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MOBILE VERTICAL SYSTEMS: INNOVATIVE APPROACHES TO GREEN URBAN SPACES

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The urbanization of cities is accelerating and it accompanied by the deterioration of the ecological situation in cities, caused primarily by the loss of green areas. Thus, vertical gardening is becoming increasingly popular as a way to maximize limited space and green the urban environment.

The main aim of these studies was the possible use of practices of vertical greening of cities, as well as ways to improve the efficiency of structures for this purpose, by changing not only the forms, but also filling containers with soil with the addition of biochar, as one of the most ecological and suitable materials for improving hydrophilic properties of soils.

Despite the environmental challenges cited in [1,2], as far as Ukraine is concerned, there is currently no possibility of significant financing of global green inclusions in the state's city system. We offer the manufacture of simple and standard systems for the rapid increase of green mass. In addition, the creation of such ones will allow effective training of young people and contribute to the development of the positive ecological trend of Urban Agriculture.

Economic calculations of the proposed mobile vertical greenery system showed a payback period of eight production cycles (assuming a constant market price). The system can stand for two calendar years without any capital maintenance and repair. The use of biochar as a component of the soil mixture increases the adaptability of plants and their rapid growth. It is possible to use inexpensive types of ivy, vines or other plants, depending on the location and natural conditions in such mobile vertical greenery system. This work shows that 100 of these mobile systems provide a total of 750 m² of intensive greening.

From an economical point of view, the most expensive vertical greenery systems are modular, but it should be noted that during operation the modular system is flexible and allows to easily replace some modules if necessary, and the decorative effect of such a greenery system is at the highest level. In addition, when designing modules, it

is possible to use recycled plastic. Thus, recycled plastic ensures durability and adaptability of the design, making it an ideal material for use in modern greenery systems, and the method of landscaping itself is highly aesthetic. Adding biochar to gardening soil has good potential, but widespread use will not be competitive if consider only its price. However, taking into account the environmental benefits, the proposed mobile vertical greenery systems can be widely used in cities.

Reference:

- 1) Manso, M.; Castro-Gomes, J. (2015). Green Wall Systems: A Review of their Characteristics. *Renew. Sustain. Energy Rev.*, 41, 863–871.
- 2) Chen, H., Ma, J., Wang, X., Xu, P.; Zheng, S., Zhao, Y. (2018). Effects of Biochar and Sludge on Carbon Storage of Urban Green Roofs. *Forests*, 9,413.