Term of Reference
Kalisindh Major Multipurpose Irrigation Project Jhalawar

Project Name: - Environment Clearance for the Kalisindh Major Multipurpose Irrigation Project District Jhalawar Rajasthan.

Project Proponent :- Chief Engineer Water Resources Zone, Kota
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Project Category :- As per MOEF Notification New Delhi 14th September, 2006 Schedule 1 (c) ii, Project lies in 'Category –A' as CCA of project ≥ 10,000 Ha of cultural command area

A. THE PROJECT

The project comprises the following:-

- Raising the height of gates of Kalisindh Gravity Dam by 3.25 m so as to increase water storage capacity from 54.37 MCM at EL 316.00 m to 148.11 MCM at EL 319.25 m.
- Rehabilitation & Resettlement of Project Affected persons
- Construction of saddle dam cum Head Outlet sluice for Left Main Canal -1
- Construction of Canal Network viz LMC -1, LMC-2 & RMC including intermediate structures to create irrigation potential in 14250 Ha of CCA in Jhalawar & Kota Districts
- Repair & renovation of existing Harish Chandra Sagar Pickup weir & head regulator
- Construction of Diggi's /intake structure for installation of sprinkler irrigation system
- Development of other infra-structure facilities like canal roads etc.

B. Brief History of Project

In Phase I of the project, Kalisindh Dam was constructed so as to create water storage of 54.37 MCM upto EL 316.00 m for Kalisindh Thermal Power Plants Unit I & II (2X600 =1200 MW). The salient features of the project in Phase I & II is enclosed at end.

Since the Phase I of the project was dedicated entirely for Kalisindh Thermal Power Project, Phase I of Dam project was an integral part of the Kalisindh Thermal Power Project and accordingly environmental clearance of dam part was accorded with the environmental clearance by Reconstituted Expert Appraisal Committee on Environmental Impact Assessment of Thermal Power and Coal Mine Projects during its 26th meeting held on July 10-11, 2008 in SCOPE Complex New Delhi issued vide file no. J- 13011/80/2007-IA.II (T) dated 26 Feb, 2009.

The construction of 955 m long concrete gravity Dam with 33 nos radial gates was started in year 2010 and water was stored during monsoon 2014. The intended benefits from the Phase I of projects are achieved.

C. SCOPE OF WORK

The baseline studies should consists of three season's field data i.e. Pre-monsoon, Monsoon and Winter season covering one year. The broad scope of the work is to carry out Environment Impact Assessment of proposed project. EIA includes identification of positive and adverse impacts with their economic evaluation and prepare Environmental Management Plan (EMP) to mitigate the adverse effects, including the socio-economic aspects and R&R Plan for project affected people. EIA

shall also include dam break analysis and prepare Disaster Management Plan. The scope also includes preparation of monitoring plan for implementation of EMP.

D. STUDY AREA

The study area for the project can be considered as:

- 1 km either side of the canal network
- 10 km radius around the Dam area
- Adjoining Mukundra National Wildlife Park
- Submergence and catchment area for the reservoirs,

E. PLANNING AND DEVELOPMENT OF DATA BASE

- Consequent upon the collection of environmental and socioeconomic data, desk studies shall be carried out so as to undertake preliminary planning and development of a comprehensive database. The data base shall be in such a format that can be used in web based GIS portal also.
- The database shall be generated with provisions of data inputs from multiple sources and shall be capable of generating outputs in the form of tables, graphs, reports & data files. The output files shall be used in conjunction with software, spreadsheets, word processors and statistical software.

F. ENVIRONMENTAL IMPACT ASSESSMENT

The Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) report shall be prepared considering all the relevant notifications issued by Ministry of Environment and Forests (MoEF) or any other competent authority (viz. EIA notification, 2006 and subsequent notifications/amendments issued from time to time) and in accordance to all the relevant guidelines issued by MoEF or any other competent authority.

The studies shall be carried out for reservoir including its appurtenant works considering the impact on the entire connected environment.

As outlined in the notification cited above, Public hearing shall be carried out as per the requirements of the fulfillment of EIA notification as a part of consultation with civil society.

