EWCE-103

SURVEYING

Last class we learned

- Some Definitions- Curved surface, Level Line and Great circle.
- Principles of Survey
- Scale of Plan/Map

Today we will try to Learn

- Works of a **Surveyor.**
- **Precautions** of handling survey instruments.
- Government **Organizations** on Survey.
- **Khatiyan** (Records of right of land/porcha/sottolipi).

Surveying-Works of a surveyor

Works of a surveyor may be divided on 3 distinct parts:

a. **Field works**
b. **Office works**
c. **Care and adjustment of the instruments.**

Question: Briefly describe the works of surveyor in the field surveying.

Survey- Character of works

Field works:

- **Measurements** of angles, distance etc.
- **Records on field note books**.
- Field's notes may be three types:

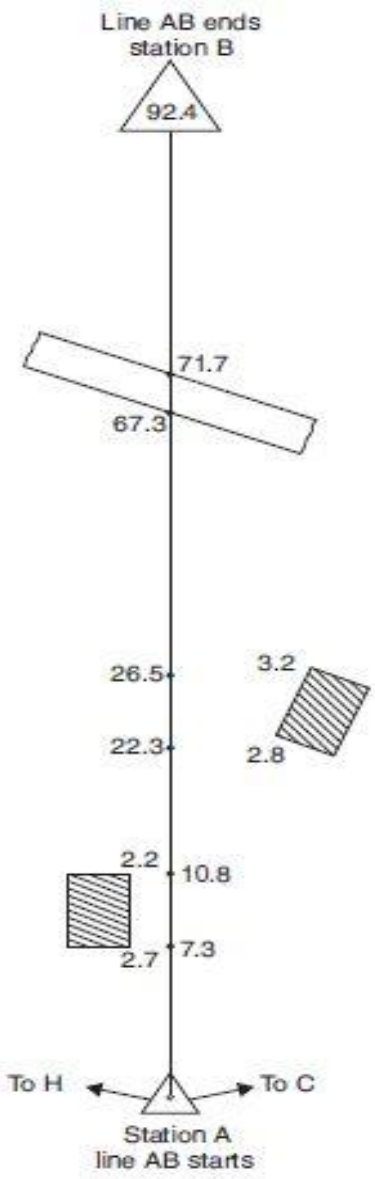
  -Numerical values,

  -Sketches and

  -Explanatory notes etc

Field Works





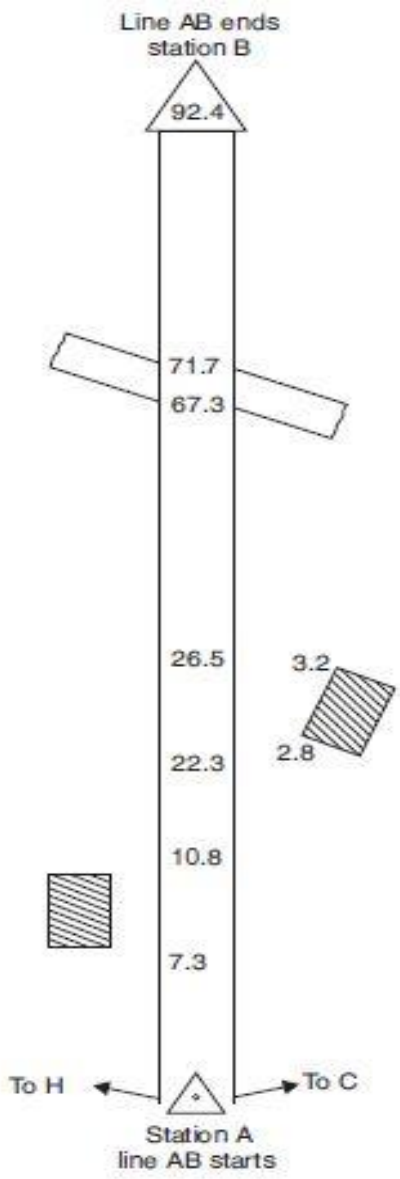


Fig. 12.17

Office works

Office Works:

- **Preparation** of **plans** and **sections,** ultimately preparation of **map**.

