

UNIT 12

Representation of Geographical Data



Unit Overview

- 12.1 Introduction
- 12.2 Classification of statistical diagrams
 - 12.2.1 Line Diagram
 - 12.2.2 Bar Diagram
 - 12.2.3 Pie Diagram

12.1 Introduction

Economists, statisticians, and geographers make use of statistical facts and data in their respective fields. Climatic data like temperature, pressure, rainfall, etc., may be represented by diagram such as isotherms, isobars and isohyets respectively. Besides the tabular form, the data may also be presented in some graphical or diagrammatic form. Population, climatic, and Socio economic data can be represented visually for better understanding in the form of graphs, diagrams, charts and maps. Thus, geographical data needs to be scientifically visualised for appropriate cartographic communication. Therefore, cartographic presentation of geographical data is important to explore the nature of data, their pattern of variations over time and space, to analyse the data set, and to identify and classify the real world objects.

We study climatic, economic and population data in geography. The numerical data or facts when collected in a systematic



Learning Objectives

- Identify various types of Geographical data.
- Understand various methods of drawing geographical data.
- Analyse the various methods of constructing diagram suitable for particular data.



manner to serve some purpose and presented in a tabulated form they are called statistics.

The diagrams representing statistical data are known as statistical diagrams. Geometrical figures such as bars, rectangles, squares, circles, cubes, sphere, etc., and curves or lines are used to represent statistical data diagrammatically. These diagrams serve the following purposes:

1. They enable us to compare figures at a glance.
2. They cast easily memorable impression on the mind.
3. They enable us to analyse the data and draw inference easily.

12.2 Classification of statistical diagrams

There are three classes of statistical diagrams. They are as follows;

1. **One-dimensional statistical diagrams** such as line graph, poly graph, bar diagram, histogram, and star diagram. etc., in these diagrams quantities are represented by the line, length of bars and length of radiating lines in a star diagram.
2. **Two-dimensional statistical diagrams** are also known as area diagram such as squares, rectangles and circles. Divided squares, divided circles also called as pie diagrams are two dimensional diagrams.
3. **Three-dimensional statistical diagrams** are also called volume diagram examples cube, block piles and spherical diagrams.

We will discuss the following diagrams alone

Line graphs

Bar diagrams

Pie diagram

12.2.1 Line Graph

The line graphs are usually drawn to represent the time series data related to the temperature, rainfall, population, birth rates and the death rates.

Uses of line-graphs

Line-graphs are commonly used for representing

- Climatic data pertaining to elements such as temperature, pressure, humidity, etc.,

Example 12.1

Construct a line graph to represent the data as given in Table 12.1

Table 12.1: Literacy Rate of India – 1901 to 2011

| Year | 1901 | 1911 | 1921 | 1931 | 1941 | 1951 | 1961 | 1971 | 1981 | 1991 | 2001 | 2011 |
|--------------------|------|------|------|------|-------|-------|------|-------|-------|-------|-------|-------|
| Literacy rate in % | 5.35 | 5.92 | 7.16 | 9.50 | 16.10 | 16.67 | 24.0 | 29.45 | 36.23 | 42.23 | 64.83 | 74.04 |

Source: Census report 2011

- Population data such as growth of population, birth rate, death rate, etc, and
- Economic data such as crop yield, minerals extraction, production of industrial goods over a period of time etc.

