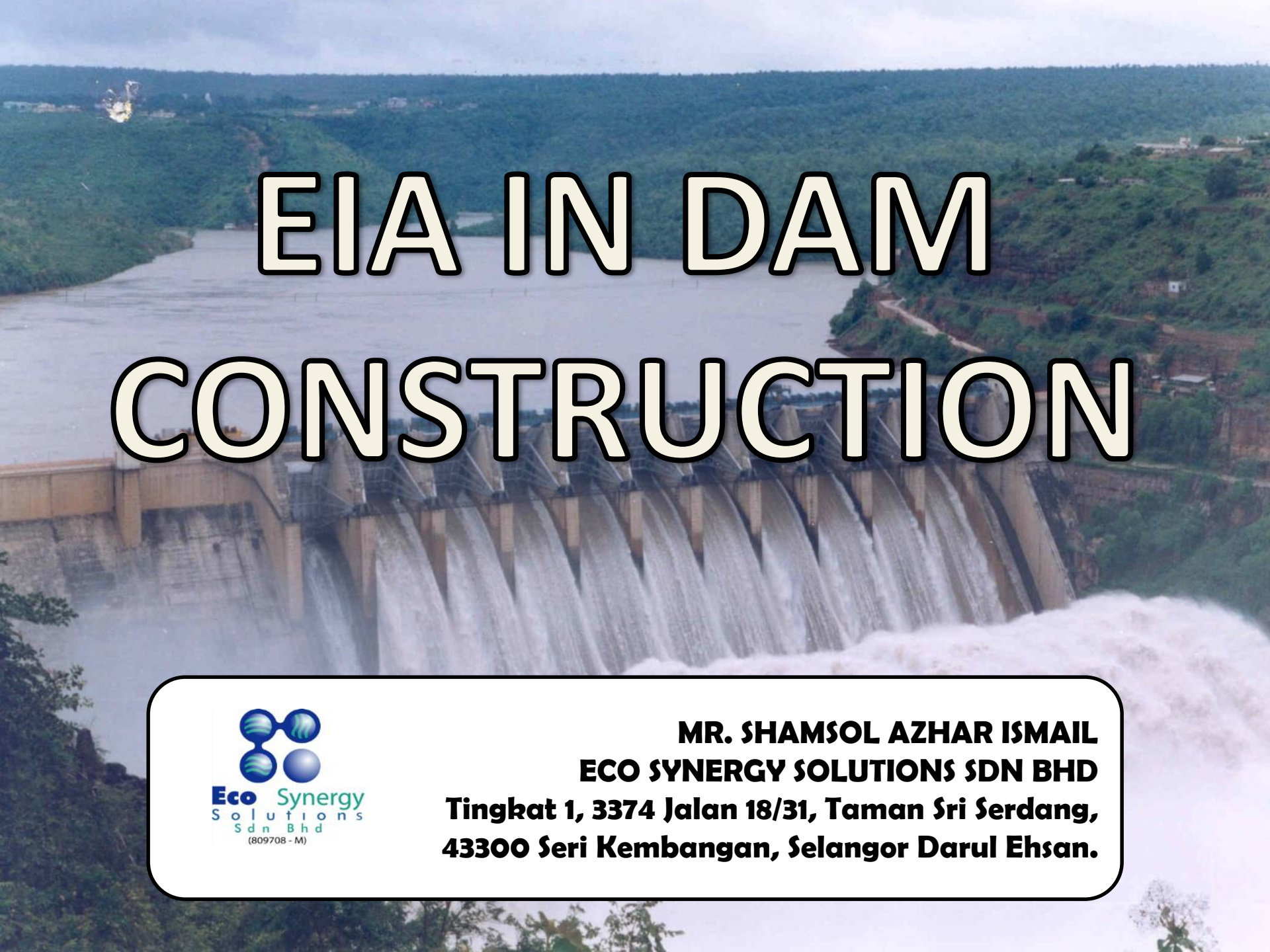
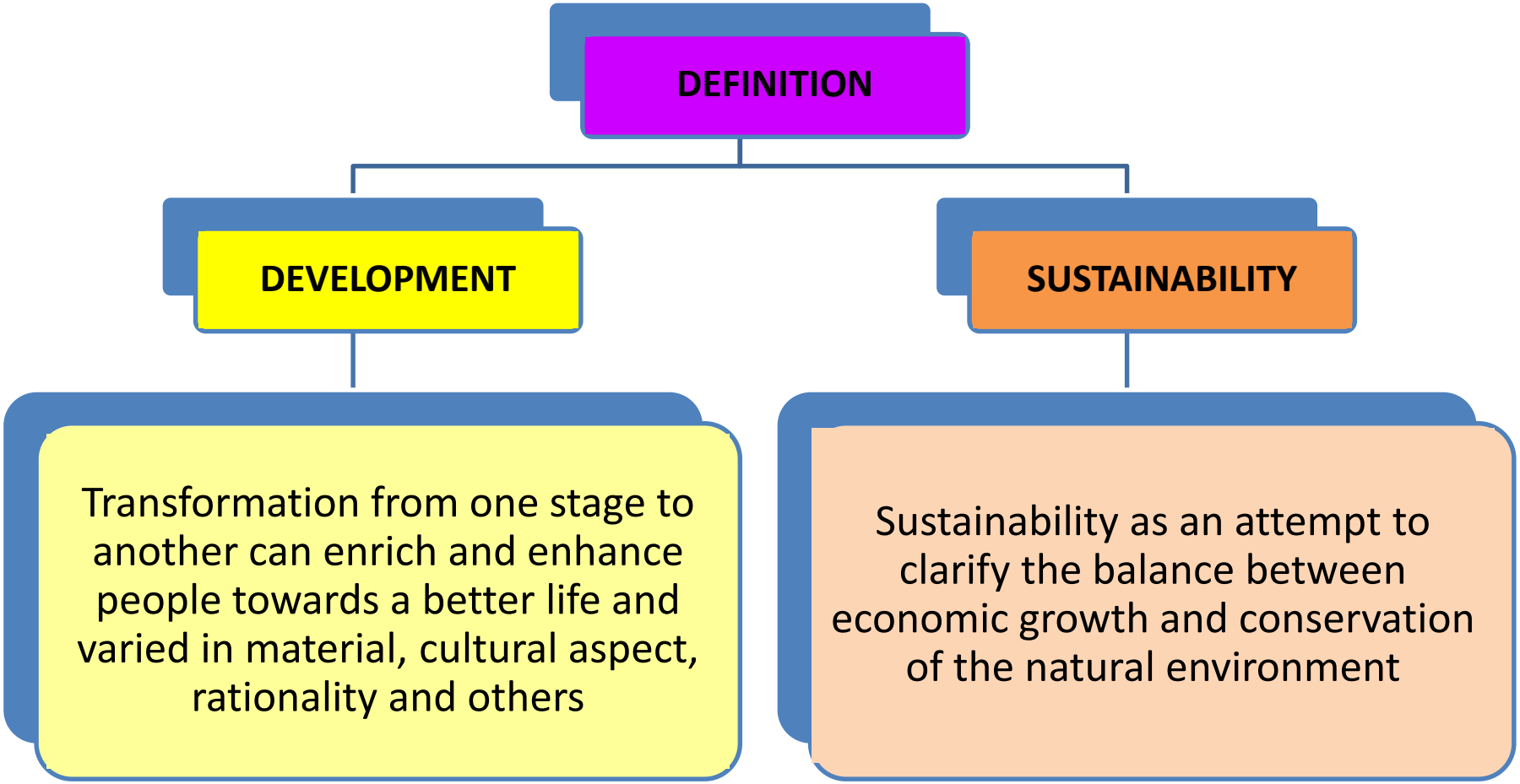


EIA IN DAM CONSTRUCTION

MR. SHAMSOL AZHAR ISMAIL
ECO SYNERGY SOLUTIONS SDN BHD
Tingkat 1, 3374 Jalan 18/31, Taman Sri Serdang,
43300 Seri Kembangan, Selangor Darul Ehsan.

