

TERMS OF REFERENCE
for
ENVIRONMENTAL IMPACT STATEMENT

INTERIM PROJECT

UTTAR PRADESH STATE TUBEWELLS PROJECT

INDIA

Activity number: IN007703

- * Deze ToR is gemaakt door DST/ML na advisering door DAL/22; DST/TA, en OS New Delhi (L&W & MUCC)
De ToR is dus niet opgesteld door de uitvoerder.

SUMMARY

Objectives

The objectives of the Environmental Impact Statement (EIS) is to report on the effects of the project activities, as far as relevant to groundwater irrigation, for the physical, natural and social environment and to report on the analysis of alternatives to avoid or to limit and to mitigate the negative environmental effects of these activities, as far as relevant for groundwater irrigation.

The EIS should cover:

A. **Executive Summary**

Concise discussion of significant findings and recommended actions, preferable in the form of maps, figures, tables and diagrams.

B. **Problem and Objectives**

Delimitation of the most important problems to determine the objectives of the project. This should also take into account the finalized development activities and/or other activities in the area where the project is to be executed.

C. **Legal and policy framework**

A presentation of the current and expected legal and policy framework regarding environmental issues, including the relevant environmental standards of India and Uttar Pradesh and the necessary licensing procedures together with a discussion of these standards.

D. **Baseline data**

Dimensions of the study area and description of relevant biological conditions. Current and proposed development activities effecting the project area, but not directly connected with the project, should also be mentioned.

E. **Description of alternatives**

Alternative project options concerning operational parameters aiming at minimizing the negative or maximizing the positive

environmental impact should be developed. They would seek to offer solutions for the identified problems from several possible angles. Alternatives should include an estimate of the consequences of discarding the project altogether and an alternative aiming at establishing maximized environmental protection.

F. Environmental impact of alternatives

As far as possible, for each of the alternatives, the environmental costs and benefits should be quantified, and economic values attached, where feasible.

G. Analysis of Alternatives

Proposed investment design, site technology and operational alternatives should be compared systematically in terms of their potential positive and/or negative environmental impact, capital and recurrent costs; suitability under local conditions; and institutional, training and monitoring requirements.

H. Gaps in key data

The extent and quality of available data, gaps in key data and uncertainties associated with predictions should be identified or estimated.

I. Plan for mitigating adverse environmental impacts.

Proposal for measures which may reduce potentially significant adverse environmental impacts. The plan should provide details on the proposed work programme and schedules, to ensure that the proposed environmental measures are in phase with engineering activities.

J. Monitoring plan

Specification of the type of monitoring, responsibilities, costs and other inputs (e.g. training).

Both negative and positive environmental effects should be addressed. Where possible, expected effects should be qualified and quantified and summarized or illustrated on maps. Use of recent SPOT imagery combined with adequate ground surveys could be essential. For this purpose close coordination with the National Remote Sensing Agency, the UP Remote Sensing Agency and ongoing studies for the preparation of the EIS is essential.

1 INTRODUCTION

This paper describes the terms of reference for an Environmental Impact Statement for the interim phase of the Uttar Pradesh State Tubewell project. The EIS will be finalised within 6 month from the starting date of the Interim project. As a part of the Interim project Uttar Pradesh State Tubewells, with activity number IN007702 the EIS will be executed by DHV Consultants BV and Department of Irrigation (DOI) of Uttar Pradesh, India.

Much of the data needed for the study has been collected already. No promary data will be collected. This is documented in various reports and papers not directly concerned with the environmental impact of the project.

2. STATEMENT OF THE PROBLEM AND OBJECTIVES

The EIS must present a description of the background of the proposed initiative leading to a clear statement of the problem as envisaged in Uttar Pradesh in relation to present and future tubewell irrigation.

In turn, the statement of the problem must form the basis for clearly formulated (and if possible quantitative) objectives which must be observed for the various components of the initiative for a certain planning period during the subsequent stages of implementation of tubewell irrigation (preparation, construction, operation, extension and follow up, including monitoring).

3. LEGAL AND POLICY FRAMEWORK

A presentation of the current and expected legal and policy framework regarding environmental issues, in relation to tubewell irrigation development, including the relevant environmental standards of India and Uttar Pradesh and the necessary licensing procedures together with a discussion of these standards. See also 5.5.

4. BASELINE DATA

In the EIS the current situation and the study areas must be clearly specified. A concise description should be given of the project area and the preproject ecological conditions. Based on a literature survey complemented, if necessary, by field observations, a general description should be given of the area's geological history, main soil types,

hydrology, climatic conditions and natural flora, fauna and ecosystems (biodiversity).

