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Soil- Water Conservation Engineering and Structures

Presented By-

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FARM POND

Definition :-

- Farm ponds are small tanks or reservoir like structure for the purpose of storing surface runoff generated from the whole catchment.
- Farm ponds are basically water harvesting structure which solve the problem of farm needs such as irrigation ,cattle feed ,fish production etc.
- The farm pond has significant role in rainfed farming and some other common uses are –
 - Recreation
 - Live stock
 - Fish production



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TYPES OF FARM POND

➤ There are four types of farm ponds
I.e

- Embankment type farm pond
- Excavated type or dugout type farm pond
- Spring fed type or creek type farm pond
- Off stream storage ponds



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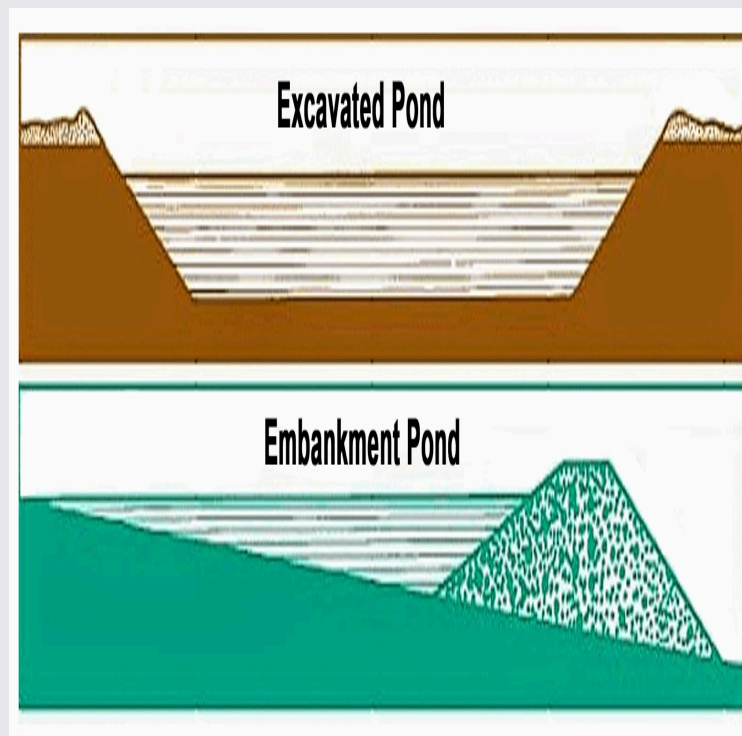
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Embankment type farm pond :-

- Embankment type farm ponds are generally constructed across the stream or water course.
- Such ponds consist of an earthen dam, whose dimensions are evaluated on the basis of volume of water to be store.
- These ponds are generally built in an area where land slope ranges from gentle to moderately steep.

Excavated type or dug out type farm pond :-

- Excavated type fish ponds are constructed by excavating the soil from the ground ,relatively in level area





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Spring or creek type:-

- They are generally found in hilly areas where natural spring or creeks are found to supply continuous water.



Off stream storage pond:-

- They are constructed on the side of ephemeral streams to store seasonal water in the ponds.