- **Computing** is done for **plotting** and **calculating areas**.

- **Designing** is done specially for **route surveying**.

Surveyor- Office works



Care and Adjustment of Instruments

Why care and adjustment of survey instruments is required?

- **Main instruments** are- theodolite, levels, total stations etc.
- Instruments are very **delicate** and must be **handled** with care.
- If any parts is **impaired**, can not be restored with original efficiencies.

Question: What do you understand by the care and adjustment of survey instruments by the surveyor?

Main Instruments - Surveying



Vernier Theodolite



Survey Compass



Auto Level



Digital Theodolite



Total Station


alamy stock photo



Components of Dumpy Level

An optical instrument used to establish or verify points in the same horizontal plane.

Calibration of Instruments

Calibration

- Calibration of any instrument is the **process of determining its accuracy in measured results.**

- **Process**: Involves in:
  -obtaining a reading from the instruments and
  -measuring its variations from the **reading obtained from the standard instruments** or **from the known measurements** and
  -then adjust.

- Manufactured factory always gives a **chart** of standard results/readings.

Calibration of Instruments



Calibration of Instruments (cont..)

Requirement of calibration:

- Instruments' **reading may deviate** due to
  - **-Rough handling**
  - -Mechanical shocks
  - **-Exposures to extreme weather conditions**

- Calibration of an instrument to be **carried out at regular basis.**

- **Frequency** of calibrations depends on:
  - **-Objectives** of measurement
  - -Instruments' **tolerance level**.

Question: Define the calibration of survey equipment. Why do you need to calibrate your survey equipment and when?

Precautions of Survey Instruments

General Precautions - handling survey instruments:

- Instruments to be **lifted by placing the hands under** the leveling base of the footplate.

- Instruments to be **carried, setting all clamps tightly, on** the shoulder/in the arms /in boxes.

- **When not use**, telescope to be **capped over the** lens and use special brush to remove the dusts.

Question: Survey instruments are very delicate, as a surveyor you need to take care while surveying in the field. Describe the different precautions you need to take care while handling survey instruments.

General Precautions of Survey Instruments (cont..)

- Do not **set the instruments on smooth floors**, legs of tripod may tipped off, damaging the parts.

- **Water/dust proof cover may be used to protect the exposed parts,** when the instruments not used in the fields.

- Do **not leave the equipment unguarded** when set on a road, footpath, high ground

General Precautions of Survey Instruments (cont..)

- **Do not force any screw or part** to move against strain. Parts to be cleaned and lubricated.

- **Steel tape should be wiped clean and dry** after use with dry cloth, then with slightly oily cloth.

- When **compass not in use**, needle should be lifted off the point.

Precautions from Salt water - Instrument

Care from salt water- To protect the instruments from the effects of salt water in the **coastal areas**:

- A fine thin of **watch oil** to be **rubbed over** the exposed parts to **prevent the appearance of oxides.**
- To **remove the oxide spots**, **apply some watch oil**, allow to remain for a few hours. And dry with a **soft pieces** of linen.
- To **remove dust**, use **camel's hair brush** and to **preserve** the outer appearance.

Watch oil and Camel's Hair Brush







Precautions of Survey Instruments

- To **remove water and dust**, first use **camel's hair brush**, then, rub off with fine **watch oil**, keep in a while, then **wipe dry** with soft linen.

Cautions-**To let the oil remain**, would tend to accumulate more dust on the instruments.

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Question: As a EWCE student, you have to survey in the coastal areas. To protect your survey instruments from the effects of salt water, what are the precautionary measures you need to take while surveying in the coastal areas.

Government Organizations on Survey

- **Department of Land Records and Survey.**
- Survey of Bangladesh (SOB)
- **Geological Survey of Bangladesh (GSB)**

Question: Describe briefly the different government organizations on survey in Bangladesh.

Department of Land Record and Survey



Department of Land Records and Survey.

- **Land Record and Survey Department** (ভূমি রেকর্ড ও জরিপ অধিদপ্তর) is a Government Department responsible for **surveying and keeping records of land** in Bangladesh.

- Functions of Jareep Department of BD
  - **Land administration** in Bangladesh.
  - **Land records** of Bangladesh.

