Summary Report on the Preparatory Study for Environmental and Social Considerations

1. Title of the Cooperation Project, Relevant Project Report

1-1 Title of the cooperation project

Feasibility Study for Expansion of Victoria Hydropower Station in Sri Lanka

1-2 Name of the project proponent

Ceylon Electricity Board, CEB

2. Outline of the project and location

2-1 Outline of the cooperation project

2-1-1 Background of the project

The growth rate of power demand in Sri Lanka is estimated in between 7 and 8 percentage per year, and power facility expansion such as new power stations and transmission lines connecting areas for high power demand is one of the most important issue in the country. Even though an introduction of large scale powers by fuel imports proceeds rapidly, the country also needs to carry on power source developments for peak time demands.

The Victoria hydropower station is the largest station by using domestic natural resources in the country, and has been designed for peak time demand in future, therefore the intake facility constructed, and a site for power station and others obtained. The previously-conducted study by JICA, which are the Study of Hydropower Optimization and the Master Plan Study on the Development of Power Generation and Transmission System, recommend taking action immediately on developing domestic water resources for power because of ensuring a stable energy supply and escalating fuel prices in recent years.

2-1-2 Project description

Major physical components of the project are likely included as the following:

a) Excavation and construction of a new tunnel 5.7 km long;
b) Expansion of the existing power station, including two or three new turbines;
c) Construction of a tailrace next to the existing facility; and
d) Extraction of construction material.

2-1-2 Project area

The direct and indirect affected areas by the project (hereinafter called affected areas) will
cover the six districts in Kandy and Nuwara Eliya provinces: Hanguranketha, Medadumbara, Kundasale, Ganga Wata Korale, Rathawewaheta and Udadumbra Madadumra. The area is located at eastern region from the capital (see the fig. 1).

2-2 Outline of the location

2-2-1 Social environment

The profile of population and other social aspects in the project area is shown in the table below.

<table>
<thead>
<tr>
<th>Table 1: Demographic features in Kandy and Nuwara Eliya provinces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
</tr>
<tr>
<td>Kandy</td>
</tr>
<tr>
<td>Nuwara Eliya</td>
</tr>
<tr>
<td>HCI</td>
</tr>
<tr>
<td>Kandy</td>
</tr>
<tr>
<td>Savannakhet</td>
</tr>
<tr>
<td>Ethnic group</td>
</tr>
<tr>
<td>School attendance</td>
</tr>
<tr>
<td>No schooling</td>
</tr>
<tr>
<td>Attendance</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Fig. 1 a concept of the affected areas
Regarding the population size, Kandy province is fourth and Nuwara Eliya, thirteen, respectively. The population growth rate of the provinces have been average or less than average in recent years. HCI (Head Count Poverty Index) of the provinces indicates lower poverty level last year. The largest ethnic group in the provinces are Shinhala, accounting for 80.4% of the population.

A gender bias likely has been observed on the education field in the provinces, therefore no schooling rate of women to men is 2 to 1.

In terms of other social aspects, epidemiology of the provinces show lower prevalence rate than others last year; Kandy is eleventh and Nuwara Eliya, twentieth. And, land use classification of the provinces indicates mainly agriculture, producing Chena, Tobacco, rice, tea and so on, and forest cover. The recent land use pattern is shifting from forest to farmland for Chena cultivation.

2-2-1 Natural environment

The provinces are located at latitude between 7.25 and 7.05 north and longitude between 80.40 and 81.0 east, and generally is hilly land. The annual mean rainfall and temperature are 1,840 mm and 24.6 Celsius, respectively. Climatic division is classified as an intermediate zone between dry and wet zones.

The Sri Lankan geology is mainly composed of the Southern Indian shield which is one of the oldest crust beneath, and metamorphosed in the middle Precambrian or Paleozoic time. The major rock type is of metamorphic derived from various sedimentary rocks such as gneiss, granitoid, charnockite, granulite and so on. Those sediments of quaternary cenozoic cover the area and form an aquifer.

The provinces are belonging to the Mahaweli watershed, flows from southern mountainous area to northern. And, the vegetation cover in the provinces is made up of forest, tea, home garden, grassland, paddy, and so on.

3. Legal Framework of Environmental and Social Considerations

3-1-1 Environmental Impact Assessment

National Environmental Act (No. 47) promulgated in 1980 as a first basic environmental law, and due to the revision in 1988, EIA system was introduced to the country. Practical guidelines for EIA implementation were prepared by Central Environmental Authority in 1993, and the scoping guideline, in 1995.

EIA or IEE requirements related to the project are as following:

a) All tunneling projects
b) Construction of hydroelectric power stations exceeding 50 megawatts
c) Within 100m from boundaries of, or within, any area declared as a Sanctuary under the Fauna and Flora Protection Ordinance (Chapter 469)

As other laws on environment regard to the project, Fauna and Flora Protection Ordinance established in 1937 is important because a sanctuary and the affected area overlap. According to the ordinance, the following activities are prohibited: hunting wild animals; moving inflammable materials; construction of buildings; and so on.