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Components of farm pond

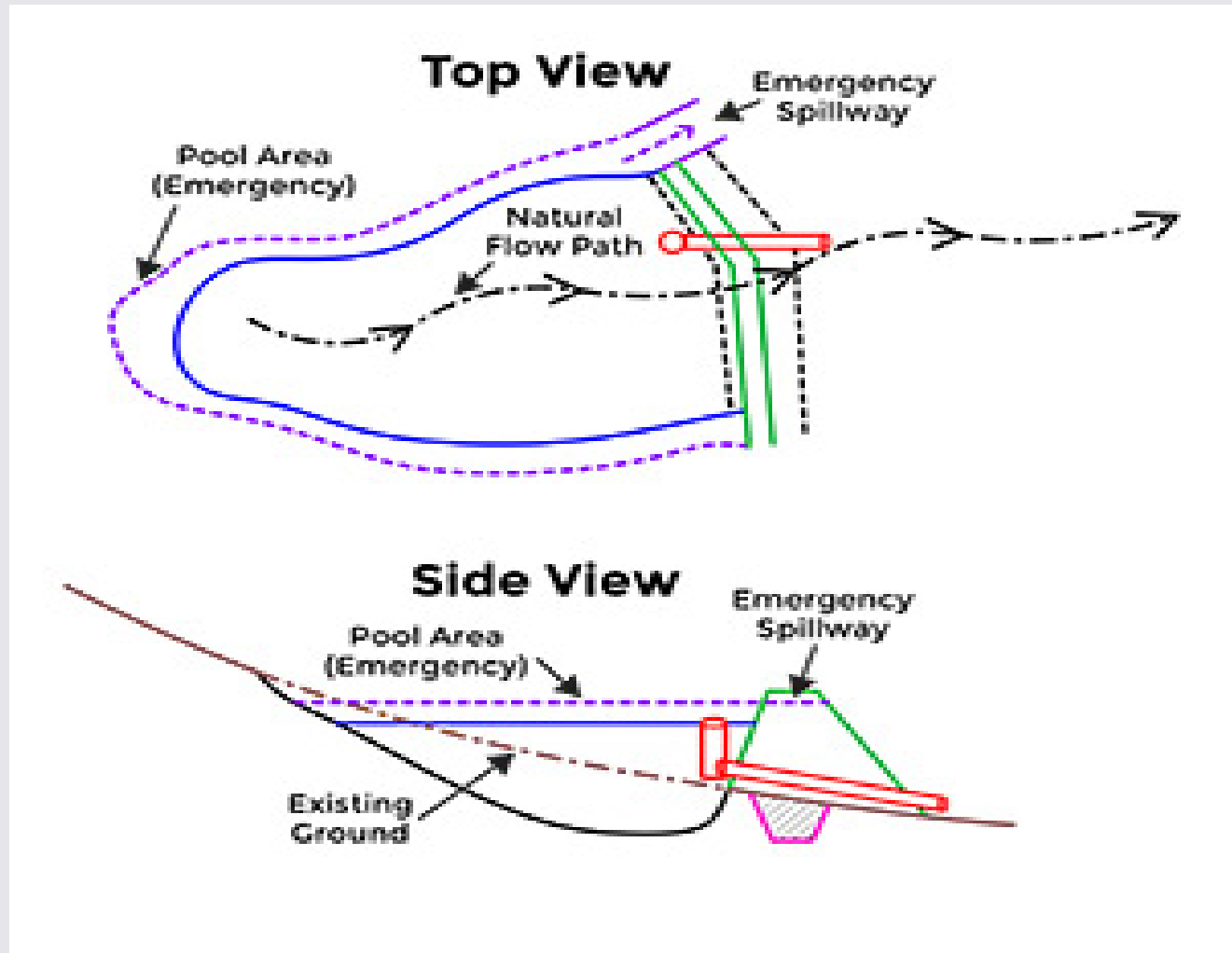
The pond consists of :-

- Storage area
- Earthen dam
- Mechanical spillway
- Emergency spillway



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Criteria for site selection of pond

- The pond should be located at that side where the largest storage volume can be obtained with least amount of earthwork.
- The pond site to be such that water can be conveyed for various uses like irrigation livestock ,fishing etc.
- The site should not be selected where sudden release of water due to the failure of dam is suspected.
- The site where low hanging power lines at present be avoided.
- The site near to the dam should not be selected for pond construction.



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Design criteria for farm pond

Earthen embankment of farm pond for design a construction of earthen embankment the following data required:

- Hydrogeologic data
- Climatic data
- Geologic data
- Dam site and tail water data
- Foundation of the dam
- Core well
- Cross section
- Height of the dam



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Capacity of farm pond

- The capacity of the pond is determined from a contour survey of the site at which the pond is to be located. From the contour plan of the site the capacity is calculated for different stages using the trapezoidal or Simpson's rule.
- Using Simpson's rule the volume between any odd number of contours is given by,

$$V = \frac{h}{3} [2(\text{area of odd contour}) + 4(\text{area of even contour}) + (\text{area of first} + \text{last contour})]$$



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➤ Trapezoidal formula :-

According to the trapezoidal rule, the volume V between two contours at an interval H and having areas A_1 and A_2 is given by,

$$V = \left[\frac{h}{2} (\text{area of first contour} + \text{area of last contour}) + \text{area of remaining contour} \right]$$