

## ES12.

# ESTIMATION OF DIVERSION POTENTIAL OF THE WELI-OYA FOR THE DEVELOPMENT OF MALAKANDURA BASIN

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The Weli-Oya falls into the Walawe river about 35 km upstream of Udawalawe reservoir has a catchment area of about 230sq km ranging from Horten Plains in the wet zone to intermediate zone. According to the master plan of water resources development in Sri Lanka, diversion of the Weli-Oya water to Malakandura basin in the Walawe upstream area through a left bank canal starting at the confluence of the Weli-Oya and the Kalkan-Oya has been identified. This diversion project will be very important for the upliftment of the standard of living of the people in the basin who are farmers. Cultivation in the Malakandura basin heavily depends on the rain water storage in the cascade systems of village tanks common to dry zone built across the ephemeral rivulets in the sub basins. The storage in these tanks becomes often inadequate for Yala season and results in a low cropping intensity. This can be attributed to low rainfall and the fragmentation of the catchment from the many small tanks.

The potential diversion volume of water from the Weli-Oya is to be decided based on the operation of the Udawalawe reservoir and also the water uses between the diversion point and the confluence of Weli-Oya with Walawe River. Therefore, following guidelines are pre-established and used in the present analysis.

1. Minimum daily release for the downstream demands should be above the flow available in the stream over a period of 85% over a year.
2. Maximum diversion is  $4 \text{ m}^3/\text{s}$  to minimise the effect on the Udawalawe reservoir operations.

At the proposed diversion location of the Weli-Oya, which has a catchment area of about 220 sqkm, stream flow data is available only during a short period of one year. Therefore, a time series of stream flow is generated using daily rainfall data of 10 years at West Haputale rainfall gauging station to understand the flow pattern using HEC-HMS model. HEC-HMS was appropriate here, as it is a hydrological model with less number of parameters. The generated data showed that the dry weather flow in the Weli-Oya at the site is 1.5 cumecs. The peak flood discharge of 10-year return period is about 100 cumecs.

Using the Weibul distribution it is estimated that the discharge in the Weli-Oya is less than 1.5cumecs for 85% of the period of the year. A minimum release of 1 cumec into the canal at the diversion is considered to be necessary for efficient flow along the canal. This follows the fact that the diversion is possible only if the discharge in the Weli-Oya is greater than 2.5cumecs. Daily-based computer simulation was carried out to obtain the distribution of potential diversion discharges through the canal over a 10-year period under the above operating rule. Accordingly, an annual total diversion of 40mcm of Weli-Oya water is found to be possible with an 80% of reliability for the development of the Malakandura basin. Nevertheless, the reliability of the supply to the paddy fields depends also on the storage availability in the basin, i.e. in the cascade system of tanks.