Simple line graph

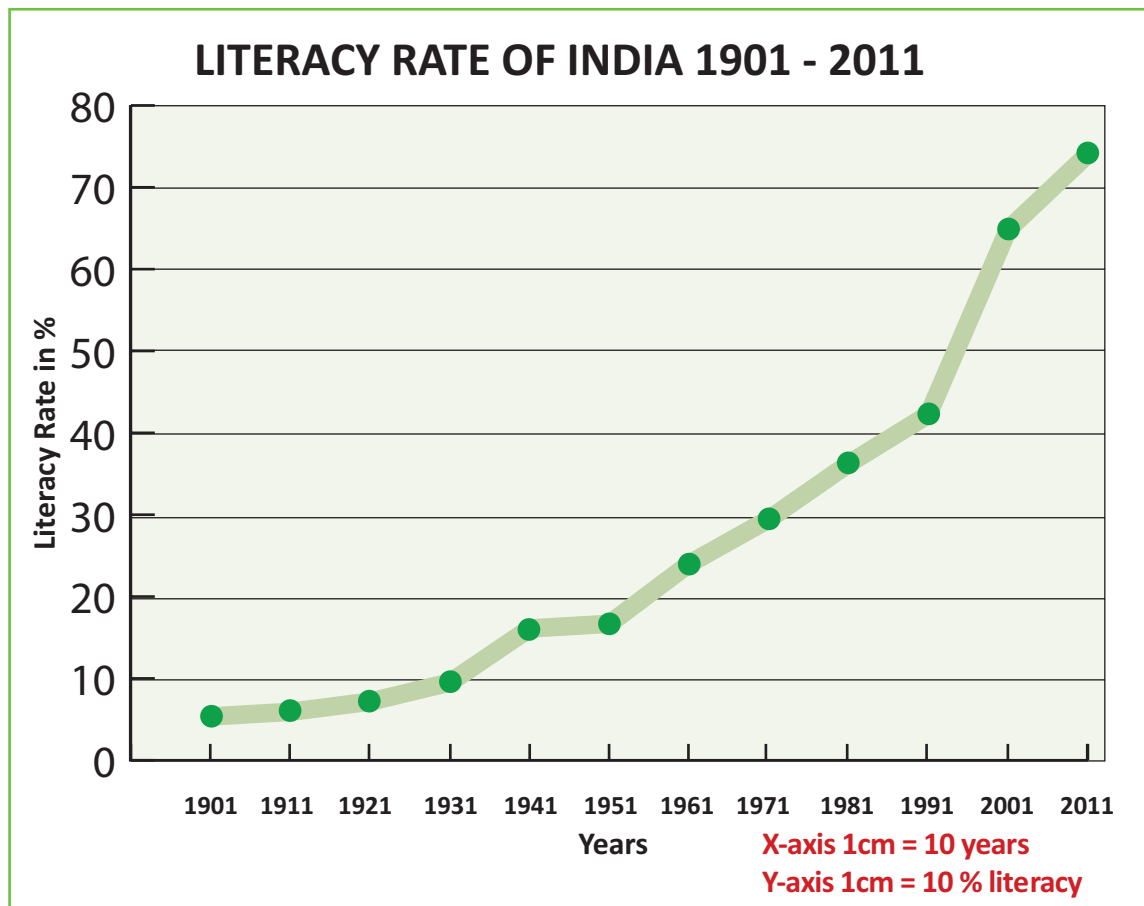
A simple line-graph is a line or a curve drawn by joining together, points plotted with the help of two co-ordinates i.e. is a vertical axis and horizontal scale. It represents the successive changes in the value of one variable over a certain period of time.

How to construct a Line Graph

Line graphs are very easy to construct on graph paper.

1. Draw a horizontal line to represent x-axis and vertical line to represent y-axis. The point where x-axis and y-axis intersect at right angles is the starting point. Normally assigned the value zero (0).
2. Next add label and scale for both axes.
3. After that, plot your data points.
4. Next draw a line through the plotted data points.
5. Finally add a title.

Let us see some of the solved examples given below.



Simple line graph

Polygraph

Polygraph is a line graph in which two or more variables are shown by an equal number of lines for an immediate comparison, such as the growth rate of different crops like rice, wheat pulses or the birth rates, death rates and life expectancy or sex ratio in different states or countries. A different line pattern such as straight line (—), broken line (---), dotted line (.....) or a combination of dotted and broken line (.-.-.-) or line of different colours may be used to indicate the value of different variables.

