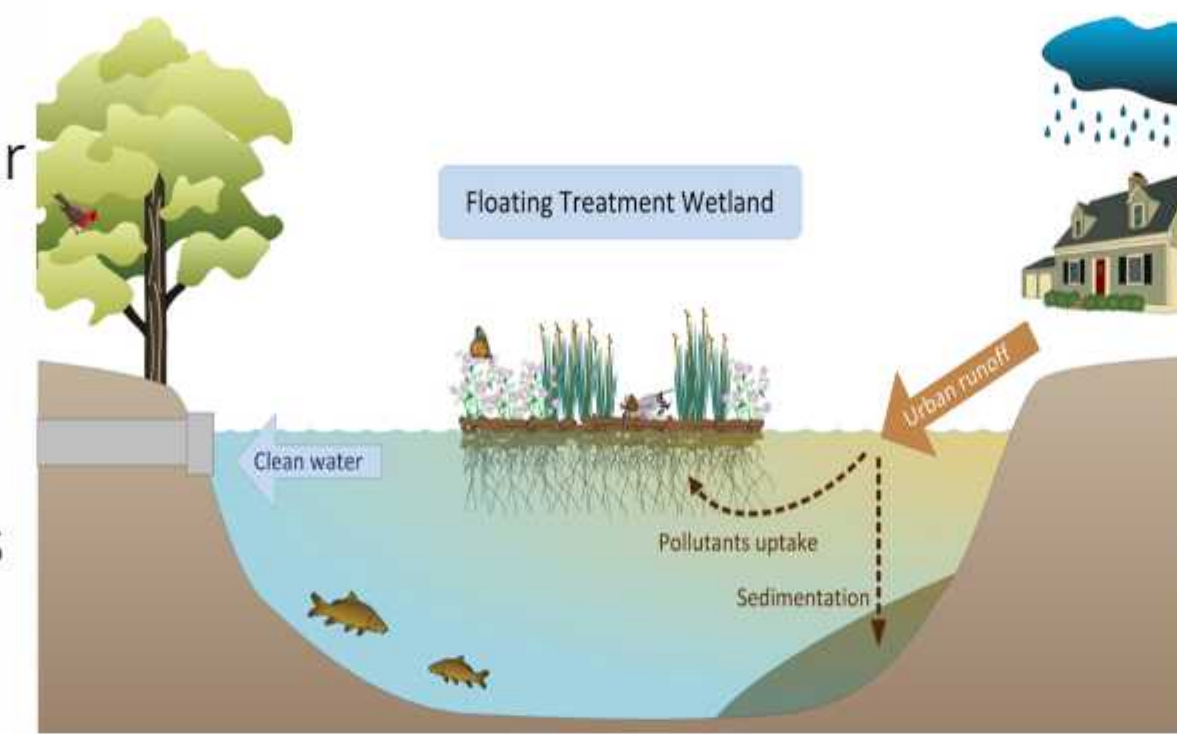


Floating Treatment Wetland System (FTWS)- Sustainable green technology to remediate polluted surface water bodies

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Introduction

Many surface water bodies are subjected to eutrophication and are in need of low cost, green water treatment technology. FTWS system contains a synthetic buoyant mat supporting shallow rooted plants with their roots hanging freely into the water column. With the help of pollutant degrading microbes biofilm growth in roots and plants combinedly cleans water bodies by reducing pollutants by absorbing nutrients (Ijaz et al., 2016).



