MA-SEM III rd Paper- CC 10

Quantitative Techniques & Research Methodology

CORRELATION

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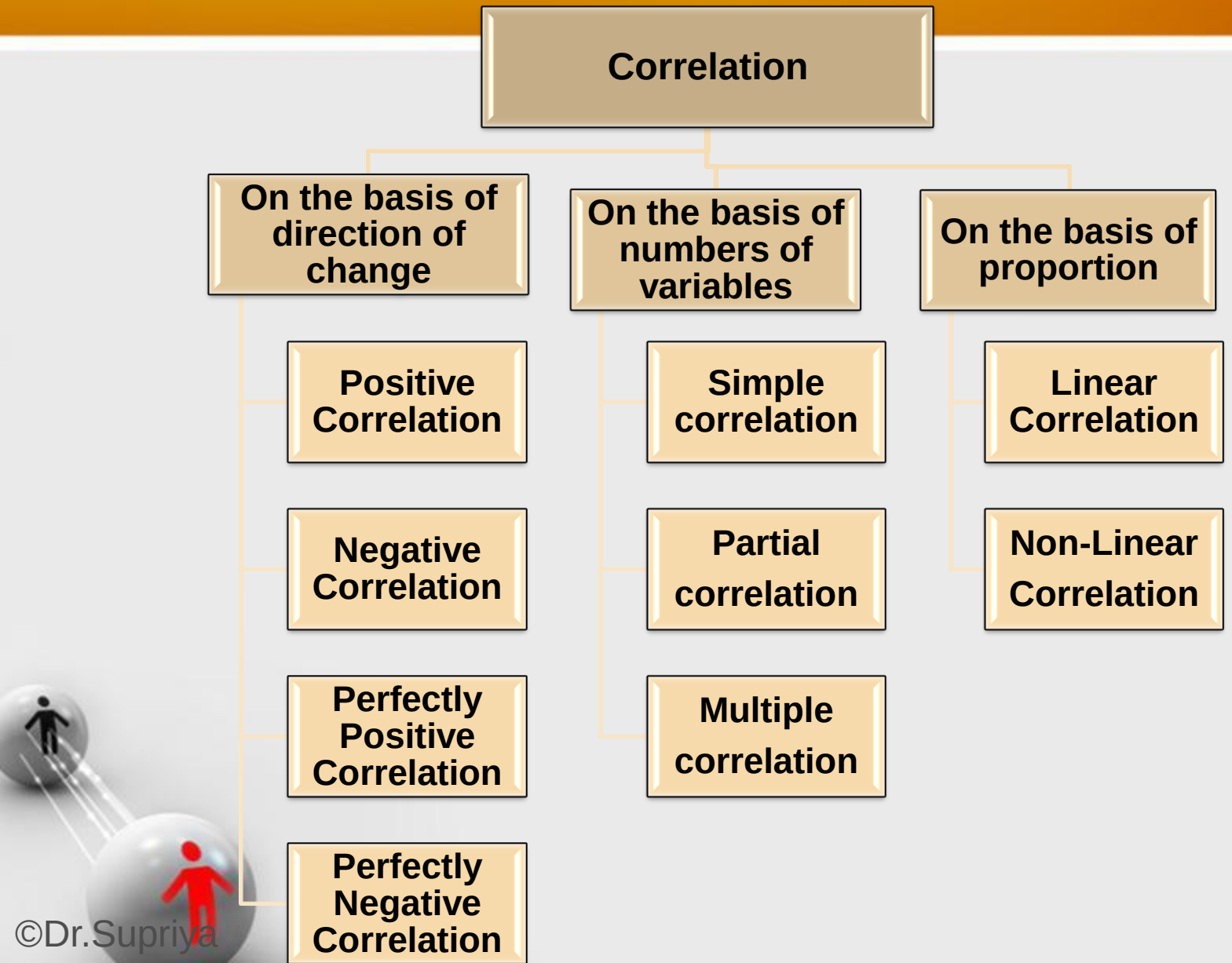
Introduction to Correlation

- Correlation a LINEAR association between two random variables. Correlation analysis show us how to determine both the nature and strength of relationship between two variables
- When variables are dependent on time correlation is applied.
- The correlation between groups can be calculated either by the trend of their scatter or by finding out their coefficient.
- Correlation lies between +1 to -1

