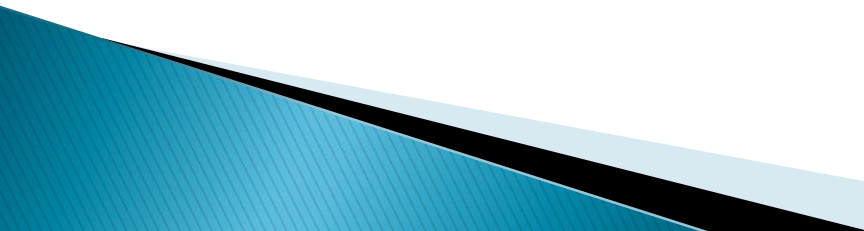


ANALYSIS & INTERPRETATION OF TOPOGRAPHICAL MAPS

Geography Hons. Sem: 2; Paper: C4(Practical)

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INTRODUCTION:

- A Topographical map or a Toposheet generally shows the surface features of the earth as it exists during the period of survey by means of **cartographic and conventional symbols**.
 - It involves a great variety of **symbolization, generalization, topography and colour** to portray in detail both the **natural and man-made features** of an area, with functions and utilities.
 - It contains a **large number of names**– both **specific** (viz. hills, rivers, forests, towns, highways etc.) and **descriptive** (viz. general features such as fords, post offices, mines etc.).
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STUDY OF THE MAP

STEP 1

- **MAP READING:** Identifying the geographical features conventional shown by symbols(point, line, area, letter, colour);

STEP 2

- **MAP ANALYSIS:** Measuring their attributes and spatial patterns;

STEP 3

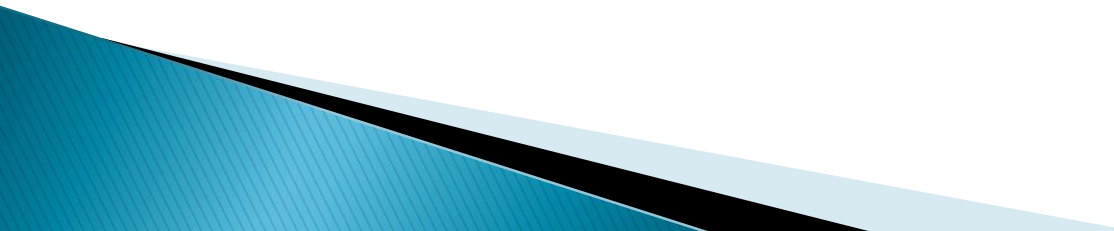
- **INTERPRETATION:** Comprehending their occurrence and origin.

MAP READING

A closer look at the marginal information:

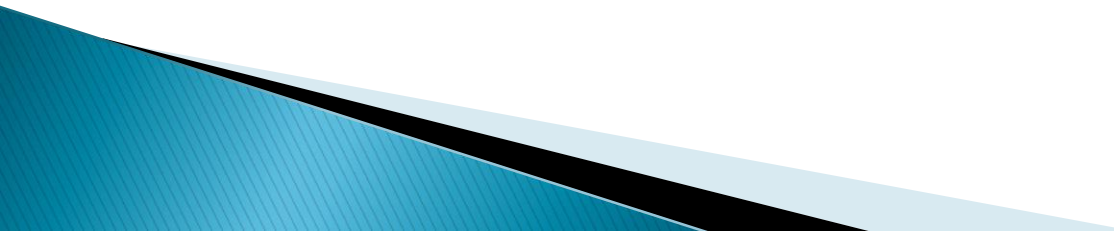
- **Map number,**
- **Year of survey,**
- **Name of the state(s) and name of the district(s),**
- **Magnetic declination** (at a point of time and its rate of increase or decrease),
- **Conventional symbols and names** (which are used in the map to represent lines of transport and communication, spring, mines, well, fort, watch tower, church, mosque, grave, post and telegraph offices, police station etc.),

CONTD..