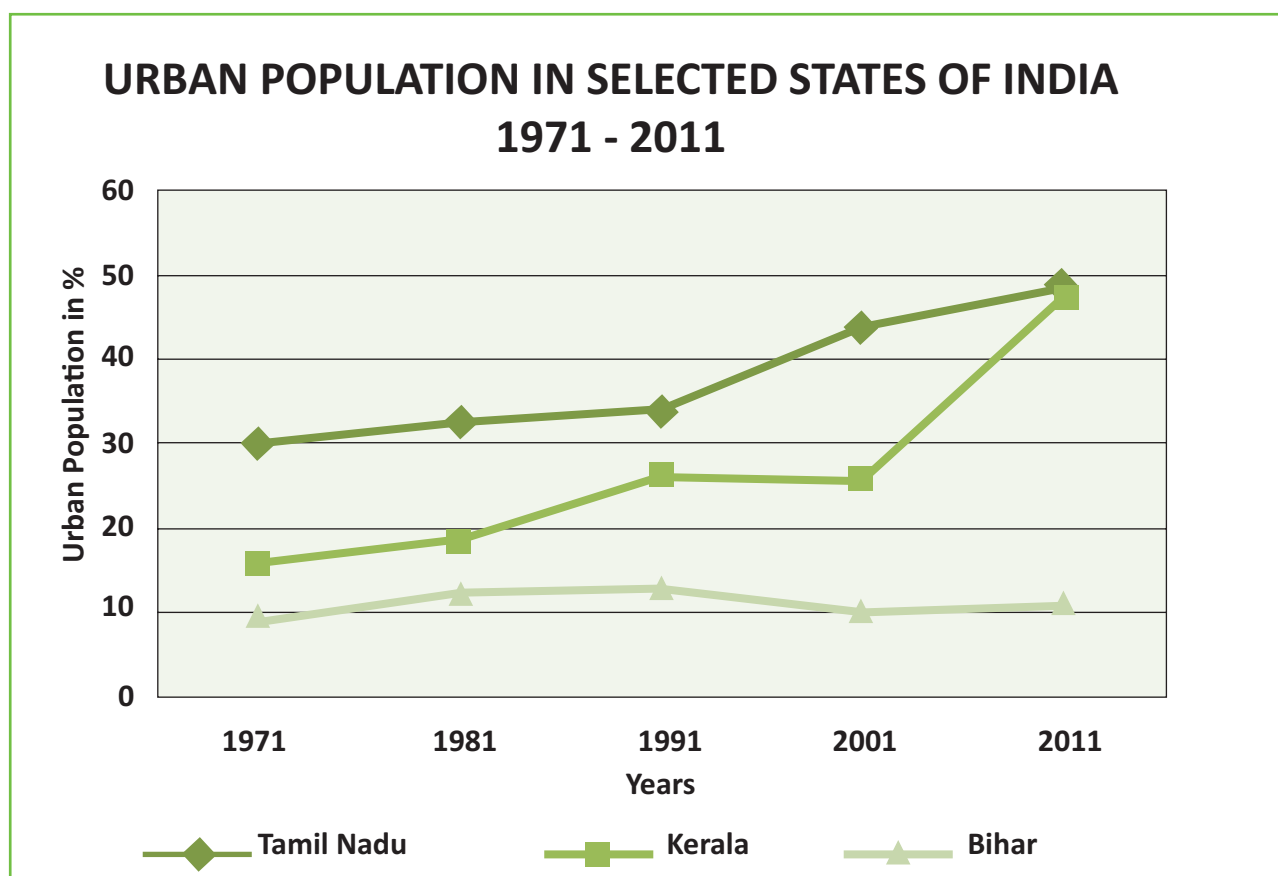
Example 12.2

Construct a polygraph to represent the data as given in Table 12.2.

Table 12.2 Urban Population in percentage of selected states of India

| States | 1971 | 1981 | 1991 | 2001 | 2011 |
|------------|-------|-------|-------|-------|-------|
| Tamil Nadu | 30.26 | 32.65 | 34.15 | 44.04 | 48.45 |
| Kerala | 16.24 | 18.74 | 26.39 | 25.96 | 47.72 |
| Bihar | 10 | 12.47 | 13.14 | 10.45 | 11.3 |





Polygraph

12.2.2 Bar Diagram

In Bar diagrams quantities are represented by bars, the length of which are proportional to the quantities, they represent. The diagrams which represent quantities by bars are known as bar diagrams, columnar diagrams or bar-graphs. When compared with other diagrams, the bar diagram gives more accurate idea of the size of the quantities represented by them. They are also drawn on maps for showing regional variations in the distribution of a quantity. The bars are either vertical or horizontal.

