



Research Center for Environment and Development (RCED)

I. REFLECTION

Despite all current challenges, the Research Center for Environment and Development (RCED) has continued its efforts to contribute to the educational and development mission of BAU. This annual report briefly presents a highlight of the RCED's main activities performed during the academic year 2021-2022 focusing on academic services and environmental research.

II. ACTIVITIES AND WORK PROCESS

• Scientific Activities

- **Participation in HawkaMaa-EU Research Grants Programme funded by the European Union Regional Trust Fund in Response to the Syrian Crisis (MADAD).**

HawkaMaa-EU program aims at strengthening the capacity of water governance actors - public institutions and civil society in Lebanon to offer sustainable services to local hosting communities and Syrian refugees.

(<https://www.coursehero.com/file/139098461/Research-Grants-Program-Detailspdf/>)

The program is implemented by a consortium of non-governmental organizations comprised of ACTED, We World-GVC, Solidarités International, Action Against Hunger, Lebreliief and LEWAP. Under the frame work of this program, two student research grants were facilitated by RCED for three senior students of the Biology Department, Faculty of Science. The funded senior projects are:

Project 1. “Potentiality of treated wastewater in Bekaa region, Lebanon, for Irrigation”

Students: Sinno Razan, Irany Abdel Karim Abdallah, Yassine Kinda Ahmad

This project aims to assess current status and challenges of wastewater treatment in Bekaa region and examine the potential use of treated wastewater for irrigation purposes. The project contributes to sustainability strategies related to water, agriculture, environment and climate in Lebanon.



Project 2. “Assessing the effectiveness of phytoremediation and UV sterilization in the treatment of wastewater in informal settlements of Syrian refugees”

Student: Farid Malaeb

This project aims to assess the efficiency solar driven phytoremediation-based system with UV sterilization on wastewater treatment in Informal Tented Settlements of Syrian refugees in Bekaa. The project contributes to the development of decentralized nature-based solutions in wastewater treatment as promising approaches for encouraging local wastewater treatment while providing multiple co-benefits and energy conservation. This project is selected as one of the best three project of the total 10 successfully selected projects of the whole program.

- ***Participation in a joint afforestation project with the Association for Forests Development and Conservation (AFDC) and Faculty of Science, under different environmental conditions in two sites of Bekaa region***

The project aims to assess the impact of different techniques of digging, vegetation control and soil amendment afforestation on seedling survival, carbon sequestration and soil properties under semiarid conditions in Lebanon. This initiative involves two Ph.D research topics of two students of the Faculty of Science working on:

- ***Impact of afforestation on soil properties and microbial community under Mediterranean semi-arid climatic conditions***

Student: Abeer Jawad

This topic focuses on studying the effects of different soil amendment on afforestation survival rate, soil chemistry and microbial community. This study hypothesizes that, in a context of semiarid Mediterranean climatic conditions, the use of soil amendment in afforestation could enhance rapid plant establishment and enhancement of soil chemistry as well as C and N cycling bacterial and fungal communities.

- ***Assessment of Carbon Sequestration Potential and Microbial Communities by Afforestation Initiatives under Eastern Mediterranean Conditions”***

Student: Mohamad Saleh

The study aims at assessing the impact of afforestation on carbon sequestering as soil organic carbon and terrestrial aboveground and belowground carbon in addition to improving soil quality and on bacterial and fungal communities and biomass in addition to earthworm density. The study assesses how different plantation (i.e. several digging approaches) and vegetation control techniques affect the success and tree growth in afforestation under semi-arid Mediterranean conditions.



Techniques of digging, vegetation control and soil amendment afforestation on seedling survival

- **Visits and Collaborations**

1) Pedagogic Training Workshop, Montpellier University

Under the framework of the joint project “*International Post Graduate Studies in Environmental Management and Sustainability for Mediterranean Countries*” of Faculty of Science, Beirut Arab University and Faculty of Science, Montpellier University and their partners, a “*Pedagogic Training Workshop*” was organized by the Master’s program *Ingénierie en écologie et en Gestion de la Biodiversité (IEGB)* at Montpellier University, 30th May-2nd June, 2022. The project is funded by *Projet Structurant de Formation (PSF)*, *Institut de Recherche pour le Développement (IRD)*.

The *Pedagogic Training Workshop* aimed at building capacities of project team on professional development of students, creation of innovative project activities and fostering partnerships with stakeholders as well as enhancing graduate’s employability.

The training workshop was provided by IEGB team consisting of Olivier Thaler, Kathy Jeffery, and Arnaud Martin along with several faculty members and the environmental and urban planning company managers; Alexandre Cluchier and Roland Thaler. Participants included Mahmoud Khalil & Ghada Khawaja, BAU Faculty of Science; Safa Baydoun, BAU Research Center for Environment and Development; Carla Khater & Jonny Fenianos from the Environmental Observatory of Lebanon and France (O-Life); Esthere Garnier & Drapeau Laurent, IRD. In addition to technical working sessions, workshop program included; institutional welcome, campus visit, nature laboratory (La Source de L’avy Grabels) and a meeting of project team with the Dean of Faculty of Science, Montpellier University.



A working session with project team

- Conferences

-Participation in 6th International Conference on Duckweed Research and Application (ICDRA) 2022, May 30-June, 2021. Organized by Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Gatersleben, Germany. Topic: “*Phytoremediation potential of duckweed for heavy metals from polluted waterbodies; the case of Lebanon*” by: Ghanem, H., Chalak, L., Baydoun, S.

The research presented was on the potentiality of native *Lemna minor* and *L. gibba* growing naturally in the Upper Litani River Basin to remediate heavy metals of polluted Lebanese freshwaters. The research offers data on the promising employment of these plants in the phytoremediation of polluted fresh water surfaces of Lebanon.

-Participation in the International Horticultural Conference, IHC2022, August 14-20, France. Topic: “*Wild greens traded in the open markets of Lebanon*” by Nasser, H., Arnold, N., Baydoun, S., Chalak, L.

The study identify a list of wild edible greens being a very promising source to potentially contribute to food security and economic resilience of rural communities of Lebanon. Driven by economic motivations for marketing, the plants are commonly traded in the form of either sole or mixed species in local open markets in Lebanon. The study calls for future actions for conservation and integration of such plants in agricultural systems.



- **Publications**

T. Darwish, A. Fadel, S. Chahine, S. Baydoun, I. Jomaa & T. Atallah (2022). Effect of Potassium Supply and Water Stress on Potato Drought Tolerance and Water Productivity. *Communications in Soil Science and Plant Analysis*, Communications in Soil Science and Plant Analysis, 2022, 9, 1100-1112. <https://doi.org/10.1080/00103624.2022.2043341>

Machaka, M.; Khatib, J.; Baydoun, S.; Elkordi, A.; Assaad, J.J. (2022) The Effect of Adding Phragmites australis Fibers on the Properties of Concrete. *Buildings* 12, 278. <https://doi.org/10.3390/buildings12030278>.

Mounzer, C.; Baydoun, S.; Amer, R. & Borjac (2021). Knowledge, Attitude and Practice Regarding the Use of Antibiotics: A Cross Sectional Study from a Rural Area of Lebanon. *BAU Journal, Health and Wellbeing*, 4 (1), Article 8.

- **Academic Activities**

RCED in coordination with the dean of student affairs and the director of admission department attended school forums for secondary students of public and private schools in central, western Bekaa and Baalback region Students to provide them with detailed information on the specialties available in the universities, admission requirements and extracurricular activities, in addition to financial aids & scholarships.



Bekaa Forums