Details pertaining to the Environmental and Ecological Aspects are furnished below:

The sequence of steps to be followed for consideration and assessment of Environmental and ecological aspects shall be as follows:

- Assessment of alternate sites and justification for selecting the present site
- Study no project option & alternative options
- Legal status of the proposed project site with respect to various applicable Environmental Legislations
- Baseline Environmental Data
- Environmental Impact Assessment
- Environmental Management Plan

G. LEGAL STATUS OF THE PROJECT SITE

The legal aspects of the project with respect to various environmental legislation/ guidelines shall be discussed. This will include the status of the project with reference to various environmental acts like Forest Act, 1980, National Forest Policy, 1998, Environment (Protection) Act, 1986, Wildlife

Protection Act etc. Subsequent revisions and amendments, if any in all these acts should also be considered.

The legal aspects of diversions of designated land use categories to other like National Park or loss of endangered species should be covered. Consideration should also be given to the requirement of prior approval of the Central Government under the Forest (Conservation) Act, 1980 and the Supreme Court in the designated areas.

H. BASELINE ENIVIRONMENTAL DATA

Baseline Environmental Status of the project shall be established based on the baseline survey carried out for various relevant seasons (either fresh or based on available literature/authenticated documents supplemented by field monitoring) in accordance to the MoE&F requirements for all the following elements. The field monitoring span for EIA should be over a period of one year to cover the entire annual cycle accommodating seasonal variations on various parameters.

- Air Environment
- Socioeconomic Environment including public health, Demography etc.
- Water Environment
- Biological Environment (Aquatic and Terrestrial Ecology)
- Land Environment

i. Air Environment

Description of climatological conditions of the site with respect to wind speed & direction, temperature, atmospheric pressure, humidity, solar radiation and rainfall based on secondary data collected from nearest IMD station(s) as well as meteorological observations taken during field studies. Monthly and Annual averages of Pressure, Relative humidity, Solar radiation, Temperature and Rainfall should be presented. Seasonal and Annual wind rose should be prepared (3 seasons). In addition, weather phenomena like hail, thunder storms, fog/smog and cloud cover should be noted in terms of their intensity and duration.

- Ambient Air Quality near dams, power houses, canals, weirs/barrages & townships
- SO_2
- NOx
- PM2.5,PM10
- Methane
- CO_2
- Noise

ii. Water Environment

This will cover all the aspects of surface as well as ground water. This shall include but not limited to:

- Hydro-geological aspect (siltation)
- Surface Water Quality and flow including nutrient levels
- Ground water quality
- Hydrological cycle
- Ground water regime (ground water table, aquifers)
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iii. Land Environment

Land use and land cover (e.g. Forest, agriculture, wasteland etc.) Using high resolution satellite imagery

- Mineral resources
- Water use
- Water logging

iv Biological Environment

- Forest cover
- Rare and endangered species
- Species which require management
- Species of economic significance
- Species of special interest to local population or tourists
- Aquatic fauna of commercial/recreational value and migratory fish species along with their spawning ground
- Habitat including breeding ground and access corridor for food and shelter
- Biodiversity

v. Socioeconomic Environment

- Archaeological Locations and places of worship
- Sources of water pollution (present as well as future)
- Dependence on water system
- Tourism
- Public Health
- Human settlements (occupational pattern, demographic profile, economic profile, agricultural practices etc.)

vi. Status of conditions laid for Environmental Clearance in Phase I of project

Vii Status of conditions laid in forest clearance in Phase I of project

I. ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

Environmental Impact Assessment (EIA) shall be carried out for construction and operation phases using qualitative or quantitative methods (wherever possible) and using predictive modeling techniques. EIA should have proper reference for all the facts and figures. In case of Primary data, precise information regarding time, data, place etc. of the observations should be given.

