International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

A Study on Self Watering Magnetic Plants

Ekta Kumari[1], Baisakhi Debanath[2], Accamma CG[3], Deepesh M Jain[4]

[1,4]Student, Center for Management Studies, Jain Deemed-to-be U,
[2,3]Assistant Professor, Center for Management Studies, Jain Deemed-to-be U,

Abstract
The main idea of this article is to show you how Normal operation of the system automatic watering is in progress places for these common plants. In this article we are alone works on regular implants, not implant specific and are not specific to any vegetable category. We will work on it normal ground. The soil moisture depends on the water content that will impact growth and development Factory. Then the normal treatment of the irrigation system usually handcrafted, no matter how strong water needed by plants. Many studies have been conducted, which have been discussed in several articles and in the system designed to measure soil moisture. The irrigation function is stopped by the device if the floor detects humidity levels over 50%. Because the humidity display platform presents data in graphical form, the system has what it calls the potential to be employed in the automatic crop watering process. This planter can hold both water and plants thanks to the extremely high gripping ability of the permanent magnets utilised in it. These vases are made of fine handcrafted ceramics of the finest calibre.

Keywords: soil moisture sensor, microcontroller, autonomous irrigation system.

INTRODUCTION

OVERVIEW

If we look at the current scenario of the country the population of the country will increase day by day and the number of tree plantings will decrease are trees, but the maximum number of people is not people don't have enough time to take care of themselves plants that are in the house or people who have it planted, which they planted in the garden of their house or a small area of land. So, in this review article, we will work for automatic watering of plants. Like a number The population of is increasing, so must we increases the number of plants that provide us with more oxygen, the so-called if it will be busy then we will need it large irrigation system, then with intelligent irrigation we can deliver the right amount of water. The water supply process of the facility can be done manually, as well as the use of smart devices or self-irrigating magnetic implants. This study is related to Design of a prototype plant watering device and system, that works automatically. Device prototype They focuses on measuring soil moisture to control water flow when watering plants. Only the purpose of this research work is the irrigation of plants The system can control the required water content of plants as a function of soil moisture.

After extensive investigation and discussion with renowned farmers and botanists, we developed the concept of self-watering magnet plants. These plants can be cultivated everywhere and add beauty and greenery to densely populated areas. Rooftop gardens are ideal for self-watering containers since they can be positioned anywhere, no matter how big or small the garden is. The pots of Self Watering Magnetic Plants can be placed virtually anyplace.

These pots are specially designed to retain water and take up minimal space. These containers provide plants with water when they need it. They don't let plants suffer from the extreme humidity swings that can occur. The super strong holding force of the permanent magnets used in this planter allows it to hold water and plants. The ceramics that make up these vases are of the highest quality and are handcrafted.

FORMULATION OF THE PROBLEM

How to design and implement a system that can reliably, efficiently, and effectively automatically irrigate crops without the need for constant human intervention? This problem arises from the need to provide plants with an adequate and constant supply of water to support their growth and survival while minimizing the time and labor required of keepers to carry out this task. Traditional methods of watering plants often rely on hand watering with a watering can or hose, which can be time-consuming and prone to human error such as over- or under-watering. Ideally, a self-watering system should provide plants with a constant and appropriate level of humidity, depending on factors such as species, age, size, and environmental conditions. It should also be designed to be easy to use, maintain, and customize when needed.The solution can include a combination of sensors, controllers, pumps, valves and other hardware components, as well as software algorithms to manage the system and optimize water usage.

OBJECTIVES OF THE STUDY

Potted plants have a problem. They rely on human keepers to provide them with water, light,
nutrients, and pest control—basically everything they need to survive.
But people are fickle, and figuring out exactly how much water to give your plant at any
given time can be difficult. In fact, overflow is the number one reason why indoor plants die off.

Irrigable, or self-watering, planters take the guesswork out of watering by allowing your plants to water themselves.

