Explore and develop automated garden irrigation

Project Description

The aim of this project is to explore and develop an automatic garden irrigation system. The garden where the experiment could be carried out is located on the roof of the Quartier des Spectacles at Esplanade Tranquille. It's in the heart of Montreal, close to the Place des Arts metro station. The aim of this type of project is to reduce water wastage, save farmers time, optimize production and secure the harvest.

This rooftop garden will be used by 3 different organizations. We chose this roof because it doesn't yet have an automated irrigation system and there are different organizations occupying it. Firstly, it might be interesting to explore the possibilities, feasibility, needs and constraints of installing an automatic irrigation system. Secondly, it will be necessary to develop a low-cost solution for automating irrigation (partially or fully, depending on needs). This solution must meet the needs of the 3 organizations, the needs of each crop and depend on weather conditions.

Project Deliverables

A low-cost, easy-to-use solution for automatic garden irrigation.

A guide to the solution: how to install it, how to use it, how to manage it during winter, how to maintain it.

A quick analysis of the possibilities, feasibility, needs and constraints of installing an automatic irrigation system in a garden used by different organizations.

An economic analysis of the solution developed.

Learning Outcomes

- Better understanding of urban agriculture, green roofs, their ecological impact and their importance.
- Development of a low-cost and home-made system to save water and optimize production.
- Collaborate with several organizations, understand the needs of the sector.

Recommended Skillset

- Interest in Urban Agriculture and Farming
- Project management and organizational skills
- Good communication skills to collaborate with organization

- Interest and skills for construction and development of low cost solution : electronic, web development
- Fluent in French and English

Support Organization

Laboratoire sur l'Agriculture Urbaine : AU/LAB

AU/LAB is a non-profit organization that conducts research on urban agriculture. Thanks to this research, AU/LAB has developed the expertise needed to manage projects and provide support to farms, municipalities, institutions, other non-profit organizations and private companies. The aim is to develop and promote urban agriculture. Research can be of an economic, social, agronomic or technological nature, and can be explored directly in the field thanks to AU/LAB's operation of several gardens: the roof of the Palais des Congrès de Montréal, part of the roof of the Quartier des Spectacles, another roof in Sainte-Marie district and a greenhouse in Saint-Sulpice District.

Project Timeline

Phase 1 – Preliminary Research - Requirements (1-2 weeks)

The first week involves getting generally familiar with the garden's organization and the needs about automated irrigation requirements. This may take the form of a preliminary study of the existing situation, the construction of a short survey and an interview with each organization.

Phase 2 – Preliminary Research - Conceptualization and Budgetization (2-3 weeks)

Study existing research on low-cost automatic irrigation systems. Conceptualization of a first automatic irrigation system. Presentation and discussion with organizations and AU/LAB. Budgeting, solution development plan and equipment list. The solution will have to adapt to the garden's equipment.

Phase 3 – Development (4 weeks)

Development of the automatic system : construction of the electronic solution and development of the software to control the solution. MVP : Minimum Valuable Product

Phase 4 – Testing solution (3 weeks)

Once a first automatic solution has been developed, it will be tested directly on the garden rooftop. It will then be possible to monitor the efficiency of the irrigation and gather user feedback. Finally, the MVP can be improved if necessary.

Phase 5 – Summary Report (1-2 weeks)

Create a guide for the installation, use and maintenance of the solution. Describe how to manage it during winter.

Quick summary summarizing what was experienced and learned. Irrigation automation needs for a shared garden, feasibility, possibilities. But also the constraints and technical issues.