The EIA study shall cover all the relevant environmental issues that have impact due to the proposed project including the following:

- Air Environment
- Water Environment
- Land Environment
- Biological Environment (Aquatic & Terrestrial)
- Socioeconomic Environment

i. Air Environment

- Impact on air quality due to construction
- Changes in microclimate
- SO_2
- NOx
- PM2.5,PM10
- Impact on ambient Noise level specially during construction period
- Methane
- C O_2

ii. Water Environment

- Likely change in the regime of the river including down-stream of dam
- Impact due to change in hydrological cycle
- Present and future ground water and surface water use in the upstream and the impact on the water availability of the project
- Impact on siltation preferably using quantitative techniques and its removal

- Impact due to spread of contamination due to agro-chemicals and organic/heavy metals
- Impact due to transportation of fluorides, Nitrates, toxic chemicals, heavy metals
- Impact due to acidification of lakes and water bodies due to presence of soils with rich minerals
- Impact on water quality (surface/ground) including down-stream riverine area
- Impact on ground water levels and recharge potential.
- Impact on human health, diseases.
- Impact on ground water pollution due to seepage from canal system and reservoir (ground water level and quality)
- Impact due to change in waste assimilation capacity of the river system including down-stream of dam
- Impact on water quality due to influx of labour
- Impact on drainage system upstream near reservoir submergence area*
- Impact on drainage system downstream due to canal system*
- Impact on existing water bodies downstream as well as upstream in the project area*
  * (*Assessment by using GIS tools and satellite imageries.)*
- Back water effect for one in 100 year flood including tributaries
- Impact due to sudden releases downstream from the dam into the river and in link canal.
- Impact on the performance of existing projects.
- Impact of water releases from the project downstream the river (pre, during and post monsoon) and in the recipient basin.

iii. Land Environment

Impact on land use/land cover and change in designated land-use in the project area i.e. submergence area due to construction of proposed dams, weirs, power houses, roads, colonies, transmission lines etc., areas one Km either side of proposed link canal and areas under proposed command. The assessment can be done using the GIS tools and satellite imageries of the area However, it will have to be confirmed by ground truthing.

- Impact due to irrigation induced salinity and water logging
- Impact due to inundation of mineral resources
- Impact on soil erosion
- Impact of mining for construction materials
- Impact due to dumping of muck generated from foundation excavation, tunnels etc.

iv. Biological Environment

Terrestrial environment

- Impact on forest area and National park and wildlife sanctuaries and other sensitive ecosystem.
- Impact on biota and biodiversity loss particularly with special reference to the rare and threatened species, endemic species of both animals and plants.
- Impact on habitat loss particularly with special reference to the rare and threatened species, endemic species of both animals and plants.
- Impact due to habitat change having effect like corridor loss and loss of migratory path for wildlife including birds.
- Impacts on the breeding grounds of species and on access of animals to food and shelter.
- Impact on animal distribution
- Impact of loss of species.
- Impact due to loss of ecosystem services being offered by the area.

Aquatic environment

- Impact on flora and fauna in the connecting basins as well as along the link.
- Impact on aquatic ecology including fisheries and endangered species
- Impact on sensitive ecosystem
- Impact due to bio-accumulation and bio-magnification in aquatic life and biota
- Impact due to change in ecological functioning of river system
- Impact on growth of aquatic weed
- Impacts on fish spawning and migration including impact on their breeding ground.
- Impacts on fish breeding habitats.
- River both at head as well as mouth regions would be considered while addressing the issues on wildlife and breeding places.

v. Socioeconomic Environment

- Impact of loss of common property resources (river, forest, land etc.) on livelihood
- Impact on public health due to vector borne diseases, dam diseases.
- Impact on sensitive locations like archeological sites and places of worship etc.
- Impact on change in occupational pattern
- Impact on tourism
- Impact on human settlement
- Impact on flood moderation & drought mitigation
- Impact of influx of labour

vi. Geological and Other Aspects

- Geology, Physiography and Topography of the area
- Bedrock formation
- Geological stability or instability
- Fault zones
- Seismicity

vii Impacts due to project Location

(a) Resettlement and Rehabilitation of Displaced Families - This issue will be addressed based on a thorough socio- economic survey of families displaced from the submerged areas and the area occupied by project components.