1. Eliminate inconsistencies = happy potted plants
   Constant care of plants is strenuous work. You can't exactly control how much light they're getting unless you're exclusively using grow lights, so their water needs vary constantly. Two glasses of water one week may be too much or the next not enough. And this is the heart of the problem that indoor plants face. They want one thing that most of their caregivers can't provide: consistency.
2. Conserve water.
   We all need to do everything in our power to preserve water, the essence of the life, in the face of global warming. These containers are a tremendous blessing since they reduce water loss from evaporation or infiltration.
3. Give room with flexibility for growth: As more people move into apartments, gardening is only possible in containers, on decks, patios, and in windows. Self-watering pots are ideal for rooftop gardens since they may be positioned anywhere, regardless of the garden's size or shape.
4. Make sure there is always water available: As was already said, these clever containers give plants water when they require it. They stop the dramatic humidity swings that would otherwise happen from harming plants.
5. Keep Your Roots Hydrated: Because water is held in the container's outer chamber and delivered to the roots as needed, the plant's roots grow normally and remain strong during its entire life cycle.

6. Self-watering plants use capillary action to hydrate the soil, which decreases illness. It avoids powdery mildew or other dangerous organisms from attacking the plant since the soil is irrigated directly rather than through the leaves, stems, or soil surface. Learn how to take care of houseplants by reading on.
7. The soil is where nutrients are stored; excessive irrigation causes the soil to lose important nutrients. In contrast to a conventional container, nutrients in self-watering containers do not seep out and are kept in the soil because they are sealed.
8. No weeding

REVIEW OF LITERATURE

Water is one of nature's greatest gifts to humanity, say Prisilla et al. (2012), because as the population grows, so does the need for food. The amount of water used for irrigation has skyrocketed in recent decades. The water contains pollutants and industrial trash. conservation of water is most important.

Cosmin (2012) asserts that there is undeniable growth in the use of AI in agriculture. Several specialised Computer systems are used in the agriculture industry, albeit the quality and accessibility of these systems varies greatly from country to country. Notwithstanding operational difficulties, only about 30% of the world's population currently has access to this state-of-the-art technology. The first is that many countries still have underdeveloped IT infrastructures.

According to YETIRAJ et al., more data are now available from more sources than ever before as more agricultural applications use data mining techniques (2012). There is potential for additional advancement in this very young field of study. This active and exciting area of research requires a lot of work. For accurate crop prediction and management, a multidisciplinary strategy integrating agriculture and information technology will be helpful.

Jaichandran et al. (2013): Prototype of the automatic control and remote access to the irrigation motor. The prototype includes a sensor node, a controller node, and a mobile phone. A sensor node is distributed across the irrigation field to collect soil moisture readings and the collected data is sent to a control node. After receiving the value from the sensor, the controller node compares it to the required soil moisture value.When the soil moisture in the irrigation field is not needed, the motor will start watering the corresponding agricultural fields and send an alert message to the registered mobile phone. The mobile phone can be used to send SMS to check the soil moisture value in the irrigation field, and it can also send SMS commands to turn on/off the irrigation motor. The prototype is tested using three clay pots with different humidity levels as irrigation fields. Experimental results show that theprototype is capable of automatically and remotely controlling the irrigation motor based on feedback from a soil moisture sensor. The prototype could make it easier for the farmer to remotely monitor and control irrigation activities.

Sami al. (2014): The Indian farmer and those who have to work for him must be able to cope with the emerging scenario of full or partial liberalization and dismantling of government safeguards, agricultural market opening, fluctuations in the farming environment and Use possible export opportunities to finish . Quality of life in the countryside yes We can also improve it by introducing quality information for better decision-making. IT can play an important role in facilitating the transformation of rural India to meet these challenges and bridge the rapidly widening digital divide. one of those helping farmers to understand modern farming methods, availability of agricultural inputs, sources of irrigation, availability of pesticides and fertilizers to increase crop production and efficiency.

RESEARCH GAP

Users encounter numerous concerns while using self-watering pots, including toxic mineral buildup, fungal, poor root growth, and many other variables that may result in poor growth of the plant. This is one of the main market issues with self-watering magnetic plants. This has an adverse effect on the market for self-watering magnetic pots.

Also, the increase in coronavirus cases around the world and the lockdown scenario had posed a number of difficulties for practically all the industries. The global market for self-watering plants has seen a decline in sales as a result of the pandemic scenario and the directives imposed by various governments in various nations to close all manufacturing facilities, schools, malls, offices, and other public locations.

