

## DON'T YEARN TO LOSE ANY MORE

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The historically demarcated land area of the Taudaha Lake over the years exhibit mid rising deformation in its shape. Taudaha Lake supports many life forms including avifauna, macro vertebrates and macro vegetations. It is also equally important for its long established religious beliefs that lies concealed within the Lake. Since 1982, several studies carried out in the Taudaha Lake have repeatedly issued threats warrant for long term preservation of the Lake. Nutrients enrichment, non-native invasive species emergence and area reduction are some distinguished threats. In spite of these profuse distress calls, only few long term restoration measures were employed to extricate the unremitting problems. In this issue, I have discussed how the pristine aquatic ecosystem continue to remain in dynamic flux and changing its inherent physico-chemical state and biological evolution.

### ONE LAKE VALLEY

Lake Taudaha is located at the second level terrace of Bagmati River, south-east of Kirtipur Municipality, Kathmandu Valley. The Lake is uneven in shape with eight corners and situated at an altitude of 1350 m asl. At present, it occupies total area of 3.7 hectares. The depth ranges from 0.5-5.5 m (Devkota, 2007). Lake has nine inlets covering north-west agricultural fields and permanent outlet towards south-west (Figure 1). The inlets in average adds 0.12 million liters water per day and outlet in average remove 0.27 million liters of water per day (Paudyal & Joshi, 2006). Since 2004, Taudaha Lake was guarded by Karkotak Nagraja Nagrani Resident Restoration Society (KNNRRS) and prohibits direct human interferences at the Lake.

### DEBATE: WHO MADE IT?

A long established religious belief prevails regarding the origin of the Taudaha Lake. When Kathmandu Valley was once surrounded by Lake (Known as Kalidaha), the mythical figures and their force drained out all water outside the Valley from the Chobhar gorge. Then, Valley began to flourish humans with their cultures and civilizations. Lake Taudaha was made for snake's king Karkotak and for other snakes to safeguard from their lost habitat. However, most

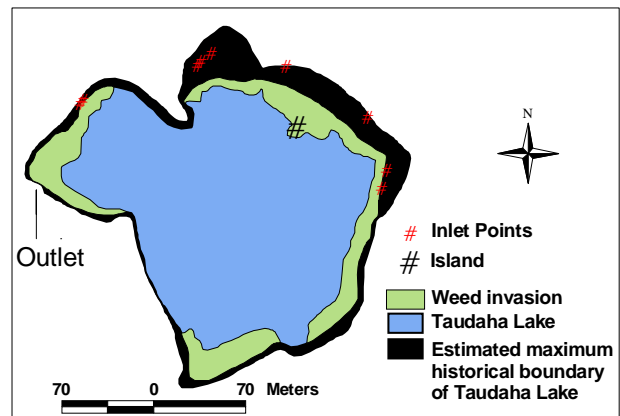


Figure 1: Taudaha Lake: Estimated historical maximum boundary; Present size with weed invasion area; Agricultural Inlet points

of our current science texts refute these myths. Geologists argued that about 10,000 years ago, geomorphic agent dissolved limestone deposits by developing narrow fissures at the Chobhar gorge. Water from the Lake was gradually drained outside by crafting Kathmandu Valley into the fluvial environment. The recent sediment analysis carried out by Devkota (2007) concluded that Taudaha Lake was once in the channel of the Bagmati River. Over the years, due to undercutting of the channel, Bagmati River shifted further downward, leaving Taudaha Lake as an oxbow Lake.

### ACCOUNTING SIZE LOSS

Taudaha Lake boundary was once demarcated by placing eight wooden poles at the periphery. The study carried out in February 2006 suggest that each pole was in average 6.4 m distance away from the present water level and one of them was found in the agriculture land (Paudyal & Joshi, 2006). To date, 15.5 % area have been lost compared to estimated historical land area of the Taudaha (Figure 1). The digitization of historical surface area of the Taudaha Lake based on Google Earth data in total yield 4.44 ha area. The aerial photograph data of 1992 suggest decrease in area by 1.8 % by making 4.36 ha compared to estimated previous size. In between 1992 to 1998 there was dramatic loss of 11 %, receding area to 3.88 ha (Figure 2). The Lake area continues to shrink and at present maintain total surface area of 3.75 ha.

