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Description of the funded research project

1st Call for H.F.R.I. Research Projects to Support Faculty Members & Researchers and Procure High-Value Research Equipment

Title of the research project:
Designing constructed wetlands for greywater treatment in Mediterranean urban areas

Principal Investigator:
Michail Fountoulakis

Reader-friendly title:
Greywater treatment in buildings using ornamental plants

Scientific Area:
Environment and Energy

Host Institution:
Department of Environment, University of the Aegean

Project webpage
Follow us on twitter:@Green4Grey_prj

Budget: **160.720,00 €**

Duration: **36 μήνες**

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Research Project Synopsis

In order to cover water and energy demand in urban areas, we need to adopt new approaches for sustainable and efficient use of water and energy resources. In this context, nature-based solutions (NBS) have recently been indicated as critical for the regeneration and improvement of well-being in urban areas.

The main aim of Green4Grey project is to define the optimum design of constructed wetlands (CWs) vegetated with ornamental plants for greywater treatment in urban areas especially under Mediterranean climatic conditions. The systems will be designed based in the principles of Ecological Engineering to remove pollutants and pathogens from greywater. The reclaimed water will be used for non-potable uses (toilet flushing) while the established CWs will improve micro-climate and aesthetic of the cities.

Project originality

Green4Grey will provide sustainable solutions through developing of a novel “Treatment garden” by combining constructed wetlands technology and the use of ornamental plants. For this purpose, a number of novelties will be examined such as the use of*:*

- ✓ Climbing plants
- ✓ Hydroponic substrate in vertical flow constructed wetlands
- ✓ Floating wetlands

In addition, evapotranspiration of examined wetlands will be calculated by measuring water losses and correlated with different plant species as well as seasonality and operational parameters.

Expected results & Research Project Impact

The Green4Grey project is tackling issues of great concern for scientific community. Specifically, the on-site treatment and reuse of grey water for indoor uses is a novel water management approach with a growing interest.

It is mentioned that in Mediterranean areas it is difficult to establish green spaces due to high fresh water demands especially during long dry periods. However, grey water is an all-year alternative water resource which could meet this demand. Moreover, in this proposal the grey water is not just used for garden irrigation but treated by gardens (constructed wetlands) for toilet flushing. The exploitation of the results which will obtained from this project will have significant socio-economical impact as the Green4Grey project increase the available water resources, reduce the water pollution and improve the aesthetic and microclimate of cities.

The importance of this funding

This funding is very important as it enables the Principal Investigator to conduct cutting-edge research in the field of Ecological Engineering. In addition it offers the opportunity to young scientists to carry out high level doctoral and postdoctoral studies.

The implementation of Green4grey is expected to build a strong research team that will be engaged in research in the coming years regarding the use of nature based solutions for water management.

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