SUSTAINABLE DEVELOPMENT



ENVIRONMENTALLY SENSITIVE AREAS (ESA)

ESA RANK 1

No development, agriculture/logging shall be permitted EXCEPT for

- low-impact nature tourism
- Research
- education

- ❖ All Protected Areas, potential Protected Area, wetlands & turtle landing sites
- ❖ Catchment of existing & proposed dams
- ❖ All areas >1000 m contour.

ESA RANK 2

- No development or agriculture
- Sustainable logging and low-impact nature tourism MAY BE permitted subject to local constraints

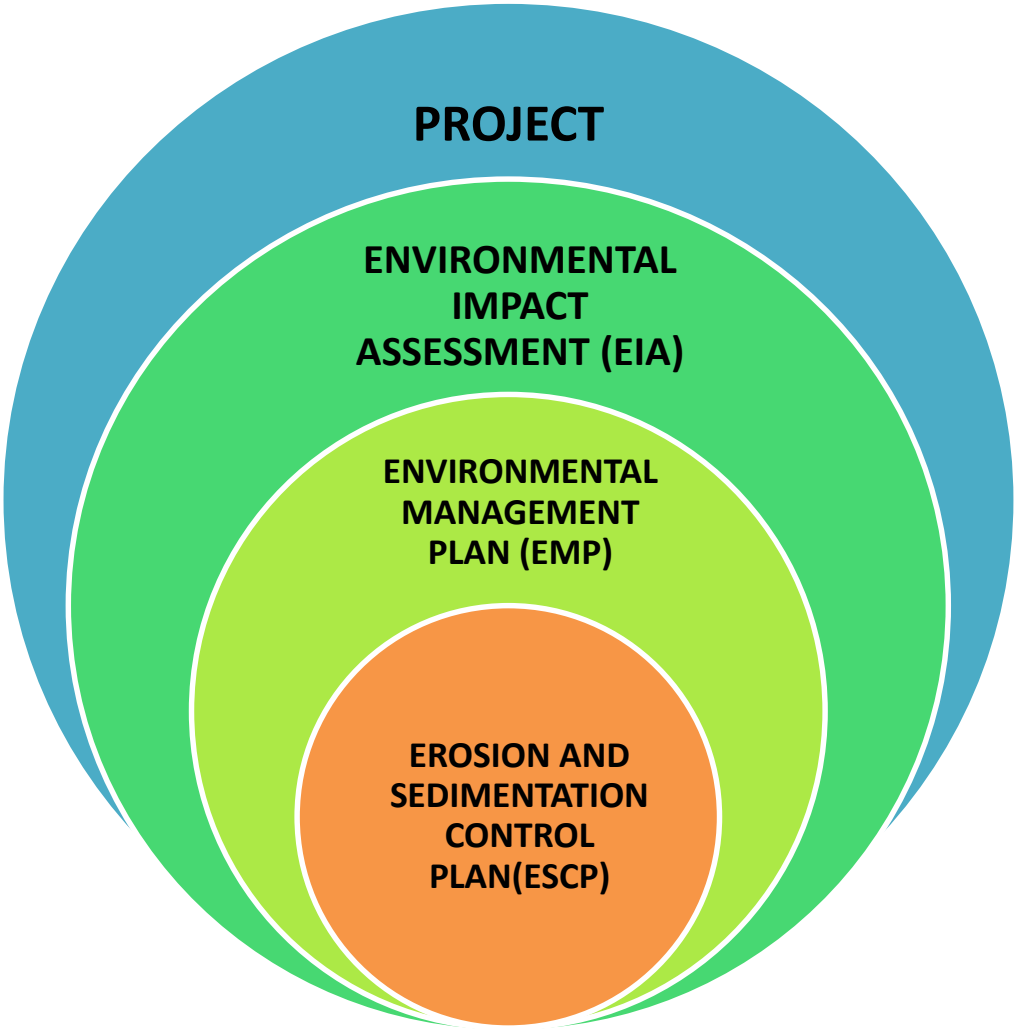
- ❖ All other forests, corridors, corridors linking important Protected Areas, buffer zone around Rank 1 areas
- ❖ All area between 300-100m contour

ESA RANK 3

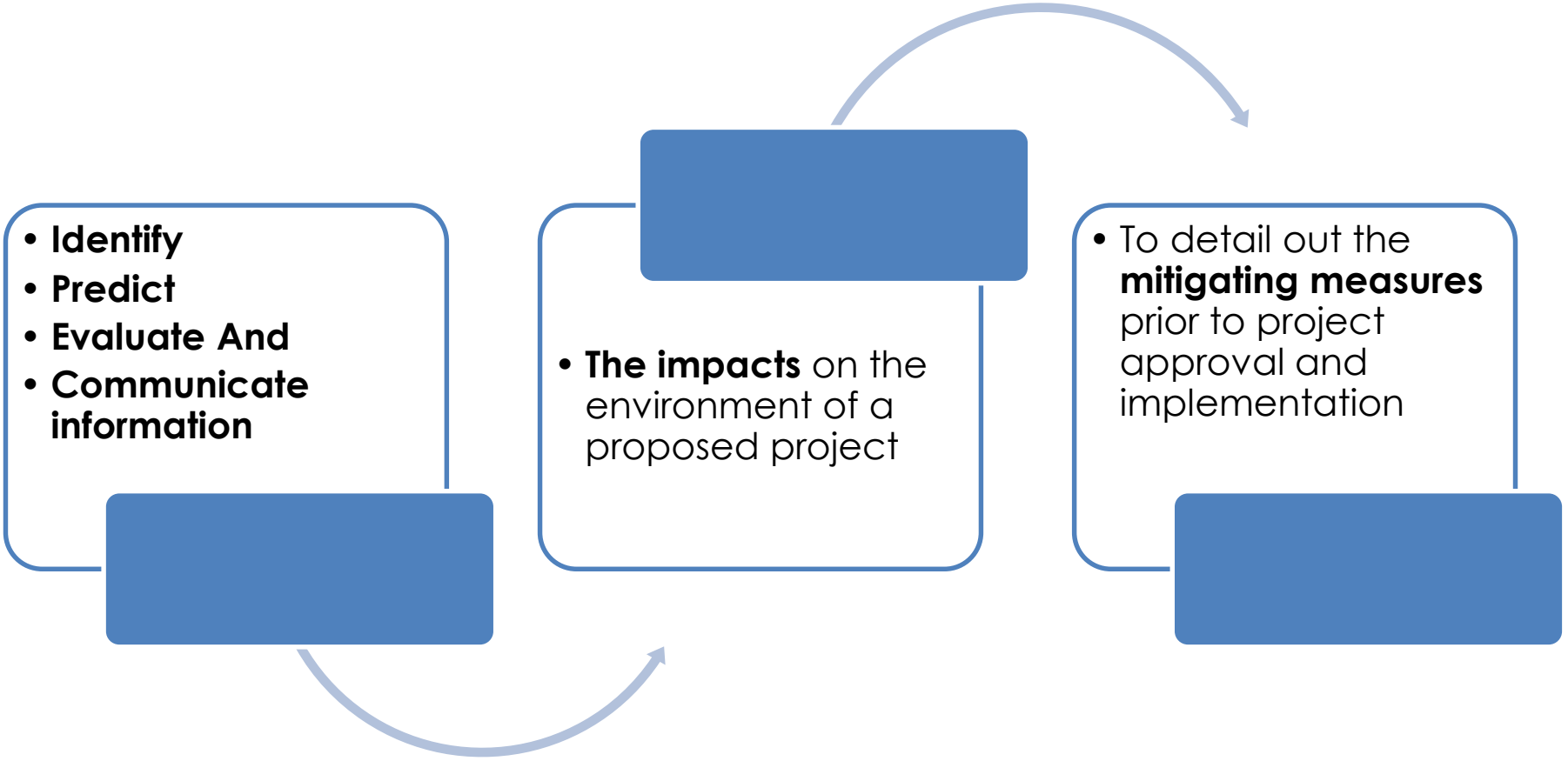
Controlled development where the type and intensity of the development shall be STRICTLY CONTROLLED depending on the nature of the constraints

- ❖ All marine park islands, buffer zone around Rank areas
- ❖ Catchment areas for water intakes, areas for groundwater extraction (well fields), all areas between 150m – 300m
- ❖ All areas with erosion risk >150 ton/ ha/yr, all areas experiencing critical or significant coastal erosion