GSB



Government Organization on Survey

GSB – Geological Survey of Bangladesh.

- **Investigation** and **exploration** **of mineral resources.**
- **Geo investigation** studies
- Engineering **hazards studies**
- **Urban geological mapping**

Survey of Bangladesh (SOB)



Govt Organization on Survey

Services of SOB (Survey of Bangladesh):

- Geodetic services
- Photogrammetric services
- Cartographic Services
- Map Services

Govt Organization on Survey

Services of SOB (Survey of Bangladesh):

- **Geodetic services** by **Geodetic department**.

***Geodetic survey*:** a survey of a large land area in which corrections are made for the curvature of the earth's surface

Question: Describe the different services provided by the Survey of Bangladesh.

Govt Organization on Survey

SOB

- **Photogrammetric services**:

  -Producing digital maps of 1:25,000 scale and 1:5000 scale, **using aerial photos** by **digital photographic** section.

Photogrammetry can be defined as the science of **making reliable measurements** using **photographs or digital photo imagery** to **locate features** on or above the surface of the earth

Govt Organization on Survey

- **Cartographic Services**: Providing various types of topo maps, coastal area maps, and thematic map.

Surveyors are responsible for visiting the sites that need to be mapped and collecting necessary data by utilizing special measuring equipment.

After collecting the data, surveyors punch it into a computer and allow the **Cartographers** to take over from there. Cartographers typically collect and utilize a select pool of information to create maps

Govt Organization on Survey

- **Map Services**:

  -Topo map

  -Thematic map (map designed on particular data set, ie rainfall, poverty etc).

  -Maps of scales ie 1:5,000; 1:25,000; 1:50,000 and 1:10,00,000.

