

THE EIA PROCESS AND THE UPPER KOTMALE HYDROPOWER PROJECT

Dekshika Charmini Kodituwakku* and Vinod Moonesinghe ‡

Environmental Foundation Limited, 146/34, Havelock Road, Colombo 05, Sri Lanka

INTRODUCTION

Environmental Impact Assessment (EIA) is intended to involve citizens directly in the planning process through consultation on specific plans or projects and their potential environmental impact. In many countries this intention often fails, with little research being done on EIA from the viewpoint of the public or from the perspective of trying to make project approval more democratic. In several instances where these failures occur, it is because the process is over-politicised and the bureaucracy fails to act independently. In others, there appear to be vested interests working through the bureaucracy. In some countries, such as India, the EIA process is not transparent.

In Sri Lanka, too, the EIA legislation includes provision for public participation in the environmental decision-making process. The Upper Kotmale Hydropower Project (UKHP) represents a model case of the exertion of these pressures. The project, which impacts upon five waterfalls, exemplifies questions of public objectives, means, strategies and influence - that are raised in relation to public involvement in planning from the perspective of environmentally concerned citizens and their efforts in challenging the authorities' decision on the project, appealing to the bureaucracy in varying arenas.

PROJECT LOCATION/DESCRIPTION

Sri Lanka, an island in the Indian Ocean, has a warm tropical climate and a total land area of 6.6 million ha. It has three different zones of wetness: dry (average annual rainfall below 1000 mm), wet (1500-2500mm) and intermediate (2500-5000mm) [1]. The climate of the (wet) Southwest of Sri Lanka is fairly aseasonal, receiving precipitation from the Southwest Monsoon from May to July, the Northeast Monsoon from October to December, and conventional rains between the monsoon periods [2].

The project site is located on the western slopes of the Nuwara Eliya mountain range in the Administrative District of Nuwara Eliya, in the Wet Zone. The project area extends over the altitudes of 700-1200m, upstream of the Kotmale Oya - one of the largest tributaries of the Mahaweli River - covering the upstream catchments of the existing Kotmale reservoir and Kotmale Oya [3]. The ground water table within this 940 sq.km area is of a complex nature.

The UKHP is intended to harness the water of seven tributaries - Devon Oya, St. Andrews Stream, Pundal Oya, Puna Oya, Ramboda Oya, St Claire's and Holyrood - by diverting water above several water falls.

The primary feature of the project is a concrete gravity dam, 34m in height, sited just 2 km downstream of the valley town of Talawakelle [4]. This dam is intended to divert water through a 12.8km long head race tunnel and 796m long underground type penstock to an underground power house with two unit of 77Mw turbine/generator and 6 tributary diversion facilities located 1 km upstream of the confluence of Puna Oya and Kotmale Oya [5].

PROJECT HISTORY

The government of Sri Lanka initiated active steps towards harnessing the Kotmale Oya with a Master Plan for Mahaweli Development by the UNDP/FAO in 1968. Subsequently, the UKHP entered the planning process in 1980, when a Ceylon Electricity Board (CEB)/ German Technical Cooperation (GTZ) joint team proposed a cascade of power plants, of 64-93 MW capacity, as part of a Master Plan for Electricity Supply [6].

The current concept was formulated - after a feasibility study funded by the Japan Bank for International Corporation (JICA) in 1985-1987 - by a team of Japanese Consultants who proposed several options. The CEB, after selecting one of these options decided in 1992 to go ahead with the proposed UKHP, seeking a loan from the government of Japan to carry out detailed design and an EIA report. The project was originally proposed with a capacity of 248 MW, which was later reduced to 150 MW (i.e. to contribute 530 GWh of energy annually to the national grid) [7].

In the face of strong reservations from professionals, environmentalists, politicians and the general public, the project dragged on. The latest protest came from the then Minister of Housing and Plantation Infrastructure – who was also General Secretary of the Ceylon Workers' Congress (CWC), members of which predominate among the inhabitants of the project area – just prior to its inauguration by the Ministry of Power and Energy. Subsequently, a Parliamentary Sub-committee was appointed to go into the matter.

