Systematic Approach for Solving Flood and Erosion Problem of Assam: A 100 Days Programme

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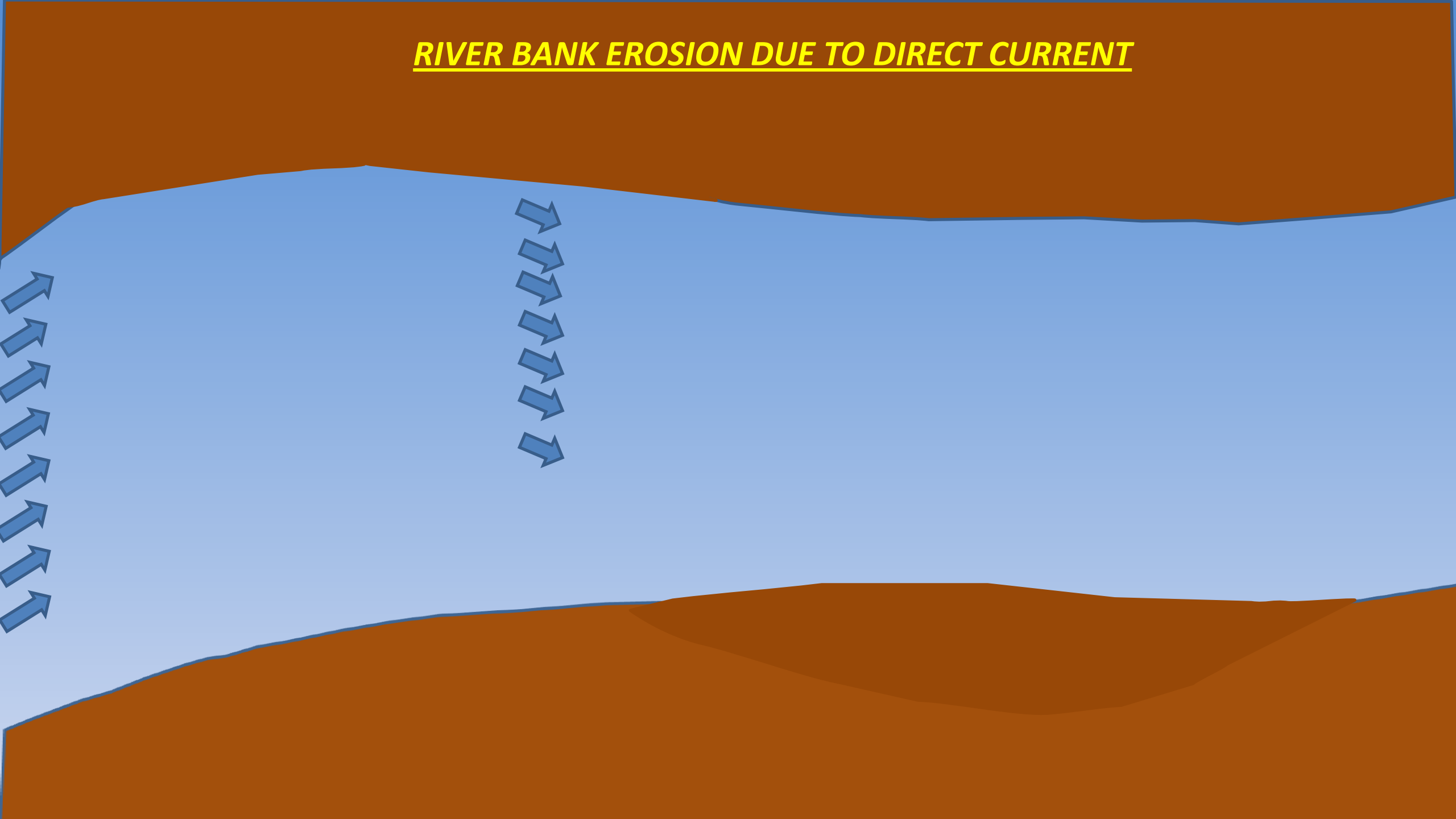
Introduction