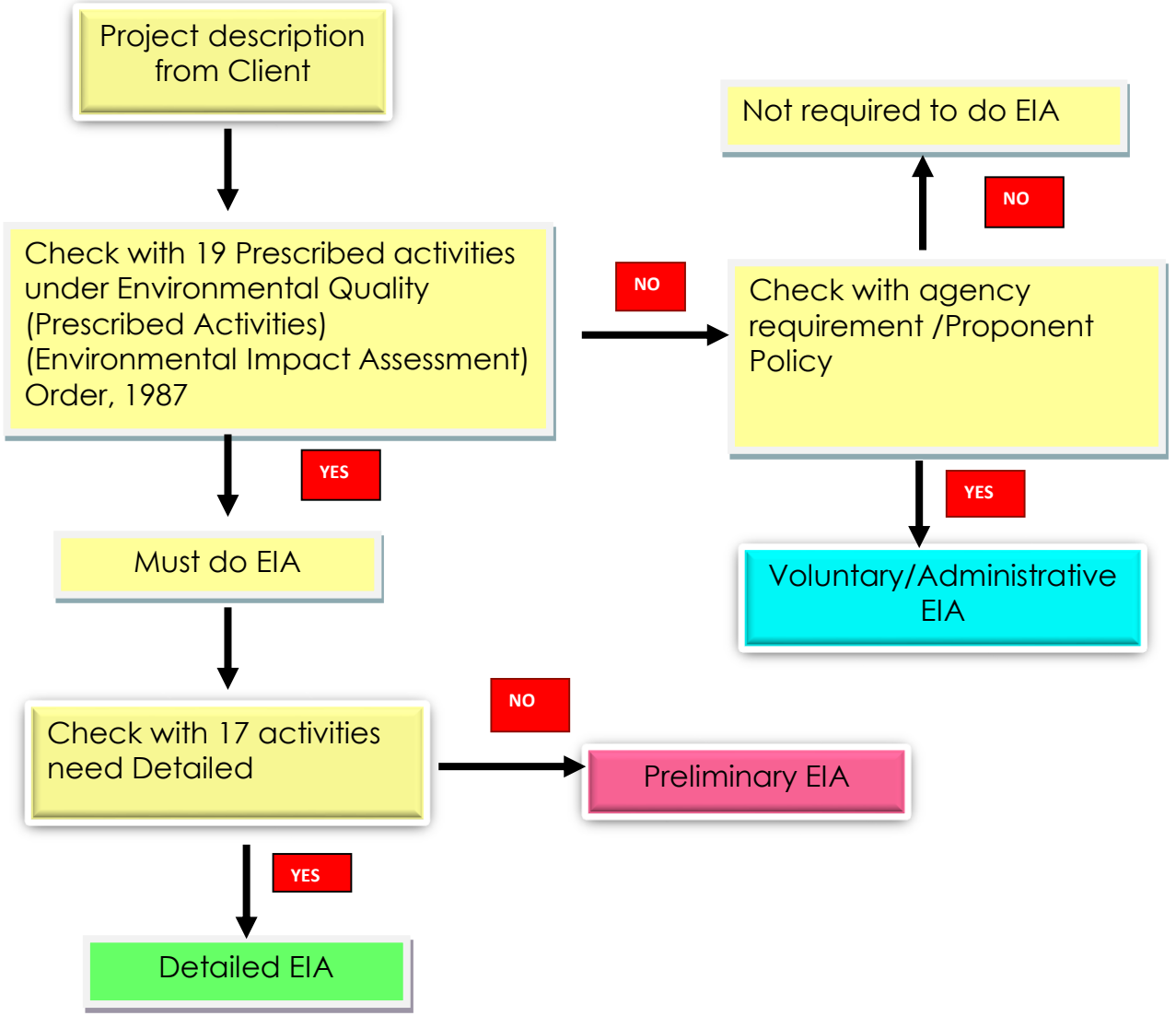
OUTLINE OF THE ENVIRONMENTAL PRACTICES



DEFINITION OF EIA



WORKFLOW TO DETERMINE THE TYPE OF EIA



ENVIRONMENTAL IMPACT ASSESSMENT (EIA) FOR DAM CONSTRUCTION

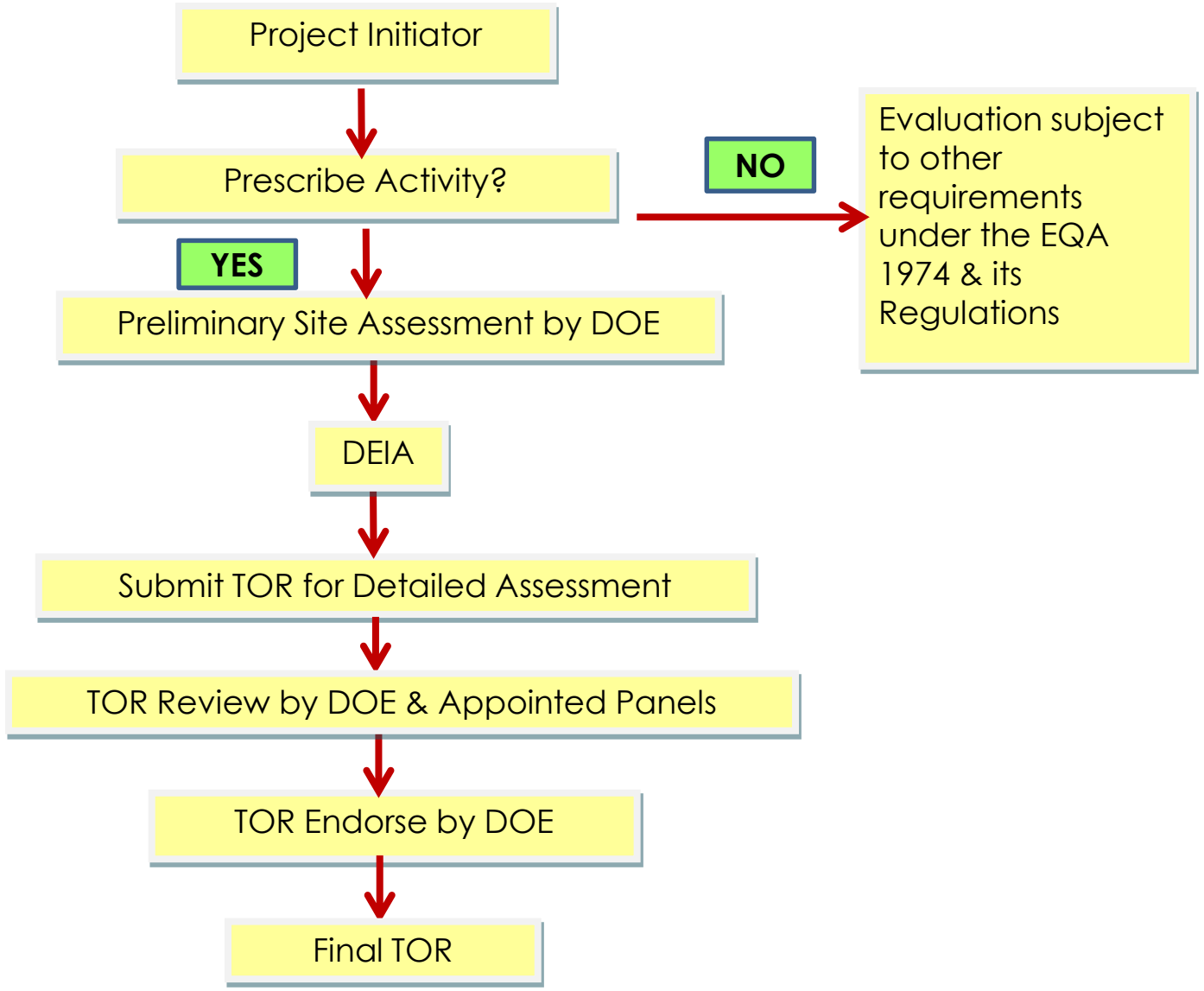
Under section 34A of the Environmental Quality Act, 1974 for activities in the Environmental Quality (Prescribes Activities) (Environmental Impact Assessment) Order, 1987 require the Detailed Environmental Impact Assessment (DEIA).