Self-watering magnet plants are not suitable for very thirsty plants as they require very moist soil, they may struggle with a top-off watering system. Self-watering pots will never properly water a thirsty aquatic plant like an umbrella palm or fiberglass plant. They are unable to discern meteorological or environmental factors. Self-watering pots provide water for your plants regardless of expected humidity or rainfall. If you live in a very humid area or have a particularly rainy season, you'll need to monitor your self-watering pot to make sure your plants don't get wet and rot.

Another loophole in the magnetic self-watering plant market is buying a standard pot or planter, which is a cheaper option. Self-watering pots are more complicated to set up initially and require additional parts to function effectively. The price depends entirely on the size and style you choose.

METHODOLOGY OF STUDY

RESEARCH QUESTIONS

1. What is the anticipated rate of market growth from 2022 to 2028? How big will the market be in the anticipated period?
2. What major variables are expected to have the biggest impact on the self-watering pots and pans market over that time period?
3. What effective business strategies have the major market players used to dominate the Automatic Watering Pots and Pots sector?
4. What are the most important market trends influencing the expansion of the self-watering pot and pot market globally?
5. What are the main risks and impediments that could prevent the market for self-watering pots and pots from expanding?
6. What are the most crucial skills that market leaders can employ to be successful and profitable?

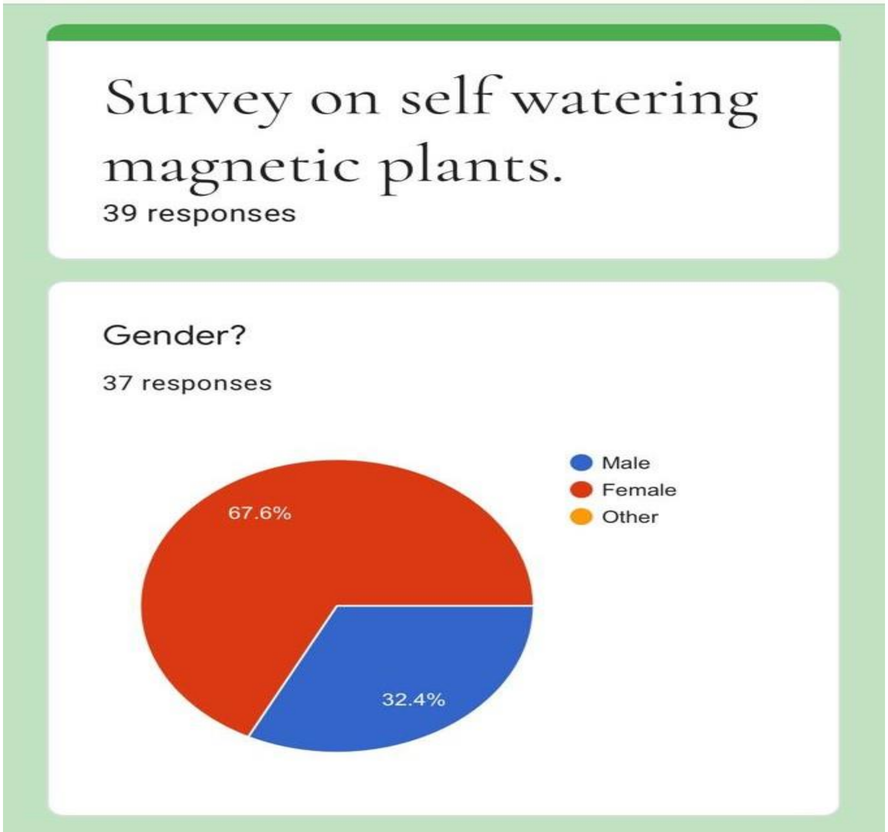
RESEARCH DESIGN

The study was carried out using the Qualitative Research Design Studio's research methodology. The goal of qualitative research is to gather and examine non-numerical data in order to comprehend people's attitudes, beliefs, and motives in their social reality. The discussion took a qualitative approach and conducted a descriptive analysis of the findings. The primary research method in this study was observation. By using the observational method, researchers were able to comprehend the different kinds of pots available for purchase in stores, homes, and offices. This allowed researchers to consider the ideal materials, the temperature and behaviour of various materials, as well as the design and finishing