IMPACTS OF THE PROJECT

The most harmful consequences associated with UKHP are adverse impacts on several of Sri Lanka's waterfalls, geological instability and inundation.

Waterfalls

The most controversial feature of the UKHP was its adverse impact on several of Sri Lanka's natural waterfalls including Devon and St Claire's, which are considered significant tourist attractions, locally and internationally [8]. At least five world-class waterfalls lie within the Project area; these, unlike others, are easily accessible to the average commuter using public transport since they fall beside a major highway of the central hills.

Geological Impacts

The whole area is mountainous with steep slopes. Landslide zones are present almost continuously along the Kotmale Oya, on both banks, extending from a point about 4km above the confluence with the Puna Oya to the Kotmale dam reservoir downstream; and along the Puna Oya, from its confluence with the Kotmale Oya to the vicinity of the Puna Oya falls. Landslides readily occur in these zones due to the basement rock being composed mainly of gneiss, which is more susceptible to weather, and charnockite, the top layer being composed of heavily weathered soil as clayey soil in many cases, which promotes a tendency to retain water [9]. The scientific information clearly indicates strong presence of a crystalline limestone band within the project area and entire Kotmale valley is classified as a landslide prone area [10].

The rock in the project site, which is charnockitic gneiss, is highly fractured with two major joint sets [11]. These are perpendicular to each other and in most locations of the project area are overlain by thick colluvium and residual soil layers. The thick overburden - that is visible at most locations of the project site - has high fracture intensity. It is formed due to the occurrence of past landslides, indicating that no type of human practice is suitable due to the sudden development of mass movements. The abutments behind the proposed dam site consist of well developed

discontinuities. The Puna No 2 intake is composed of thick debris, reaching the river bed. The basement rock is envisioned to be loosest in this area, with water seepage in the tunnel excavation [12].

There is a threat at the point where the headrace tunnel in the Talawakelle area is located: water is likely to outpour in to the tunnel due to high permeability. The geological instability associated with the project site is exemplified by the fact that air photography has revealed open cracks and other deteriorated rock zones at lineament valleys crossing the Devon Oya Diversion tunnel route.

Inundation

Some of Talawakelle's lower-lying neighbourhoods would be flooded; according to a recent survey 538 houses including business communities and people engaged in agriculture, livestock farming and other activities would need to be either resettled or relocated, and given alternative land or accommodation to continue with their livelihoods.

THE EIA PROCESS FOR THE UKHP

The original EIA Report for the UKHP was submitted in September 1994. The Ministry of Irrigation, Power and Highways was appointed the Project Approving Agency (PAA) under the National Environmental Act (NEA), the Project Proponent (PP) being the Ceylon Electricity Board (CEB). The subsequent chronology of the EIA process is laid out in Table 1.

Table 1 : Chronology of UKHP

EVENT DATES STAGES

M/ I, P & H, as PAA, appoints a TEC to consider EIAR
TEC (Ministry of Irrigation, Power and Energy) issues report rejecting project & recommending consideration of alternative proposals 7th February 1995 1st rejection

M/ I, P & H appoints an oversight committee to consider TEC report, Chaired by S/IP & E
Oversight committee recommends approval of project and seeks concurrence from CEA to grant approval as per NEA. 25th February 1995 1st approval

CEA refuses to give concurrence for above recommendation and nullifies 1st approval 2nd rejection

CEB applies to Secretary /TE & WA against refusal by CEA S/TE & WA appoints a panel of experts to hear appeal with public participation 23rd March 1995
Panel of experts submit its report endorsing refusal of project by CEA. 30th June 1995 3rd rejection

S/TE & WA dismisses appeal by his decision, condemning conduct of PAA in recommending approval when its own TEC has rejected it. 3rd August 1995 4th rejection

CEB issues an addendum to EIAR on Yoxford option, claiming that Yoxford option is neither feasible nor economical. September 1996

TEC appointed by CEA rejected addendum to EIAR on Yoxford option and recommended investigations on Yoxford option including core drilling at dam site. December 1996 5th rejection