Legislative Provisions

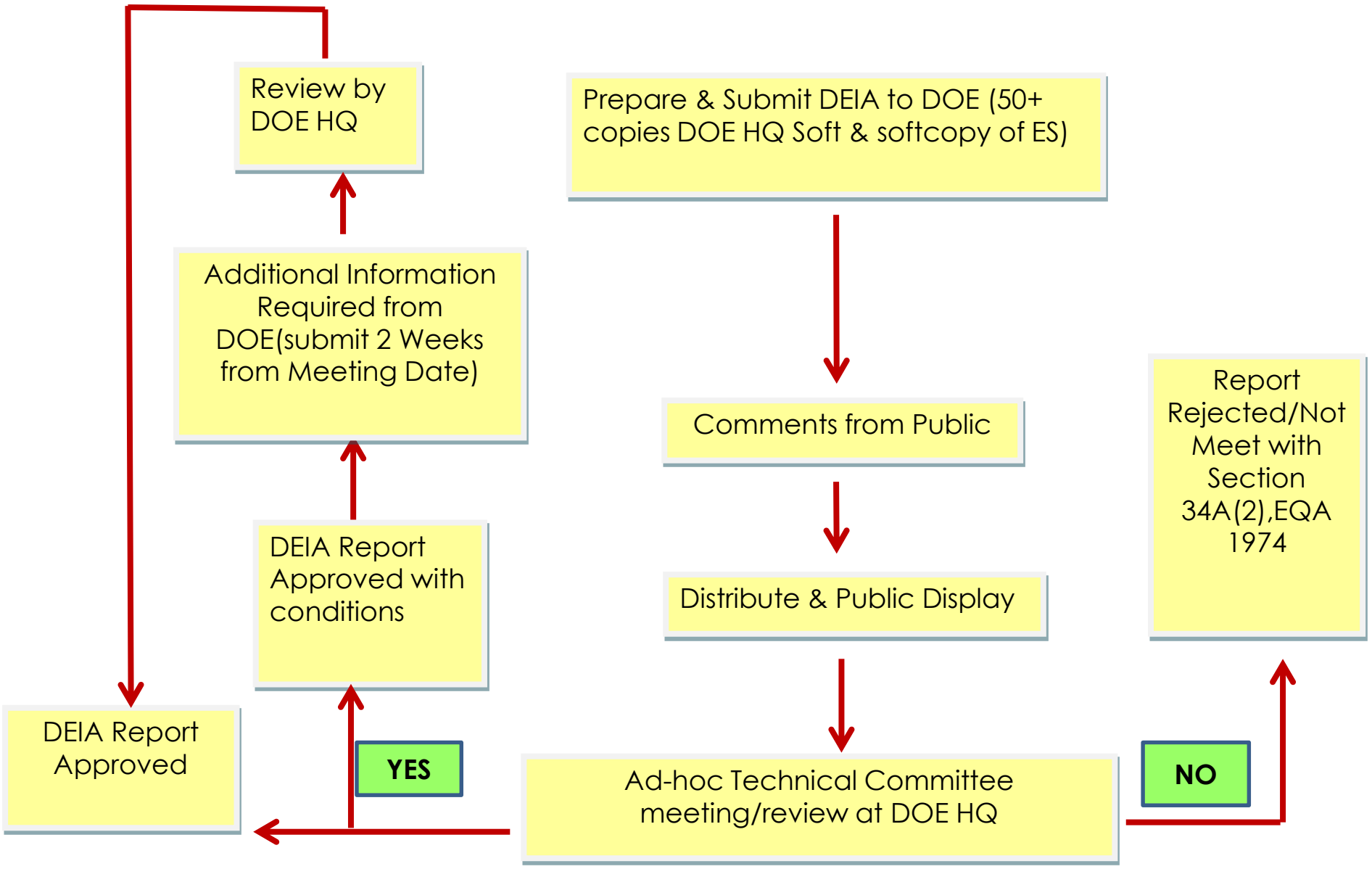
3. DRAINAGE AND IRRIGATION

a) Construction of dams and man-made lakes and artificial enlargement of lakes with surfaces areas of 200 hectares or more.