- **Scale** (statement, ratio, graphical forms),
 - **Contour interval and units of elevation**,
 - **Administrative index** (information about administrative boundaries),
 - **Geographical co-ordinates** of sheet corners which are shown in degrees and minutes,
 - **Name of the publication directorate**, date of publication, date of revision,
 - **Copy right information** so on and so forth.
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MAP ANALYSIS:

Several techniques may be employed to analyze the Toposheet:

- **Morphometries,**
 - **Drawing of profiles** (cross sections, long and cross profiles of rivers, road profiles etc.)
 - **Transectional charts** (popularly known as transect charts),
 - **Typical sketches** etc.
- 

MAP ANALYSIS AT A GLANCE

Sl.No	Features	Specialized Techniques	Remarks
1	Physiography	<p>Representative Profile, Serial Profiles, Superimposed, Projected and Composite Profiles.</p> <p>Relative Relief, Dissection Index, Average Slope, Ruggedness Index, Broad Physiographic Divisions.</p> <p>Altimetric frequency curve & hypsometric curves.</p> <p>Typical sketches of scarp, spur, badland, rocky knobs, sheet rocks, cliffs, knolls, col, ridge, conical hill, isolated hill etc.</p>	<p>Used to identify breaks-in-slope, summit levels, general nature of relief character.</p> <p>To delineate spatial variation of relief features.</p> <p>Statistical distribution of relief aspect.</p> <p>Identification of features from the map.</p>

CONTD..

Sl.No.	Features	Specialized Techniques	Remarks
2	Drainage	Long and cross profiles of streams and rivers.	To understand fluvial morphology.
		Drainage Density & Stream Frequency; correlation with morphometries related to relief.	To delineate spatial variation of drainage features.
		Different drainage and channel patterns, erosional and depositional features.	Identification of features from the map.

CONTD..

Sl.No.	Features	Specialized Techniques	Remarks
3	Natural Vegetation	<p>Areal coverage by vegetation (%) and its correlation with morphometries related to relief and drainage.</p> <p>Typical sketches showing species type, orchards, reserved and protected forests, afforestation and deforestation.</p>	<p>To delineate spatial variation of vegetation features.</p> <p>Identification of features from the map.</p>

CONTD..

Sl.No.	Features	Specialized Techniques	Remarks
4	Transport	<p>Network graphs</p> <p>Road Density of metalled and unmetalled roads and its correlation with morphometries related to relief, drainage and vegetation.</p> <p>Typical sketches to depict types of links: metalled (national and state high ways and important roads), unmetalled (cart tracks, pack tracks,), foot paths, seasonal tracts, ford and ferry services, railway tracts, mineral lines etc.</p>	<p>To understand structural properties of the network.</p> <p>To delineate spatial variation of transport features.</p> <p>Identification of features from the map.</p>