Definition of Correlation

- "Correlation methods provide measures whereby the relationship between two or more variable can be calculated." **-Cole & King**
- "Correlation is an analysis of the covarriation between two and more variables." **– A.M.Tuttle**
- Correlation analysis contributes to the understanding of economic behavior, aids, in locating the critically important variables on which other depend , may reveal to the economist the connections by which disturbances spread and suggest to him paths through which stablising forces may effective. **- W.A. Neiswanger**

Types of Correlation

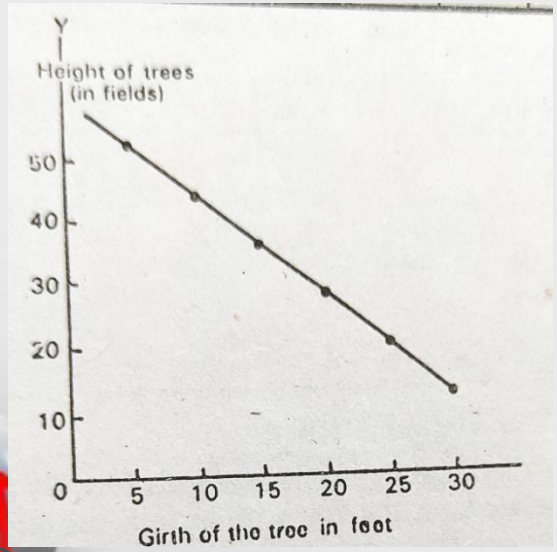


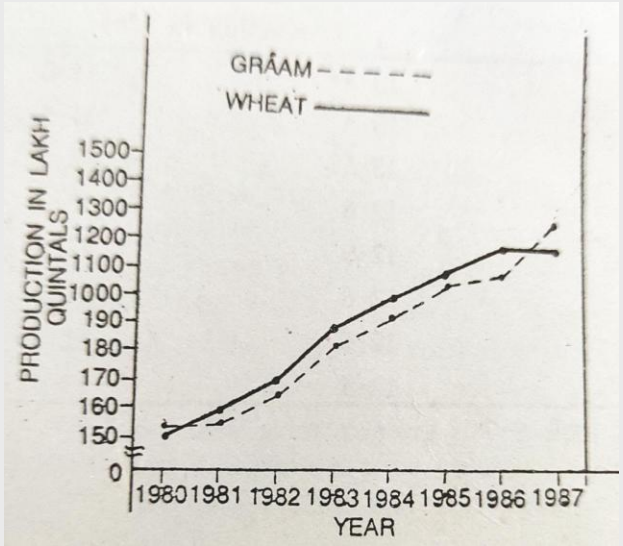
Types of Correlation….

Ist Classification	On the basis of of direction of change
1. Positive Correlation	If two related variables are such that when one increases (decreases), the other also increases (decreases). (Ex. Population & Area)
2.Negative Correlation	If two variables are such that when one increases (decreases), the other decreases (increases)
3. Perfectly Positive/Negative Correlation	It is a theoretical magnitude in all group of data expressed as ± 1 (exception natural sciences
4. NO Correlation	If both the variables are independent there is no relation known as Zero Correlation

Types of Correlation….

2nd Classification	On the basis of proportion
1. Linear Correlation	When both variables is in the same proportion or When plotted on a graph it tends to be a perfect line.
2. Non – linear Correlation	When proportion of change in both variables is different or When plotted on a graph it is not a straight line





Types of Correlation…..

3rd Classification	On the basis of numbers of variables
1. Simple Correlation	Two independent and one dependent variable
2. Multiple Correlation	One dependent and more than one independent variable
3. Partial Correlation	One dependent variable and more than one independent variable but only one independent variable is considered and other independent variables are considered constant (**Effect of only two is studied while others are kept Constant)**

Methods of Ascertaining Correlation

A .Mathematical Methods	B. Non –Mathematical Methods
1. Karl Pearson's Method	Graphic Method
2. Spearman's Method of Rank	2. The Scatter Or Dot diagram
3. The Concurrent Deviation Method	3. Correlation table Method