- The width of all the bars or columns should be similar.
- All the bars should be placed on intervals of equal distance.
- Bars may be shaded with colours or patterns to make them distinct and attractive.

Kinds of Bar Diagrams

1. Simple bar diagram.
2. Comparative or multiple bar diagram.
3. Compound or sub-divided bar diagram.
4. Percentage bar diagram.

We shall discuss Simple Bar Diagram and Multiple Bar Diagram in this unit.

Simple Bar Diagram

A simple bar diagram consists of a series of bars each of which shows total value of only one variable. We can represent for example the total population of different states of a country for a particular year, the annual production of wheat, rice, cotton for a particular place etc., and monthly rainfall for 12 months of the year. A simple bar diagram is constructed for an immediate comparison. It is advisable to arrange the given data set in an ascending or descending order and plot the data variables accordingly.

Construction of Simple Bar Diagram

Solution:

We represent the above data by simple bar diagram in the following manner:

Step-1: Time (Years) is marked along the X-axis and labelled as 'Year'.

Step-2: Production Cost is marked along the Y-axis and labelled as 'Production Cost' (in lakh of rupees).

Step-3: Vertical rectangular bars are erected for each year marked on x-axis and the height of each bar is proportional to the value of the respective production cost.

Step-4: Simple Vertical bars are filled with the same colours.

