

# Urbana: An Innovative Platform for Collective Awareness and Enhancement of Urban Agriculture - Abstract

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## Summary

The need to provide adequate food supplies for an estimated population of nine billion people in the near future, while reducing the agricultural footprint on the environment, will be one of the most critical challenges to be faced. To that course, scientists are looking for alternative ways to ensure sufficient food production, without relying on the intensification of conventional agriculture or land clearing. Urban agriculture, defined as the food-producing activity within or around the limits of an urban area, could be one way to increase food supplies, utilizing the already cleared spaces and areas.

Urban agriculture has multiple positive impacts on societies. To begin with, it provides food security to urban farmers and fresh goods to city markets, with little to no environmental impact regarding transportation. In addition, urban farming fosters social inclusion and improves gender equality, as it can be practiced by any resident regardless of their social status or gender. Finally, it is observed that air quality and biodiversity are improved, while city waste is reduced, in the areas where urban agriculture is applied.

Despite the various ecological and social benefits of urban agriculture and a broad swift towards the implementation of sustainable and eco-living practices, urban agriculture remains unknown to the vast majority of people.

In order to raise awareness of urban farming and amplify its social and environmental benefits, we developed the Urbana platform. The Urbana platform is formed around a mobile application, which provides the space for urban cultivators and agricultural consultants to exchange knowledge and good practices regarding urban farming. In the Urbana app, users can create and share their own do-it-yourself (DIY) projects describing the steps and the resources needed for completion. Users may also initiate or participate in collective projects, thus promoting a common utilization of public areas and reinforcing social inclusion.

Having identified the need for scientific guidance regarding farming practices, we introduce the role of the agricultural consultant. Agricultural consultants can advise urban cultivators on their projects, while they build a foundation of further promoting their business. Agricultural consultants may also provide expertise data on cultivation practices applicable to each project. Cultivation practice data include growing and harvest seasons, soil parameters (soil type and pH), parameters related to climate (temperature), irrigation parameters (quantity and frequency), and fertilization parameters.

Furthermore, users can retrieve valuable information from crowdsourcing mechanisms, IoT, and social media. More specifically, users can assemble sensors and connect them to their cultivations in order to obtain values of specific indicators in real time. Users, also, have access to tweets related to certain agricultural terms being tracked within Twitter's stream, and to an embedded analytics web application that encompasses Business Intelligence (BI) functionalities, including filtering of data, charts, and maps. The analytics application allows users to run parameterized queries presented in user-friendly dashboards of aggregated advice, statistics, and trends of the platform's contemporary data. Gaining a deeper insight into the

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platform's data facilitates the decision-making process of the user and magnifies the crowdsourcing power of the platform.

Finally, in order to increase the engagement and enjoyment of the users, gamification techniques are utilized. To that end, we introduce a competitive aspect by providing points, awards, and badges to users who perform specific tasks, impelling them to share their work with their communities.

By leveraging gamification principles, providing adequate sources of information, and fostering a sense of collaboration between users and communities, Urbana is expected to raise awareness of the aforementioned benefits of urban agriculture and provide communities with a suitable tool to improve their urban ecosystems.

### **Keywords**

urban agriculture, urban cultivators, agricultural consultants, mobile application, DIY projects, IoT, sensors, data analytics, crowdsourcing

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