(b) Forests and forest Land - An assessment will be made of the loss of forest and forest land due to the project and it will be specified by the type of forest (plantation, village forests, natural forest ,etc., present conservation status, productivity and standing timber volume (forest clearance report may be referred to),

- assessment of loss of non-wood forest produce in the reservoir area, i.e., thatch, grazing fields, tree, fodder, etc., and
- assessment of the effects of these losses on (a) forest department operation and (b) on local communities.

(c) Nature Reserves

It should include assessment of the following in project area (upstream and downstream) area to be submerged

- effects of the project on national parks, sanctuaries etc.
- reserves, sanctuaries and other protected areas within the project area;
- impact on rare or endangered species of flora and fauna within and outside the project area; impact on economically important plants such as medicinal plants, orchids, lichens and other NTFPs
- impediments to wildlife movement, and
- Positive and negative effects on the aquatic life.

(d) Historical and Cultural Monuments

- An inventory should be made of historical and cultural monuments of regional, national and international importance which will be lost or affected by project activities and impoundment of water.

(e) Grazing Lands

- an inventory of community and other grazing land which will be lost or affected by project activities and impoundment of water;
- an assessment of possible conflicts in land use and effect on animal husbandry operations,
- an assessment of impacts on livestock movements.

(f) Water Resources Outside the Project Area include::

- assessment of potential conflicts amongst water/users downstream of the project area;
- assessment of risk of water logging and flooding out side the project area, and
- assessment of impact of changes in ground and surface water quality outside the project area (both upstream and downstream).

(g) Water Resources Inside the Project Area :

- assessment of effect of changes in hydrological balance;
- expected changes in water quality in the project area as a result of upstream water-regulatory works (i.e. reduced flow, temperature, dissolved salts, sediment load etc.);
- assessment of effects of planned activities on run-off and sediment load of the river.

(h) Erosion and siltation

- an analysis of present sediment load of water entering the project area and the risk of siltation of canals and the reservoirs, and
- an assessment of erodibility, slope stability and scouring risk of the main soil types in the project area. (A slope map indicating erosion prone areas should be prepared). [see f above]

(viii) Impacts due to Project Design

(a) Hydrological Balance

- the effect of changes in the hydrological balance caused by the construction of the dam, reservoirs and canals;
- evaporation losses from reservoirs;
- expected rise in groundwater table, and
- impact on aquatic ecosystems including fish; aquatic birdlife, spawning areas and seasonal migration.

(b) Drainage

- the risk of water logging/flooding;
- siltation, eutrophication, salinization & alkalinization risks, and

- Adequacy of proposed drainage network.

(c) Dam, Canals and structures

- Assessment of adequacy of planned provision to prevent excessive aquatic weed growth, erosion and seepage, and design of culverts, intakes and protective structures to prevent bank scouring.

(d) Passage-way review whether suitable and sufficient crossings for people, livestock and wildlife are included in the project design.

(ix) Impacts Due to Construction Works

(a) Soil Erosion

Runoff during rains from excavated areas, quarry sites, dam faces etc. can result in soil erosion. Adequate provisions for re-vegetation, dressing, resurfacing of burrow pits etc. should be ascertained.

(b) Construction Spoils

- Adequacy of provisions for dumping of construction spoils, waste materials etc. should be reviewed.

(c) Public Health

- Improvement in availability of water for various uses;
- The adequacy of sanitation in workers' camps, and
- The vectors that may transmit diseases from local carriers to immigrant labour and staff and vice- versa.

(x) Impacts Due to project Operation

(a) Residues of Agro-Chemicals

- an estimate of expected increase in the use of pesticides and fertilizers (type, dosage, application technique);
- an assessment of adequacy of provisions made in ! the project for ensuring proper and safe use of fertilizers and pesticides;
- an assessment of the effects of runoff and "'I drainage of residual fertilizers and pesticides on the water quality of the receiving body and on aquatic communities downstream, and
- a summary of GOI regulations on the use of agro- chemicals in relation to environmental protection.

(b) Impact on Soils

- improvement of fertility and increase in agricultural production;
- the risk of waterlogging (maps with site indication), based on soil survey data;
- of salinization and alkalization risks based on water quality data and soil characteristics;
- the expected modifications in soil structure and texture, and
- expected soil losses from runoff due to project operation.