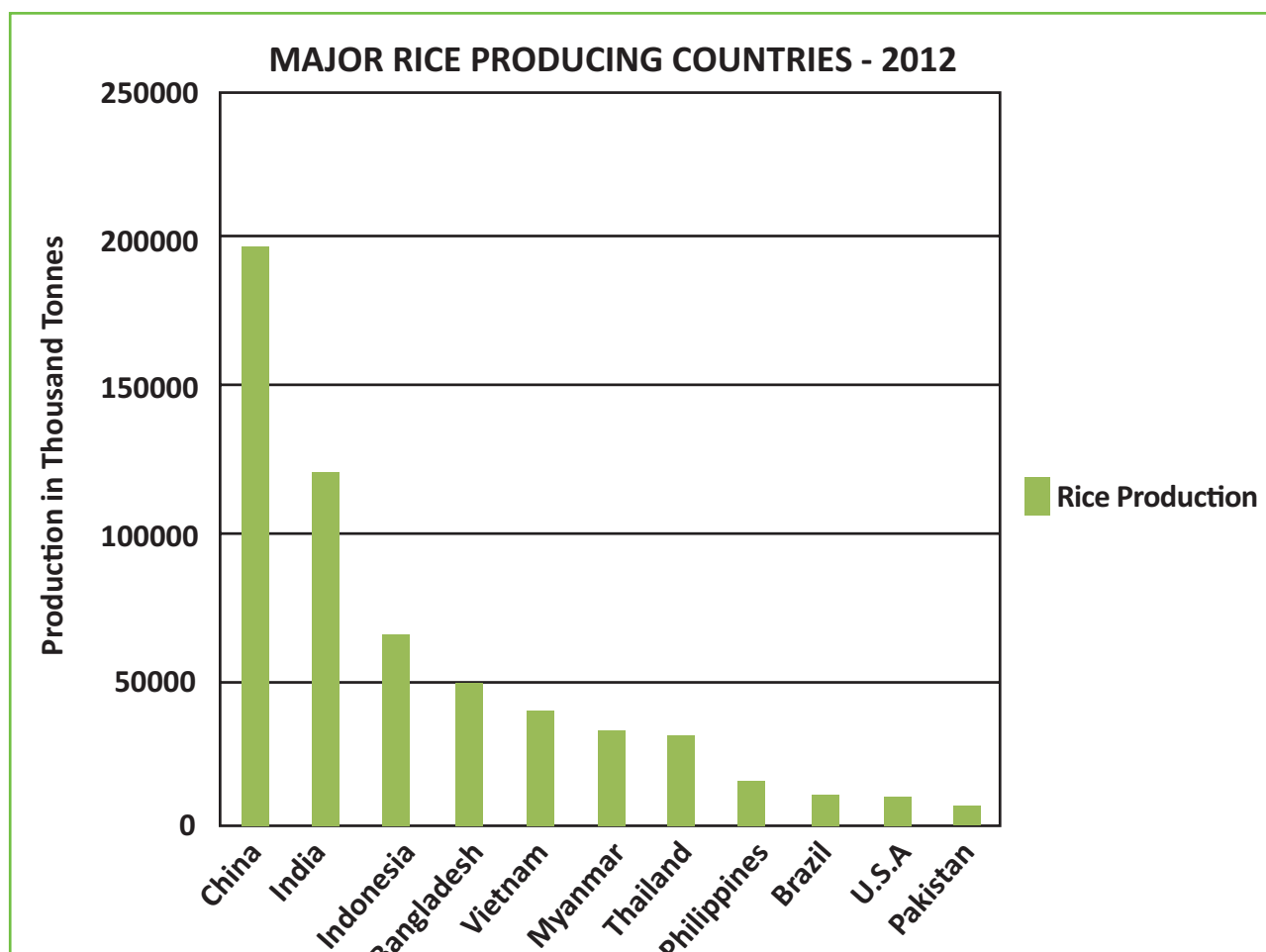
Example 12.3

Construct a simple bar diagram to represent the data given in Table 12.3.

Table 12.3 Major Rice producing countries – 2012

| Country | Production (Thousand Tonnes) |
|-------------|------------------------------|
| China | 197221 |
| India | 120620 |
| Indonesia | 66412 |
| Bangladesh | 49355 |
| Vietnam | 39989 |
| Myanmar | 33204 |
| Thailand | 31597 |
| Philippines | 15772 |
| Brazil | 11309 |
| U.S.A | 11027 |
| Pakistan | 7235 |

Source: F.A.O. Yearbook of Agricultural Statistics, 2012



Simple Bar Diagram

Multiple bar Diagram

Multiple bar diagrams are constructed to represent two or more variables for the purpose of comparison. For example, a multiple bar diagram may be constructed to show proportion of males and females in the total,

rural and urban population or the share of canal, tube well and well irrigation of the total irrigated area in different states or yield of rice, wheat sugar cane, coffee in the different states of a country, etc.