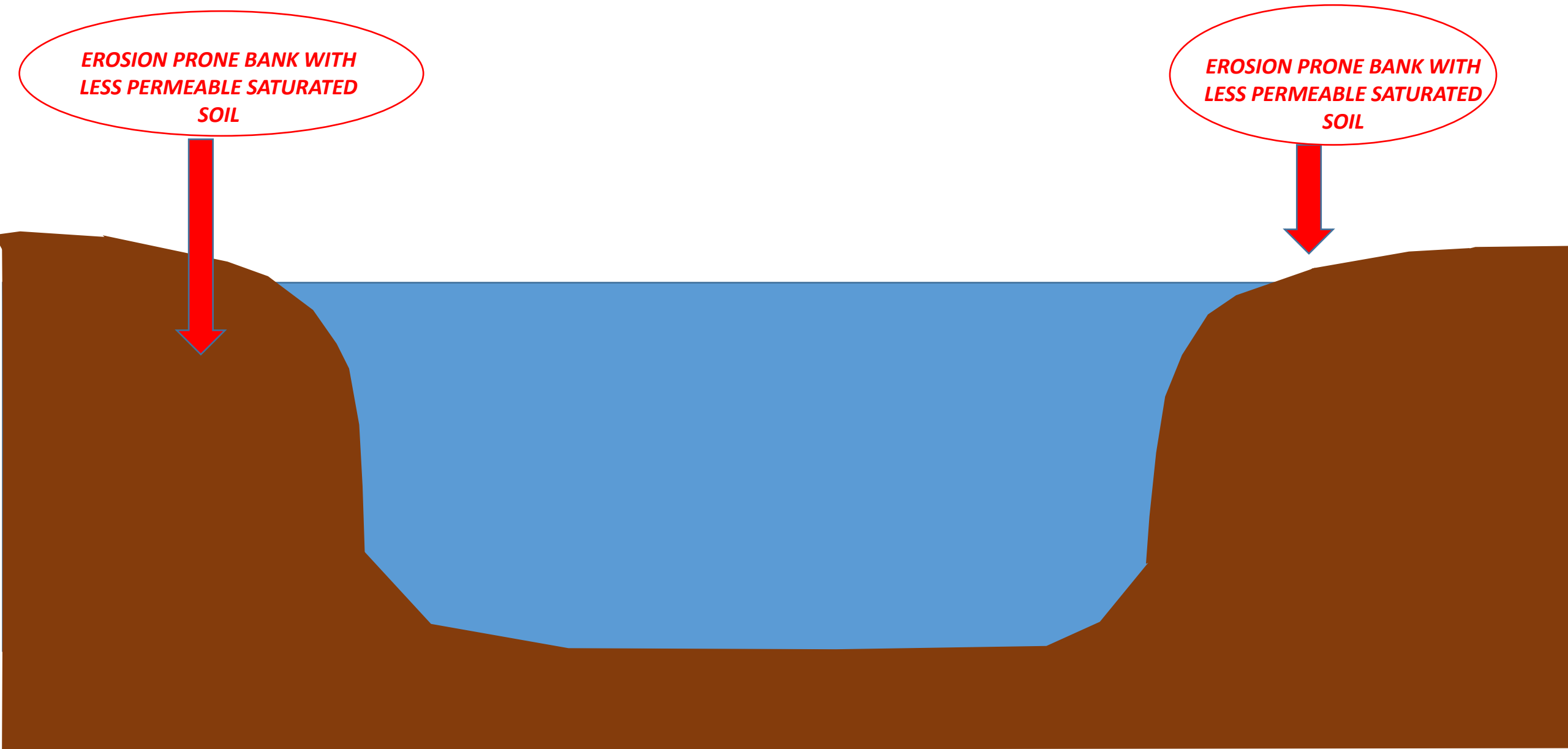
- Severity of the flood and erosion problem of Assam does not need any introduction
- While long term measures need to be started without delay short term measures are essential for immediate relief
- Long term measures includes:
  - Integrated river basin planning,
  - watershed management,
  - construction of flood control reservoir in suitable location in the tributaries,
  - flood diversion by parallel canal like Ganga canal etc.
- Immediate measures are essential to reduce people's suffering due to:
  - River bank erosion and
  - Embankment failure
- Like correct diagnosis is the first step for right treatment of any disease, understanding actual causes of bank erosion and embankment failure is essential
- Systematic approach for proper diagnosis of the problem is therefore presented with a well-defined initial programme of 100 days.