CEB appeals to M/FE for approval of project, dismissing CEA recommendation and questioning credentials of TEC members to evaluate Hydropower projects. 2nd April 1997

S/F & E grants conditional approval after hearing submission of CEB/ CEA 2nd July 1998 2nd approval

EFL files a case against S/F&E seeking a stay order and a fair hearing. 6th October 1998

EFL case concludes with settlement reached. 17th July 1998

Appeal Hearing starts. 22nd October 1999

S/F&E approval for project. 27th March 2000 3rd approval

Inter-Ministerial Committee reports on project. July 2002

Parliamentary Sub-committee on UKHP Ongoing

TEC Report

The PAA's own Technical Evaluating Committee (TEC) found that the project threatened the pristine waterfalls in the area, for which the weightage given in the EIA report was inadequate; no economic values had been assigned to the waterfalls; and better indications could be given to decision makers if a contingent valuation exercise was to be conducted. The waterfalls should remain in their natural condition at least during the day time. Possible impacts were effects on water quality, changes in the water table, upstream flooding, resettlement and the loss of biodiversity. It refused approval on these grounds and recommended that the other alternatives should be re-examined in detail [135].

First Approval

The Secretary Ministry of Irrigation, Power and Energy overruled the TEC decision by appointing an oversight committee, which suggested that the TEC recommendations were economically and technically unfeasible, thus granting the 1st approval for the project (conditional on concurrence from the CEA) [14]. As there had been no evaluation of alternative locations, the CEA refused permission and the PAA was unable to grant approval.

The CEB then exercised its statutory right of appeal, under the National Environmental Act, to the Secretary of the Ministry of Transport, Environment and Women's Affairs. His findings were that the EIA Report submitted by the CEB failed to give a rigorous, responsible evaluation of the 'Yoxford Option', an alternative for 120 MW/370GWh, one of three identified in the EIA report and recommended for re-examination by the TEC; and that an extended environmental cost/benefit evaluation should be part of the financial/economical evaluation. While refusing the appeal, he allowed the CEB to submit a fresh application addressing the alternative proposals [15].

Second Approval

The CEB then submitted an addendum to its EIA Report dealing with the 'Yoxford Option'. It commissioned the Central Engineering Consultancy Bureau (CECB), which had earlier proposed this option on environmental grounds, to undertake detailed geological investigation into the Yoxford site. The CECB reported that the site had several adverse geological features making it un-feasible for a dam and reservoir as required by the project [16]. The option was rejected on this basis.

Although there is no provision in the law for an 'addendum' to a rejected EIA Report, the CEA considered this addendum as a fresh EIA Report and went through the prescribed procedure by publishing a notice in the newspapers. Consequently in 1997 the CEA refused approval to the addendum and the CEB appealed to the Secretary of the Ministry of Forestry and Environment on 15 January 1997.

The Secretary in his judgment was critical of 'environmental lobbying' and hinted that the EIA procedure delays economic development in the country. He considered the economic valuation and cost/benefit analysis, mentioned by his predecessor in his decision, to be vague. He concluded:

'However it is clear that these measuring of human wellbeing are not universally accepted by policy makers or citizens as building blocks for decision rule for policy choice.'

EFL Writ and Appeal Hearing

The Environmental Foundation Limited (EFL) challenged this decision, filing a writ application in the court of appeal, seeking a stay order on the grounds that its exclusion from the second appeal process was arbitrary & contrary to principles of natural justice and contrary to the procedure set out in the CEA's 'Public Participation handbook.' That mere rejection of the Yoxford option did not constitute an adequate consideration of alternatives.

EFL sought to quash the findings of the Secretary of the Ministry of Forestry and Environment, arguing that they contained a number of generalised and un-attributed quotations, showed bias against the 'Environmental Lobby' and had been made on the basis of what the Secretary saw as the mission of his Ministry rather than in terms of the National Environmental Act. At the hearing of the case a settlement was reached whereby the State agreed to conduct a fresh appeal with the participation of EFL.

