

# **FIS 407: AQUATIC ENVIROMENTAL SURVEY (2 UNIS)**

Topics to be taught:

1. Visual survey (Reconnaissance). Purpose of visual survey, Location, Water parameters, geology and meteorology)
2. Topographic survey
3. Surveying (Levelling)
4. Levelling instrument and its maintenance
5. Booking/ record keeping in surveying
6. (Practical classes will be held in the University fish farm, Industrial Park Road, Alabata, UNAAB)

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## **Topic 1**

### **What is surveying?**

- ☞ Surveying is the branch of applied mathematics which deals with measuring and recording of the size and shape of any portion of the earth's surface, and the delineation of the same in a map or plan.
- ☞ It deals with the setting out of works such as roads, railways, waterworks, drainage schemes etc and the calculation of areas and volumes.
- ☞ It may be taken to include levelling i.e. determination of the relative heights of different points on the earth surface.

### **Types of surveying**

1. Trigonometrical surveying : - This is for the preparation of maps of large extents of territory
2. Land surveying: - this is ranging from the land division system and extensive topographical surveys and work for boundary commission to small ones such as farms and estates.
3. Hydrographical surveying: - ranging from coast surveys to plans for harbour works.
4. Engineering location surveying: - For the construction of highways, railways and various public works.

5. Preliminary or parliamentary surveys: - This is in connection with a projected scheme such as the construction of a railway or a waterworks.
6. Exploratory surveying: - This is for geological, engineering and mining enterprises including archaeological expeditions.
7. Environmental survey: - This is survey carried out for forest and water parameters.

### **Difference between surveying and Levelling:**

Surveying consists in making measurements in the horizontal plane while Levelling is making measurements in the vertical plane.

In surveying, the measurements consist in fixing position of points in the horizontal plane; 2 points fix a straight line while 3 or more straight lines determine the plan of a plane figure.

### **What is Visual survey?**

This is also called reconnaissance survey.

⇒ It is the preliminary inspection of an area to be surveyed.

⇒ It is a see-for-yourself walk-over of the ground to be used for a fish pond or a fish farm. It is first done with a view to visualise the work to be done.

⇒ It is the venture taken to note and identify all the parameters to be measured or surveyed.

⇒ It is a rough sketch of the field or fields in which all positions and stations are made in the field book.

⇒ It is preliminary work done whereby the routes of the main chain lines are noted.

### **What do you do during visual survey?**

(i) The purposes of the survey should be noted.

This includes (a) is it for pond construction?

(b) Is it for damming? (c) Is it for irrigation purposes; (d) Is it for Hydro-electric power (HEP)?

The purpose will determine the extent of the reconnaissance survey.

- (ii) The water parameters to be measured should be noted as from the beginning. Such parameters include : (a) Water level; (b) Geological attributes; (c) Soil conditions (texture, structure and permeability); (d) Water pH, hardness, alkalinity, chloride, phosphate, ammonia, sulphide, sulphite, dissolved oxygen etc

### **Survey in pond construction**

Through topographic survey, the proposed site is inspected and professionally approved. The water, soil and other parameters are determined. Using levelling instrument, the topography of the site is ascertained and the area to be dug/ excavated or filled is pegged out with the use of lines.

## **Topic 2**

### **Topographic survey**

Topographic survey is carried out at the site selected for a fish farm project. This is based on a convenient datum marked with a temporary bench mark (TBM) at the site.

There are several methods used for topographic surveys, depending on the nature and size of the land required for the project.

The following methods are the most commonly applied for topographic surveying:

- (i) Gridding
- (ii) Plane tabling
- (iii) Cross-section method with traverse survey
- (iv) Radiating lines method with traverse survey
- (v) Tachimetry.

Methods (i) and (ii) are ideal on relatively flat land, while methods (iii) and (iv) may also be used but are best suited to hilly terrain or in narrow long valley.

The following topographic maps and plans are generally needed for a project:

- (i) Index or location map
- (ii) Boundary map
- (iii) Contour map
- (iv) Cross and longitudinal section and
- (v) Land map

## **General Information and data needed for topographic survey**

### **A. The Project site**

- Location
- Accessibility
- Communication
- Power supply
- Land status
- Existing improvements

### **B. Hydrological data**

- Design flood
- Runoff
- Ground water potential

### **C. Meteorological data**

- Mean monthly temperature
- Mean monthly rainfall
- Mean monthly evaporation
- Mean monthly humidity
- Mean monthly sunshine
- Mean monthly wind speed and prevailing direction

### **D. Water Source and quality**

- Description of water source
- Statement for water rights or water restrictions
- Summary of water analysis

**E. Topography**

- Summary of topographic survey
- List of the boundary points' coordinates
- List of the temporary bench marks

**F. Soil characteristics**

- Summary of the soil report
- Water table conditions