A brief summary of demography, socioeconomic conditions, land use and land tenure systems in the project area should be given. Preproject irrigation water and water uses (all purposes, both surface and groundwater resources, in relation to tubewell irrigation and drinking water) should be identified and evaluated.

Existing environment constraints should be summarized. These may include shortage of fuelwood, construction and utility wood, constraints in dry-season water supply, pollution of surface or groundwater by agro-chemical residues or other waste products and public health (with special emphasis on water-related diseases).

The EIS should describe the tasks and responsibilities of all agencies in the water sector in the project area as well any existing or planned coordination activities between the agencies. This must take place with a view to the formulation of the preferred intervention in the project area (e.g. cooperation with Indo-Dutch drinking water projects).

5. DESCRIPTION OF THE ALTERNATIVES WITH THEIR ENVIRONMENTAL IMPACTS AND ANALYSIS OF ALTERNATIVES

5.1 General

The preferred interventions must be formulated. The objectives should be attainable by these interventions. The current situations acts as the point of departure.

The environmental impacts which will result from the implementation of the preferred interventions must be described. Both the negative as well as the positive impacts must receive attention. Impacts can either be reversible or irreversible. The emphasis in the EIS must be on the irreversible impacts. In the EIS the applied prediction methods and assumptions must be indicated as well as their limitations and inaccuracies.

The magnitude of the impacts and the degree in which they will manifest themselves depend on the degree of sustainability that can be attained by the project's interventions.

In the EIS the impacts which will occur from the proposed interventions must be compared with the impacts from the existing situation as well with the situation that would develop if the interventions would not take place; in other words if the project would not be implemented.

The following issues (5.2, 5.3, 5.4, 5.5) should be addressed.

5.2 Impacts related to the project location

- ◆ social impacts;
- ◆ loss of forest land;
- ◆ loss of grazing lands, impacts on livestock movements;
- ◆ fishgrounds;
- ◆ impact on flora and fauna;
- ◆ the loss of natural habitat;
- ◆ impact on natural ecosystems;
- ◆ impediments to wildlife movements;
- ◆ effects on aquatic and migratory birds;
- ◆ impacts on historical and cultural monuments;
- ◆ effects on water resources outside the project area:
 - . assessment of potential conflicts with water users outside the project area;
 - . assessment of risk of waterlogging and flooding by excess water from drainage discharge outside the project area;
 - . assessment of impact of changes in water quality in areas outside the projects area;
- ◆ effects on water resources inside the project area:
 - . analysis of water quality and suitability for irrigation, with special attention to: (i) conductivity (salination risk), (ii) seasonal variation in dissolved and suspended solids, (iii) biological oxygen demand, and (iv) sodium/calcium ratio;
- ◆ erosion:
 - . assessment of erodibility, slope stability and scouring risk of the main soil types in the project area;
 - . assessment of future effects of ongoing and planned activities.

5.3 Impacts related to project design

- ◆ disruption of the hydrological balance:
 - . the effects of changes in the hydrological balance by lining of canals
 - . potential seepage losses from canals;
 - . evaporation losses;
 - . impact on aquatic ecosystems including fishpopulations (fish ponds);
- ◆ drainage problems:
 - . assessment of the risk of waterlogging or flooding;
 - . assessment of siltation, eutrophication, alkalination and salination risks by drainage discharge;

- ◆ assessment of suitable and sufficient crossings for people and livestock (and wildlife) in the project design

5.4 Impacts related to construction works

- ◆ adequacy of provisions for dumping of construction spoil, waste materials, etc.;
- ◆ health risks to labourers;
- ◆ risks for soil erosion by runoff during rains;
- ◆ assessment of problems which could arise due to differences between the cooperating agencies, institutions and labourers.

5.5 Impacts related to project operation

- ◆ pollution by residues of agro-chemicals, including:
 - . estimates of expected increase in use of biocides and fertilizers (type, application rate, application technique);
 - . assessment of the adequacy of provisions taken for proper and safe use of fertilizers and allowable biocides by the farmers;
 - . assessment of the effects of residual runoff of fertilizers and biocides on drainage water quality and on aquatic communities downstream;
 - . a summary of Indian and Uttar Pradesh government regulations on the use of agrochemicals in relation to environmental protection (list of prohibited products, standards for residue contents in waters, water quality standards) (see also 3);
- ◆ impacts on soil, including:
 - . the risk of waterlogging, salination and alkalination;
 - . rate of nutrient leaching;
 - . other changes in soil structure and texture;
 - . soil losses from runoff due to project operation;
- ◆ changes in groundwater level and groundwater quality;
- ◆ changes in surface water quality and risk of eutrophication;
- ◆ incidences of water-related diseases, assessment of favour of proliferation of pathogens and insects or other vectors of water-related human and livestock diseases. Estimates should be made to what extent this can be expected, specified for the most serious diseases only, e.g. malaria, filariasis and flukes;
- ◆ assessment of energy use and energy sources.