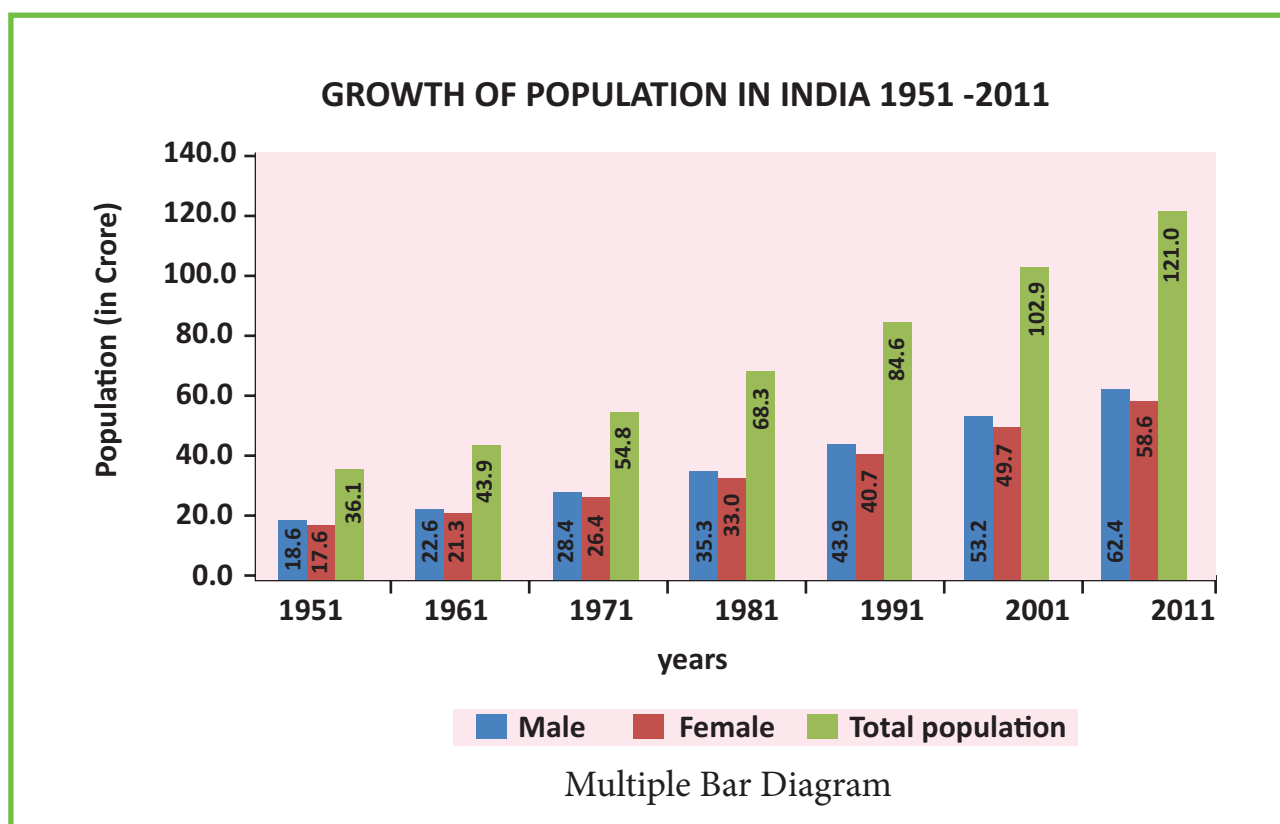
Example 12.4

Construct a Multiple Bar diagram to represent the data given in Table 12.4.

Table 12.4: Population of India from 1951-2011

| Year | Male | Female | Total population |
|------|-------------|-------------|------------------|
| 1951 | 185,528,462 | 175,559,628 | 361,088,090 |
| 1961 | 226,293,201 | 212,941,570 | 439,234,771 |
| 1971 | 284,049,276 | 264,941,570 | 548,159,652 |
| 1981 | 353,374,460 | 329,954,637 | 683,329,097 |
| 1991 | 439,358,440 | 407,062,599 | 846,421,039 |
| 2001 | 532,223,090 | 496,514,346 | 1,028,737,436 |
| 2011 | 623,724,248 | 586,469,174 | 1,210,193,422 |

Source: Office of the Registrar General, India.



12.2.3 Pie Diagram

The Pie diagram is a circular diagram. A circle which has 360° is divided into different sectors. Angles of the sectors, subtending at the center, are proportional to the magnitudes of the frequency of the components. When a circle is sub-divided into various component sectors, it is called a Pie diagram.

How to construct a pie diagram?

The following procedure can be followed to draw a Pie diagram for a given data:

1. Draw a circle by using a particular radius.
2. The proportional values of various components should be converted into degrees.
3. The angles are obtained by the following formula

$$\text{Angle value} = \frac{\text{Value of component}}{\text{Total value}} \times 360$$