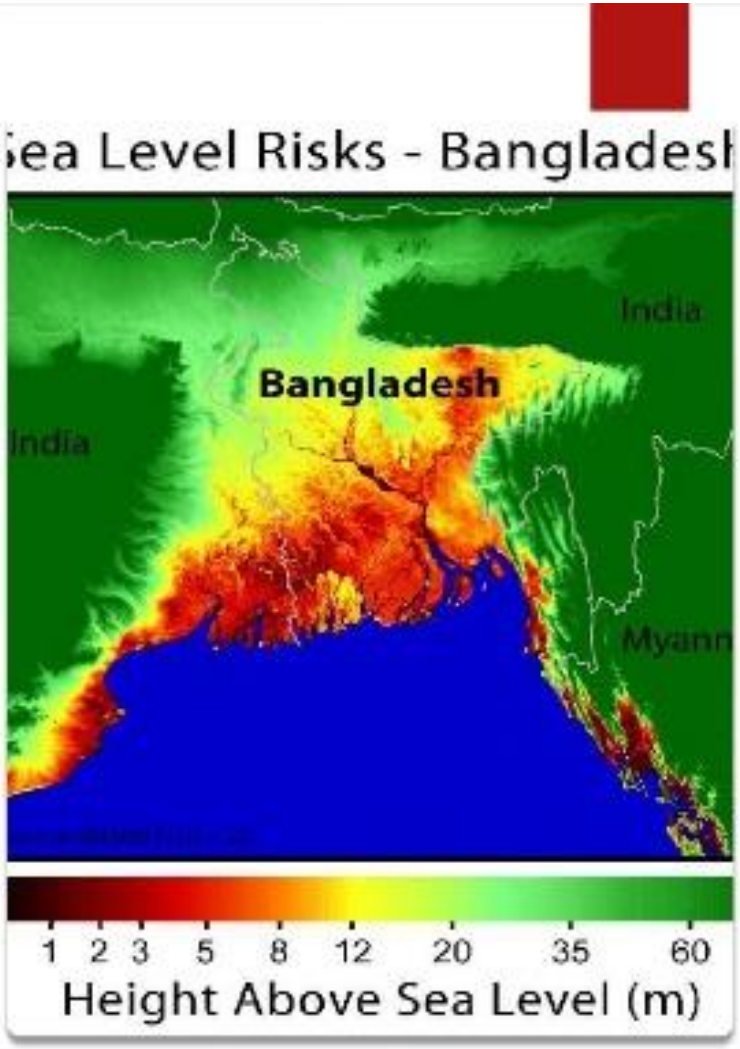
Topographical Map

Topography of Bangladesh

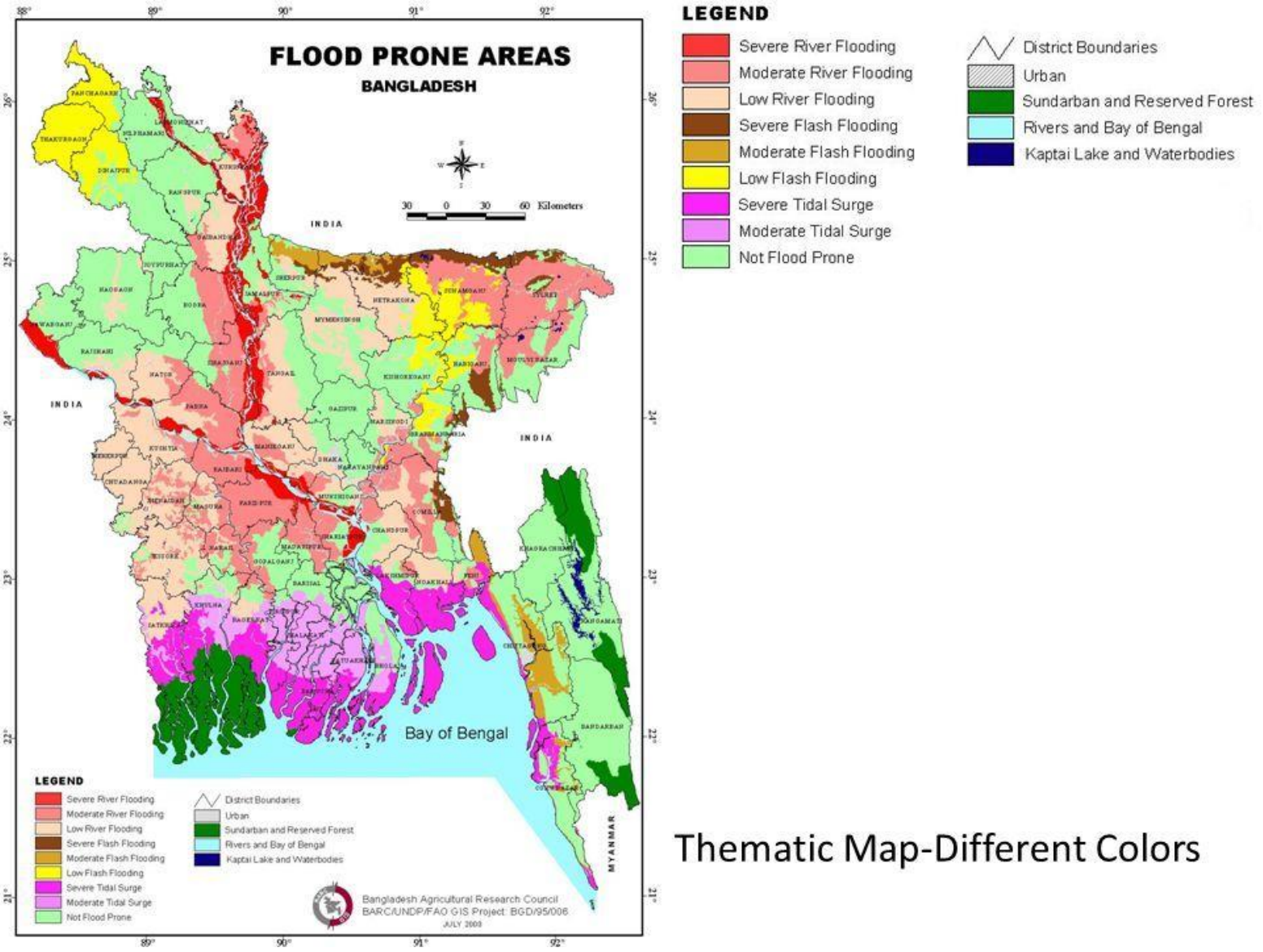
(Landforms & Elevation)

Bangladesh has a considerable topographic diversity. It has three distinctive features:

- a broad alluvial plain subject to frequent flooding,
- a slightly elevated relatively older plain, and
- a small hill region drained by flashy rivers



Thematic Map



Thematic Map-Different Colors

Record of Rights (Khatiyan)

What is Khatiyan (*Sottolipi* or *porcha)*?