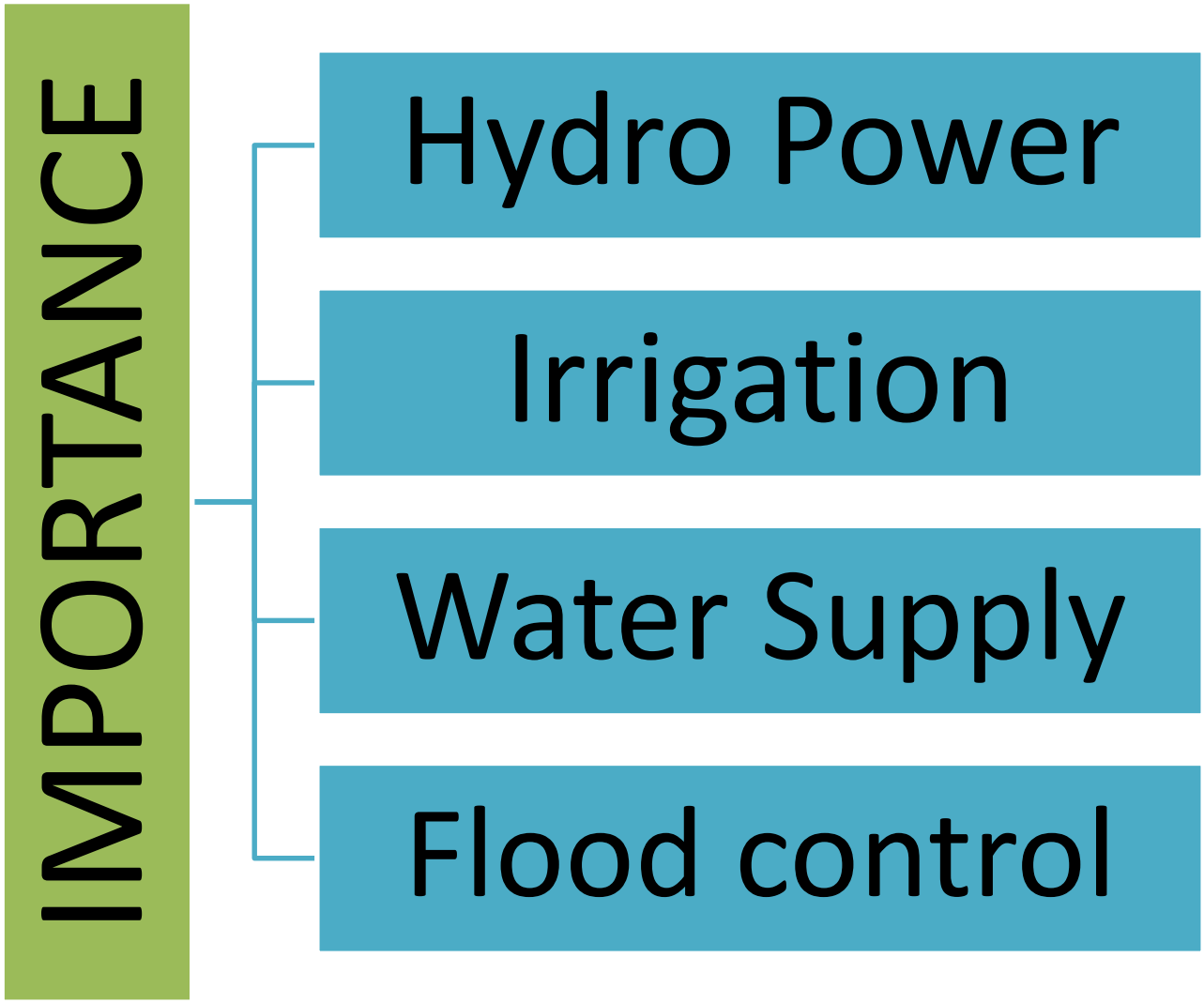
PROCEDURE FOR DEIA



PROCEDURE FOR DEIA

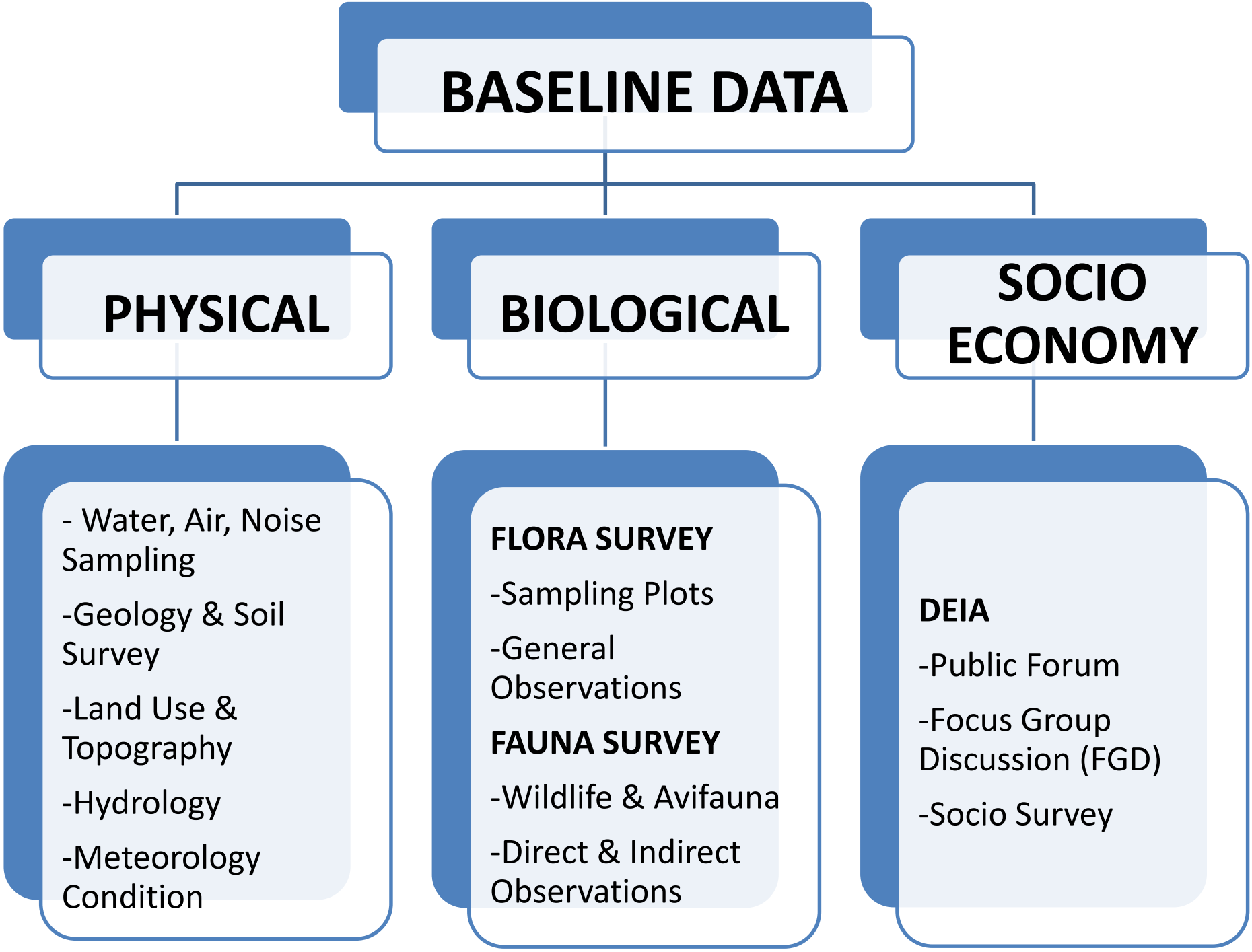


DAM

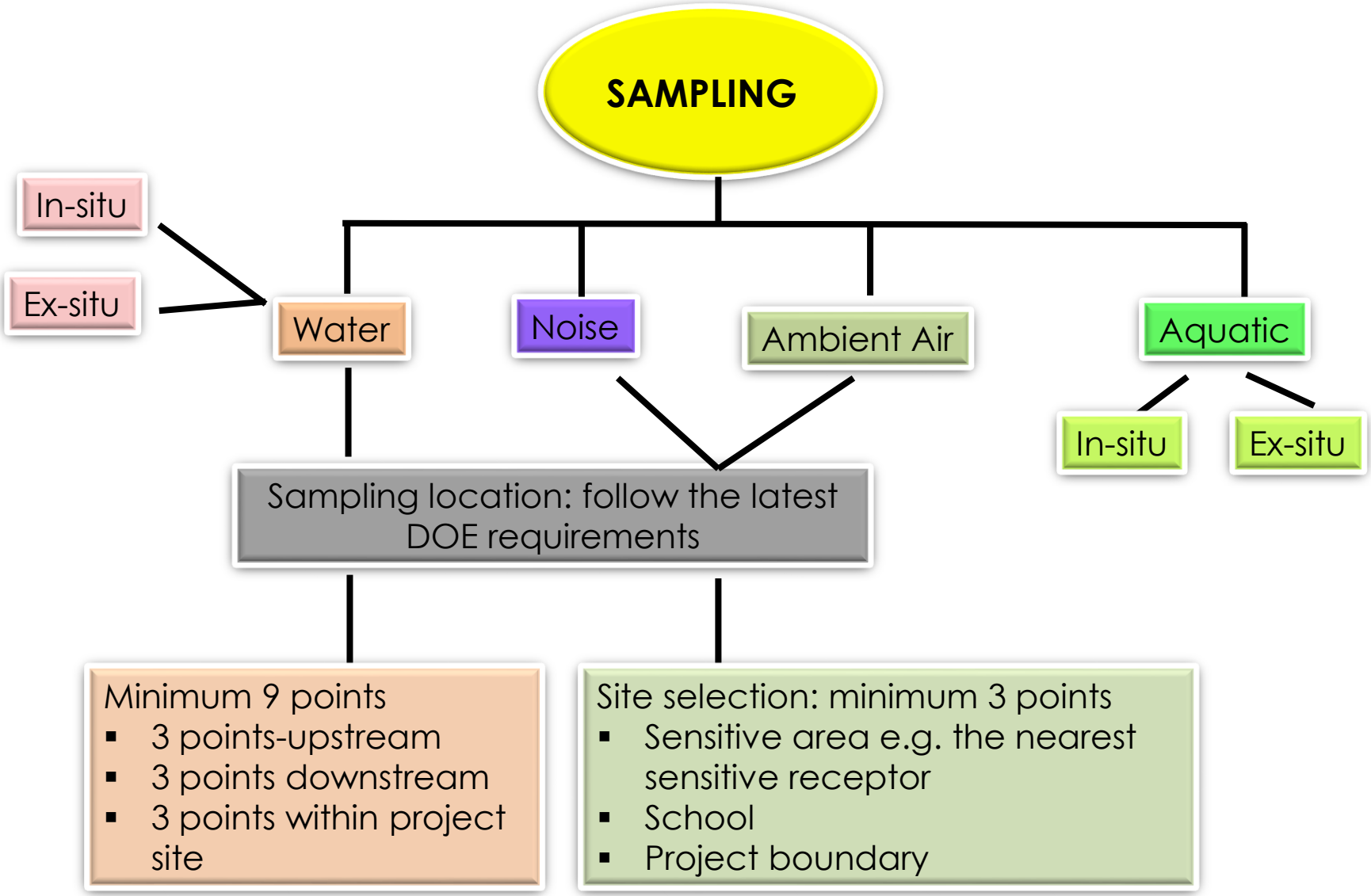

IMPORTANCE
Hydro Power
Irrigation
Water Supply
Flood control

General Approach of the DEIA study for Dam Construction

- **Delineation of the study area into 4 zones** i.e. (1) the dam area, (2) inundated areas, (3) catchment areas, and (4) other areas affected by the project development and and operation (zone of influence).
- A **scoping exercise** for each zone to identify significant environmental aspects related to the project development.
- **Collection of Environmental Baseline Data** to identified as sensitive or critical in the 4 zones.


