{Actual value}}{\text{Total of the actual value}} \times 360^0$$

$$\text{(or) Angle} = \frac{\text{Percentage}}{100} \times 360^0$$

Step 2:

Find the radius using the area of the circle πr^2 where value of π is 22/7 or 3.14

Example

Given the cultivable land area in four southern states of India. Construct a pie diagram for the following data.

State	Cultivable area(in hectares)
Andhra Pradesh	663
Karnataka	448
Kerala	290
Tamil Nadu	556
Total	**1957**

Using the formula

$$\text{Angle} = \frac{\text{Actual value}}{\text{Tota lof the actual value}} \times 360^0$$

(or)

$$\text{Angle} = \frac{\text{Percentage}}{100} \times 360^0$$

6

The table value becomes

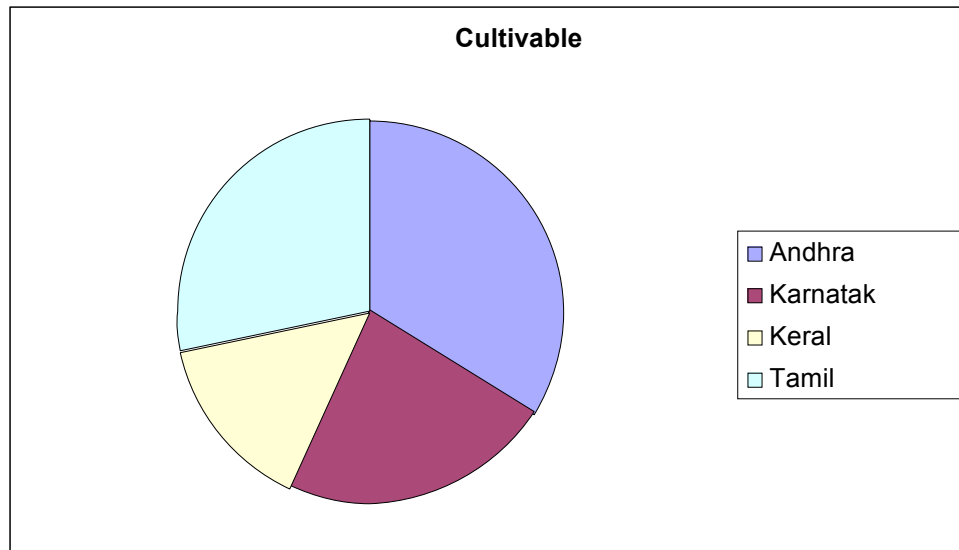| State	Cultivable area
Andhra Pradesh	121.96
Karnataka	82.41
Kerala	53.35
Tamil Nadu	102.28

Radius $= \pi r^2$

Here $\pi r^2 = 1957$

$$r^2 = \frac{1957}{\pi} = \frac{1957}{3.14} = 623.24$$

$r = 24.96$

$r = 25$ (approx)

Cultivable

Legend: Andhra, Karnatak, Keral, Tamil

Questions

1. In a component bar diagram the length of the bar

   a) Will be same for all   c) will not be same

   b) Depends on the total   d) none of these

   Ans: Depends on the total

2. The length of the bar will be same for all categories in

    a) Multiple bar diagram   b) component bar diagram

    c) Percentage bar diagram   d) none of these

    Ans: Percentage bar diagram

3. Sub-divided bar diagram are also called Component bar diagram.

    Ans: True

4. The multiple bar diagram is the extension of simple bar diagram.

    Ans: True

5. In a bar the width of the bars should be equal.

    Ans: True

6. In a percentage bar diagram the length of the bars will not be equal.

    Ans: False

7. How diagrams are useful in representing statistical data?

8. How to draw a pie chart?

9. Explain how to draw simple and multiple bar diagrams.

10. Explain how to draw Component and percentage bar diagrams.