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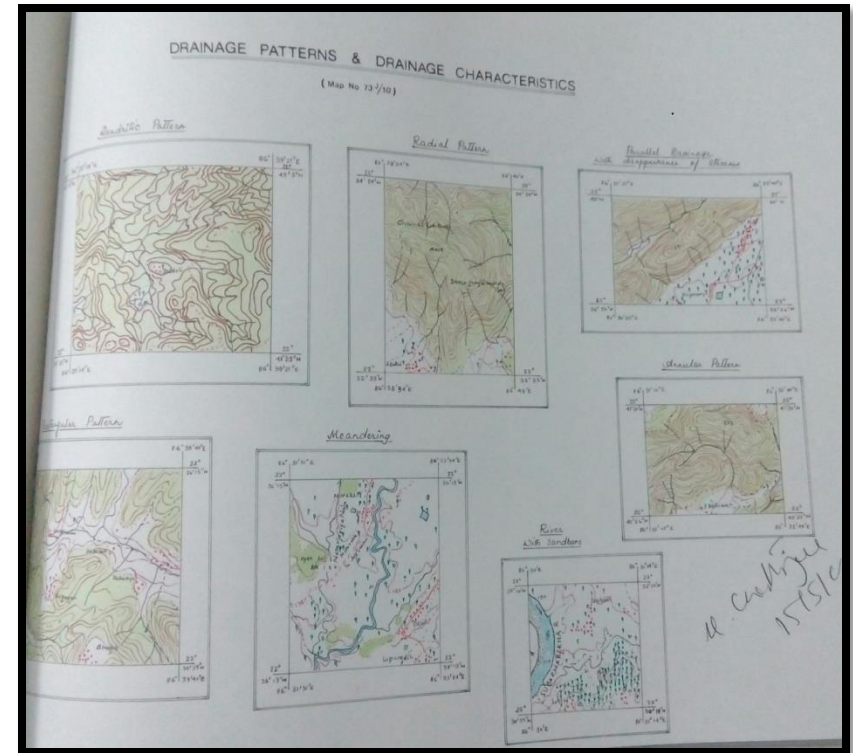
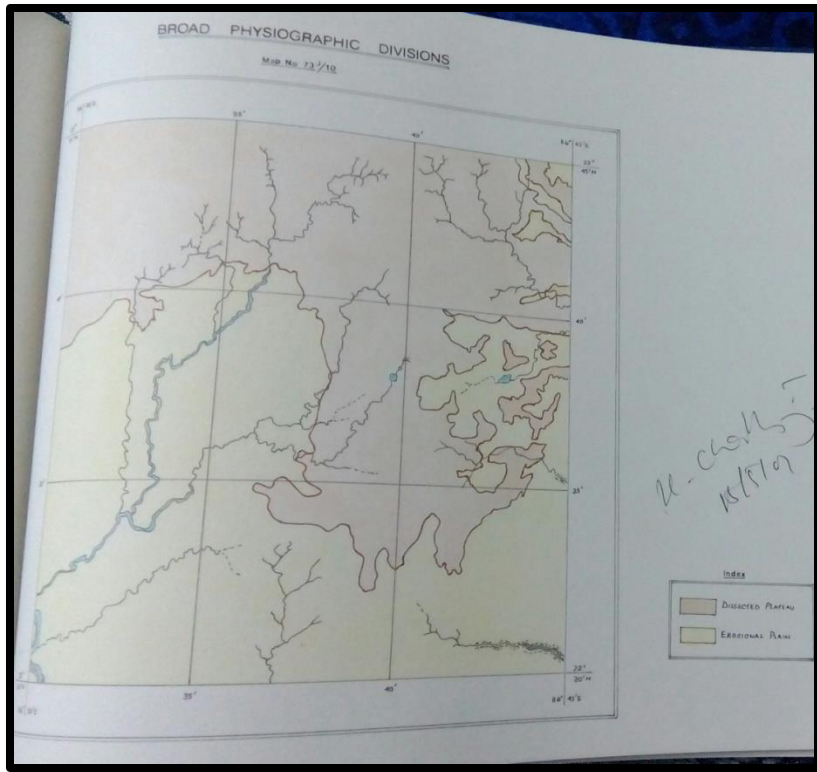
Sl.No.	Features	Specialized Techniques	Remarks
5	Settlement	<p>Settlement Frequency, Homestead Density and its correlation with morphometries related to relief, drainage, vegetation, transport and communication.</p> <p>Typical sketches to settlement patterns: Compact (Linear, Nodal, Star shaped, Nucleated, Agglomerated) and Dispersed.</p>	<p>To delineate spatial variation of Settlement features.</p> <p>Identification of features from the map</p>

SOME RELEVANT MORPHOMETRIC TECHNIQUES: I

- Formula for **Relative Relief** (After Smith):
Maximum Relief – Minimum Relief
- Formula for **Dissection Index** (After Dov Nir):
Relative Relief ÷ Maximum Relief
- Formula for **Average Slope** (After Wentworth):

$$\tan^{-1} \frac{\text{No. of Cont. Crossings / Length in kms}}{636.6} \times \text{C.I.}$$

TERRAIN ANALYSIS:



BROAD PHYSIOGRAPHIC DIVISIONS

TYPICAL SKETCHES

MORPHOMETRIC TECHNIQUES:II

- Formula for **Drainage Density**:

Length of the streams in kms \div Area in Sq. Kms

- Formula for **Ruggedness Index**:

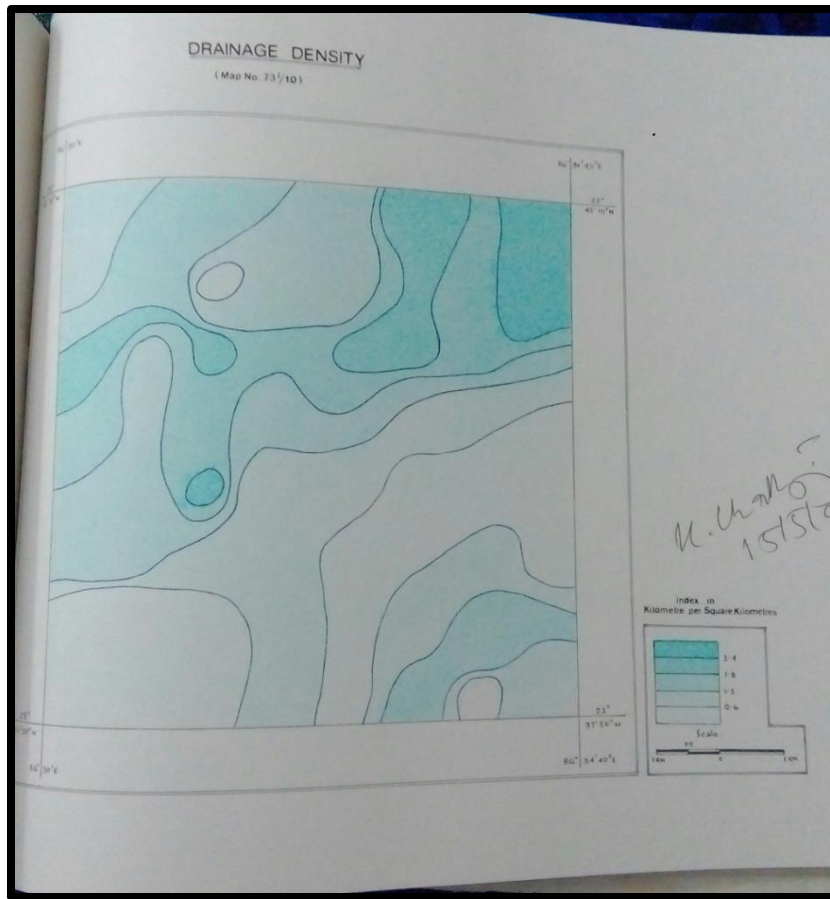
Relative Relief X Drainage Density

1000

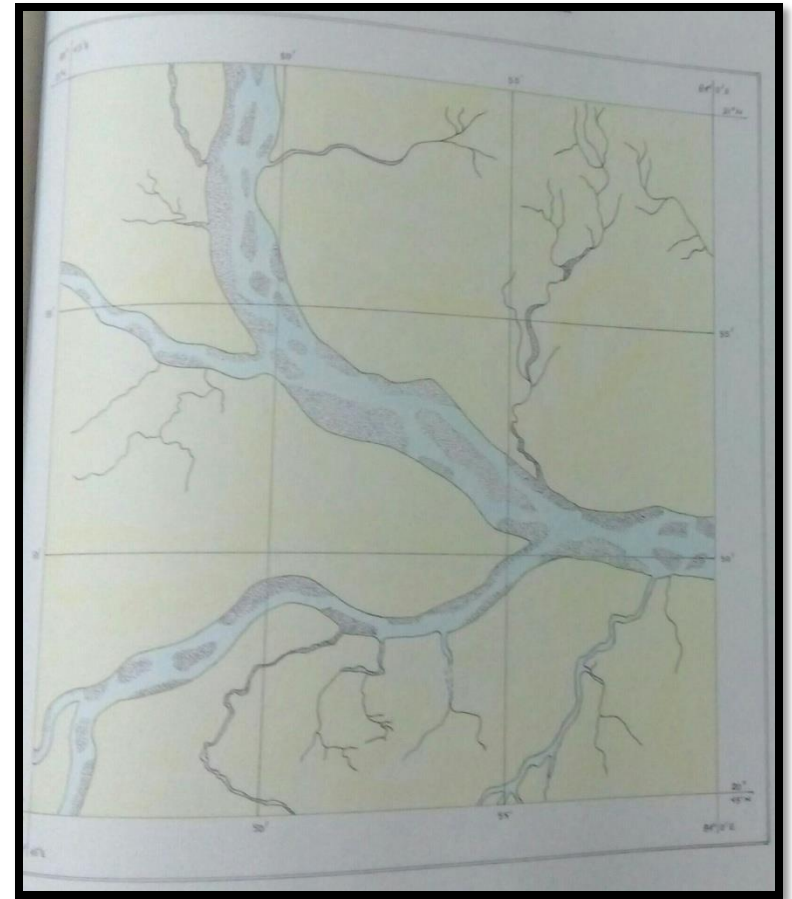
- Formula for **Drainage Frequency**:

No. of streams \div Area in Sq. Kms

DRAINAGE:



DRAINAGE DENSITY



**ROUGH SKETCH SHOWING
THE DRAINAGE**

MORPHOMETRIC TECHNIQUES: III

- Formula for **Areal coverage of vegetation (%)**

Area occupied by the Vegetation

-----X 100

Area in Sq. Kms

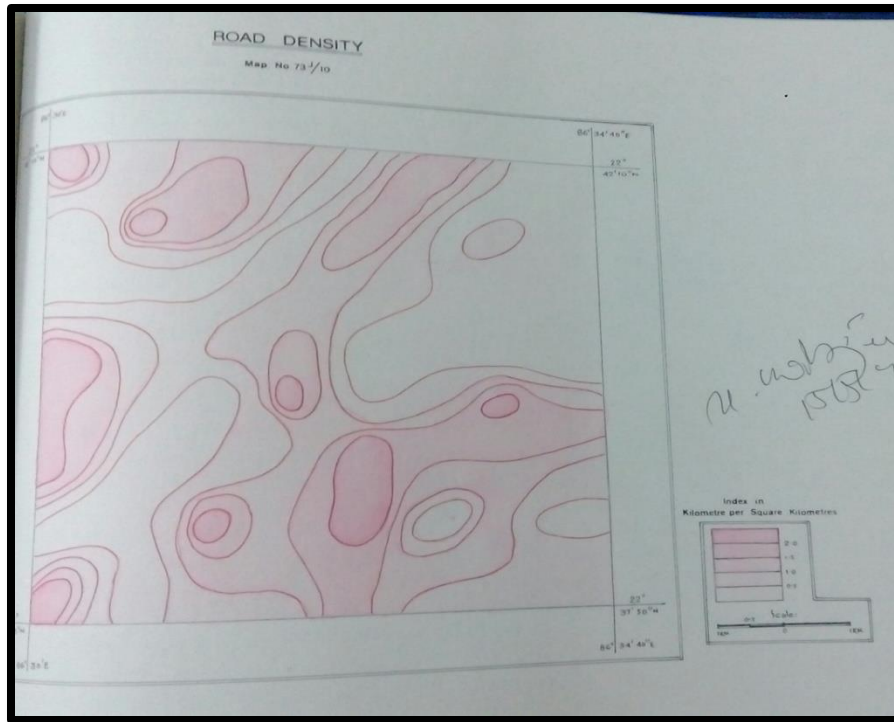
- Formula for **Road Density:**

Length of the roads in kms ÷ Area in Sq. Kms

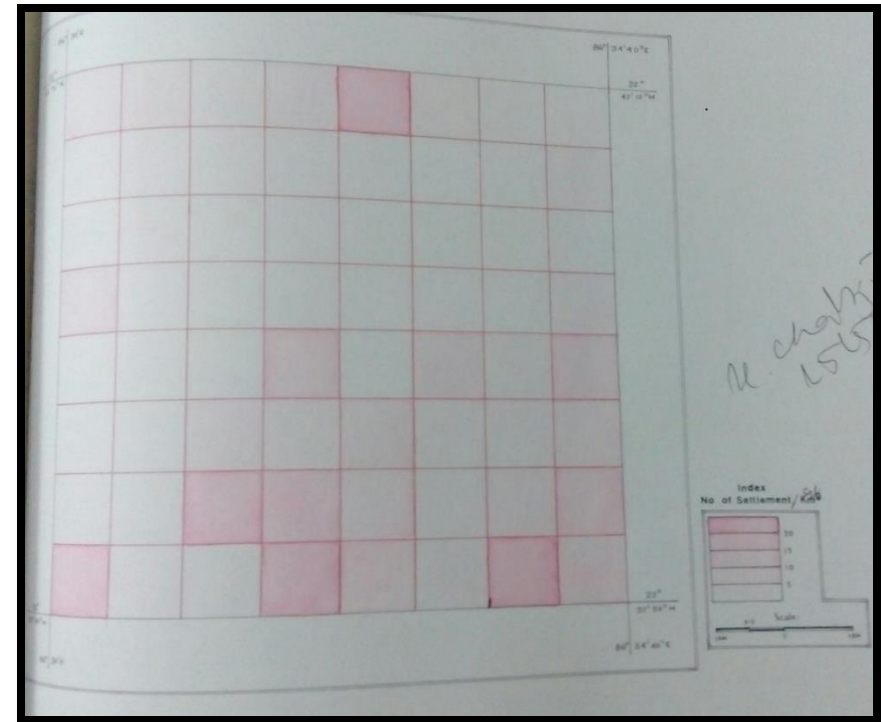
MORPHOMETRIC TECHNIQUES: IV

- Formula for **Settlement Frequency**:
No. of settlement \div Area in Sq. Kms
- Formula for **Homestead Density**:
No. of households \div Area in Sq. Kms.