BASELINE DATA
PHYSICAL
BIOLOGICAL
SOCIO ECONOMY
- Water, Air, Noise Sampling
-Geology & Soil Survey
-Land Use & Topography
-Hydrology
-Meteorology Condition
FLORA SURVEY
-Sampling Plots
-General Observations
FAUNA SURVEY
-Wildlife & Avifauna
-Direct & Indirect Observations
DEIA
-Public Forum
-Focus Group Discussion (FGD)
-Socio Survey

BASELINE DATA- PHYSICAL



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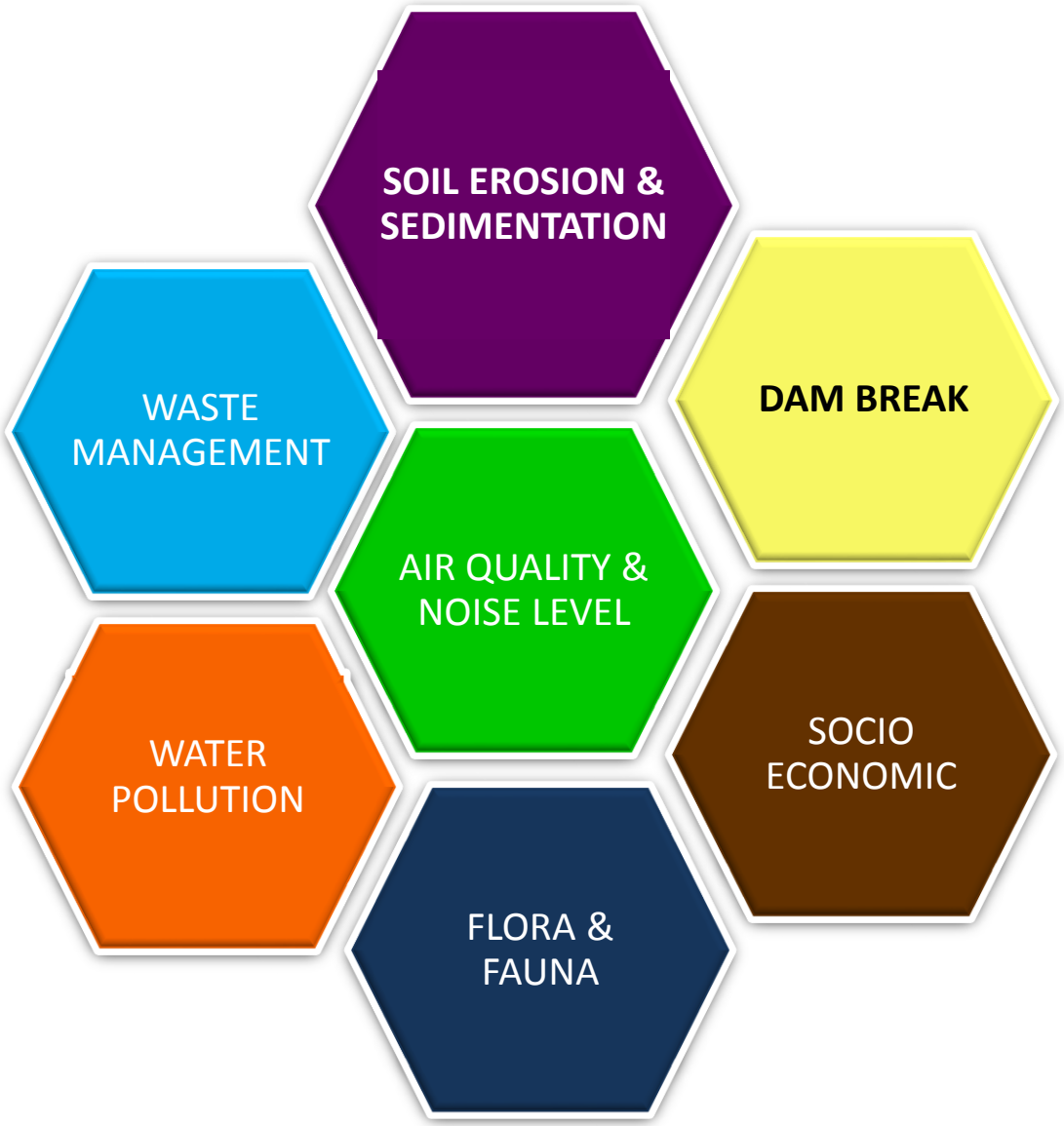
- A **scoping exercise** for each zone to identify significant environmental aspects related to the project development.
- **Collection of Environmental Baseline Data** to identified as sensitive or critical in the 4 zones.
- Analysis of the significant direct and indirect impacts of the project at all stages of project development (pre-construction, construction, post-construction) to formulate abatement and/or mitigation measures. **Residual impacts shall be evaluated and implement the mitigation measures recommended.**
- Special consideration shall be given to the element of dam risk and safety, and resettlement issues in the proposes project site.

ASPECT TO CONSIDER



SOIL EROSION & SEDIMENTATION

POTENTIAL IMPACTS

CONSTRUCTION OF ACCESS ROAD AT PEDA CATCHMENT

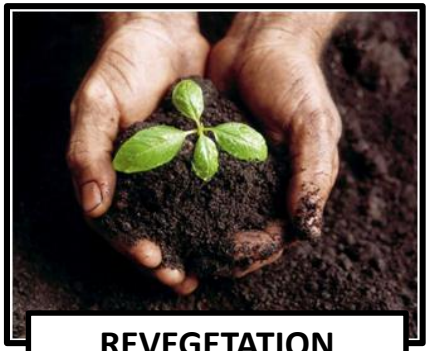
SITE CLEARING & VEGETATION REMOVAL

BORROW AREA AND QUARRY

CONSTRUCTION OF DAM – SOIL EROSION PROBLEM→ DETERIORATION OF RIVER IN TERM OF TSS, TURBIDITY, ETC.

MITIGATION MEASURES

WATER BROWSER



REVEGETATION

GEOTEXTILE COVER

WASH TROUGH

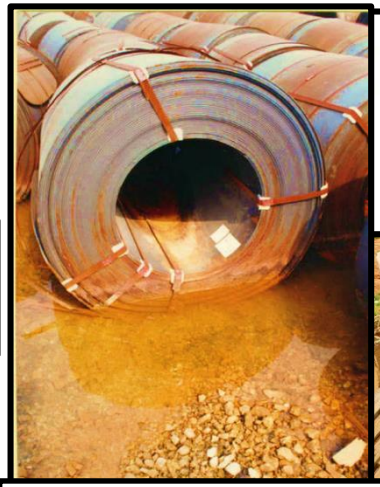
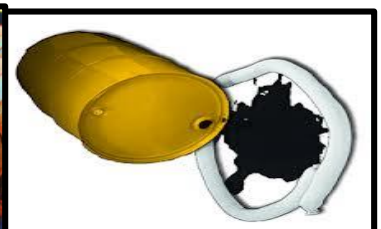
- ✓ **Selective land clearing and stages.**
- ✓ Install **temporary storm water diversion ditches**.
- ✓ **Diversion of river flow through diversion tunnel**

- ✓ **Limit & scheduled the trip of material transported** to the **11 trips/day max.**
- ✓ **Paved or gravel road**.
- ✓ All **borrow area** which are sited the full supply level of the reservoir must be **re-vegetates**

WASTE MANAGEMENT

POTENTIAL IMPACTS


SOLID WASTE - BASE CAMP & SITE OFFICE


LEAKAGE & SPILLAGE OF MATERIAL OF CONSTRUCTION MATERIALS


MITIGATION MEASURES

ZERO BURNING

PROPER CONTAINERS & GARBAGE BINS

SKID TANK

PROPER PACKAGING, LABELING & STORAGE

- ✓ Provide structure to retain material spill and chemical leak.
- ✓ Follow EQ (Scheduled Waste) 2005.