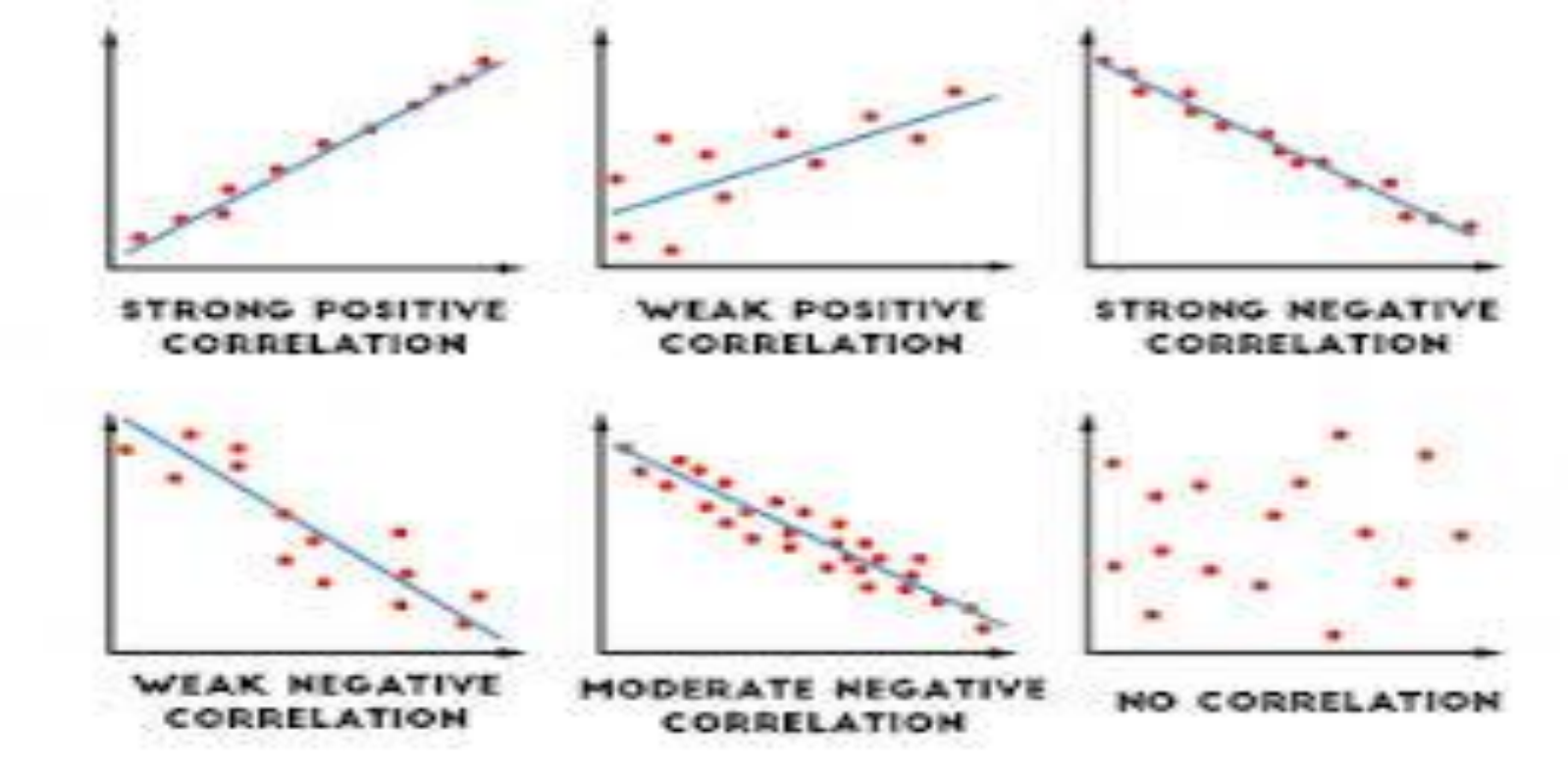
Table 9·10 : Positive Correlation Table.

Y Production of Fields (in Quintals)	Area of Fields in hectares X				Total
	0 – 5	6 – 10	11 – 15	15 – 20	fy
14 – 18				5	5
9 – 13			3		3
5 – 8		2			2
0 – 4	1				1
fx Total	1	2	3	5	11 = N