(c) Ground Water

Areas where changes in groundwater level can be expected should be indicated. Both positive and negative effects should be described. An assessment of possible changes in ground water quality as a result of percolation of toxic residues of agro-chemicals and its effects inside and outside the project area should be carried out.

(d) Changes in Surface Water Quality and Eutrophication

- an assessment of the risk of surface water pollution by residues from agro-chemical, future trends and its effect on fisheries and aquatic ecosystem i.e. assessing biochemical oxygen demand, toxicity, and dissolved oxygen;
- an assessment of the risk of eutrophication of reservoir water by sediment, nutrient leaching and fertilizer residues, and consequently, the risk of invasion of noxious aquatic weeds, such as water hyacinth;
- an assessment of the adequacy of provisions for clearing of canals and reservoirs in the operation and maintenance programme and its cost estimates, and
- suggested methods that are environmentally acceptable for weed control.

(e) Water Related Diseases

- the effect of changes in water quality, eutrophication, weed growth and the increase in areas of stagnant water on the proliferation of insects or other vectors of water-related human and livestock diseases. (Estimates should be made to what extent this can be expected, specifically for the more serious diseases, e.g. malaria, filariasis, schistosomiasis and enteric parasites etc.);
- a study of the present (pre-project) incidence of main water related diseases in the project area from surveys and existing public health records;
- an assessment of the risk of introduction of new pathogens and disease vectors;
- an assessment of required health care facilities, especially in the resettled area, and
- an assessment of adequacy of planned measures to reduce the spread of water related diseases.

(f) Flood risks – data pertaining to flood history of the region for last 40 years have to be incorporated with EIA. Downstream consequences of floods when the dam gates are opened under floods have to detailed out.

J. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Based on environmental impact assessment, mitigation/ enhancement measures need to be specified in the form of environmental management plan. The components of the EMP will inter-alia deal with the following as may be relevant to specific project site:

- Environmental safeguards (management) during construction activities Catchment Area Treatment
- Plan for restoration of quarry areas/borrow areas and areas for dumping excavated material.
- Management to arrest salinity/ alkalinity in the wake of recharge of water in the interlinking channels.
- Problems associated with transportation of silt across basins and utilization thereof in environmentally/ecologically benign manner.
- Compensatory Afforestation plan along with cost benefit analysis Plan for green belt (other than catchment area).
- Reservoir rim treatment plan
- Comments/observations/recommendations of Chief Wildlife Warden in case Wildlife habitat/migratory path exists within 10 kilometers of project site.
- Conservation plan for affected flora/fauna including rehabilitation plan for rare/endangered species including action plan for alternate breeding ground and access corridor for food and shelter.

- Action plan for control of irrigation induced water logging, salinity etc including strategies and policies with choice of species/crop for optimum use of water for agriculture to reduce adverse impacts of excessive irrigation including water logging.
- Action plan for command area development in respect of irrigation potential.
- Watershed management
- Ground water management including harnessing of ground water in conjunction with surface water.
- Land use management with special emphasis on water logging problem Management of flora and fauna in the connecting basins as well as along the link including action plan for alternate breeding grounds.
- Alien flora and aquatic weeds management
- Fishery Development Plan
- Wetland management
- Protection of sensitive and archeological monument sites
- Action plan for health delivery systems
- Post project environmental monitoring plan (including physical & financial details covering all aspects of EMP).
- Disaster Management plan including risk and dam break analysis
- Provision of free fuel to labour
- Soil fertility management plan
- Action Plan for release of assured flow downstream of the dam to meet ecological and other water needs in the affected river reach
- Suggest suitable structural measures to pass silt laden water from the reservoirs so as to ensure sediment flow downstream
- Compliance mechanism with due representation from affected people

K. Socio-Economic Aspects and Preparation of R&R

A detailed socio-economic study of project affected people will be carried out.

i. Socio Economic Survey

In order to perform the socio-economic studies, on-site socio-economic survey shall be carried out covering socio-economic profile of the region. The region shall include the project-affected areas likely to come under submergence or land acquisition and wider project influence areas comprising the catchment area, areas downstream of dam and up to confluence of major tributary, the command area, the area en-route the link canal where there could be secondary displacement. The following aspects shall be covered in the socio-economic surveys