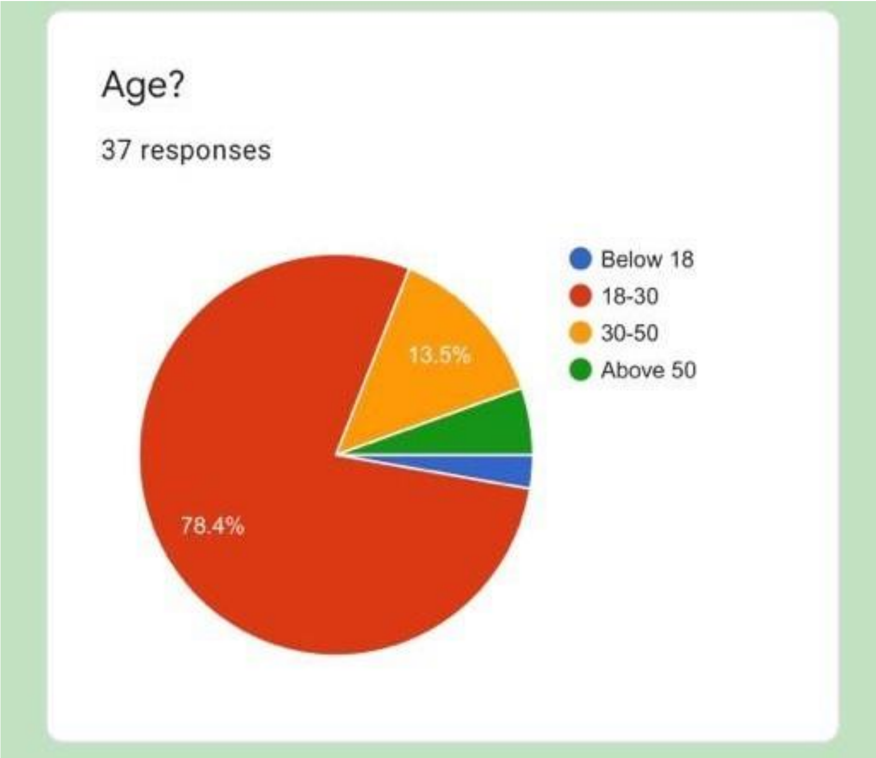
techniques that were required. To successfully apply the findings, considerable consideration was given to the observations that were made.
The self-watering planter consists of the following parts
bet
earth and pot Tank(for water storage)
Sensor: Regularly monitor soil moisture
Magnet
The system used by self-watering containers is a tank. The container has a water tank at the bottom that needs to be filled. A hole for the overflow of water is there. The plants deliver a steady amount of moisture directly to their roots as long as the reservoir is full because the soil collects water from the earth. Self-watering tanks are extremely water-efficient thanks to the Tank System. The water evaporates more slowly and with less water loss when it is shielded from the sun and wind than when it is sprayed on plants. Because you are feeding your plants directly through their roots, you are retaining water from the leaves while lowering the risk of fungus and disease.