Table 9.11: Negative Correlation table

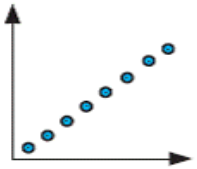
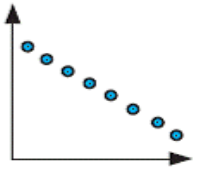
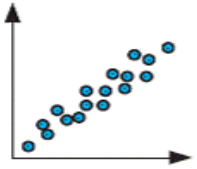
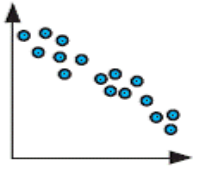
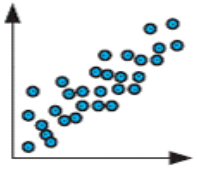
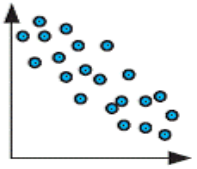
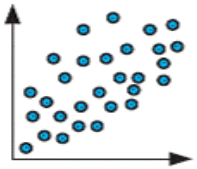
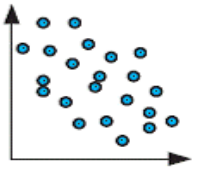
Y Production per hectare (in Quintals)	Area of the fields (in hectares) X					Total
	0 – 5	5 – 10	10 – 15	15 – 20	20 – 25	fy
40 – 50	3					3
30 – 40		5				5
20 – 30			15			15
10 – 20				10		10
0 – 10					25	25
fx Total	3	5	15	10	25	58 N

Interpretation of Coefficient of Correlation



- A zero correlation indicates that there is no relationship between the variables
- A correlation of –1 indicates a perfect negative correlation
- A correlation of +1 indicates a perfect positive correlation

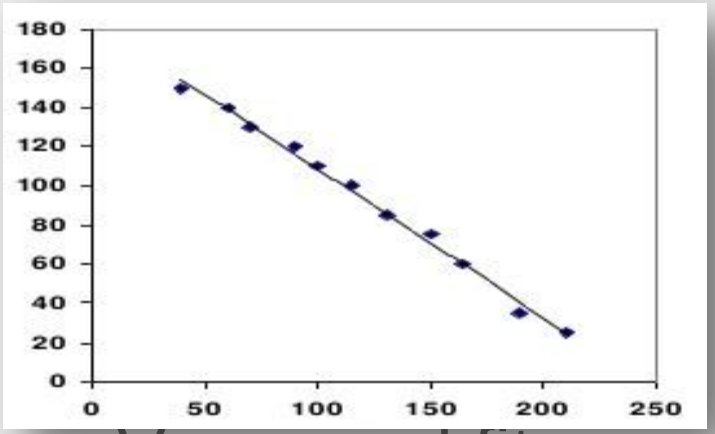
Pearson's Coefficient of Correlation & Scatter Plot

r	Description	r	Description
1	perfect positive correlation 	−1	perfect negative correlation 
0.75 to 1	strong positive correlation 	−1 to −0.75	strong negative correlation 
0.50 to 0.75	moderate positive correlation 	−0.75 to −0.50	moderate negative correlation 
0.25 to 0.50	weak positive correlation 	−0.50 to −0.25	weak negative correlation 

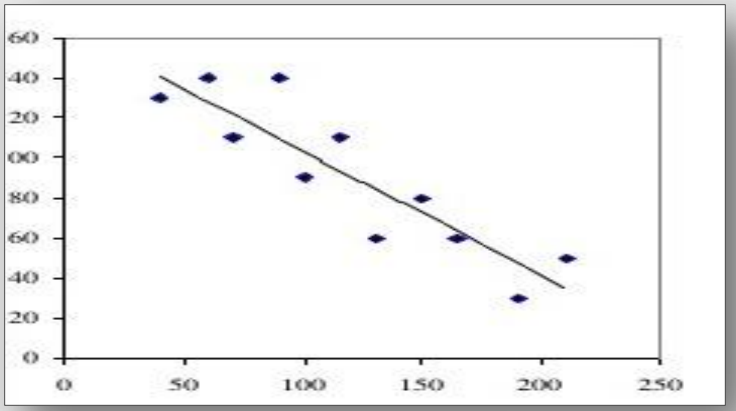
Pearson's Correlation coefficient gives a measure of the relation ship between two variables on a scale from -1 to +1.

Correlation: Linear Relationships

- Strong relationship = good linear fit



Very good fit



Moderate fit

- Points clustered closely around a line show a strong correlation. The line is a good predictor (good fit) with the data. The more spread out the points, the weaker the correlation, and the less good the fit. The line is a REGRESSSION line (Y = bX + a)

Suggested Readings

- Kothari, C.R. & Garg, G.; (2014) Research Methodology : Methods and Techniques, New Edge International Publisher, New Delhi.
- Mahmood, Aslam. (2008) Statistical Methods in Geographical Studies, Rajesh Publishing, New delhi
- Misra, R.P & Ramesh, A.; (2019) Fundamentals of Cartography, Concept publishing , New delhi
- Negi, B.S.; (2008) Statistical Geography, Kedar Nath ram Nath, Meerut

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