

## Annex A6

### RESEARCH COLLABORATION OPPORTUNITY

**Research Collaboration Opportunity Ref No.:** RCO-CUGE-2018-06

**Project Title:** A circular economy approach in phytoremediation

#### 1. **Background**

Water hyacinth (*Eichhornia crassipes*) is a large, free-floating tropical macrophyte that is known to improve water quality by absorbing dissolved pollutants. Biochar has high affinity to nutrients thereby reducing the bioavailability of organic contaminants and immobilising pollutants taken up by the plant. At the same time biochar could provide an effective means for long-term carbon sequestration.

Wet biomass waste (such as from water hyacinth) arising from phytoremediation efforts can potentially be used for sequestration of carbon and immobilization of pollutants through conversion to biochar, or other methods.

#### 2. **Objectives**

The proposed project should include (but not be limited to) the assessment of -

- (i) the potential of various approaches to deal with wet biomass in a climate-friendly and cost-effective manner, including pollutant/carbon immobilisation processes like biochar.
- (ii) the extent that these processes contribute to a circular economy, including a cost benefit analysis.
- (iii) the efficiency of using water hyacinth for bioremediation.

#### 3. **Minimum Project Deliverables**

The deliverables described here represent the minimum outcomes arising from the proposed project. Additional relevant deliverables that are proposed will be favourably considered during project evaluation.

- (i) Analyses of circular economy and cost/benefit of the various processes used.
- (ii) Protocol(s) for conversion of water hyacinth biomass to biochar for effective carbon sequestration and immobilisation of potential pollutants.
- (iii) Assessment of the characteristics of biochar, including leaching of carbon and other components.
- (iv) Assessment of phytoremediation efficiency.
- (v) Detailed reports (2 progress, and 1 final) of the above.

#### **4. Budget Limits**

- 4.1 The proposed budget cannot exceed \$300,000. Proposals that exceed this limit will not be considered. Please note that this amount is simply an indication of budget availability, not an estimate of expected project cost and that value for money is a criterion for project evaluation.
- 4.2 The project duration should not exceed 2 years.
- 4.3 Please note that NParks' decision on the funding support to be awarded for the project is final.

#### **5. Submission Instructions**

Proposals for the Research Collaboration Opportunity as stated above must be submitted to Subhadip Ghosh at [Subhadip\\_Ghosh@nparks.gov.sg](mailto:Subhadip_Ghosh@nparks.gov.sg) by 30<sup>th</sup> April 2019, 1200 hrs.

#### **6. Enquiries**

For transparency, all written enquiries and associated clarifications will be published (without details of the identity of the person making the enquiry) on the Research Collaboration Opportunity page on the CUGE website. We regret that phone enquiries will not be entertained.

For enquiries, please email Subhadip Ghosh at [Subhadip\\_Ghosh@nparks.gov.sg](mailto:Subhadip_Ghosh@nparks.gov.sg).

There will be an optional briefing/Question and Answer session held on 8 April 2019, 2pm, level 1, Rosewood Room, 1E Cluny Road, S259601