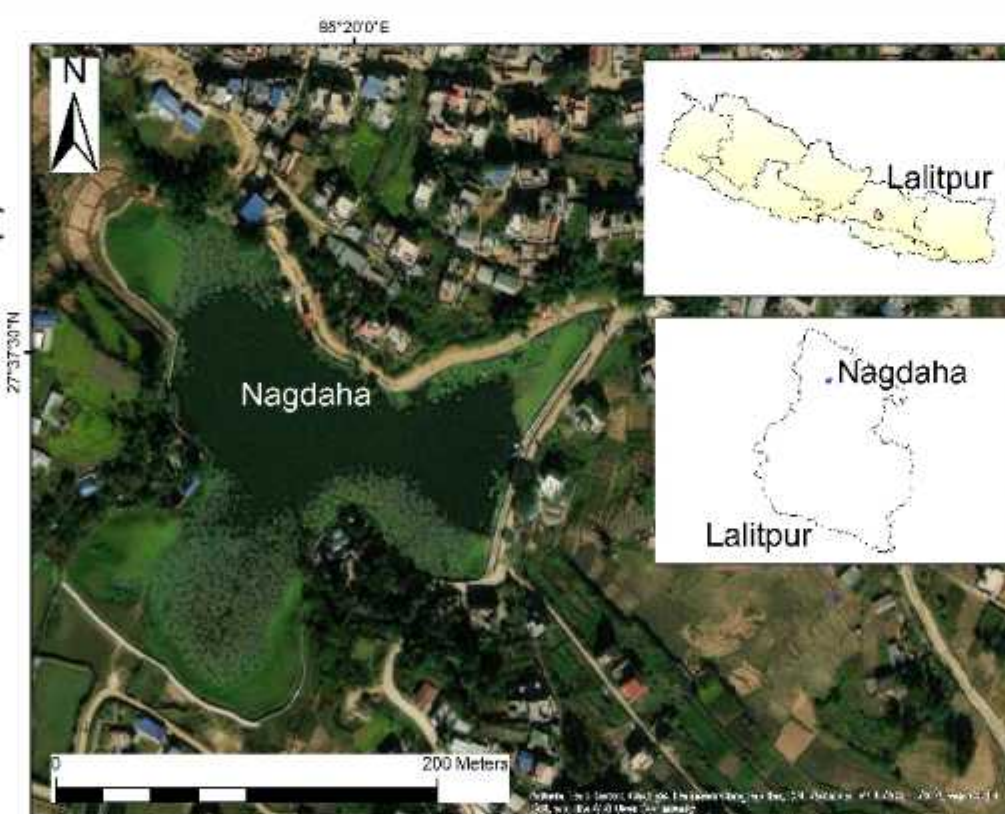
Floating treatment wetland system, (Source: University of Maryland and centre for Environment Science)

Objective

1. To test a floating raft using locally available low-cost materials.
2. To determine the effectiveness of selected plant species on removing water pollutant Nitrate and Ortho-phosphate, and changes on Dissolved Oxygen.

Methods

Magar and Khatri (2017) found Nagdaha was hyper-eutrophic and eutrophic at average Phosphorus loading up to the first 2.5 meter and onward depth respectively. Sample water from Nagdaha was taken to lab setup constructed in the premises of Kathmandu Valley Water Supply Management Board (KVWSMB) office at Lalitpur. A green house type shed was constructed for the experiment. Two setups were established namely, Setup1 and Setup2 (replication of setup1). Each setup had 4 treatment units and a common control unit for both setups. Four treatment units consisted; raft only; Tradescantia with raft; Canna with raft; and combination of Canna and Tradescantia with raft. Each unit consisted three 40 L buckets interconnected with a storage tank, where water was circulated within the unit. *Canna indica* and *Tradescantia pallida* were the plant species used for the study. In total 4 tests were conducted in the post monsoon of 2021.



