

# ENVIRONMENTAL CHANGE: CHALLENGES AND OPPORTUNITIES FOR A SUSTAINABLE FUTURE

ISBN: 978-81-981142-8-0 | Year: 2025 | pp: 48 - 53 |

---

## Application of organic manure on infertile land for creating a vegetable garden

<sup>1</sup>Kavita E. Shelke

<sup>2</sup>Vijay Kisan Hile

<sup>3</sup>Suraj Gajbhiye

<sup>4</sup>Jai Knox

<sup>1</sup>Asst. Prof. Konkan Gyanpeeth Karjat College of Arts, Science & Commerce Karjat - Raigad.

<sup>2</sup>Asso. Prof. Bhavan's H. Somani college, Chowpatty, Mumbai-7.

<sup>3</sup>Asso. Prof. Bhavan's H. Somani college, Chowpatty, Mumbai-7.

<sup>4</sup>Asso. Prof., Department of Botany, Wilson College (Autonomous), Mumbai - 400007

Email: [kavitairnak@gmail.com](mailto:kavitairnak@gmail.com)

Article DOI Link: <https://zenodo.org/uploads/15188740>

DOI: [10.5281/zenodo.15188740](https://doi.org/10.5281/zenodo.15188740)

### Abstract

Organic manure is a natural product utilized by farmers to improve sustainable crop production. The primary objective of application of organic manure on infertile land for growing organic vegetable is to enhance the health and productivity of the interconnected communities of soil, plants, animals and humans. Here, using college premises infertile land to create vegetable garden and awareness towards the organic farming and organic vegetables and their value. Among the vegetables planted, the maximum growth was recorded in *Solanum melongena* (L.), *Solanum lycopersicum* (L.), *Anethum graveolens* (L.), *Trigonella foenum-graecum* (L.) and satisfactory growth in *Luffa cylindrical* (L.), *Lablab purpureus* (L.) and *Spinacia oleracea* (L.). No lowest growth was recorded in any vegetables while using the organic manure in vegetables garden. *Luffa cylindrical* and *Lablab purpureus* cultivated in bed border and found that fruitful results. Now a day's chemical fertilizers were used in excess amount to increase the crop production for economical purpose. Such chemical vegetables are affected the human body parts and to create measure disease like cancer. So, one of the main motives of this research is to cultivate vegetable using organic compost and bio pesticide to increase nutritive value as compared to chemical fertilizers.

**Keywords:** Vegetables, organic manure, infertile Soil

### Introduction:

India is the land of vegetable crops and ranked second in the world in vegetable

production. In Indian kitchen vegetable play an important role. Vegetables are so common in human diet that a meal without a vegetable is supposed to be incomplete in any part of world. All the vegetables have presented a great variant nutrient as per human diets which are necessary. Vegetable requirement is 300g/day/person as recommended by dietician. Vegetables are herbaceous plants and produce large amount of biomass within short period (Chatterjee and Thirumdasu, 2014). Research conducted by the School of Vegetable Gardening indicates that consuming grains, fruits, and vegetables cultivated with chemical fertilizers causing the development of serious health issues in humans, including cancer, skin diseases and kidney problems. The utilization of natural manure has demonstrated a positive impact on both agricultural productivity and human well-being, facilitated by the consumption of organically cultivated fruits and vegetables in daily life (Basnet and Chidi, 2019).

So, the demand for fresh and healthy organic vegetable is increasing sharply both in domestic and international market due to the harmful effects of chemically treated vegetables on human health and soil quality. If the soil contains a beneficial living organism and organic manure is the most important factor for crops production and maintain soil fertility at the same time. Farmers are most influenced by observing and using this method. Soil quality defines the characteristics and dynamics of soil properties, while soil health defines function in terms of a given soils capacity to supply a service based on the existing stock or process. Zhao et al.

(2024) stated that combining of organic manure with mineral fertilizers effectively boosts crop production and the economic income of farm while mitigating the harmful effects of solely using chemical fertilizers on the soil.

Organic manure is the most natural and chemical-free substance way to boost crop yield and enhance soil productivity. Organic manure prepared from decaying animal waste, plant scraps and food waste (Verma et al., 2021). The use of this type of manure in farming, enriches the soil with a variety of essential nutrients for plant growth. In today's generation, the heavy use of chemical fertilizers has negatively impacted on the land, leading to higher crop yields but also an increase diseases and pests in cereals. As a result, many farmers have now that turned towards the traditional farming by using natural fertilizers instead of chemical ones (TNAU, 2016). Organic manure enhances the soil's ability to retain water, makes it more porous for better gas movement and boosts the population of beneficial soil microorganisms (Sanasha, 2014). Poikayil (2021) told from his research that Holstein Friesian cow dung significantly enhances crop productivity due to its high quality in creating farm yard manure, surpassing the contributions of other Indian breeds. Farm yard manure content 0.5% N, 0.2% P<sub>2</sub>O<sub>5</sub> and 0.5% K<sub>2</sub>O in well-rotted manure (TANU, 2016) while green manure (compost) content 0.5-0.1% N, 0.4-0.8% P<sub>2</sub>O<sub>5</sub> and 0.8-1.2% K<sub>2</sub>O nutrient (Katyayan, 2019). Organic manure contains nitrogen, phosphorus and other essential nutrients that plants need to grow.

