Dot maps

The simplest form of a symbol is a dot. It is a very useful form for a distribution map representing a quantity or value by dots of uniform size. Such a method is specially useful when values are distributed unevenly and sporadically. The dots are inserted within particular administrative units for which data is available. The smaller the statistical unit chosen for a dot, the more accurate is the map. The success of the map depends on the choice of this value. The unit to be represented by a dot should not be so small that there will be difficulty in inserting all the dots in the administrative area. It will not be so high too, because that may result in a presentation by a very few dots only (fig. 5.16).

Some cartographers claim that coalescence of dots is preferable in areas of higher density, so that the contrast between the white or dot less area and solid black areas can be maintained. But some others insist that the dots should be countable and should not be allowed to merge. Of course, in practice dots are rarely counted because the person in search of more precise information must return to the statistical source upon which the map is based.

The placement of dots should be even and straight rows of dots should be avoided because patterns are not wanted.

The dots may be placed more precisely when detailed information is available concerning the exact location of the values derived from field work. But more generalised information as is provided by relief or climatic maps should be avoided. However, without any precise information the even distribution of dots may, of course, create misconceptions. For instance, a rural unit having a rugged and forested populationless area may show uniform density of dots as in plains, in the absence of any precise information about the location of settlements.

The actual size of the dots to be used presents another problem. The dots must be neither so big that a coarse generalised effect may be produced, nor so small that a blur is produced in areas of dense value. A ball-pointed nib should be used to make dots of uniform size. Care must be taken about the possibility of reduction in size if the final reproduction requires some reduction of the map. Moreover, the same idea of reduction should be kept in mind in connection with the spacing of dots. If several types of distribution are required to be shown in one map, dots of different colours may be used.

A **dot** distribution **map**, or **dot** density **map**, is a **map** type that uses a **dot** symbol to show the presence of a feature or a phenomenon. **Dot maps** rely on a visual scatter to show spatial pattern.

Advantages and disadvantages of dot maps

Advantages

- Dot maps are easy readable, also for laymen
- Are perfectly suitable to show density distributions
- By counting the symbols it is possible to determine the original data

Disadvantages

- The data have to be georeferenced with coordinates
- The map design is time-consuming and expensive