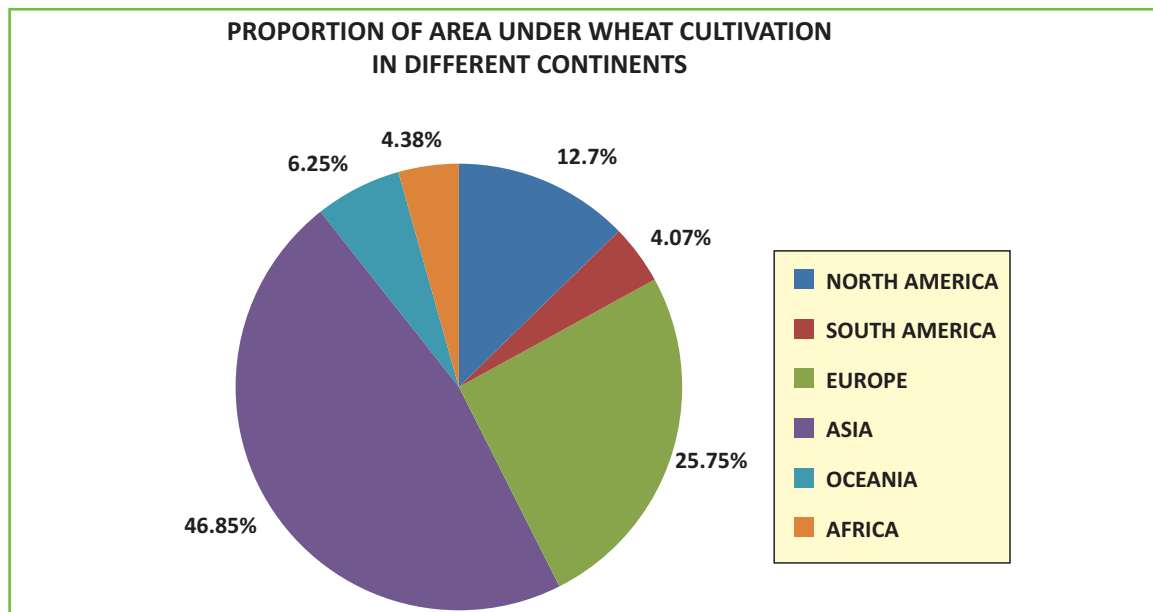
Example 12.5

Construct a Pie diagram to represent the data given in **Table 12.5**.

Table 12.5 Percentage of area under wheat cultivation

| Continent | Area in % |
|---------------|-----------|
| North America | 12.7 |
| South America | 4.07 |
| Europe | 25.75 |
| Asia | 46.85 |
| Oceania | 6.25 |
| Africa | 4.38 |

| Continent | Area in % | Calculation | Degree |
|---------------|-----------|---|-------------|
| North America | 12.7 | $\frac{12.7}{100} \times 360^\circ = 45.72$ | 46° |
| South America | 4.07 | $\frac{4.07}{100} \times 360^\circ = 14.65$ | 15° |
| Europe | 25.75 | $\frac{25.75}{100} \times 360^\circ = 92.7$ | 92° |
| Asia | 46.85 | $\frac{46.85}{100} \times 360^\circ = 168.66$ | 169° |
| Oceania | 6.25 | $\frac{6.25}{100} \times 360^\circ = 22.5$ | 22° |
| Africa | 4.38 | $\frac{4.38}{100} \times 360^\circ = 15.76$ | 16° |
| Total | 100 | | 360° |



Pie diagram

Exercise

1. Represent the following data using simple line graph.

Station: Vellore

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Temperature in ° C | 21 | 22 | 24 | 26 | 28 | 27 | 26 | 25 | 25 | 24 | 23 | 21 |
| Rainfall in mm | 4 | 9 | 10 | 28 | 94 | 71 | 96 | 122 | 172 | 195 | 122 | 58 |

2. Represent the following data with poly graph.

| Temperature in ° C | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Cuddalore | 25 | 26 | 28 | 30 | 31 | 30 | 30 | 29 | 29 | 27 | 26 | 25 |
| Coimbatore | 25 | 26 | 27 | 28 | 28 | 26 | 25 | 25 | 26 | 26 | 25 | 25 |
| Karur | 23 | 24 | 26 | 27 | 27 | 25 | 25 | 24 | 25 | 24 | 23 | 23 |

3. Draw a simple bar diagram for the following data.

| Manganese - ore production in 2016 | |
|------------------------------------|------------------------------|
| Country | Production in Million Tonnes |
| South Africa | 4,754,560 |
| Australia | 2,388,500 |
| China | 2,150,000 |
| Gabon | 1,658,500 |
| Brazil | 1,141,684 |

4. Represent the following data using Multiple Bar diagram.

Energy Generated - India in billion KwH

| Year | Hydro Electric | Thermal | Nuclear |
|-----------|----------------|---------|---------|
| 2008-2009 | 110 | 616 | 14 |
| 2009-2010 | 104 | 677 | 18 |
| 2010-2011 | 114 | 704 | 26 |

5. Represent the following data by a Pie Diagram.

Average Yield of Rice – 2014–2015

| State | Yield Kg/Hec |
|---------------|--------------|
| Tamil Nadu | 3191 |
| Karnataka | 2827 |
| Kerala | 2818 |
| Uttar Pradesh | 2082 |
| West Bengal | 2731 |



References

1. Elements of Practical geography, R. L. Singh and Rana P.B. Singh.
2. Advanced Practical geography, Pijushkanti Saha and Partha Basu.