

Advanced Higher Geography Statistics

Nearest Neighbour Analysis

The background of the slide is a solid blue color. In the lower right quadrant, there are several decorative elements consisting of concentric circles, resembling ripples in water. These circles are light blue and vary in size and opacity, creating a subtle pattern.

Introduction

- Settlements often appear on the map as dots. Dot distributions are commonly used in geography, yet their patterns are difficult to describe.
- One way in which patterns can be measured objectively is by nearest neighbour analysis.
- It can be used to identify a tendency towards clustering or dispersion for shop, industries, settlements, etc.
- Nearest neighbour analysis gives a index that enables one region to be compared with another.

Formula

A good one to sit down for!

$$R_n = 2\bar{D} \sqrt{(n/a)}$$

R_n is the nearest neighbour index.
D = the average distance between each point and its nearest neighbour
n = the number of points under study
A = the size of the area under study

note that

$$D = \sum d / n$$

Where *d* is the distance between each point and its nearest neighbour

- The formula produced by the nearest neighbour analysis produces a figure expressed as R_n (the nearest neighbour index) which measures the extent to which the pattern is clustered, random or regular.
- **Clustered:** $R_n = 0$ All the dots are close to the same point.
- **Random:** $R_n = 1.0$ There is no pattern.
- **Regular:** $R_n = 2.15$ There is a perfectly uniform pattern where each dot is equidistant from its neighbours.

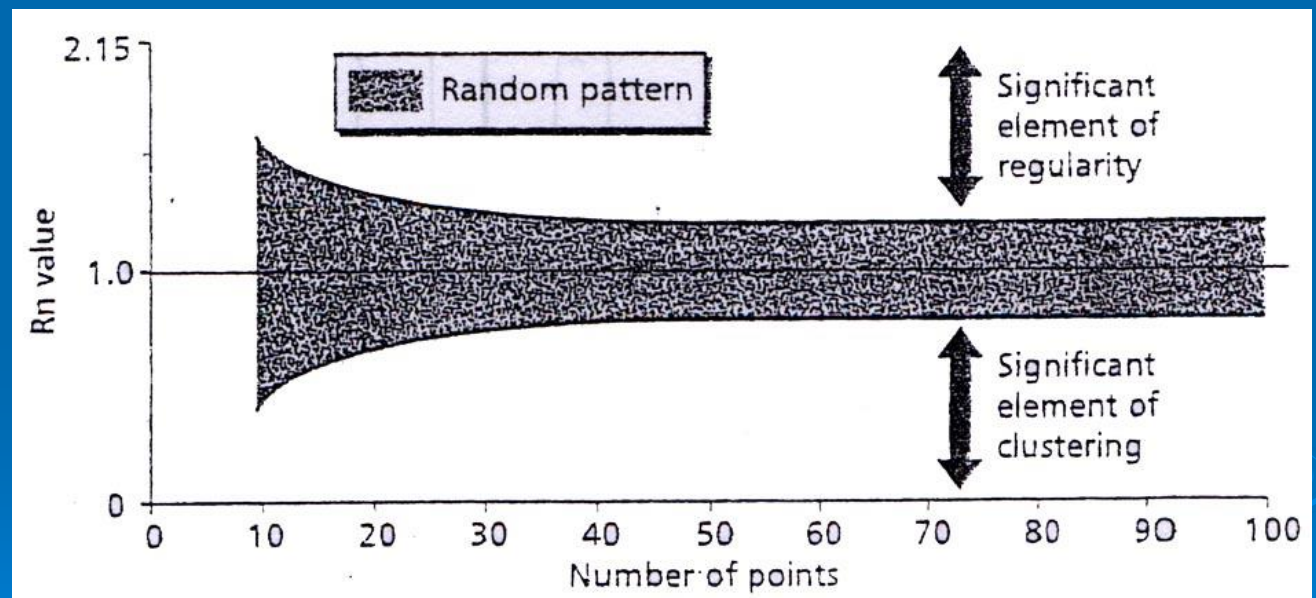
How to undertake a nearest neighbour analysis

The area of the study must have a minimum of 30 points (settlements, shops, plant species, etc)

- Measure the straight line distance between each point and its nearest neighbour.
- Total all of the distances measured above ($\sum d/n$).
This is \check{D} in the formula.
- Calculate the total area of your study area.
- Fit your calculations into the formula to calculate (R_n)

And then

Using the R_n number, refer to the diagram below to determine how regular or clustered the pattern is.



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From Geographical Measurements
and Techniques: Statistical
Awareness, June 2000.

**Now look for geographical factors
to explain your findings**