Consequently, there was an appeal hearing, at which certain significant steps were taken, including the establishment of a monitoring committee chaired by the Central Environmental Authority on which EFL has a seat [17]. This concluded with approval granted for the project by the Secretary, Ministry of Forestry and Environment. However, certain Mitigatory Measures were included.

The CEB is now required to monitor the water table in the project area and address issues arising from surface effects of its depletion [20]. It is directed to measure the stream flow of the five affected waterfalls (Devon, St Claire's, Puna Oya, Ramboda, Dunsinane), prepare a watershed management plan, assess the biodiversity, monitor the water table, plan to mitigate landslides, and develop comprehensive methods to dispose of the tunnel muck that would be generated as a result of the project. It must also maintain a complete standardised Photographic record of the waterfalls from the date of the commencement of the project [19].

The Ministry of Irrigation and Water Management was designated to ensure that measures are implemented in relation to the waterfalls so that their aesthetic values would not be disturbed. In the case of Devon Falls, a total volume of 18,000m³ of water would be released for a minimum of ten hours daily while for St Claire's a total volume of 47,250m³ of water per day for ten half hour periods is projected under the regulation [20].

The Inter-Ministerial Committee on UKHP

As a result of the influence of the Minister of Housing and Plantation Infrastructure, an Inter-Ministerial committee investigated the project. It came to the conclusion that (a) the resettlement plan was inadequate on the grounds that it did not contain a list of beneficiaries, a compensation

package to each family and their final destination at a new settlement, and (b) that the geological investigations were not adequate since there is a sub-surface geological rock formation along the tunnel trace.

The Parliamentary Sub-committee on UKHP

At present, a Parliamentary Sub-committee is investigating the UKHP. After several hearings, it was not satisfied and called upon the members of the committee on monitoring the UKHP upper watershed (of which EFL is one) to meet with it, at which there was a frank exchange of views and information.

FLAWS IN THE EIA PROCESS

EIA Report

According to section 33 of the National Environmental Act, an EIA is a written analysis of the predicted environmental consequences of a proposed project, containing an environmental cost benefit analysis (if such an analysis has been prepared), a description of the avoidable and unavoidable impacts, a description of alternatives to the activity which might be less harmful to the environment together with the reasons why such alternatives were rejected, and a description of any irreversible or irretrievable commitments of resources required by it [21].

In the UKHP case, the assessment starts off systematically, but fails to compare alternatives and present assessment results in a methodical manner. At the pre-feasibility stage of the project, detailed engineering designs were developed at great cost, while Rs.12 million were spent on the preparation of an EIA report that did not consider alternative locations for generating the equivalent energy in a less environmentally harmful manner. Instead of going into the detailed designs the alternatives should have been tested as a hypothesis at the initial stages of the EIA process to avoid misconception and misrepresentation of available facts.

The Secretary, Ministry of Transport, Environment and Women's Affairs in his decision to reject it, stated that 'the CEB's statement that the option to the UKHP is thermal is not acceptable, especially in the light that it has failed to rigorously evaluate the Yoxford option'; and that there were no independent studies done on the economic valuation of the project, the EIA failing to address this aspect fully [22].

Impact identification brings together project characteristics and baseline environmental characteristics to ensure that all potentially significant environmental impacts are identified and taken into account in the EIA process. The impact identification method adapted in the UKHP was the checklist method. The initial identification of impacts in the EIA report was comprehensive, but the checklists used were not included.

Flaws in the EIA study included: failure to determine the high flood level, non-allowance for statutory requirement of 100m reservation, improper capture during the survey on predicted resettlement of families, failure to address impact of disposing of excavated material, and failure to address adequately the possible effect on the inhabitants of the surrounding and downstream areas.

Addendum to EIA Report

In the addendum to the report, the costs of the original UKHP and Yoxford option were shown as US \$ 257 million and US \$ 246 million respectively. The cost of the Yoxford option could not be almost as much as the original project, given the reduced tunnelling and civil works, especially since the cost estimate for the Yoxford option given in the CECB proposal was only US \$ 178

million - the costing done by the consultants was for a layout different to that proposed by the CECB [23].

