Review Form 1.7

Journal Name:	**International Journal of Plant & Soil Science**
Manuscript Number:	**Ms_IJPSS_107386**
Title of the Manuscript:	**Unveiling Hydroponics and its Synergistic Technologies for Medium and Small-Scale Applications**
Type of the Article	**Review Article**

Review Form 1.7

PART 1: Review Comments

	Reviewer's comment	**Author's comment** *(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Compulsory REVISION comments **1. Is the manuscript important for scientific community?** (Please write a few sentences on this manuscript)	**1.** Hydroponics offers several advantages over traditional soil-based agriculture, including efficient use of resources (water and nutrients), faster growth rates, reduced susceptibility to soil-borne diseases, and the ability to grow crops in locations with poor soil quality or limited arable land. It has become increasingly important in modern agriculture, especially in urban farming, controlled environment agriculture, and areas with challenging growing conditions. Additionally, hydroponics offers a more efficient and sustainable way to produce food, reduces resource consumption, increases crop yields, and contributes to food security and environmental conservation. It also plays a role in advancing agricultural practices and research, making it a valuable component of modern farming systems. In this manuscript, the author provides an overview of the potentialities offered by hydroponic culture as a more efficient and sustainable method of producing food, reducing resource consumption, increasing yields, and contributing to food security and environmental conservation. Among other information,, the author also focuses on highlighting the role of hydroponic culture in the progress of agricultural practices and research, making it a precious component of modern agricultural systems.	
2. Is the title of the article suitable? (If not please suggest an alternative title)	**2.** In my opinion, a much more attractive title would be: "*Revolutionizing Small-Scale Agriculture: A Deep Dive into Hydroponics and Synergistic Technologies*"	
3. Is the abstract of the article comprehensive?	**3.** In my opinion, no. The Abstract is too long and, at times, is written as if it were the Introduction of an article. I would recommend rewriting the abstract in a much more concise manner, leaving out the historical information (which can be delegated in the Introduction of the work) and highlighting not only the innovative aspects of the Hydroponic culture but also its limitations.	
4. Are subsections and structure of the manuscript appropriate?	**4.** Yes. However, there is a missing section mentioning certain limitations of hydroponic cultivation (see some suggestions in point 7. below).	
5. Do you think the manuscript is scientifically correct?	**5.** Yes.	
6. Are the references sufficient and recent? If you have suggestion of additional references, please mention in the review form.	**6.** *Good recent works that may be added to the list of references are the following*: [1] United Nations for Food and Agriculture Organization (FAO). How to Feed the World in 2050. 2018. Available online: https://www.fao.org/fileadmin/templates/wsfs/docs/expert_paper/How_to_Feed_the_World_in_2050.pdf (accessed on 20 December 2021). [2] United Nations. Goal 11: Make Cities Inclusive, Safe, Resilient and Sustainable. 2018. Available online: https://www.un.org/sustainable development/cities/ (accessed on 20 May 2021). [3] World Bank. Urban Population (% of Total Population). 2018. Available online: https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS (accessed on 10 September 2021). [4] United Nations. World Urbanization Prospects: The 2018 Revision. 2018. Available online: https://population.un.org/wup/Publications/Files/WUP2018-Report.pdf (accessed on 15 January 2022). [5] R. S. Velazquez-Gonzalez, A. L. Garcia-Garcia, E. Ventura-Zapata, J. D. O. Barceinas-Sanchez, and J. C. Sosa-Savedra, Agriculture, **12**, 646 (2022).	
7. Apart from above mentioned 6 points, reviewers are free to provide additional suggestions/comments.	**7.** For completeness, it is appropriate that the author also mentions the main limitations inherent to hydroponic cultivation. **Suggestions** i) Hydroponic systems can be expensive to set up, especially more advanced and automated systems. This initial investment may be a barrier for small-scale or resource-constrained farmers. ii) Hydroponic systems require technical knowledge and expertise in managing water quality, nutrient solutions, and environmental variables like temperature, humidity, and lighting. Novice growers may face a steep learning curve. iii) Some hydroponic systems, especially those operating in controlled indoor environments, can be energy-intensive. Heating, cooling, lighting, and water circulation can contribute to higher energy costs. iv) Hydroponic systems require regular monitoring and maintenance. Issues such as clogged tubing, nutrient imbalances, or equipment malfunctions can affect crop health and yield.	

	v) Although hydroponics reduces the risk of soil-borne diseases, it can still be susceptible to diseases and pests that affect the plants' aerial parts. Controlling these issues in a closed system can be challenging. vi) Hydroponic systems are often heavily reliant on technology, which means that power outages or technical failures can disrupt crop growth and potentially lead to losses. vii) The production of certain materials used in hydroponics, such as plastics for containers and growing media, can have environmental impacts. It's important to consider the sustainability of these materials. viii) Maintaining the correct nutrient balance in the water is crucial. If not properly managed, nutrient imbalances can lead to stunted growth or nutrient toxicity in plants. Additionally, hydroponic systems require specific nutrient solutions, which can be costly. The ongoing expense of purchasing these nutrients should be factored into the economics of hydroponic farming. Growers can, however, mitigate some of these limitations through careful planning, education, and experience in managing hydroponic systems effectively.	
Minor REVISION comments **1. Is language/English quality of the article suitable for scholarly communications?**	**1.** The manuscript is written clearly and in good English; I enjoyed reading it.	
Optional/General comments	As mentioned, the work is interesting and very timely. The main advantages of the Hydroponic method are well illustrated. However, while hydroponic growth offers numerous benefits, it also has some limitations and challenges that need to be considered. The author did not mention these limitations and this is the vulnerable aspect of the work. The author is invited to take into account the suggestions expressed above.	

PART 2:

	Reviewer's comment	**Author's comment** *(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Are there ethical issues in this manuscript?	*(If yes, Kindly please write down the ethical issues here in details)*	

Reviewer Details:

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