

DSI-NRF Centre of Excellence for Invasion Biology (CIB) <https://blogs.sun.ac.za/cib/> calls for interested students to apply for a Working for Water (WfW) bursary available for 2023 on the following project:

## **CIB1: “Cost-benefit analysis for the Working for Water Programme”**

The Working for Water programme aims to reduce the extent of invasive alien plants which are significant drivers of biodiversity loss and disruption of ecosystem functioning. A major impact of invasive alien plants in South Africa is the use of 6.67% of the mean annual runoff (MAR) for South Africa and Lesotho or about 1 900 m<sup>3</sup>/ha/yr. The greatest percentage impact was found in the Northern Cape where water use by invaders, primarily *Prosopis* species, is equivalent to about 17% of the MAR, or the equivalent of 910m<sup>3</sup>/ha/yr, using the condensed area.

The WfW programme is an extended public works programme with funded mainly by the government's poverty relief budget. A key feature of the Programme is a pertinent focus on labour intensive clearing methods aimed to enhance human capital through employment and the development of skills of people who live in the vicinity where the alien plant clearing happens. The anticipated social upliftment formed part of the claimed success of the programme and served as strong motivation for allocating substantial funding to a programme that would otherwise have struggled to obtain significant support.

This project executes a cost-benefit analysis of the WfW programme for the communities where it is/has been operating. Natural, social and economic considerations are to be considered.

Key research questions:

- What socio-economic impact does WfW make in the communities where projects are?
- What is the net present value / internal rate of return / cost-benefit ratio of WfW projects for target communities?

Management relevance for NRMP: Feedback from local-scale studies on one of the main NRMP goals.

Expected deliverables: One Master's thesis; publications; a feedback workshop to discuss results.

The bursary is valued up to R90 000 per year for maximum of 2 years. Additional running cost of up to R70 000 per year for maximum 2 years per bursary is available.

Only one student per topic will be funded.

The CIB follows an online submission system with selection done via a CIB panel.

For more information contact Dr W de Lange at [wjdel@sun.ac.za](mailto:wjdel@sun.ac.za)

DSI-NRF Centre of Excellence for Invasion Biology (CIB) <https://blogs.sun.ac.za/cib/> calls for interested students to apply for a Working for Water (WfW) bursary available for 2023 on the following project:

## **CIB2: “Risks of creating socio-economic dependence on invasive alien species”**

The clearing of woody invasive alien species generates large volumes of biomass. Although it seems obvious to utilise this biomass in commercial value chains, consideration should be given to medium and longer-term socio-economic risks of creating dependence on such utilisation. Knowledge and insight regarding these risks are currently lacking and decisions regarding the utilisation of woody alien biomass as feedstock for commercial value chains should be taken with caution.

Technical efficiency, financial profitability, environmental friendliness and social acceptance are key determinants of feasibility/sustainability/viability. Applying these considerations on the notion of utilising biomass from woody alien invasive plants is a key step in assessing the risks of this notion and ultimately deciding on the merit of establishing these value chains.

This project employs multi criteria decision analysis / cost-benefit analysis or a similar method to assess the socio-economic risks of creating socio-economic dependence on invasive alien species. The utilisation of woody biomass from invasive alien plants in commercial value chains will be used as a case study. The research will inform decision makers to decide on the merit and extent of utilising biomass from such plants to other commercial value chains.

Key research question: What are the risks of creating socio-economic dependence when utilise biomass from woody invasive alien plants in commercial value chains?

Management relevance for NRMP: Inform as to whether value added industries for biomass from woody invasive alien plants should be pursued.

Expected deliverables: One Masters theses, publications, a feedback workshop to discuss results

The bursary is valued up to R90 000 per year for maximum of 2 years. Additional running cost of up to R70 000 per year for maximum 2 years per bursary is available.

Only one student per topic will be funded.

The CIB follows an online submission system with selection done via a CIB panel.

For more information contact Dr W de Lange at [wjdel@sun.ac.za](mailto:wjdel@sun.ac.za)

DSI-NRF Centre of Excellence for Invasion Biology (CIB) <https://blogs.sun.ac.za/cib/> calls for interested students to apply for a Working for Water (WfW) bursary available for 2023 on the following project:

### **CIOB3: “Towards tradable water pollution permits in South Africa”**

One of the main benefits associated with the WfW programme is the anticipated increase in the security of supply of water in South Africa. However, one key and often overlooked aspect determining water supply security is the quality of “leveraged” water. Polluted water has lower utility compared to clean water because of the associated cost to clean polluted water prior to use.

The assimilative and flow capacity of water drainage areas are key components of water quality regulating services. However, the natural capacity thresholds of these systems are often exceeded resulting in serious water pollution problems. This project assesses the feasibility of utilising the market mechanism to stay within the natural thresholds of these systems in South Africa. De Lange et al, 2016 presented the theoretical foundation of using the market mechanism by means of tradable water pollution permits to achieve this goal, and should now be tested throughout South Africa for various types of water pollution (e.g. nutrient, salinity, and acid mine drainage).

Water pollution permit systems are challenging to design and implement. Various reserve prices will need to be determined and the subsequent market making process will need to be presented for each pollutant according to the following steps.

- permit design, terms, conditions and transactional protocol, the monitoring system, piloting and implementation.

The notion of designing the process for a composite pollution index instead of individual pollutants should be considered within this study. It is advised to either use one of the former 19 water management areas or a specific river as case study.

Key research question: How can water pollution permit systems support the perceived increase in water supply security resulting from the WfW programme?

Management relevance for NRMP: Inform as to whether a water pollution permit system is a viable option in South Africa.

Expected deliverables: One Masters theses, publications, a feedback workshop to discuss results

The bursary is valued up to R90 000 per year for maximum of 2 years. Additional running cost of up to R70 000 per year for maximum 2 years per bursary is available.

Only one student per topic will be funded.

The CIB follows an online submission system with selection done via a CIB panel.

For more information contact Dr W de Lange at [wjdel@sun.ac.za](mailto:wjdel@sun.ac.za)

**De Lange, W.J., Botha, A.M. and Oberholster, P.J. (2016) Towards tradable permits for filamentous green algae pollution. *Journal of Environmental Management*. 179:21-30. DOI:10.1016/j.jenvman.2016.04.052.**