- Demographic profile with social categories, number of households/families, type of housing, health and educational profile, migration patterns, if any.
- Land ownership and operational holding
- Existing cropping pattern of the project area and changes thereof due to commissioning of the project
- Agricultural practices including traditional knowledge on endemic species.
- Improvement in crop production and productivity
- Possible improvement in surface and ground water availability and benefits accrued to irrigated agriculture, drinking water use, industries and thermal power plants.
- Riparian rights of down-stream users vis-à-vis proposed water release and drinking water availability
- Agricultural input pattern

- Economics of cultivation
- Non-agricultural Practices such as poultry, cattle raising etc
- Employment profile
- Income profile with sources of income
- Expenditure profile
- Other economic activities prevailing in the region
- Availability of social infrastructure
- Availability of economic infrastructure
- Gender issues

ii Secondary Data

Before start of the on-site socio-economic survey, available secondary information from various government agencies shall be collected. Relevant information from concerned state government and Census of India about infrastructure availability etc. at district/block/village level and from Survey of India on topography maps are other sources of useful information to be collected before launching of on-site survey. Based on this information, design of questionnaire and methodology of field surveys shall be finalized.

iii Sample Design

The survey shall cover both project affected (displaced) and project influenced (benefiting) areas. Sample shall be distributed between project affected and influenced households on the basis of number of reservoirs and length of main canal and distributaries.

iv Questionnaire

Different mode of data collection such as sample survey, Participatory Rural Appraisal (PRA)/ Rapid Rural Appraisal (RRA) and focus group discussions shall be used in evaluating impact of ILR.

Questionnaire shall take into account all the relevant aspects mentioned above.

Current Land prices and wages prevailing in the area is another important factor on which data should be collected in socio-economic survey. This shall help in assessment of cost of land acquisition for implementation of envisaged developments.

v Resettlement & Rehabilitation(R&R) Aspects

Resettlement and Rehabilitation (R&R) aspects techniques such as Rapid Rural Appraisal (RRA)/Participatory Rural Appraisal (PRA) and focus group discussion should be used to find out present situation in the area. This shall also involve collection of photographic records of the area likely to be submerged.

<u>Information on following aspects should also to be collected.</u>

(a) People's own perception on the settlement aspects and kind of facilities they expect in the area where they will be settled after displacement.
(b) Preferences of affected population about the compensation package, whether it should be in cash or kind.
(c) What is the location preference for settlement by affected population, whether they want to be settled closer to their existing place of residence or at a distance?
(d) Participation of affected people in construction of canals/reservoirs should also be explored.
(e) Migration patterns into and out of the project area.

A detailed R&R package shall be prepared and the National Rehabilitation & Resettlement Policy 2007(NRRP-2007) formulated by MoRD shall form basic minimum criteria for devising the R&R package. Due weightage should also be given to the R&R Policy / Act of Rajasthan State.

However, in line with the section 1.7 of the NRRP-2007, the R&R package should not limit itself to the National R&R Policy-2007 and should look for a wider horizon with millennium development goals and Planning Commission targets. The R&R package shall ensure restoration of vocation for tribals (land for land, if agriculture) to the extent possible. Also, the various schemes of the Govt. for rural development and welfare should be combined to make R&R package attractive enough. The R&R Policy should clearly come out with the kind of infrastructure required to achieve these goals. While preparing the R&R package, the past practices and difficulties experienced in implementation of various provisions of R&R package should be kept in mind.

A layout of model village for resettlement of Project Affected People (PAP) shall be prepared.

vi Kalisindh Major Multi Purpose Irrigation Project Jhalawar Rajasthan.

This project will have both short- and long-term impact on economy. The short-term impact of the project on economy in general and regional economy in particular will be in the form of increased employment opportunities and growth of service sectors in the area. Impact of the project on regional economy will depend on how strong the forward and backward linkages of construction and agriculture sectors are with the rest of the economy. In medium- to long-term major impact of the project on economy will be through increased/assured irrigation, which will lead to increased agricultural production. All these aspects will be studied in detail.