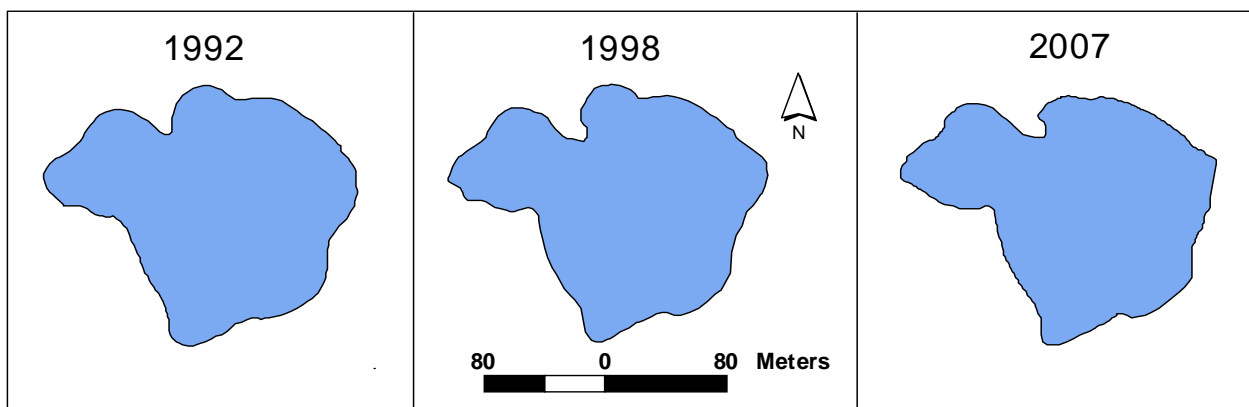


Figure 2: Change over time in size of Taudaha Lake

## UNRAVELING GRACE AND DISGRACE

The onset of visual deterioration at the Taudaha Lake began more than twenty years ago. The biological investigation (July 1981 to April 1982) carried out by Ghimire & Yadav (1982) recorded domination of 39 taxa of macro-vegetations and 36 taxa of macro invertebrates in different depth and different seasons of the year. Bird Conservation Nepal in 1998 has reported occurrence of 116 different types of migratory and residence bird species. Recently, the dense growth (> two fifth area) of an invasive species *Myriophyllum aquaticum* that was not reported in Nepal up to 2000 (Tiwari et, al 2005) prominently found to replace *Eichhornia crassipes*, *Nymphaoides indica* and *Trapa bispinosa* (Rajbhandary 1992). All these are problematic weeds. The monks while offering a gift to diety frequently found to release different types of fish species into the Lake.

Despite fishing, washing and swimming were banned these days, the persistent agriculture drainage input continue to proliferate unwanted weeds, pollute water, promote size reduction and further ecological traps to dependent aquatic lives. The recent nutrient sedimentation data analyzed by Devkota (2007) suggest high annual average concentration of nitrates (2.23 mg/L) and phosphates (0.17 mg/L). Furthermore, he argued that the context of the problem was not only centered at nutrient enrichment and invasive species emergence, in fact total annual input rate of 19.49 cu.m soil sedimentation in the lake is ticking the Taudaha Lake life clock up to 621 years. It seems fairly long enough compare to human life nonetheless the nub of the problem itself is short lived excessive human interference. So the crucial question is how these on-going state of flux in an

aquatic ecosystem dictates survival of aquatic life and assists species assemblage to flourish in the future.

## REMINDER

Environmental explanations are often rare to explicitly clarifies us with blue print standards so that we could effort to reconcile the pristine state of Taudaha Lake in the end. All this is unfair, so it is good idea to gauge in which direction Taudaha Lake had tipped off and find ways to recover its ecological integrity. Taudaha Lake can not only be a recreational spot but have prospects of research station where ecological aspects can be systematically questioned each year, to arrive at scientific information and plan for long term conservation. It is no wonder that the chemistry and biology of the Lake actually maybe far more complex than we anticipate today. Quantifying explicit impacts of nutrients sedimentation to avian populations, macro vertebrates and vegetations is therefore seems urgent to understand the complications of prevailing Lake dynamics.

## REFERENCE

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