HYDROPOWER POTENTIAL OF NALANDA RESERVOIR

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Nalanda reservoir was built across Nalanda Oya during the period from 1954 to 1957. Primarily the intention was to store and divert the Nalanda Oya to Kalawewa while supplying irrigation water to lands downstream. The need for such diversion does not exist presently, as the Mahaweli water is available to the Kalawewa. The dam and the reservoir are now mainly utilized to augment Dewahuwa reservoir by diverting through Ebbawala regulator. The reservoir is not fully utilized at present due to appearance of several cracks in the dam. A study was carried out to assess the availability of water for irrigation and hydropower generation. Further it investigates the hydropower generation potential at the dam and along the diversion path.

A simulation model was developed to study the system behaviour with hydropower generation introduced to the system. The simulation considers irrigation releases, mandatory releases, releases for hydropower generation and drinking water supply requirements. As the repairs of the dam are presently under consideration this simulation assumes full utilization of its design capacity. One simulation considers irrigation releases at Ebbawala distributed throughout the year and the other considers releases made only during September to June.

Several simulations were performed varying the releases for irrigation through Ebbawala regulator from 100acre-ft to 130acre-ft and for each irrigation release, the release at the dam for hydropower was varied from 2 to 30cusec. The following table presents hydropower generations for selected releases at the dam.

		Release from Ebbawala (acre-ft) Release throughout year				Release from Ebbawala (acre-ft) Release from Sep. to June			
		100	110	120	130	100	110	120	130
Release at Dam		Hydropower Generation at Nalanda Dam (MWh/yr)							
	10	433.9	418.2	394.7	364.4	455.5	443.6	427.3	412.8
	20	797.2	741.7	697.5	657.2	847.7	820.0	794.9	771.5
	30	1066.7	1002.8	942.7	899.4	1191.0	1151.8	1105.3	1065.2
		Hydropower Generation on Diversion Path (MWh/yr)							
	10	13613.9	14870.1	15884.0	16774.8	11648.8	12751.5	13737.9	14675.8
	20	13325.8	14369.6	15272.3	16003.3	11491.0	12502.4	13453.4	14303.4
	30	12912.6	13792.5	14642.2	15356.9	11297.1	12216.7	13092.5	13865.2

Comparison of the different scenarios is through the quantity based reliability, time based reliability, average interarrival time, average interevent time and resilience in addition to hydropower generations. The results of the simulations carried out indicate that an irrigation water supply up to about 130acre-ft can be supplied with a reasonable reliability as applied to irrigation water supplies. Energy generation on the diversion path is significantly higher than that at the dam. Also, generation on diversion path associates with high reliabilities for both irrigation water supply and hydropower generation.

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