DATA ANALYSIS AND DATA INTERPRETATION

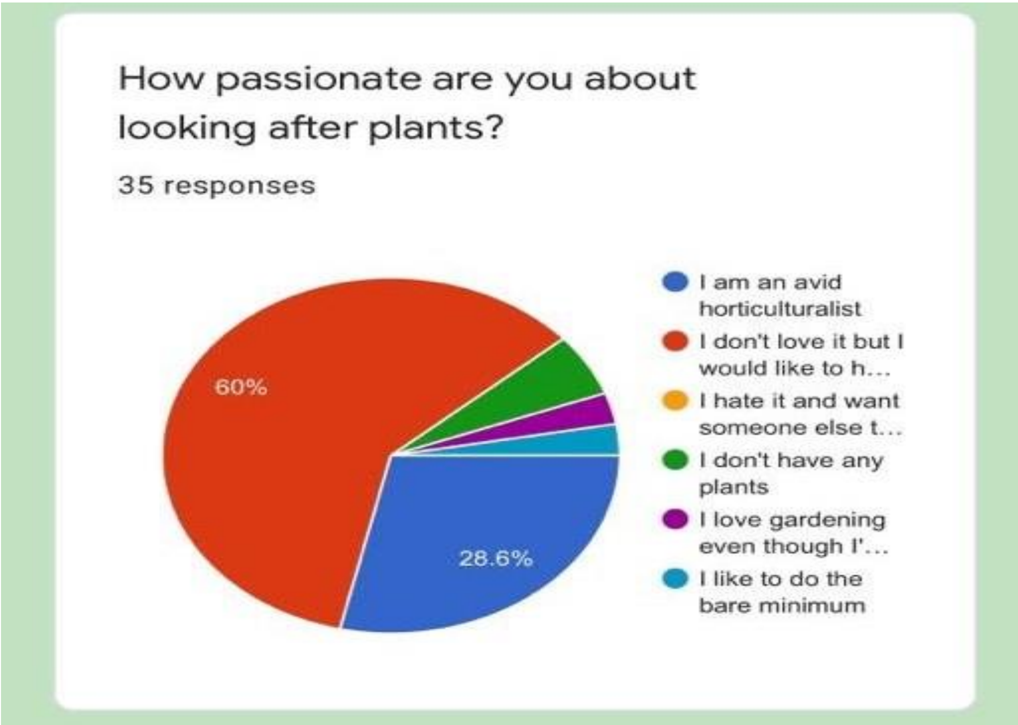
Responses from a population sample of about 40 people.



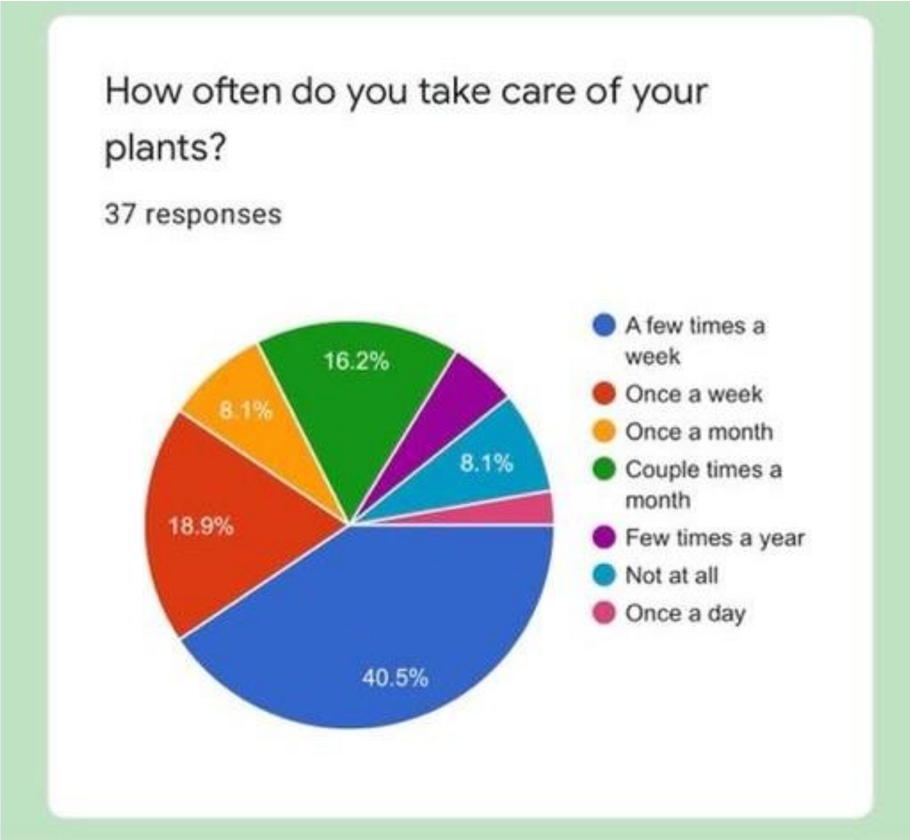
The survey revealed that women (67.7%) are more interested in gardening and plants than the male population by around 32.4%.