Process of River Bank Erosion

RIVER BANK EROSION DUE TO DIRECT CURRENT



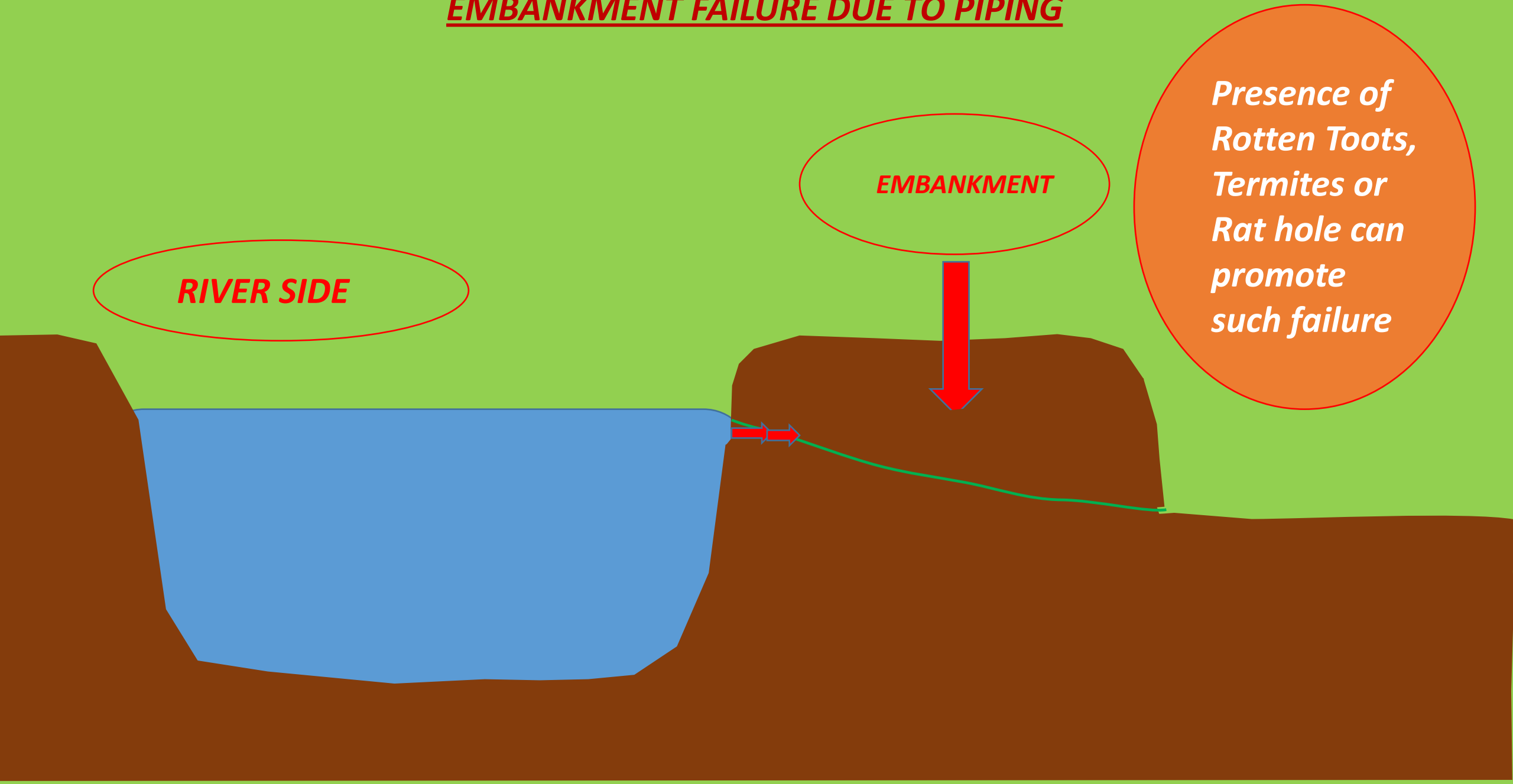
EROSION OCCURS DURING RECESSION OF WATER LEVEL



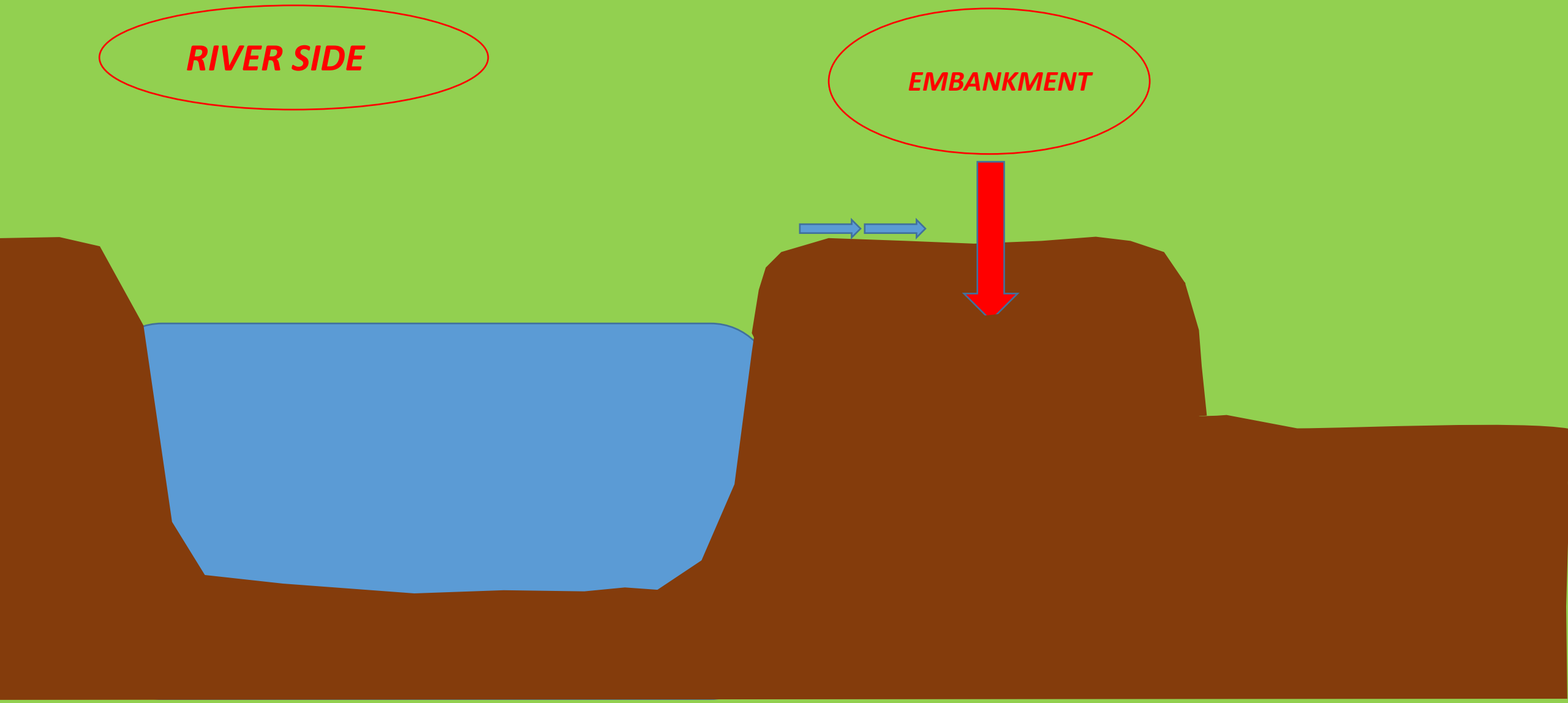
EROSION DUE TO SEEPAGE

Process of Embankment Failure

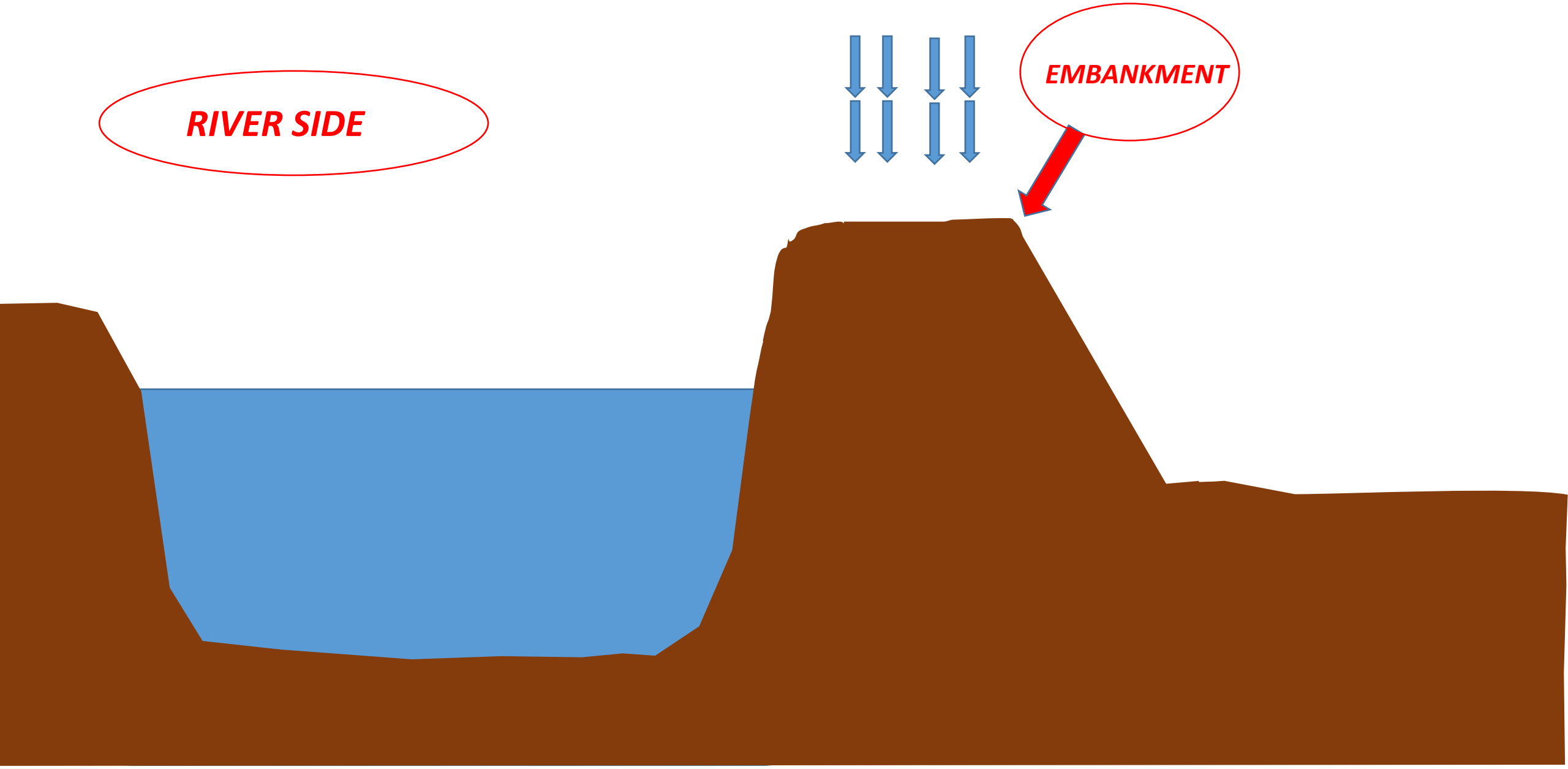
EMBANKMENT FAILURE DUE TO PIPING



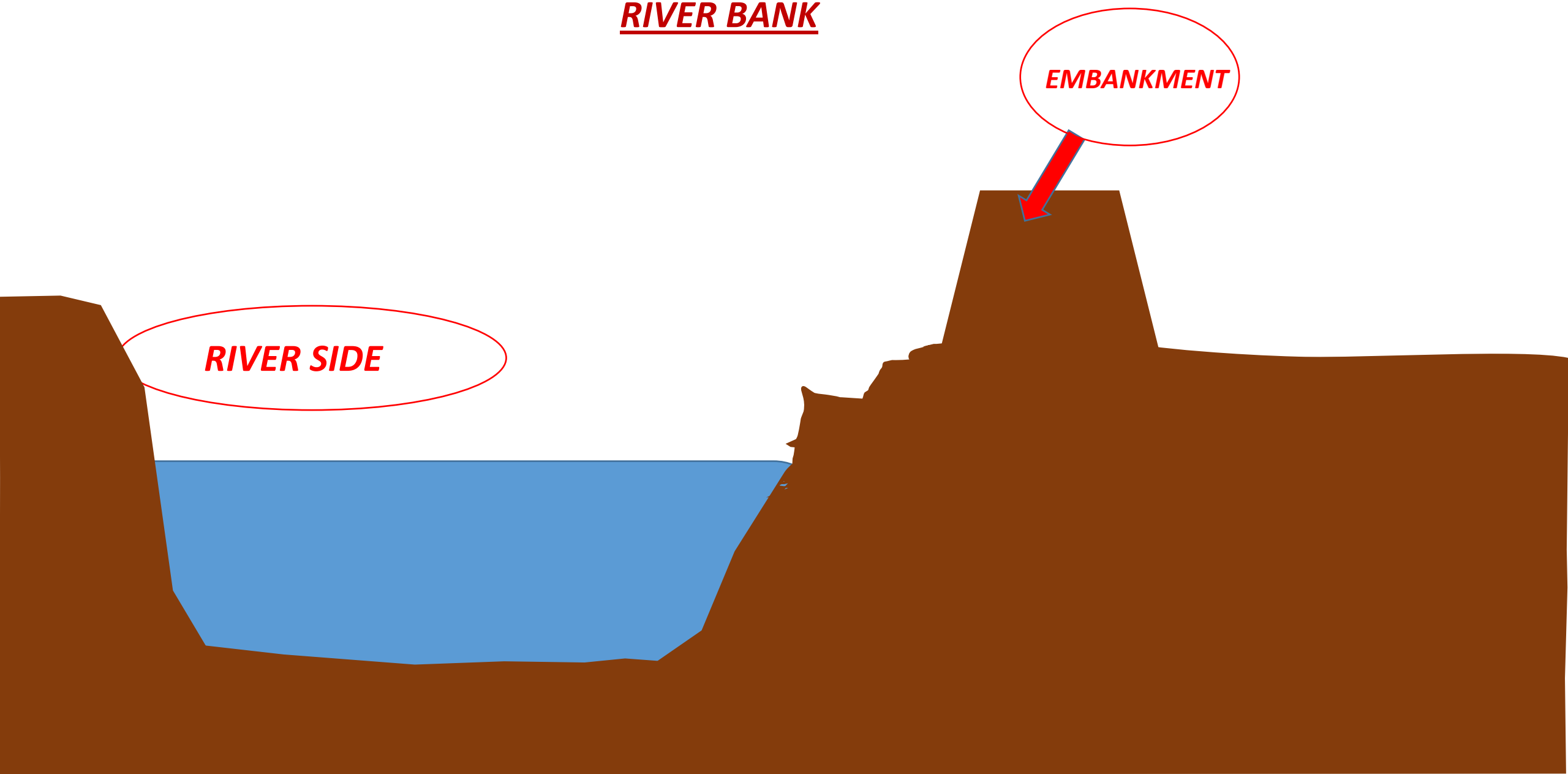
EMBANKMENT FAILURE DUE TO OVERTOPPING



EMBANKMENT FAILURE DUE TO RAIN CUT



EMBANKMENT FAILURE DUE TO PROGRESSIVE EROSION OF THE RIVER BANK



Prevention measures

- Depending on the cause of failure appropriate prevention measures need to be taken for preventing the failure.
- Sometimes failure occurs due to multiple causes.
- A judicious combination of
  - Soft (vegetative) measures,
  - Hard measures (traditional structural measures), and