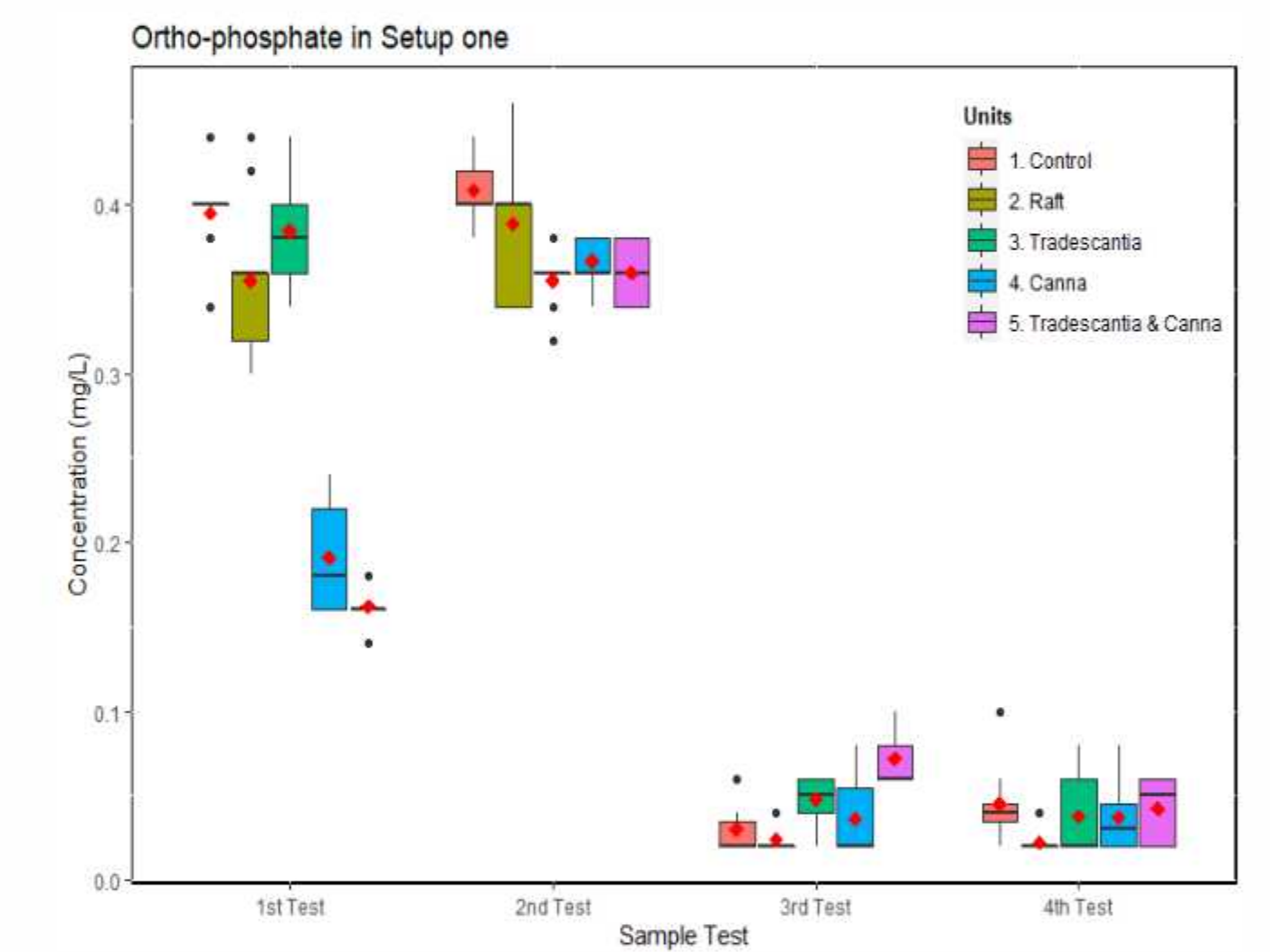
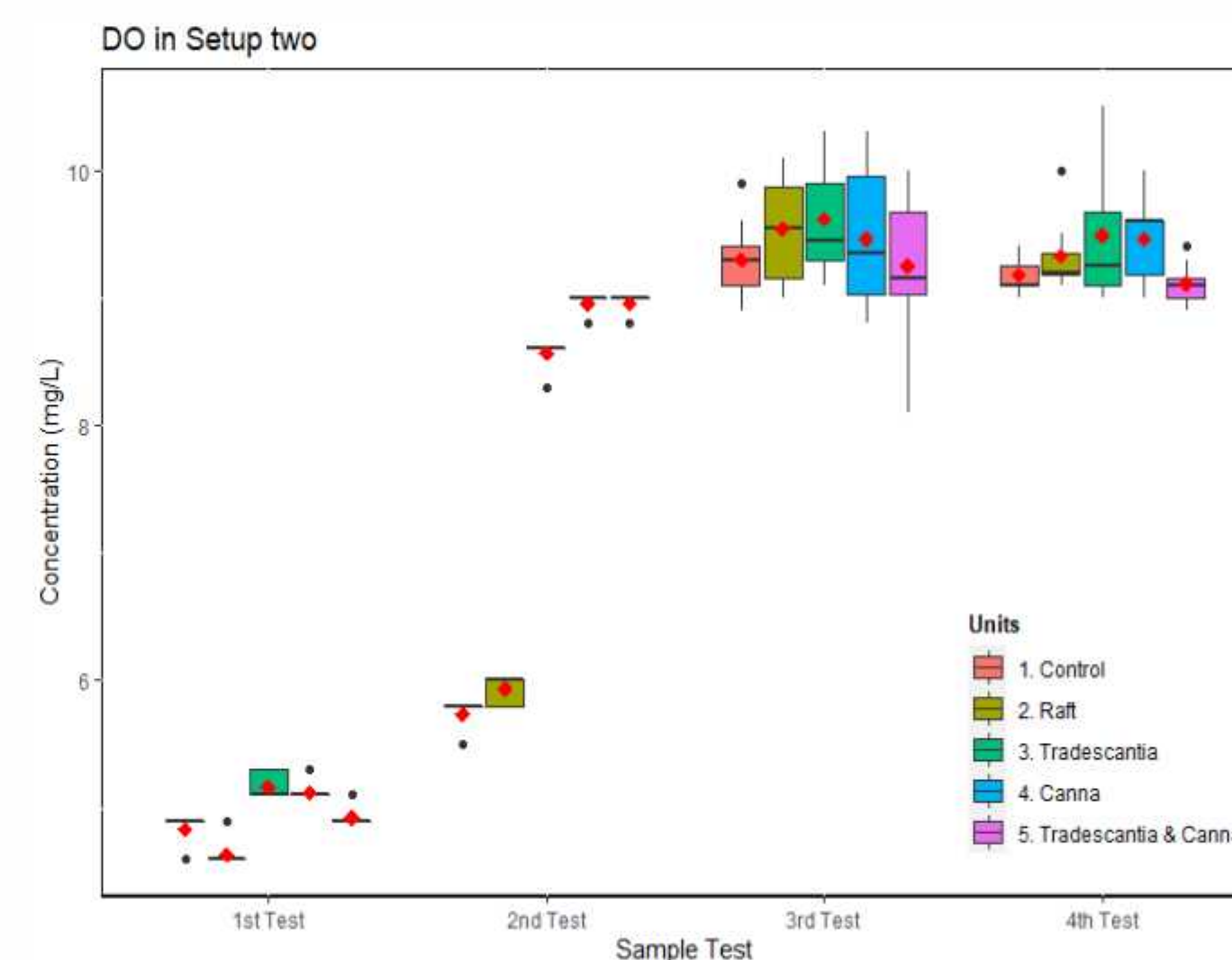
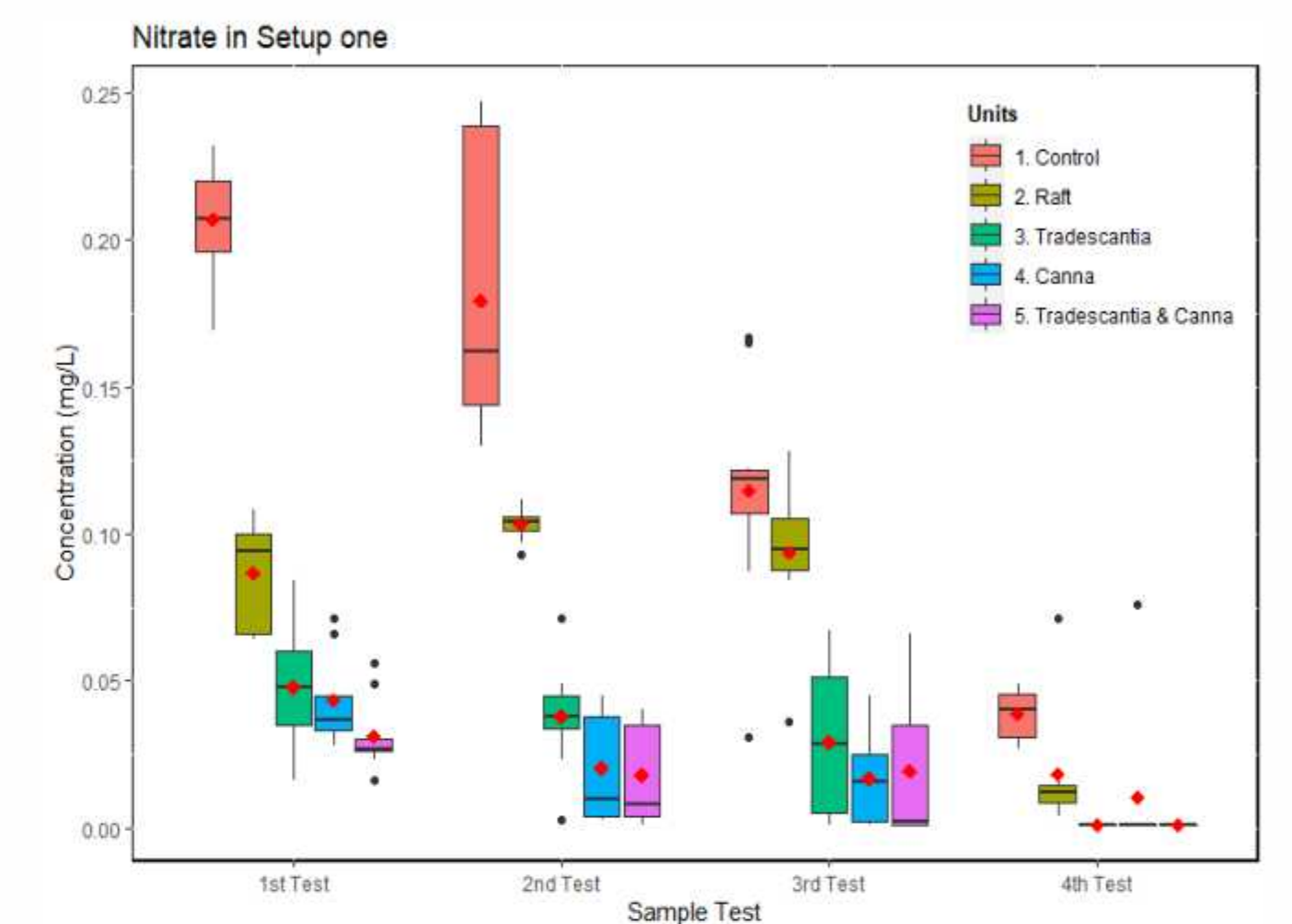
Project Area, Nagdaha, Lalitpur



Lab setup at KVWSMB

Result

Treatment unit having Tradescantia and Canna, had significantly lower mean (p -value<0.05) concentration of Nitrate and Phosphate followed by treatment unit of *Canna*. In the case of Dissolved Oxygen, no specific plant species showed significantly higher concentration mean. However, *Canna* treatment unit showed maximum increment of $56.29 \pm 0.67\%$ against control unit during the 2nd test.



Conclusions

- ▷ *Tradescantia* and *Canna* treatment unit showed lowest mean concentration throughout the tests for Nitrate and Ortho-phosphate.
- ▷ *Canna* treatment unit showed maximum DO increment of 10.5 mg/L during 4th test.
- ▷ Preliminary result showed that combination of *Tradescantia* and *Canna* treatment is more effective in removing pollutants of water from Nagdaha.