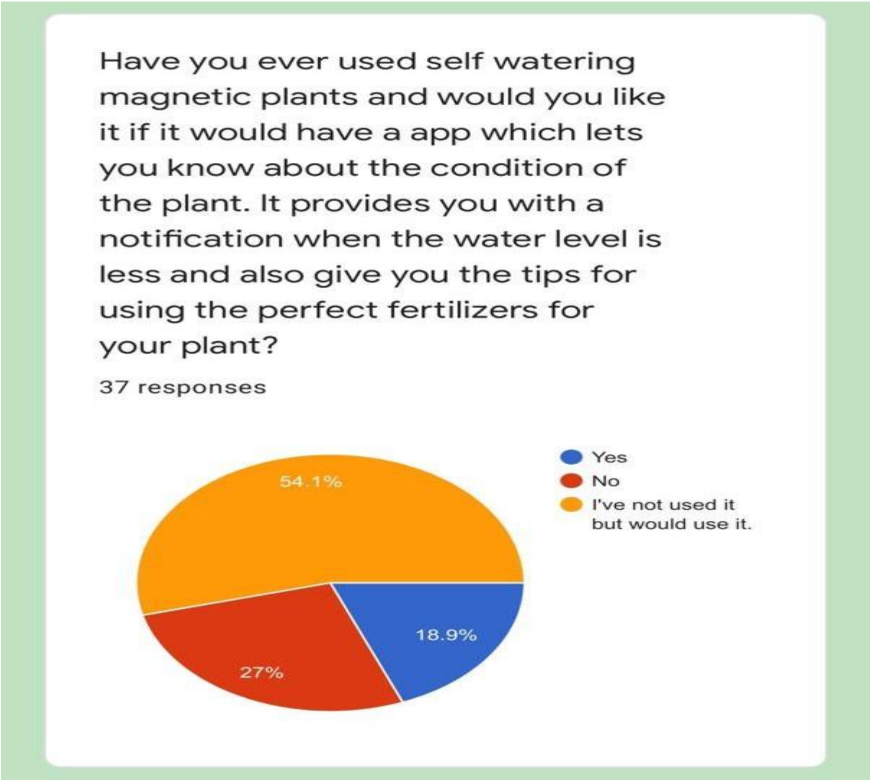
The survey shows that 18-30 year olds (78.4%) are more interested in gardening and plants than under 18, 30-50 and over 50 year olds.



A survey shows that 60% of people dislike plants but would like to have them. On the other hand, 28.6% of people are avid gardeners.



The graph shows that 40.5% of people tend to plant several times a week, 18.9% of people once a week, 8.1% of people once a month, 16.2% several times a month and 8.1% of people do not take care of plants.



In the table above, 54.1% of people have not used it yet but would like to use it in the future, and 18.9% would like to have an app to check the system status in the future.

SUMMARY OF FINDINGS ON STUDY OF SELF WATERING PLANTS

Research on self-watering plants aimed to investigate the effectiveness of self-watering systems in ensuring optimal water supply to plants and their impact on plant growth and health. The following main results were observed:

Increased Plant Growth: Plants grown with self-watering systems show better growth than traditional irrigation methods. The constant supply of moisture promoted healthy root development, resulting in increased shoot growth, leaf density and overall plant vigour.

SAVING WATER: Self-watering systems are proven to save water. They reduced water loss by preventing excess water from dripping out of the pots, which is common with traditional irrigation methods.

Cost factors: Purchasing or setting up the self-watering pots or systems may need an upfront investment in self-watering systems. Yet, the decreased need for maintenance and use of water may eventually make up for the expenditures.

Overall, the study results suggest that self-watering systems can be an effective method to ensure optimal water supply, promote plant growth, conserve water and reduce maintenance, although the suitability of self-watering systems may depend on specific plant species and growing conditions. More research may be needed to investigate the long-term effects of self-watering systems on plant health and growth.

CONCLUSION

While it may seem progressively more difficult, there are many other options such as B. creating complex combinations of plants of the same variety. Using too many sensors is another idea to experiment with irrigation and a timer to regulate sprinklers etc. Regardless of the design, however, there is no doubt that this system can be very useful. It solves many problems, some of which seem trivial. Thanks to this system, you can now be sure that the right amount of water is released when you water your plants. Although human survival can be very dangerous, for an advanced user who is not very tech savvy and interested in science, people using this system will benefit greatly from using this system. A self-watering pot helps reduce your carbon footprint as water wastage is reduced by using a self-watering pot. The growing demand for public parks and gardens, which contribute to the improvement of infrastructure in various cities and suburbs around the world, will boost the automatic irrigation tank market in the near future. Self-watering containers are also perfect when you're on the go and can't keep up with your plants' watering needs.They also work well if you have a place you want a container but the location makes watering impractical or difficult.

