

# UMA OYA MULTI-PURPOSE DEVELOPMENT PROJECT

## Sri Lanka flood management and social impacts

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This is an edited version of the paper submitted for journal publication. It highlights conflicts of interest arising from a multi-purpose dam-construction project in Sri Lanka.

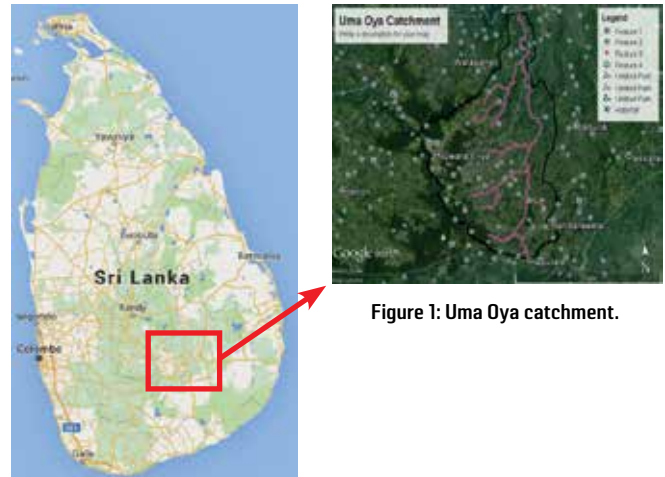


Figure 1: Uma Oya catchment.

### INTRODUCTION

River basin management is not new to Sri Lanka. The accelerated Mahaweli development project, probably the largest multi-purpose hydro project in Sri Lanka, is one of the better examples for this river basin management among others such as the Kalu River and Walawe River development projects and Goloya Valley development project.

Uma Oya is one of the major tributaries of Mahaweli River, the longest river in Sri Lanka. Uma Oya starts from Pidurutalagala (Sri Lanka's highest mountain) and reaches Mahaweli River at Rantambe reservoir. Therefore, it has a significant elevation difference ranging from 2500 metres to 152 metres over the length of the river. Uma Oya catchment covers an area of around 720km<sup>2</sup> (Environmental Impact Assessment [EIA] supplement report, 2010). The Uma Oya multi-purpose project is proposed to divert 145MCM (million cubic metres) of water annually to Kirindi Oya basin

(south-east dry zone). However, 231GWh of hydroelectricity (annually) is expected to add to the national electricity grid of Sri Lanka as an indirect outcome (120MW hydropower station).

The ongoing Uma Oya multi-purpose project is subject to many environmental concerns. Environmental organisations and local people believe that the damage from the project outweighs the gain from it to the country. However, the authorities have a controversial idea on the project's deliveries. A critical analysis from an engineering point of view has not been conducted in literature and it is therefore timely to conduct such an analysis to identify whether the benefits the project delivers outweigh the adverse impacts or vice versa. This paper therefore presents the primary overview details of what is an ongoing multi-purpose project from an engineering point of view and looks at the project's role in flood management.

### ABSTRACT

The Uma Oya multi-purpose development project (UOMDP) in Sri Lanka has been under the eagle eye not only of local environmental organisations but also the general public. UOMDP is expected to deliver many outcomes. These include enhancement of the country's hydropower generation, provision of drinking water for dwellers in dry areas of southern Sri Lanka, provision of water for proposed industrial zones in Hambanthota and enhancement of agricultural lands south of Sri Lanka. However, there is doubt whether these objectives outweigh the adverse environmental

concerns related to the project. The UOMDP involves two new reservoirs and a tunnel to divert water to the southern area of Sri Lanka. It was initially drafted by Central Engineering Consultancy Bureau (CECB), Sri Lanka in 1991. However, it was rejected by the Asian Development Bank because of the violation of the water rights of the people. Therefore, a mix of advantages and disadvantages can be identified from our initial review of the project. In addition, indirect benefits and losses can be discussed in the context of floods and social impact.

## HISTORY OF UMA OYA DEVELOPMENT PROJECT

The Uma Oya project has a long history dating as far back as the 1950s. Uma Oya catchment was analysed in 1959 by the United States Operations Mission (USOM) and Canadian Hunting Survey Corporation (CHSC) for the potential development of hydropower. Under the United Nations Development Program – Food and Agriculture Organization (UNDP FAO) has proposed a master plan to develop the Uma Oya basin by constructing two dams to create the Upper and Lower Uma Oya reservoirs. This proposal was tabled during the years of 1968–1969. It was further discussed during 1988–1989 by the Lahmeyer International Company as part of a master plan to supply electricity in Sri Lanka. It proposed a three-stage development program to Uma Oya basin. This was later revised to a two-stage project. However, all these proposals were abandoned for various reasons, including funding issues and environmental concerns. In addition, these proposals were never planned to include or extend the project benefits to areas such as Hambanthota, Monaragala and Ampara where there is a significant amount of irrigable lands lacking adequate water for irrigation. However, in 1991, the Central Engineering Consultancy Bureau Sri Lanka (CECB) carried out a pre-feasibility study for Uma Oya Trans-basin project. This Trans-basin project proposed to divert the Uma Oya water to southern Sri Lanka. However, it was rejected by the Asian Development Bank due to water rights violations of the people. Nevertheless, CECB, in connection with Lavalin Inc, Canada, re-posed this Uma Oya Trans-basin project in 2000. Now the project is under construction with help from the Republic of Iran.