- A **Persian** word.
- **Document for identifying land.**
- **Documents prepared through survey** for the purpose of determining **possession**, **ownership** and **assessing Land Development Tax** is known as Khatiyan.
- Only record of rights but this is **not a deed of ownership.**

Question: What is khatiyan in land records and survey in Bangladesh.

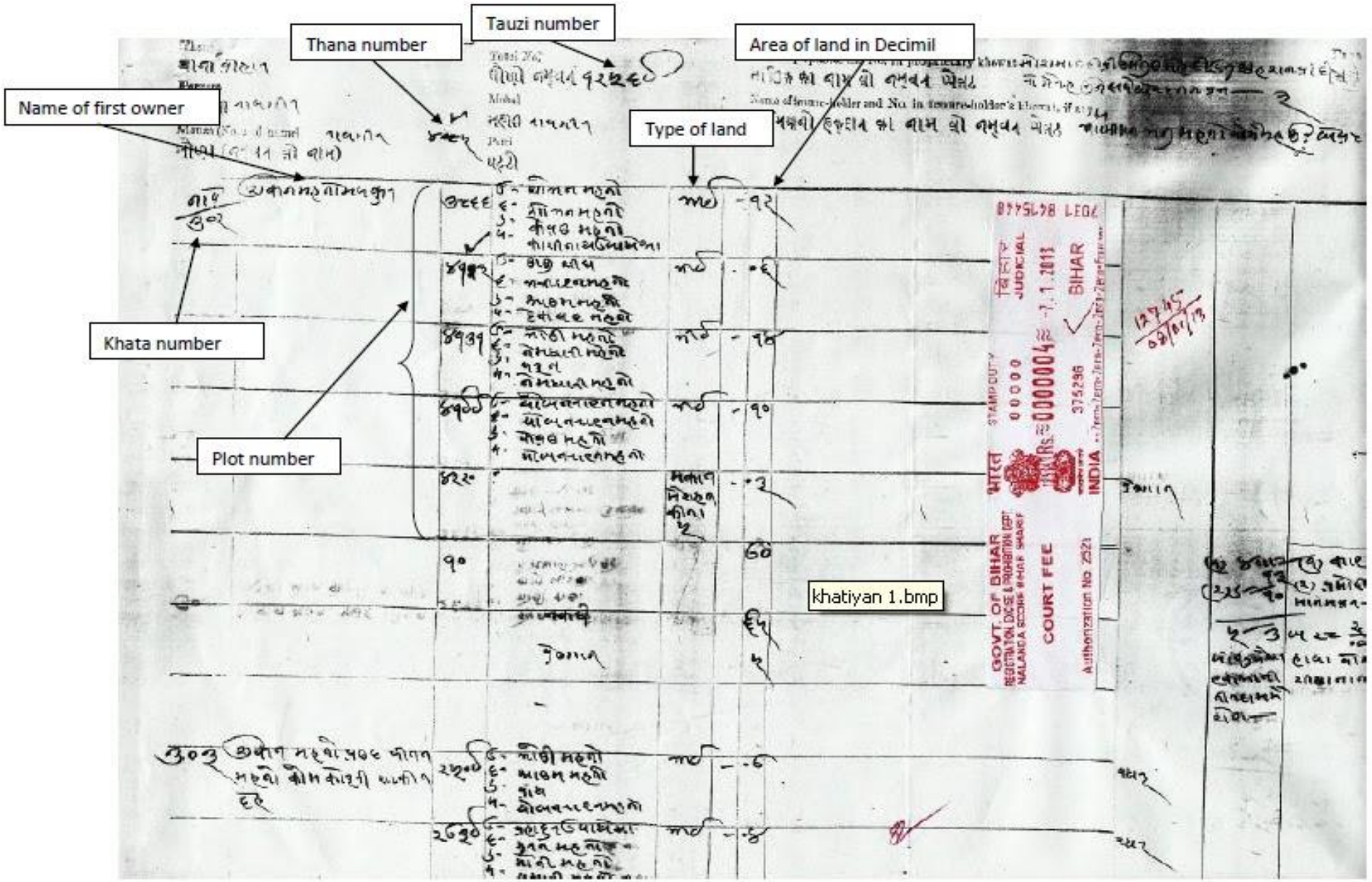
Record of Rights (Khatiyan)