6. GAPS IN KEY DATA

The EIS should include a list of the gaps in knowledge which remain. Any uncertainties in forecasting the environmental impacts should also be included. The significance of these gaps in knowledge and uncertainties for the implementation of the proposed initiative should also be clarified.

In view of the remaining uncertainties, it is recommended that the EIS will include a monitoring programme. The monitoring including field observations, pumping tests and water sample analyses of the supplied water and the quality of the effluent is needed in order to carry out a quality control of the entire production cycle and to assess the actual impacts which result from the implementation and operation.

The monitoring programme should be established immediately and must start before the actual implementation of the project (Phase III) to provide a baseline for comparison.

7. PLAN FOR MITIGATING ADVERSE ENVIRONMENTAL IMPACTS

An environmental management strategy will be developed to mitigate selectively the adverse impacts of the activities as identified, with a list of priorities. The strategy should include an evaluation of alternative methods to reduce or eliminate the most significant environmental impacts of the project. Cost estimates for each of the proposed interventions or mitigatory measures should be given. Considering the likely impacts, this should include the following sectors.

- * Erosion and siltation. Revegetation of exposed sites etc;
- * Maintenance (silt removal);
- * Waterlogging and drainage. Drainage plan, additional works for draining of areas prone to waterlogging, sites, areas, structure required, costs involved;
- * Aquatic weed control. Method, cost and labour requirements for clearing;
- * Water-related diseases. Potential for biological control, assessment of required new health care centres; possibility of using intermittent irrigation; preventive and hygienic measures; need for health care extension programmes;
- * Extension programmes. A shift from rainfed to irrigation agriculture would require training and extension programme for farmers. Apart from technical training these programmes should include safety measures for using agro-chemicals and pay attention to environmental protection issues;

8. MONITORING PLAN

The proposed impact assessment study is basically an evaluation of future events. It is necessary for the project authority to continue monitoring certain environmental indicators. This will signal any potential environmental problems and allow for timely implementation of corrective measures. It will also allow validation of many of the assumptions made in preparing this complex assessment. The study team will design a poststudy environmental monitoring programme for implementation by the authority. The design will include all cost estimates and equipment necessary for the implementation of this programme.

Monitoring of environmental indicators is required for at least three years after the project has become fully operational. monitoring should be carried out twice a year (before and after the monsoon). Monitoring of the following indicators is recommended;

- * water quality. Standard analysis techniques, including the analysis of toxic residues from agro-chemicals are recommended;
- * spread of aquatic weeds;
- * trend in incidence of water-related diseases;
- * changes in soil structure and texture;
- * soil erosion rate;
- * adequacy of the drainage system (waterlogging, salination, eutrophication);
- * changes in groundwater levels and groundwater quality. A network for sampling groundwater quality should be designed and documented.

9. TIMING AND ORGANIZATION OF STUDY

A draft report, will be produced six month after the start of the study. The study start at the same time as the Interim phase UP Tubewells project, with activity number IN007703. It should be prepared in close cooperation with ongoing studies for preparing the feasibility study report. The study team should also consult Indian and Uttar Pradesh government environment departments, the local pollution control board, the central Water Commission and other relevant agencies.

The Department of Irrigation and Waterways will supply alle relevant information, drawings, and reports on request. It will arrange meetings of the specialists with the consultants of other related studies, and, if necessary, with representatives of other agencies such as the Pollution Control Board and the Department of Forest and Environment, Uttar Pradesh.

Reporting schedule

Specialists are to submit the following reports and documents to the Royal Netherlands Embassy:

- ◆ a detailed schedule and work plan noting all tasks of action to be taken up by the study team; within two weeks of award of contract;
- ◆ a draft outline of all chapters and annexes of the EIS; within two weeks of award of contract;
- ◆ a complete draft of chapters and annexes for review and approval by the Royal Netherlands Embassy within one month of submission of the draft outline (three copies);
- ◆ the final report in twenty copies before 1 May 1994.

Assessment of specialists' capabilities

Specialists will be evaluated and selected on the basis of the following criteria:

- . a comprehensive statement explaining the specialist' understanding fo the ojective, scope of service, and products to be submitted under the terms of reference;
- . a detailed description of how the specialist will carry out the assignment including data handling, analysis, internal programme management and review, staffing and equipment;
- . a complete statement of the specialist's experience in the specific field fo preparation of EIS as defined in the objective;
- . a frim designation of specialist by name, location, assignment, time period and total effort in months with complete curricula vitae presenting in detail their experience in EIS study of irrigation projects.