The sanctuary overlapping in space with the affected area is Victoria, Randenigala and Rantambe (VRR) sanctuary, declared in 1987. In recent years, the sanctuary border is under review because it was not marked based on scientific references on natural forest habitat but simply contours. After reviewing the border, the affected area will be out of the sanctuary.
4. Scoping

4-1 Adverse impacts

The likely adverse impacts caused by the project are predicted as the following:

<table>
<thead>
<tr>
<th>No.</th>
<th>Impacts</th>
<th>Rating</th>
<th>Brief Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Social Environment: *Regarding the impacts on &quot;Gender&quot; and &quot;Children’s Right&quot;, might be related to all criteria of Social Environment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Involuntary Resettlement</td>
<td>0</td>
<td>No impact expected.</td>
</tr>
<tr>
<td>2</td>
<td>Local economy such as employment and livelihood, etc. and Land use and utilization of local resources</td>
<td>0</td>
<td>No impact expected.</td>
</tr>
<tr>
<td>3</td>
<td>Social institutions such as social infrastructure and local decision-making institutions</td>
<td>+, ??</td>
<td>Expanding employment opportunities, however some local people who live around Victoria lake have blamed MASL in 2003-04 because the water level of both Victoria lake and their own wells was getting down at same time.</td>
</tr>
<tr>
<td>4</td>
<td>Existing social infrastructures and services</td>
<td>-</td>
<td>Some adverse impact on public facilities may be expected during construction period</td>
</tr>
<tr>
<td>5</td>
<td>The poor, indigenous and ethnic people</td>
<td>??</td>
<td>N/A</td>
</tr>
<tr>
<td>6</td>
<td>Misdistribution of benefit and damage / Local conflict of interests</td>
<td>-</td>
<td>Some adverse impact expected due to influx of construction workers (If using local peoples as workers, no impact)</td>
</tr>
<tr>
<td>7</td>
<td>Cultural heritage</td>
<td>0</td>
<td>No impact expected.</td>
</tr>
<tr>
<td>8</td>
<td>Sanitation / Infectious diseases such as HIV/AIDS</td>
<td>-</td>
<td>Some adverse impact expected due to influx of construction workers (If using local peoples as workers, no impact)</td>
</tr>
<tr>
<td>9</td>
<td>Hazards (Risk)</td>
<td>0</td>
<td>Construction accidents to local residents are likely limited</td>
</tr>
<tr>
<td>10</td>
<td>Topography and Geographical features / Soil Erosion</td>
<td>--</td>
<td>Existing tunnel might be affected due to blasting</td>
</tr>
<tr>
<td>11</td>
<td>Groundwater</td>
<td>--</td>
<td>Fissure water can arise during tunnel construction, and ground water level is likely getting down.</td>
</tr>
<tr>
<td>12</td>
<td>Hydrological Situation (surface water)</td>
<td>0</td>
<td>No impact expected.</td>
</tr>
<tr>
<td>13</td>
<td>Flora, Fauna and Biodiversity</td>
<td>-</td>
<td>In case of ground water drawdown, annual and/or perennial plants can be affected during construction</td>
</tr>
<tr>
<td>14</td>
<td>Meteorology</td>
<td>0</td>
<td>No impact expected.</td>
</tr>
<tr>
<td>15</td>
<td>Landscape</td>
<td>0</td>
<td>No impact expected.</td>
</tr>
<tr>
<td>16</td>
<td>Global Warming</td>
<td>0</td>
<td>No impact expected.</td>
</tr>
<tr>
<td>17</td>
<td>Air Pollution</td>
<td>-</td>
<td>Construction vehicles can emit pollution gas.</td>
</tr>
<tr>
<td>18</td>
<td>Water Pollution</td>
<td>-</td>
<td>Milky water can be emitted from construction work and a soil disposal site.</td>
</tr>
<tr>
<td>19</td>
<td>Soil Contamination</td>
<td>0</td>
<td>No impact expected.</td>
</tr>
<tr>
<td>20</td>
<td>Waste</td>
<td>-</td>
<td>Waste soil, etc. can be emitted during construction phase.</td>
</tr>
<tr>
<td>21</td>
<td>Noise and Vibration</td>
<td>-</td>
<td>Tunnel blasting can emit noise and vibration. The noise level can be high, however, it is limited within the existing power plant site. The vibration level can be low.</td>
</tr>
<tr>
<td>22</td>
<td>Ground Subsidence</td>
<td>??</td>
<td>N/A</td>
</tr>
<tr>
<td>23</td>
<td>Offensive Odor</td>
<td>0</td>
<td>No impact expected.</td>
</tr>
<tr>
<td>24</td>
<td>Bottom sediment</td>
<td>0</td>
<td>No impact expected.</td>
</tr>
</tbody>
</table>

Rating:

-**-**: Serious impact is expected.
-**: Some adverse impact is expected.
-0**: Neither adverse nor beneficial impacts are expected. IEE/EIA is not necessary.
-+**: Some positive impact is expected.
-++**: Positive impact is expected.
-??**: Extent of impact is unknown (Examination is needed. Impacts may become clear as study progresses.)
5. Tentative Terms of Reference on environmental and social considerations

Based on the result of the study, a tentative Terms of Reference (TOR) on environmental and social considerations is described below. At start-up of the full-scale study, the TOR should be prepared in accordance with the tentative TOR.