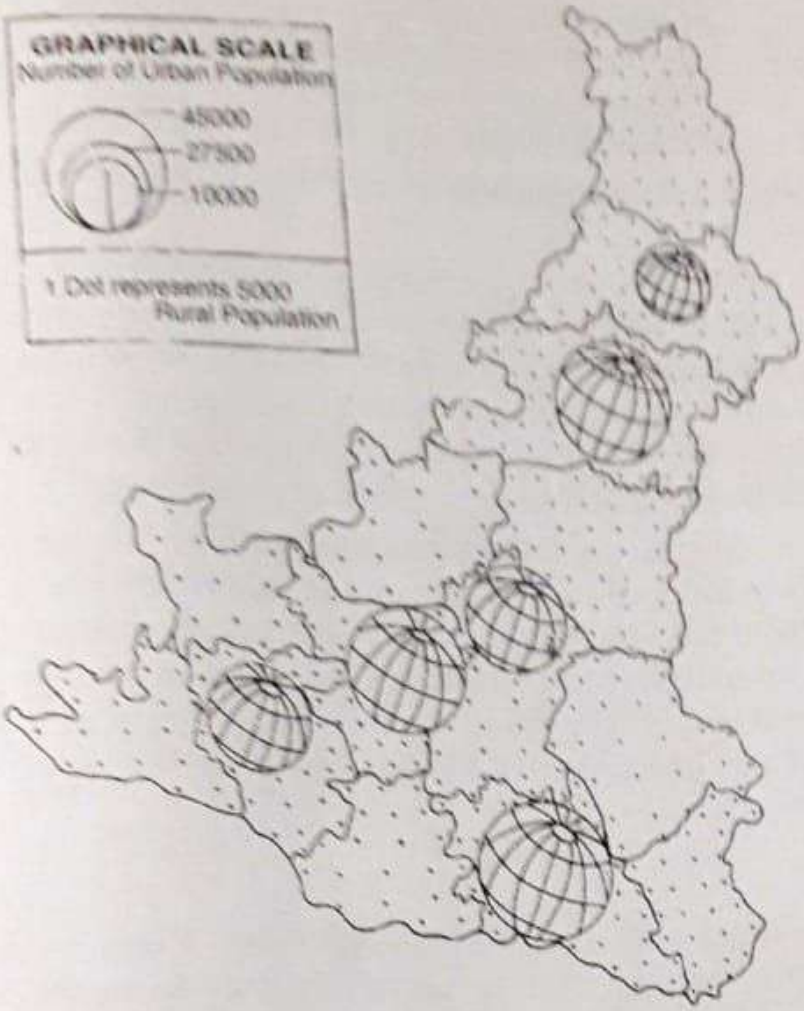

Fig. 5.16 Dot and Sphere showing the Rural and Urban Population of Birbhum

TABLE 5.8

Data for Dot & Sp

Sl. No.	Name of the Police Station	Rural Population		Number of dots (1 dot ≡ 5000 person)
1.	Muraroi	208843		42
2.	Nalhati	194759		39
3.	Rampurhat	224276		45
4.	Mayureswar	187727		38
5.	Muhammad Bazar	92853		19
6.	Rajnagar	54139		11
7.	Khoyrasole	100817		20
8.	Dubrajpore	113624		23
9.	Suri	115793		23
10.	Illambazar	99064		20
11.	Sainthia	129318		26
12.	Bolpur	127999		26
13.	Labhpur	130132		26
14.	Nanoor	142952	—	29

desired by the cartographer (Fig. 3.43).

Quantitative Dot Maps

In this kind of distribution maps, quantities or values are represented by dots of uniform sizes, each dot having a specific value (Winterbotham 1934). Dot maps are especially useful when the values are unevenly and sporadically distributed. The dots are inserted within the particular administrative units for which data is available.

The smaller the units, the more accurate the map (Fig. 5.46).

While constructing a dot map the first step is to examine the range of quantities involved. From this, a value represented by each dot is selected. Basically, the success of a dot map depends absolutely on the choice of this value, called *dot scale*. It is chosen, keeping in mind the size of the administrative unit so that dots are neither numerous nor few.

According to the principle, *the number of dots* (n) *corresponding to an administrative unit* (i) *is directly proportional to the quantity* (q). Empirically,

$$n \propto q$$

or, $$n = k.q$$

where, k = constant of proportionality.

For a single dot, $n = 1$; therefore, $k = \frac{n}{q} \Rightarrow \frac{1}{q}$.

In other words, the statement, *one dot represents* k *quantity* forms the *dot scale*. Hence, the number of dots for any administrative unit can be found from the equation,

$$n_i = k.q_i \Rightarrow \frac{q_i}{q}$$

While plotting, the dots should be placed evenly and uniformly within each unit. The boundaries of the units are often erased after the insertion of dots. Dots should never be placed in straight rows and columns; rather the vertices of a small equilateral triangle should be assumed and dots should be placed on these. The precision of a dot map can be enhanced by consulting a physical map showing negative areas. The size of the dots depends on the scale of the base map and on the number of dots to be inserted. To avoid the effects of coarseness or blurring and to obtain a finer visual tone, a nomograph may be consulted (Mackay 1949).

Dot maps have three *variants—percentage dot maps, mille dot maps and multiple dot maps*. In the first two categories, the percentage values are mapped. In percentage dot maps, *each dot*

Proportional Circles

These are used for showing a quantity (such as the population of a country) that can be divided into parts (such as different ethnic groups). A circle is drawn to represent the total quantity. It is then divided into segments proportional in size to the components. The actual size of the circle can also be used to represent data.