  - Some innovative practices (geofabric, plastic net, geonet, natural fibers sheet etc.) can be used for controlling failure.
- Performance of preventive measure can be tested by using mathematical model study.

100 days Programme

First 2Days:

- An orientation programme for engineers of all divisions of WRD
- This can be organized by Water Resources Department and *B.P.Chaliha Chair Professor* at IIT Guwahati.

Next 8 days:

- Engineers of Water Resources Department can identify
  - the erosion effected area and
  - potentially week embankments in their respective division/subdivision.
  - In fact, this is almost known to them, they need to put the GPS location, length, site name etc., so that these can be mapped properly.

100 days Programme

Next 30 days

- Cause of bank erosion and cause of embankment failure need to be identified with proper documentation.
- Following are some of the information that need to be collected
  - channel curvature,
  - existence of water bodies on the county side,
  - type of bank material,
  - presence of protection measure, if any,
  - time of failure, i.e, during rising or recession of flood,
- Based on the final data matrix, cause of failure can be established.

100 days Programme

Next 30 days

- Collection of information about actual damage and loss caused by the failure OR the estimated damage due to potential failure.
  - Social analyst also needs to be involved in this phase.
  - Both tangible and intangible losses need to be included and proper quantification of intangible losses can be attempted with proper justification.

Next 20 days

- Visit and verification by peer reviewers (Engineers from different division with public representative) along with public representative, so that any possible mistakes can be avoided.

100 days Programme

Next 10 days

- Two separate data sheets, one for embankment failure and the other for erosion prone area need to be developed.
- Prioritization of the sites to be taken up for project implementation in phase manner.

Next Phase after 100 days

- Actual prevention measures will have to be planned by Water Resources Department immediately after completion of these 100 days, if required, with help of credible academic institution including IIT Guwahati.
- A three years plan can be prepared for implementation with defined intermediate targets to be achieved after every 3 months.
- These targets must be prepared after considering all possible constraints.

Conclusion

- Understanding actual cause of river bank failure or embankment failure is essential for designing remedial measures.
- A 100 DAYS PROGRAM for diagnostic study by Engineers of the Water Resources Department is therefore proposed.
- Two data matrices, one for embankment failure and the other for river bank failure, required for establishing cause of failure is proposed to be generated after 100 days.
- Peer review is proposed to avoid mistakes, if any.
- Prioritization of project area need to be done based on the preliminary cost benefit analysis.
- Effort should be made to quantify intangible losses, with involvement of social scientist, as per requirement.
- Water Resource Department, if required, with support credible technical institutes can do the project design after 100 days
- Project need to be implemented in phase manner as per prioritization.

Let's work for Field Based
Collaborative Project for a Better Future