Tentative Terms of Reference for the Environmental and Social Considerations Study for the proposed Expansion of Victoria Hydropower Station in Sri Lanka

The tentative TOR provides the scope of work and contents for the Environmental and Social Considerations Study (hereinafter referred to as the "ESC Study") for the proposed project of Expansion of Victoria Hydropower Station in Sri Lanka (hereinafter referred to as the "Project") which is conducted Ceylon Electricity Board, with JICA's technical cooperation project.

1. Objectives

The objectives of implementation of the ESC Study are:

1) to provide a necessary information regarding actual environmental and social aspects of the project site;
2) to establish a mitigation measure for likely adverse impacts (hereinafter referred to as the "Impacts") due to the project implementation; and
3) to monitor the Impacts during the construction and operation phase under every regulation and mandate issued by an environmental authority.

2. Contents of Scope of Work

Task 1. Description of the project:

The task is to provide a brief description of the relevant parts of the project, using maps (at appropriate scale) including a border of direct and indirect affected area.

Task 2. Description of the natural and social environment:

The task should include the following:
1) Socio-economic study:
   - Population and settlements,
   - Population characteristics,
   - Existing infrastructure facilities,
   - Housing and sanitation,
   - Water use (surface water, ground water, etc.),
   - Economic activities,
· Religious and cultural centers,
· Transportation,
· Agricultural pursuits,
· Maps in appropriate,
· Perception about the project,
· Land use pattern,
· Industry,
· Cultural and historical assets,
· Tourism sites, and
· Concern groups (NGO, associations, etc.),

2) Physical environmental study;
· Topography,
· Geology and soil (especially on soil stabilities),
· Meteorology,
· Hydrology (especially on ground water and its type, level, amount and so on), and
· Pollution (Air, water, etc.)

3) Ecological Environment:
· Existing natural habitat,
· Distribution and density of species identified, and
· Identification of rare, threatened, endemic, upper and typical species.

Task 3. Legislative and regulatory considerations:
EIA system, Flora and Fauna protection ordinance, Sri Lankan Standard regarding noise and air pollution, and other related regulations and/or ordinances should be surveyed.

Task 4. Determination of the likely impacts of the project:
In this task is to distinguish significance of likely impacts, positive and negative, direct and indirect, and construction and operation phase.

The task should be focus on the following principle areas:
· Impacts on the society due to influx of construction workers;
· Impacts on natural habitat due to tunnel construction;
· Impact on soil stability due to tunnel construction;
· Impact on ground water due to tunnel construction;
· Impact on air quality due to exhaust gas from construction vehicles, etc.;
· Impact on water quality due to discharged water and soil disposal (especially on tunnel muck) of construction work; and
· Impact of noise and vibration on the society and the natural habitat due to blasting, construction vehicles and so on.
Task 5. Analysis of alternatives to the project:

Analysis of alternatives should be conducted in order to prove the project justification. The analysis should consider a zero option (no action) and the project from the viewpoint of the three areas: economy, engineering and environment.

Task 6. Mitigatory Measures:

A suitable mitigatory measure for identified negative impact through the task 4 should be recommended, considering feasibility and cost-effectiveness to prevent or reduce significant negative impacts to acceptable levels and describe the actions necessary to implement them.

Task 7. Identification of institutional needs to implement environmental assessment recommendations:

It is to review the authority and capability of institutions at local, provincial/regional, and national levels. Recommend steps to strengthen or expand them so that the management and monitoring plans in the environmental assessment can be implemented.

Task 8. Environmental Monitoring Plan:

In this task, a detailed plan to monitor the implementation of mitigatory measures and the impacts of the project during construction and operation should be prepared.

Especially, it should include the following areas:
- Ground water level (construction, and operation phase up to the level stabilized);
- Noise and vibration level (construction phase);
- Water quality of the river surrounding the discharge water point (construction phase); and
- Water quality of the river surrounding the soil disposal site (construction and operation phase).

Task 9. Public participation and inter-agency co-ordination:

In the task, public participation should be arranged for obtaining the views of concerned groups such as local NGOs and affected groups, and in keeping records of meetings and other activities, communications, and comments. As a target group, the residents in the indirect area (around Victoria and Randenigala reservoirs) should be included because they may have a misinterpretation about the project if they could not have sufficient information on the project.