Inter-Ministerial Committee Observations

The Ministry of Power and Energy had commented that only minor unforeseen adverse conditions have been experienced during the construction in a number of similar projects already implemented in Sri Lanka and all these problems could be overcome without difficulty, and that this would apply to the UKHP as well.

In response, the Ministry of Housing and Plantation Infrastructure observed that it could not agree and quoted the following examples [24]:

(1) Leaking in the Kotmale pressure tunnel was remedied at a cost of Rs 1000 Million approximately, which was 10% of the total project cost. No one has been held responsible for this colossal waste of money.

(2) No action for stabilising of landslides due to dewatering of Kotmale reservoir had been taken so far. After the original geological survey that was done for the environmental impact assessment, no further geological studies have been done despite the repeated warning and recommendation to the CEB by experts who have reviewed the EIA report.

The Inter-Ministerial committee drew attention to the possibility of subsidence of road ways and the railway track proximate to the Talawakelle pond since the elevation gap between the road and the high water level off the Talawakelle pond is very small. It was of the view that the watershed management plan of the time ought to be replaced with one developed on the basis of an integrated approach to protect and improve the watershed with mixed plantation of indigenous species.

Project Approvals

Initial approval was granted by an oversight committee appointed by the Secretary to the Ministry of Irrigation, Power and Energy. In this project this ministry functioned as the project-approving agency, while the CEB, an agency under the ministry, was the project proponent. Since this ministry was closely involved in project formulation, proposal writing and in seeking donor assistance for the project in wider sense it was the project proponent. Under such circumstances it was difficult for the PAA to exercise an independent and unbiased judgment over the application made by CEB.

The Secretary, Ministry of Forestry and Environment, in his decision of 16th July 1998, highlighted the economic benefits by considering only demand in the power sector in the country. He was not in agreement with the contingent valuation method, which had been mentioned by the TEC, since the respondents in the contingent valuation survey could give seemingly contradictory, inconsistent answers to questions; they sometimes fail to give truthful answers to survey questions: they have a tendency to give an opinion when they do not have a real point of view on a subject and their answers any change depending on the precise wording of a question [25].

However, Navrud explains that contingent valuation surveys can be seen as a way of getting individual preferences in addition to expert assessment of environmental damage. There is a likelihood of high damage costs from the reduced flow in the waterfalls [26]. This is reflected in the UKHP area, which contains five waterfalls.

The most feasible alternative project location, the Yoxford option was rejected on the grounds of the presence of a crystalline limestone band and the associated danger of landslides. However, the proposed site for the UKHP possesses the same crystalline limestone bands and although this fact was not properly considered in the geological evaluation report of the UKHP [27], the project received approval.

Stakeholder Actions within EIA Process

The consideration of alternatives encourages analysts to focus on the differences between real choices, allowing people who were not directly involved in the decision-making process to evaluate various aspects of a proposed project and provides a framework for the competent authority's decision, rather than merely a justification for a particular action.

However, although there had been a number of participants at the public hearings during the EIA stage, the secretary considered that the parties to the dispute were the CEB and the CEA and accordingly summoned only their officials for the appeal hearing [28].

CONCLUSIONS

The EIA report on the UKHP was seriously flawed. Alternatives were not given due consideration, being rejected almost offhandedly while objections regarding the drawbacks of the proposed project were dealt with equally lightly. This seriously flawed project was, ultimately, approved despite strong opposition from the public. It might not be unreasonable to suppose that the final decision-making process was made in disregard of the opinion of the public, including experts.

When environmentally concerned citizens realise that the EIA process does not provide them with the tools necessary to make an impact, they may find other ways of acting, within formal arrangements for public involvement. In this case, the EIA opened up a forum for dialogue and discussion between the concerned parties which were, however, closed by mechanisms that restrict public involvement and impact.