MORPHOMETRIES DEPICTING CULTURAL ASPECTS:




ROAD DENSITY ZONES



HOMESTEAD DENSITY

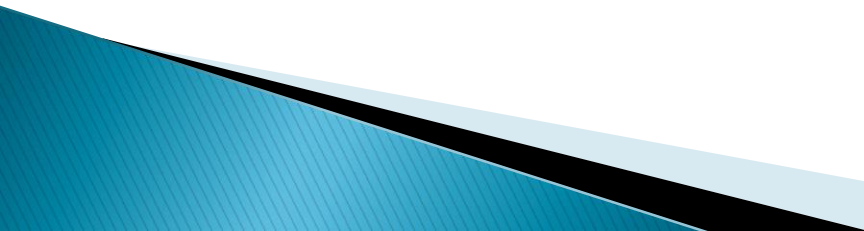
MAP INTERPRETATION:

▶ Introduction:

- a. Explanation of all the marginal information.
 - b. Type of terrain – flat, undulating, rugged etc.
 - c. Highest and lowest contour values.
 - d. General slope of the land evidenced by the flow of the consequent stream.
 - e. Fluvial or Aeolian or any other processes found active in the area.
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PHYSIOGRAPHIC UNITS:

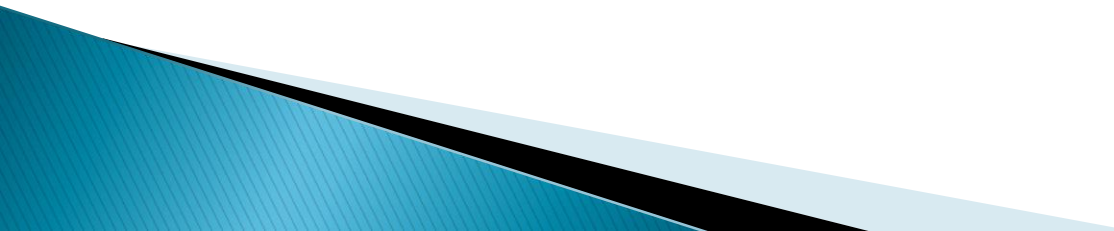
- ▶ On the basis of the break-in-slope identified from the representative profile, what are the physiographic units?

 - ▶ **FIRST PHYSIOGRAPHIC UNIT:**
 - a. Height, areal extent, slope, hills and shape of hills.
 - b. What are the ranges of relative relief, dissection index, average slope, ruggedness index etc.
- 


FIRST PHYSIOGRAPHIC UNIT:

- c. Explanation of **Serial, Superimposed, Projected and Composite Profiles** indicating number of **summit levels** or slope between erosion levels. Altimetric frequency curves showing the frequency of the spot heights with elevation.
- d. Identification of the **geomorphic features** like scarp, spur, badland, rocky knobs, sheet rocks, cliffs, knolls, col, ridge, conical hill, isolated hill etc.

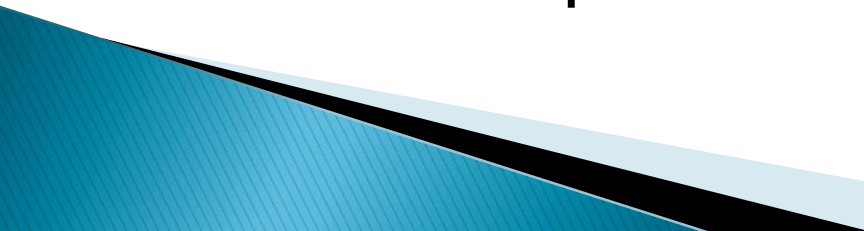
SECOND PHYSIOGRAPHIC UNIT:

- a. Height, areal extent, slope, hills and shape of hills.
 - b. What are the ranges of relative relief, dissection index, average slope, ruggedness index etc.
 - c. Establish comparison between the two physiographic units.
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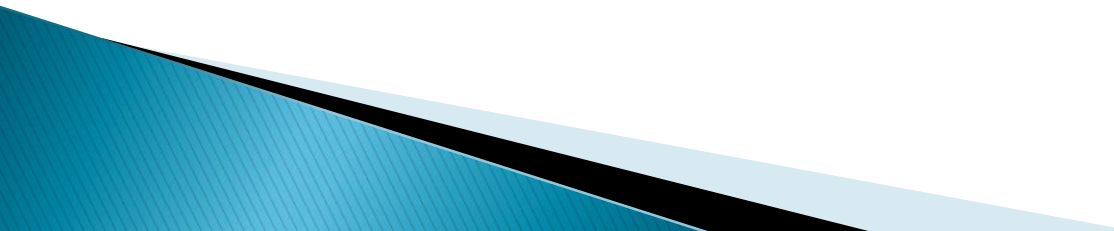
DRAINAGE:

- a. What are the main rivers draining this area?
Mention the names of the tributaries and also mention whether they are perennial or not.
 - b. What is the **general slope of the land**?
 - c. Identify the **drainage patterns** and account for the structural control of the drainage patterns.
 - d. Draw comparison between valley side slopes in case of long and cross profiles.
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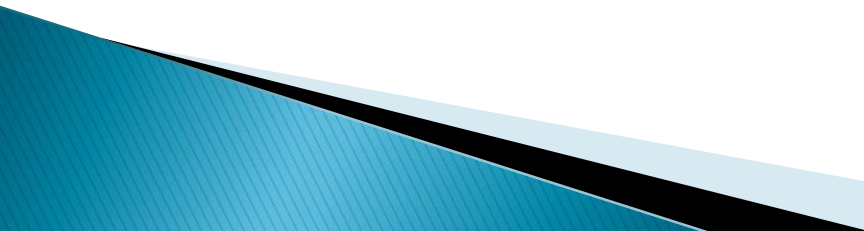
DRAINAGE:

- e. Identify the **erosional and depositional features** (like braided channels, loop of horse-shoe lake, levees, river bed deposition, meanders etc.).
 - f. Indicate presence of **water falls and springs**.
 - g. Compare between morphometries done earlier and **Drainage Density** and establish a relationship.
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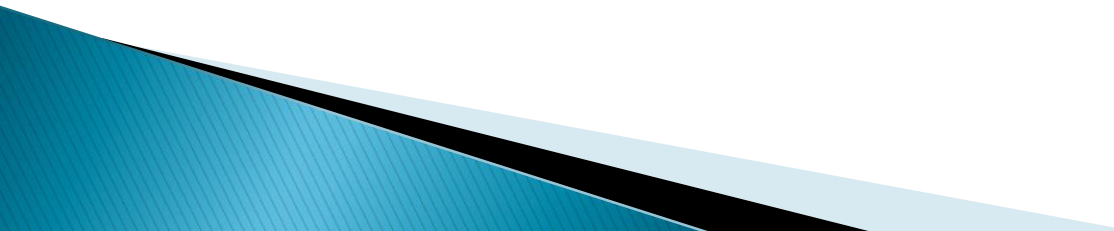
NATURAL VEGETATION:

- a. Indicate the **presence of forests** and its types.
 - b. What **type of vegetation** (species) dominates in which part – deciduous, coniferous – what type of **climate** it indicates?
 - c. Nature of vegetation in different physiographic units and reasons for their presence.
 - d. Which areas do not have vegetal cover and why?
 - e. Explanation of the vegetation density (%) and its correlation with morphometries related to relief and drainage.
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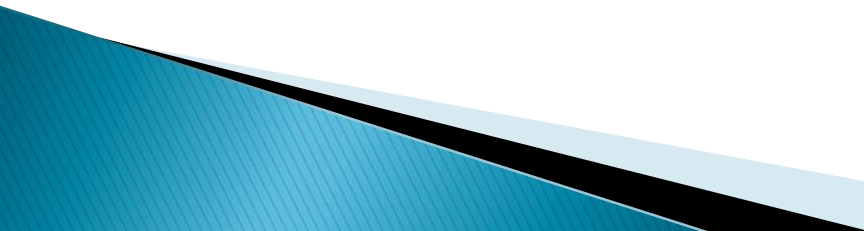
ECONOMY:

- a. Which **areas** are **suitable for cultivation** and why?
 - b. Which areas are unsuitable for cultivation and why?
 - c. **Availability of water** for irrigation.
 - d. What type of irrigation is practiced?
 - e. Is the **economy forest based** or **agriculture based**?
 - f. What are the non-agricultural employment opportunities?
- 


TRANSPORT:

- ▶ a. Is the terrain **suitable** for development of roads and railways?
 - ▶ b. Is the region has **inter and/ or intra-regional connectivity**? What are the **variation of linkages** on each physiographic units?
 - ▶ c. What **types of roads** are found? **Direction and destination** must be referred.
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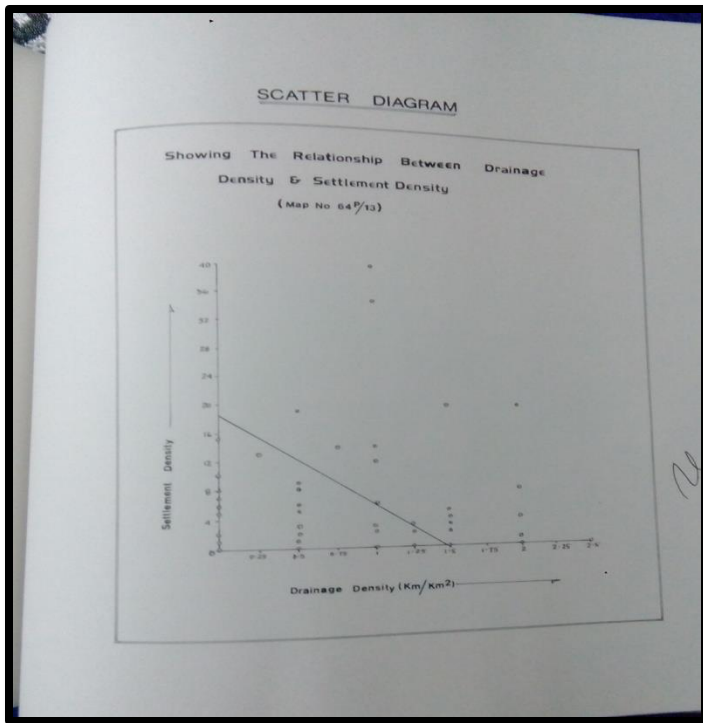
TRANSPORT:

- d. Type of railway gauge to be mentioned.
 - e. Presence of **ford and ferry services** and **seasonal tracts**.
 - f. Explanation of **Road Density** of metalled and unmetalled roads and its correlation with morphometries related to relief, drainage and vegetation.
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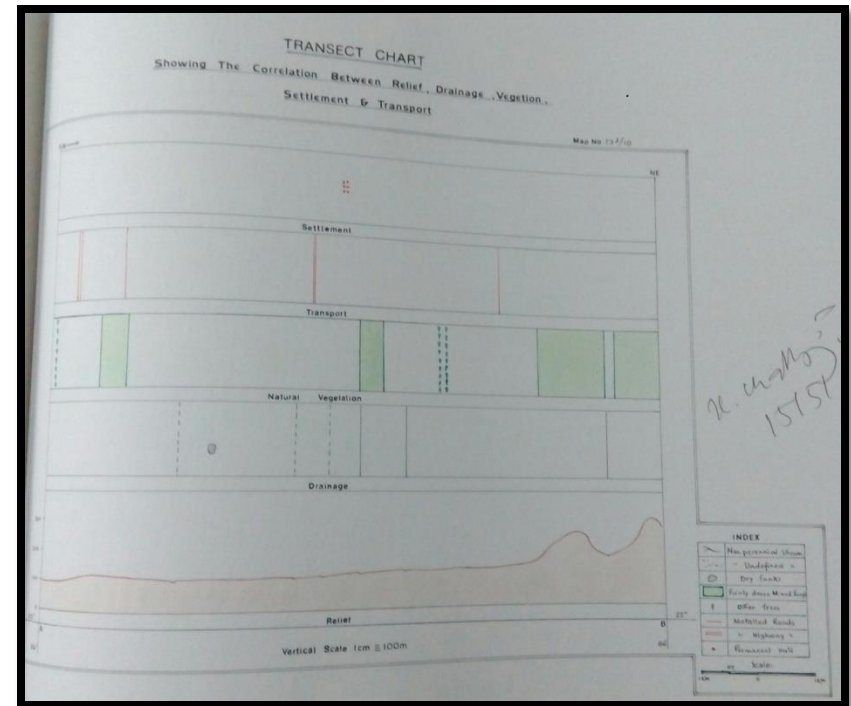
SETTLEMENT:

- a. Whether the area is densely settled? Give reasons.
 - b. **Types of settlement** found in the map with reasons.
 - c. **Settlement Hierarchy** to be prepared and explained according to the functions of the settlements.
 - d. Refer to **settlement frequency** and **homestead density** maps and compare with other morphometries to establish relationship.
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ESTABLISHING RELATIONSHIP:




SCATTER PLOT



TRANSECT CHART

CONCLUSION:

- a. Considering all the **physical and non-physical points of view**, what kind of area it may be called- advanced or backward?
 - b. What are the **major problems** identified from the map- irrigation/transport related?
 - c. What are the **existing resources** of the region?
What is the **scope for future development**?
 - d. Suggest **some tentative solutions** to the problems cited.
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THANK YOU..