Impact of the said project on different types of households such as agriculture dependent households, agricultural labourers, salaried earners, petty businessmen etc. should be analyzed. Efforts should also be made to present pre and post project commission employment profile.

L Environmental Monitoring Programme

Environment Monitoring Programme to monitor the mitigatory measures implemented at the project site should be prepared. The plan should spell out the aspects required to be monitored, monitoring indicators/ parameters with respect to each aspect and the agency responsible for the monitoring of that particular aspect throughout the project implementation and post project environmental monitoring..

The proponent/ consultant will design a post-project environmental monitoring programme for implementation, and then various parameters will be monitored by relevant departments. The cost estimates and equipment necessary for the implementation of this programme shall be included. Inclusion of the following indicators in such a programme should be considered:

- water quality, in the main canal, in drainage channels, and in the reservoir; standard analysis
- technique including the analysis of toxic residues from agro-chemicals;
- fish growth of introduced fingerlings in the reservoir;
- spread of aquatic weeds and eutrophication;
- trends in incidence of water related diseases;
- change in soil fertility, structure and texture;
- siltation rate of canals and reservoirs;
- soil erosion rate (including slope stability of canals banks and dam faces);
- adequacy of drainage system (water logging, Stalinization & alkalinization),
- changes in ground water level and ground water quality.
- proper implementation of CAT plan

- proper implementation of afforestation
- earthquake monitoring (reservoir induced earthquake)
- seepage water monitoring

M Environmental Management and Cost estimates

With knowledge of the baseline conditions, the ongoing construction activities, the planned future development programmes and current critical conditions, projections are to be made of their influence on physical, chemical and biological aspects of environment in the area. These projections should identify whether the pre-project critical environmental conditions will be further degraded and what additional environmental conditions are likely to become critical. An environmental management strategy will be developed to mitigate the adverse impacts. The strategy will include evaluation of alternative methods to reduce or eliminate adverse impacts of the most critical areas likely to contribute to the most significant environmental burdens. Cost estimates for each of the proposed mitigatory measure should be given.

N <u>Additional Points included in TOR as per MoEF circular no. J-11013/41/2006-IA.II(I)-Pt. dt. 19.05.2011</u>

1. Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.
2. Does the Environment Policy prescribed for standard operating process/procedures to bring into focus any infringement/deviation/violation of the Environmental or forest norms /conditions? If so, it may be detailed in the EIA report.
3. What is the hierarchical system or administrative order of the company to deal with the Environmental issues and for ensuring compliance with the EC conditions? Details of this system may be given.
4. Does the company have a system of reporting of non-compliances/violations of Environmental norms to the Board of Directors of the company and /or shareholders or stakeholders at large? This reporting mechanism should be detailed in the EIA report.
5. After preparing the draft EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above mentioned issues, the proponent shall get the public hearing conducted (strictly following the procedure laid down in the Appendix IV of the Amendment Notification dt. 01.12.2009 and MoEF circular no.J-15012/29/2010/IA.II(M) dt. 19.04.2010). In this regard due care would be taken in (i) deciding the venue of public hearing, (at the project site or in its closed proximity, to ensure widest possible public participation) (ii) forwarding the Draft EIA with Summary EIA Reports and notice for hearing to various authorities / offices, specifically to Urban Local Bodies/ Panchayati Raj. Institutions (i.e. Zila Parishad, Panchayat Samiti & Gram Panchayat))/ Development Authorities (i.e U.I.T., J.D.A. etc.) , (iii) adequate publicity regarding date , place and time of public hearing among local public, (iv) recording requisite “certificate” at the end of public hearing proceedings / report and (v) displaying the report in the office of Gram Panchayat, Zila Parishad, Collectorate etc. After completing the public hearing process as described above, the proponent shall take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006 and subsequent amendment dt. 01.12.2009.
6. In the final EIA /EMP report , compliance of ToRs should be reported point wise in a statement of three columns as indicated below:-

S. No.	Items in the letter of the ToRs	Reply / Response by the PP