LIMITATIONS

Here are some general limitations that may apply to self-watering research:

- Limited scope and generalizability: Research on self-watering plants may focus on specific plant species, types of self-watering systems, or environmental conditions, which may limit the generalizability of the results to other plant species, systems, or conditions. Results obtained under controlled experimental conditions do not necessarily reflect real-world scenarios where multiple factors may affect plant growth and watering needs.

- Type of short-term studies: Many studies of self-watering plants can be completed in a relatively short period of time, which may not take into account the long-term effects and changes in plant growth, water use efficiency, water and water consumption or other factors. relevant parameters. Long-term studies are needed to evaluate the durability and effectiveness of self-watering systems over long periods of time.
- Lack of standardization: There is no standard definition or methodology for self-irrigation systems, and different studies may use different criteria to evaluate their performance. This can make it difficult to compare and summarize results from different studies and can lead to conflicting or inconclusive results.
- Interactions with other factors: Plant growth and water consumption are influenced by many factors including light, temperature, humidity, soil type and plant type. Studies of self-watering plants do not always consider the interaction of these factors with the self-watering system, which can limit the accuracy and usefulness of the results.Human factors: Drip irrigation systems often require human intervention for installation, maintenance and operation. Research cannot always capture the variability in human behavior, preferences, and management practices that can affect the performance of irrigation systems in real-world conditions.
- Unrealistic Conditions: Experimental conditions controlled in research may not fully reflect the complexity and variability of actual horticultural conditions where plants are exposed to changing environmental conditions, pests, diseases and other factors. Results from controlled trials may not fully reflect the performance of irrigation systems in actual horticultural practice. Despite these limitations, research on self-watering plants can provide valuable information and insights for understanding the potential advantages and disadvantages of these systems.It is important to carefully consider the limitations of the study and to interpret the results in the context of specific horticultural conditions and practices.

REFERENCES

1. Becq, D. (1994, September). Designing automatic water quality monitoring stations for lakes and rivers. In *Proceedings of OCEANS'94* (Vol. 1, pp. I-469). IEEE.
2. Cunill, C., Cáceres, R., Narváez, L., Casadesús, J., & Marfà, O. (2010, August). Improved design of an automatic irrigation tray system for outdoor nurseries. In *XXVIII International Horticultural Congress on Science and Horticulture for People (IHC2010): International Symposium on 937* (pp. 1065-1072).
3. Dolar, S. G., & Keeney, D. R. (1971). A Self-Watering System for Growing Plants in Potted Soils 1. *Agronomy journal*, *63*(2), 334-336.
4. Geoffrey, G., de Dieu, M. J., Pierre, N. J., & Aimable, T. (2015). Design of automatic irrigation system for small farmers in Rwanda. *Agricultural Sciences*, *6*(03), 291.
5. Guntur, J., Raju, S. S., Jayadeepthi, K., & Sravani, C. H. (2022). An automatic irrigation system using IOT devices. *Materials Today: Proceedings*, *68*, 2233-2238.
6. Hanitha, D., Anusha, B., & Prakash, M. D. (2016). FPGA implementation of automatic irrigation and pesticide control system. *vol*, *5*, 136-140.