Advantages

- display relative proportions of multiple classes of data
- size of the circle can be made proportional to the total quantity it represents
- summarize a large data set in visual form
- be visually simpler than other types of graphs
- permit a visual check of the reasonableness or accuracy of calculations
- require minimal additional explanation
- be easily understood due to widespread use in business and the media

Disadvantages

- do not easily reveal exact values
- Many pie charts may be needed to show changes over time
- fail to reveal key assumptions, causes, effects, or patterns
- be easily manipulated to yield false impressions

Computation for Proportional Circles

Circles representing area (fig. 5.17) or population being proportionate in diameter in terms the amount of area or figure of population they represent, are often placed in thematic maps, more or less, within the boundary of the respective administrative division.

The radii of such circles can be computed by considering the respective area or population as πr^2.

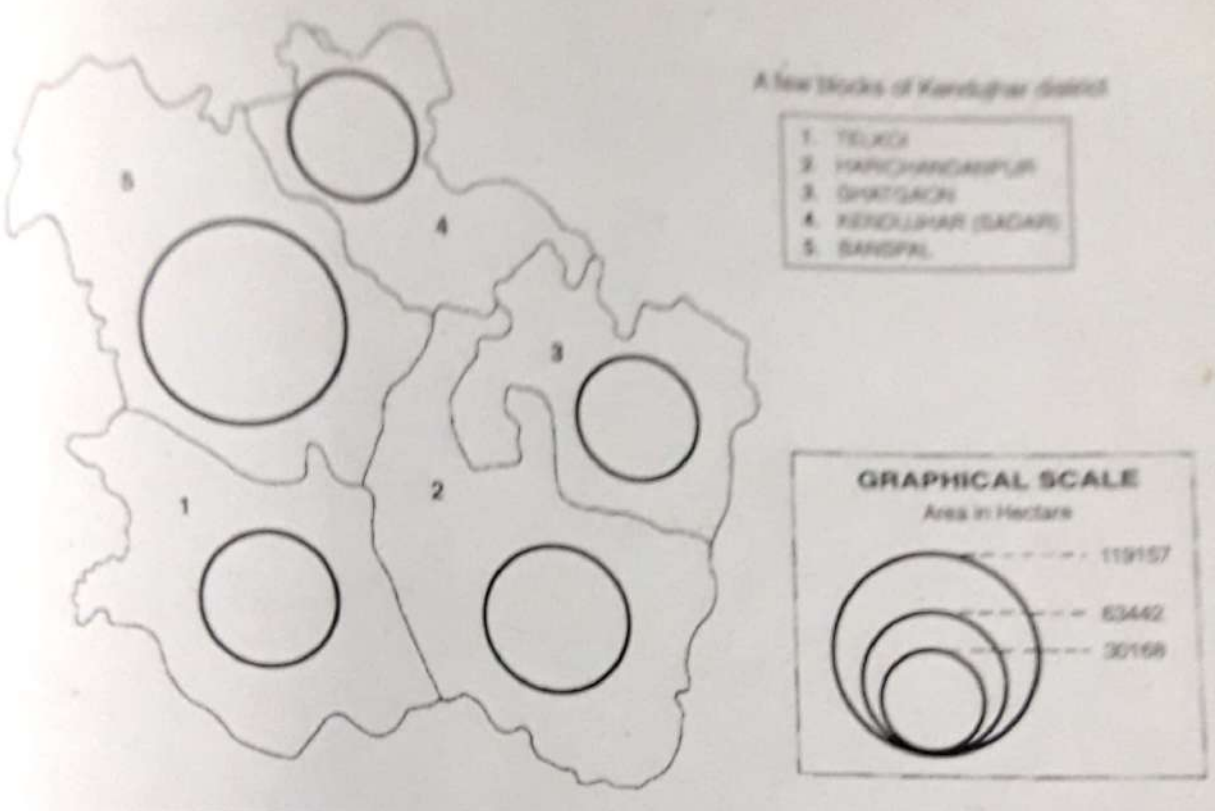

Fig. 5.17 Proportional Circles

$$\pi r^2 = x$$

$$r = \sqrt{\frac{x}{\pi}}$$

x = area or population to be represented

'r's of various lengths worked out will be converted into cm. or inch according to the scale chosen. At the time of selection of the scale care should be taken to see that the circle fits the size of the administrative division on which it will be placed. Neither the circle should cover the entire boundary nor it will be too small for the map.