## ADVANTAGES OF THE PROJECT

Southeast Sri Lanka has a dry weather pattern and scarcity of water. The proposed multi-purpose Uma Oya project aims to divert an annual 145MCM of water to the area. The supplementary document to the EIA reveals that there would not be any potential adverse impact downstream of Uma Oya, if this 145MCM were diverted to southeastern Sri Lanka. The diverted water is intended to enhance the area's irrigation capacity. In addition, it is expected that a total of 231GWh of electricity will be generated annually from this project due to the head difference of water from Uma Oya to down south. Apart from the proposed hydropower development from the Uma Oya multi-purpose project, Sri Lanka is looking to develop two other major hydropower development projects – Moragahakanda and Broadlands. These are the only major potential hydropower development projects in Sri Lanka. However, they can generate only 25MW and 35MW, respectively. Therefore, the Uma Oya project can be considered the last major hydropower development project in Sri Lanka.

In addition to the above stated advantages, the project has many other indirect advantages to the society. The development work is expected to last for several months – good news for the local construction industry, economy and retailers. Small businesses, for example, temporary

small cafeterias (tea shops) are a very common feature in Sri Lanka around construction sites.

## UMA OYA PROJECT AND FLOOD MANAGEMENT

Uma Oya catchment area is a green catchment. It has a significant annual rainfall (2000–2500mm/annum) (Peris et al, 2006) and therefore, rain-fed agriculture is the common income source for local people. Among many other cash crops, the area is famous for its potatoes. However, bad agricultural practices have led to significant sediment flow to the Uma Oya. This can be easily reckoned from the capacity of Rantambe reservoir (Revel et al, 2015; Ratnayesuraj et al, 2015). Rantambe water data provides the best proof for this capacity reduction. It was supposed to be at 11MCM level when it was constructed and it was reduced to 7MCM. Those experienced in the field suggest this capacity is likely to reduce further. Therefore, spills in Rantambe reservoir are frequent even during low rainfall events upstream.

Hydrological data from Rantambe reservoir show that the number of spills per year has increased over time. This is not because of an increase of the annual rainfall volume but due to the capacity reduction of the reservoir itself. That spillage is wasteful as the water could be put to use elsewhere. Diverting some of this water – as proposed in the Uma Oya project – would reduce the stress of flooding downstream of Rantambe dam as well as in the upper catchment of Uma Oya. It could therefore be viewed as a downstream flood protection project.



Figure 2. The muddy water flow from Uma Oya.

## PROJECT DISADVANTAGES

### 1. Damage to the eco system

The damage to the eco-system in Uma Oya catchment is considered a significant threat – as can clearly be found from the EIA report.

Molluscs (land snails), amphibians, reptiles, birds and mammals were found to be common in the concerned area. Among these, three species of land snails, 13 species of amphibians (one endemic), 10 species of reptiles (one endemic), 150 species of birds (six endemic, one endangered), and 17 species of mammals (one endemic, five endangered) have been identified. This biodiversity list highlights the importance of the eco system in the affected Uma Oya catchment which can be negatively impacted by the project.

As in any other development project, the Uma Oya

catchment is under pressure from land clearance, dredging, excavations, cut-and-fill and rock blasting. In addition, construction of access roads, resettlement of local people and establishment of new agricultural lands is being practised. These major activities will directly affect the ecosystem diversity of the catchment.

As an outcome of such impacts, some of the habitats will be fragmented and species isolation will result which in turn can result in in-breeding and potential species extinction.

Furthermore, the groundwater table will be changed due to the proposed two reservoirs which could lead to water-logging and landslides. In other words, the project has many environmental drawbacks.



**Figure 3. Observed property damage during field visits.**

## **2. Damage to the infrastructure**

Our field visits also noted the damage to local people's properties which has been blamed on the Uma Oya project and tunneling activities. However, an engineering analysis was not conducted to substantiate this – and it is recommended that a detailed engineering analysis should be carried out to ascertain the reasons for this damage.

In addition, we were able to see evidence of the adverse impacts on water wells which are used by local people. They claim these wells no longer have water – even during the rainy season (refer Figure 4).

**Figure 4.**



**Dry season.**



**Wet season.**

## SUMMARY AND CONCLUSIONS

While the Uma Oya multi-purpose project has many advantages to the society, it also has many disadvantages to the Uma Oya catchment. These disadvantages are evidenced from the field visits. However, counter measures have not yet been taken to mitigate the disadvantages of the project. It is therefore recommended that the authorities reconsider the project in a way that it can be conducted with the least amount of disadvantages as it is not in a position to abolish the project.

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