WATER POLLUTION

POTENTIAL IMPACTS

MATERIAL SPILLS

SEWAGE, SULLAGE & SOLID WASTES

DAM CONSTRUCTION – POLLUTION FROM EROSION

MITIGATION MEASURES

- ✓ **No wastewater to be allowed to enter waterways prior treatment.**
- ✓ Area where material is stored should be **layered with impermeable base & bunded.**
- ✓ **Silt traps and sediment ponds → regular inspection & maintenance**
- ✓ **Exposed area** must be **cover with geotextile**
- ✓ **Water quality monitoring programme**
- ✓ **Proper waste management system**
- ✓ **Sanitation facilities**
- ✓ **Riparian vegetation along stream**

AIR & NOISE

POTENTIAL IMPACTS

Dust, exhaust and fumes generated by heavy vehicles

Land clearing, felling & earthworks (piling & rock blasting; chainsaws; boring machines; air compressor & generators; earth moving equipment)

MITIGATION MEASURES

- ✓ All lorries and tractors tyres shall be cleaned before leaving project site.
- ✓ **Regular maintenance** on road, dry area, access road, tires and machineries.
- ✓ No open burning
- ✓ When hauling dry materials, truck beds shall be securely covered to prevent blowing of dust or loss of debris.
- ✓ **Rock blasting activities (if any)- undertakan by trained and licensed personal**
- ✓ **Warning signboard**
- ✓ **Limit operating hours**
- ✓ **Safety goggle and protective hearing devices**

FLORA, FAUNA AND AQUATIC

POTENTIAL IMPACTS

Disturb aquatic life – sedimentation

Wildlife encroachment

Habitat fragmentation and sinking of the total wildlife niche size

MITIGATION MEASURES

- ✓ Adopt **reduce – impact logging practices** (e.g. directional tree felling, established buffer zones and watershed protection areas, etc.)
- ✓ **Sensitive area** (e.g.wetland) should be **avoided**
- ✓ **Well planned for land clearing** – sufficient time for wildlife shifting to the adjacent forest
- ✓ **Translocation of wildlife**
- ✓ **Enforcement patrolling of relevant authorities**
- ✓ **Prevent illegal & improper of waste disposal**
- ✓ **Minimize river siltation**
- ✓ **Maintained river water quality** for substance of biota
- ✓ **Silt trap & sediment retention ponds** to be placed at strategic place.

SOCIO ECONOMIC

Potential Impact

- Property loss
- Land use changed from forest to water catchment
- Influx of foreign workers
- Water supply
- Human- Wildlife conflict

Mitigation Measures

- Controls the activities which cause the sedimentation
- Workers should be given briefing & explanation about the work place & its surrounding areas & well trained
- Monetary compensation
- Workers should know the rules & regulations at the base camp as stated
- Any conflict –reported to PERHILITAN

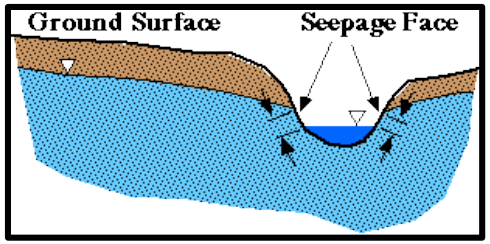
DAM BREAK

POTENTIAL IMPACTS

FLOOD

Cause by

Natural Events –rockslides, piping, seepage, wave action, overtopping



Man-made– bombing, sabotage, demolition of public good, poor construction, faulty design

MITIGATION MEASURES

✓ **The Emergency Response Plan (ERP) has to be developed for this area in the event of any dam failure due to the overtopping**

DAM BREAK ANALYSIS

3 PHASES

1

- To predict the outflow hydrograph due to dam failure
  - depends on the formation of the dam breach

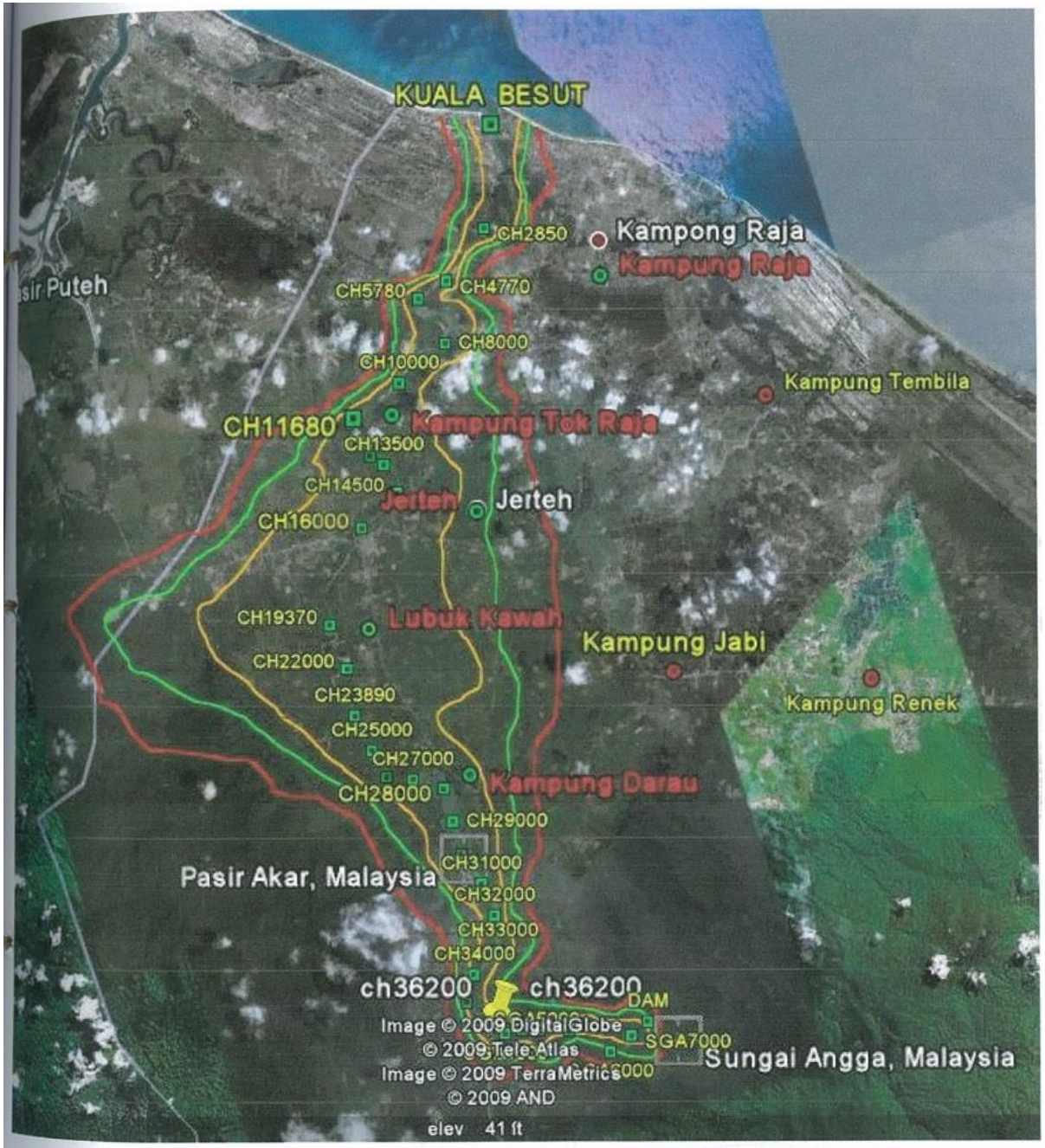
2

- The routing of the resulting outflow hydrograph from the breaching to the downstream area
  - village far from the dam ; effect of breaching small
  - village near the dam ; the prediction of breach parameters (width, depth, initiation time and rate development) important in the analyses

3

- Prediction of damage and loss of life due to the flood

EXAMPLE OF DAM BREAK ANALYSIS (PAYA PEDA DAM)



From the analysis map;

- Prediction of the outflow hydrograph due to dam failure, shown by the **yellow line** is a minimal impact and the impact will dispersed until the **red line** (maximum impact)

- The strength of impacts will depends on many factors i.e;