Contents of Khatiyan

- **Rule**, Tenancy Rules (প্রজাস্বত্ব বিধিমালা ১৯৫৫)
- **Plot No**. ---partial or complete.
- **Name, father's name, address of the owner or owners.**
- **Portion of a owner**, total amount of land, **class and nature of land,** location**, amount of Land Development Tax payable**, **rights** and **obligations** of the tenants etc.

Question: What are the contents of Khatiyan?

Record of Rights (Khatiyan)



Mutation Khatiyan

Mutation Khatiyan:

- **Normally Khatyan is made through jareep**. But jareep does not always take place.
- **Property may be transferred** in-between two jareeps. Then the **change of ownership needs to be reflected in the Khatiyan**.
- Such **change of ownership** is done through **mutation proceedings** is known as Mutation Khatiyan.
- **AC Land office** does this.

Question: What is mutation Khatiyan? Why it is needed?

Jareep Khatiyan /Survey Khatiyan

Survey khatiyan

- Khatiyan is **prepared through land survey.**
- Survey is conducted by **Land Record and Survey Department situated at Tejgoan**. It has its own press to print Khatiyan.
- Khatiyan are given **nomenclature according to the name of the survey** i.e. **CS khatiyan, RS Khatiyan SA/PS Khatiyan & BS Khatiyan.**

Question: Briefly describe the different types of survey khatiyan in Bangladesh.

Jareep Khatiyan

CS Khatiyan or **Cadastral Survey** Khatiyan

- Prepared under Bengal Tenancy Act 1885.
- Known as **Cadastral Survey**.
- Survey started from **Ramu** of Cox's Bazar Upazila on 1888 and ends on 1940 (52 years).

Jareep Khatiyan

RS Khatiyan or **Revisional Survey** Khatiyan

- After CS survey another survey was held on.
- Known as **Revisional Survey** and the khatiyan made from this survey is known as RS Khatiyan.
- **Purpose of this survey** is **to update the amount of land**, **owner's name** and **possessor's name**.
- More authentic than the CS khatiyan

Jareep Khatiyan)

SA /PS Khatiyan :

- Prepared under **State Acquisition and Tenancy Act 1950**.
- Made on the **information given by the Zamindar or Landlord.**
- SA khatiyan means **State Acquisition** or **Settlement Attestation khatiyan.**
- Known as **PS khatiyan** or **Pakistan Survey Khatiyan**.
- Not an authentic khatiyan.

Jareep Khatiyan)

BS Khatiyan :

- **More authentic khatiyan** than all other khatiyan.
- **Survey was started on 1970** which is continuing till now.
- Known as **Bangladesh Survey Khatyan** and

Important Assessment for Khatiyan)

Some important assessments for Khatiyan and Land :

20 Til/ 06 Donto = 1 Kranti/ Konto.
03 Kranti/ Konto = 1 Kora.
04 Kora = 01 Gonda.
20 Gonda = 01 Aana/ Kani.
16 Aana = 01/ 01 Taka.
16 Kani = 01 Dron.
01 Gonda = 2 Shotok/ Decimal.
01 Gonda = 1.2 Katha.
01 Gonda = 864 Sq Ft.
01 Katha = 720 Sq Ft.
01 Khata=1.65 decimal
01 Shotok/ Decimal = 435.6 Sq Ft.

1 Acre = 100 Decimal
1 Hectare = 2.47 Acre

So far we have learned!

- Works of a Surveyor
- Government Organizations on Survey
- Khatiyan (Records of right of land)

Thank You