7. Joshi, A., & Ali, L. (2017, March). A detailed survey on auto irrigation system. In *2017 Conference on Emerging Devices and Smart Systems (ICEDSS)* (pp. 90-95). IEEE.
8. Lim, B., Hong, J., & Yeon, I. (2010). Application of Canadian Council of Ministers of the Environment Water Quality Index (CCME WQI) in Daecheong reservoir using automatic water quality monitoring data. *Journal of Korean Society on Water Environment*, *26*(5), 796-801
9. LIVINGSTON, B. E. (1918). Porous clay cones for the auto-irrigation of potted plants. *The Plant World*, *21*(8), 202-208.
10. MacNeill, M. M. (1970). Automatic watering for plants in containers of varying size. *Nurseryman and Garden Centre*, *150*, 169-70.
11. Marimuthu, M., Ajitha, M., Nandhini, R. P., & Scholar, U. G. (2018). Automatic Irrigation System for Vegetable Crops using Internet of Things. *Research journal of Science and Engineering System*, *3*(1), 91-100.
12. Martin, C. A., & Borgardt, S. (1994). Self-watering Container Design and Salinity Affect Growth of Two Foliage Plants. *Journal of Environmental Horticulture*, *12*(3), 170-173.
13. Mustaqim, K., Rabbani, S. A., Surya, G. G., & Agustian, Y. (2020). Design Of Mini Plants With Self-Watering Features Using Environmentally Friendly Materials.
14. Muthukumar, S., Karthikeyan, K., Ranjithkumar, G., & Kavin, R. (2018, February). A Cost Effective System for Auto Irrigation, Soilmonitoring and Control. In *2018 International Conference on Soft-computing and Network Security (ICSNS)* (pp. 1-7). IEEE.
15. Nugroho, F., Faisal, M., & Hunaini, F. (2021, June). Autonomous Groups Particles Swarms Optimisation (AGPSO) to Optimise the Fuzzy Membership Function in the Automatic Watering Plant Case Study. In *Journal of Physics: Conference Series* (Vol. 1908, No. 1, p. 012022). IOP Publishing.
16. Parks, S. E., Worrall, R. J., Low, C. T., & Jarvis, J. A. (2007, September). Initial efforts to improve the management of substrates in greenhouse vegetable production in Australia. In *International Symposium on Growing Media 2007 819* (pp. 331-336).
17. Permale, H. K., Masturah, M. T., & Abdullah, A. H. (2018). Automatic Irrigation Monitoring System Using Android Based Application. *Journal of Telecommunication, Electronic and Computer Engineering (JTEC)*, *10*(1-14), 129-132.
18. Rohadi, E., Amalia, A., Nidianingsih, A., Arief, S. N., Ariyanto, R., & Wibowo, D. W. (2019, December). The design and evaluation of an automatic watering system by using Fuzzy Mamdani. In *Journal of Physics: Conference Series* (Vol. 1402, No. 2, p. 022088). IOP Publishing.
19. Sayed, A., Vatkar, S., Udmale, A., & Bhandiwad, V. (2018). Smart and automatic water distribution control system. *Int. Res. J. Eng. Technol*, *5*(01), 644-646.
20. Siregar, R. R. A., Palupiningsih, P., Lailah, I. S., Sangadji, I. B., Sukmajati, S., & Pahiyanti, N. G. (2020, December). Automatic Watering Systems in Vertical Farming Using the Adaline Algorithm. In *International Seminar of Science and Applied Technology (ISSAT 2020)* (pp. 429-435). Atlantis Press.
21. Steinberg, R. A. (1930). AN AUTOMATIC WATERING SYSTEM WITH RECORDER. *Journal of Agricultural Research*, 233.
22. Tolentino, L. K. S., Bacaltos, P. C., Cruz, R. M. V., Cruz, N. J. S. D., Medina, L. R. S., Panergalin, J. V., ... & Velasco, J. S. (2021). Autogation: An alternate wetting and drying-based automatic

irrigation and paddy water level control system through Internet of Things. *AGRIVITA, Journal of Agricultural Science*, *43*(3), 479-494.

23. Yan, W. Y., Shaker, A., & LaRocque, P. E. (2019). Scan line intensity-elevation ratio (SLIER): An airborne LiDAR ratio index for automatic water surface mapping. *Remote Sensing*, *11*(7), 814.
24. Yousif, J. H., & Abdalgader, K. (2022). Experimental and mathematical models for real-time monitoring and auto watering using IoT architecture. *Computers*, *11*(1), 7.
25. Zhu, H. H., Huang, Y. X., Huang, H., Garg, A., Mei, G. X., & Song, H. H. (2022). Development and evaluation of arduino-based automatic irrigation system for regulation of soil moisture. *International Journal of Geosynthetics and Ground Engineering*, *8*(1), 13.