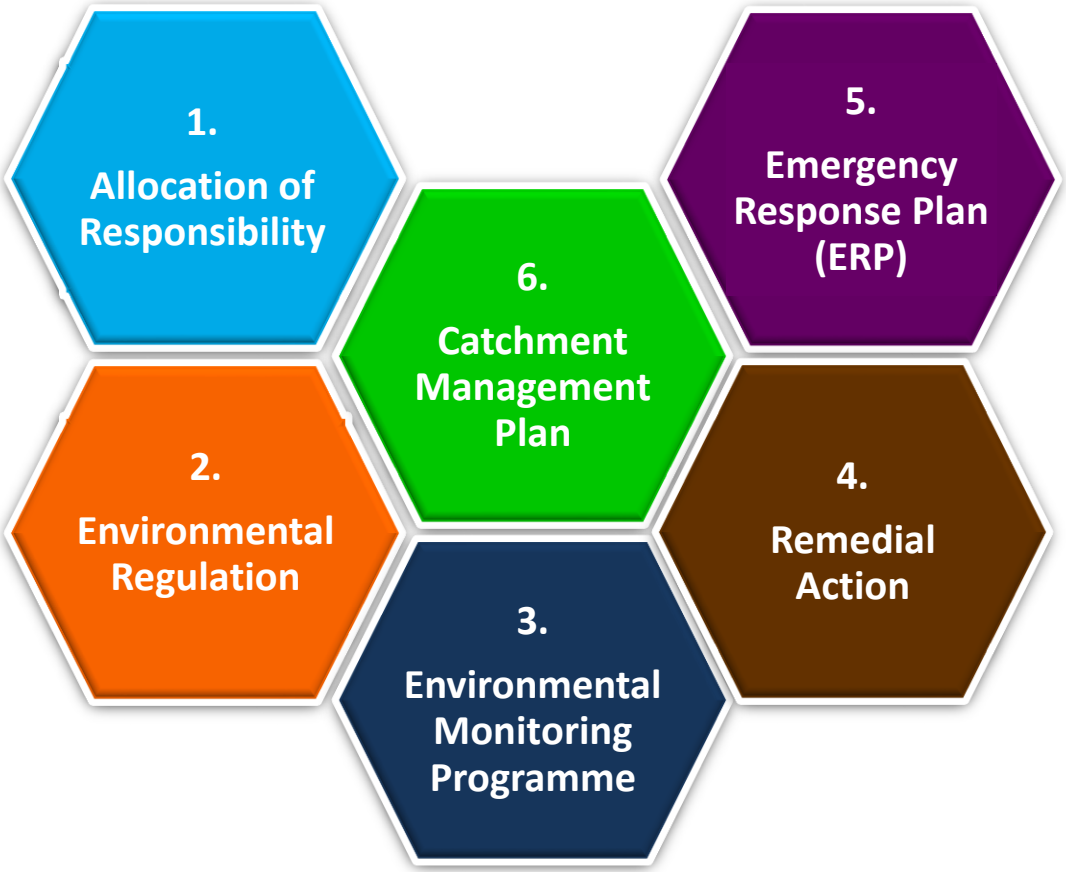
➢ Flowing rate, Q
(increase in Q- dispersion rate also increases or vise versa)

➢ Types of dam break

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

EMP is an effective tool to minimize the environmental impacts that are imposed by the development.

SPECIFIC COMPONENTS OF EMP



ALLOCATION OF RESPONSIBILITY

- Environmental Management Team (EMT);
  - Monitoring
  - Audit
  - Report based on the EMP on all matters pertaining to the environment

ENVIRONMENTAL REGULATION

- Monitoring Scope:
  - Air and water quality
  - Wastewater discharge
  - Noise level
  - Land clearing and earthworks
  - Solid waste management
  - Scheduled waste management

ENVIRONMENTAL MONITORING PROGRAMME	• To ensure all the undertaken project activities is to sustain the environment
REMEDIAL ACTION	• Provides a specific outline of the construction activities in the project specifications

EMERGENCY RESPONSE PLAN (ERP)

- Must be prepared for emergency situation during construction and operation.
- Integrated as a part of the project including general awareness on safety, health and environment.

CATCHMENT MANAGEMENT PLAN (CMP)

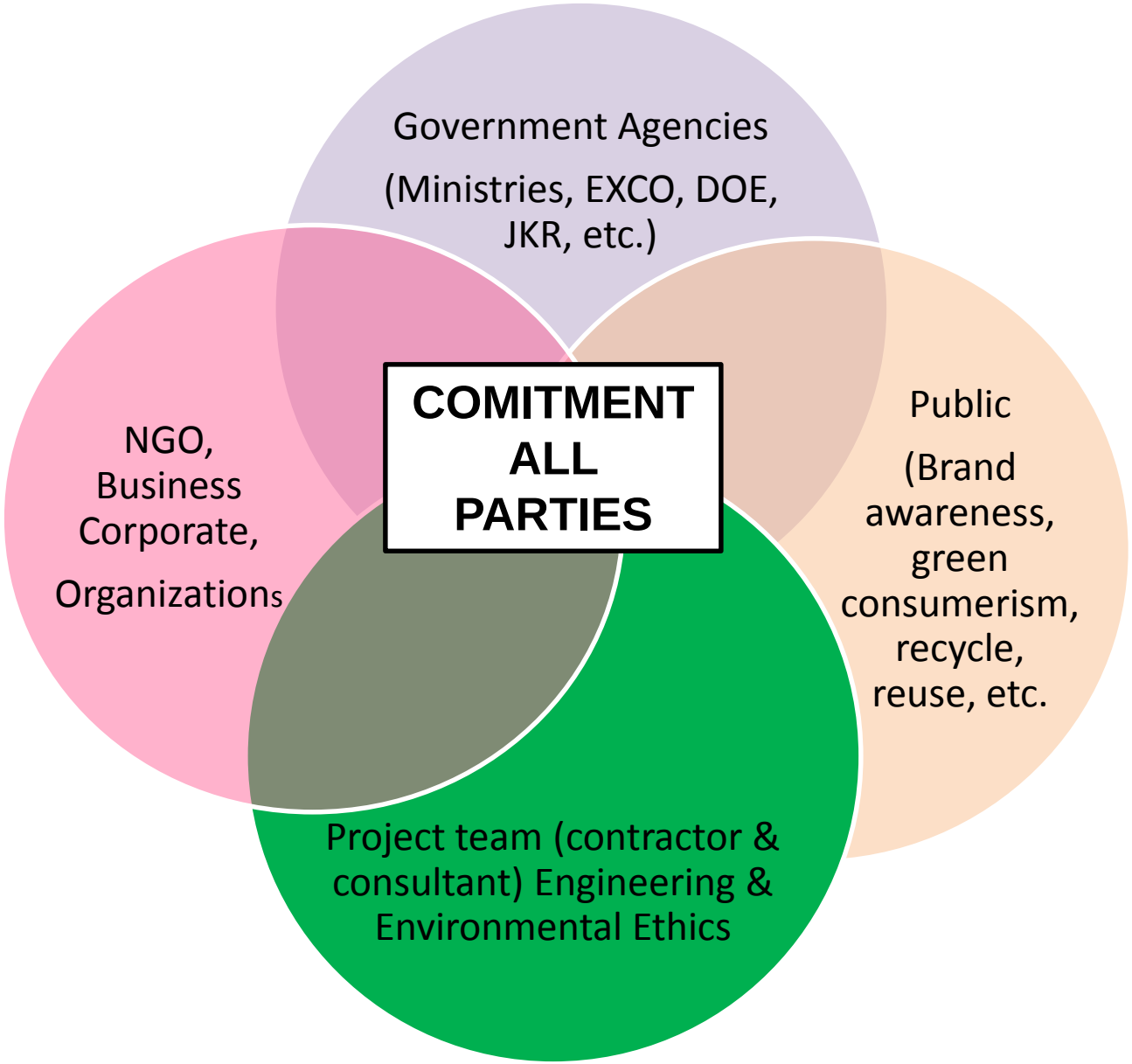
- To secure and maintain a reliable water supply to the dam.
- To ensure that the natural environment if the catchment area of the dam is well managed and protected.

PROJECT ABANDONMENT AND DECOMMISSIONING

- To prevent adverse impacts on the environment such as pollution of waterways, visual impacts, etc.

- Also can be used to mitigate and rehabilitate the area based on the extent of works carried out.

CONCLUSION


Government Agencies
(Ministries, EXCO, DOE, JKR, etc.)
NGO, Business Corporate, Organizations
COMITMENT ALL PARTIES
Public
(Brand awareness, green consumerism, recycle, reuse, etc.
Project team (contractor & consultant) Engineering & Environmental Ethics


THANK
YOU