REFERENCES:

- (1) CEA, 1999. *Central Environmental Authority of Sri Lanka/ ARCADIS/EUROCONSULT (Netherlands) Wetland Atlas of Sri Lanka – Physiography of Sri Lanka*. p4
- (2) Ashton, P. M. S., Gunatilleke, C.V.S., Singhakumara, B.M.P., Gunatilleke, I.A.U.N. (2001) *Restoration pathways for rainforest in southwest Sri Lanka: a review of concept and models*. *Forestry Ecology and Management*, Vol. 154 (2001) 409-430
- (3) Prathiraja, P.T. (2003) *Ceylon Electricity Board Upper Kotmale Resettlement Action Plan 2003*.
- (4) Potkin, A. (2000) *Waterfalls: a Hydropower development aesthetic consideration in Project Evaluation Interactive E-Book*. Waterfalls hydro as a zero-sum game: Sri Lanka's Upper Kotmale project (File name Lank_REV.pdf). Cultivate Understanding Multimedia.
- (5) EIA report, section 2.1.5: Fig 1.1.
- (6) Representatives of the Ministry of Housing and Plantation Infrastructure, 2002. *Report to the Inter Ministerial Committee Appointed by the Hon Prime Minister on UKHP*.
- (7) SAELR. (1999) *Appeal under section 23 DD of the national Environmental act by Ceylon Electricity board (no 1-3) The South Asian Environmental Law Reporter*. Vol 6(4):167-190
- (8) Ibid.
- (9) NBRO. (2002) *An overview of the Engineering geological impacts on the severely affected areas due to the proposed Kotmale Hydropower project*. National Building Research Organisation, Colombo Sri Lanka
- (10) Representatives of the Ministry of Housing and Plantation Infrastructure, Op cit.
- (11) NBRO, Op cit.

- (12) CEB. (June 1995) *Final Design Report*, Volume v Supporting report D: geological survey report main report. CNEC (Chuo Kaihatsu Corporation, Tokyo, Japan, Nippon Koei Co Ltd, Tokyo, Japan, EPDC International Ltd, Tokyo, Japan, and Central Engineering Consultancy Bureau).
- (13) SAELR. (1995) *Appeal under section 23 DD of the national Environmental act by Ceylon Electricity board (no 1-3) The South Asian Environmental Law Reporter*. Vol 2 (2&3): 36-62.
- (14) Ibid.
- (15) Amerasinghe, C. (1995) Secretary Ministry of Transport, Environment and Women's Affairs, Decision on Upper Kotmale project.
- (16) SAELR. (1999) *Appeal under section 23 DD of the national Environmental act by Ceylon Electricity board (no 1-3) The South Asian Environmental Law Reporter*. Vol 6(4):167-190
- (17) SAELR. (1998) *Appeal under section 23 DD of the national Environmental act by Ceylon Electricity board (no 1-3) The South Asian Environmental Law Reporter*. Vol 6(3):113-138.
- (18) as per National Environmental Regulation, No 1 of 2003
- (19) Regulations. (2003) *Regulations made by the minister in charge of the environment under paragraph (r) of Sub section (2), Section 32 of the National Environmental Act No 47 of 1980*. The Gazette Extraordinary No 1283/19 of 10th April 2003
- (20) Ibid.
- (21) According to National Environment Act of 1980.
- (22) Amerasinghe, Op cit.
- (23) Representatives of the Ministry of Housing and Plantation Infrastructure, Op cit.
- (24) Ibid.
- (25) SAELR. (1999) Op cit.
- (26) Navrud, S. (2001) *Environmental Costs of Hydropower Compared with Other Energy Options*. Hydropower and dams. 2.
- (27) Representatives of the Ministry of Housing and Plantation Infrastructure, Op cit.
- (28) SAELR. (1999) Op cit.

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* **Dekshika Charmini Kodituwakku**, BSc, MSc (Forestry), Former Environmental Scientist, Environmental Foundation Ltd, Colombo 05, Sri Lanka

‡ **Vinod Moonesinghe**, BSc (Mech Eng), Information Officer, Environmental Foundation Ltd, Colombo 05, Sri Lanka.

Address correspondence to Vinod Moonesinghe, BSc (Mech Eng), Information Officer, Environmental Foundation Ltd, 146/34, Havelock Road, Colombo 05, Sri Lanka. E-Mail: efl@sltnet.lk