In this study, compost and fertilizers were applied to infertile land, making it suitable for the cultivation of fresh, healthy and chemical-free vegetables. *Solanum melongena* (L.), *Solanum lycopersicum* (L.), *Trigonella foenum-graecum* (L.), *Spinacia oleracea* (L.), *Anethum graveolens* (L.), *Luffa cylindrica* (L.) and *Lablab purpureus* (L.) vegetables were grown on prepared fertile land by providing plant nutrients. A good number of vegetables in India are an introduction from foreign countries. Growing the vegetables on land they as to maintain the soil quality and avoid soil erosion. Study on the creation of vegetable garden as on infertile land in college premises has a challenge to take the production from same land. The concept of creativity of vegetable garden in college premises has one of the distinct changes regarding the organic vegetables and organic farming.

### Material and Method

Using farm tools and equipment's to made land in level removing many stones as possible and other unwanted material. All the weeds and grasses were removed from the soil. Then loosen the soil with rototiller or shovel, to a depth of at least 12 inches. Two inches of dried compost to 17% moisture content and ground into fine soil like texture (Traunfeld and Nibali, 2013) was incorporated into the superficial layer of the land and were left for two weeks. After that the soil analysis was done with several parameters like organic matter, pH, electrical conductivity, nitrogen, sulphur, phosphorus, potassium and soil texture to make the soil suitable by maintaining these all parameters for vegetable growth.

All over the places soil is not more fertile to grow various crops. First it is essential to prepare the infertile soil by enriching it with organic material while maintaining the proper pH and moisture levels to make it suitable for use. On the same land to prepared square and rectangular shape of soil beds. There are 21 beds prepared for this work. Each bed cultivated single vegetable in triplicate. Removed rocks were used to make borders of the garden. Three-four weeks old seedling of vegetable viz. *Solanum melongena* (L.), *Solanum lycopersicum* (L.), *Luffa cylindrica* (L.), *Lablab purpureus* (L.), *Anethum graveolens* (L.), *Trigonella foenum-graecum* (L.) and *Spinacia oleracea* (L.) was transplanted on prepared soil beds. There was providing plant nutrient, sufficient water and weeding was done manually throughout the growing period of the vegetables (Abegunrin et al., 2016). Biological fertilizers are also provided to ensure the continuous and healthy growth of planted vegetables, protecting them against both external and internal fungal diseases. The normal and healthy growth of vegetables was recorded.

### Result and Discussion

For crop cultivation, soil is incorporated with composts, green manure, bio fertilizers and makes more humus. It is necessary to maintain soil fertility. The vegetables are cultivated on it, provides a good production.

Growth showing various vegetables planted on prepared fertile land.

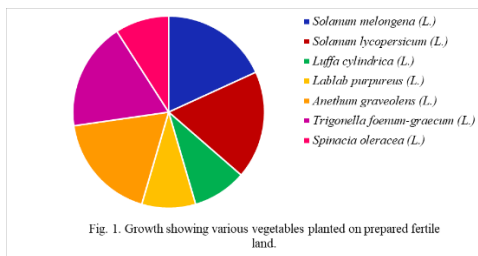
| Sr. No. | Vegetables Name               | Growth |
|---------|-------------------------------|--------|
| 1.      | <i>Solanum melongena</i> (L.) | ++++   |
| 2.      | <i>Solanum</i>                | ++++   |

|    |                                       |      |
|----|---------------------------------------|------|
|    | <i>lycopersicum</i> (L.)              |      |
| 3. | <i>Luffa cylindrica</i> (L.)          | +++  |
| 4. | <i>Lablab purpureus</i> (L.)          | +++  |
| 5. | <i>Anethum graveolens</i> (L.)        | ++++ |
| 6. | <i>Trigonella foenum-graecum</i> (L.) | ++++ |
| 7. | <i>Spinacia oleracea</i> (L.)         | +++  |

++++ - High growth

+++ - Satisfactory growth

++ - Low growth



All planted vegetables show variation in growth and production. *Solanum melongena* (L.), *Solanum lycopersicum* (L.), *Anethum graveolens* (L.) and *Trigonella foenum-graecum* (L.) shows higher production and healthy growth as compared to *Luffa cylindrical* (L.), *Lablab purpureus* (L.) and *Spinacia oleracea* (L.). The results revealed in (Table. 1 and Fig. 1) shows that *S. melongena* (L.), *S. lycopersicum* (L.), *A. graveolens* (L.) and *T. foenum-graecum* (L.) produces more branches, busy structure and maximum healthy biomass while *L. cylindrical* (L.), *L. purpureus* (L.) and *S. oleracea* (L.) produces satisfactory. This study aims to investigate the potential advantages of using organic manure in vegetable gardens specifically focusing on its ability to increase leaf count, fruit yield, stem diameter and plant height compared

to the current widespread use of chemical fertilizers by farmers.

Several previous studies have reported findings relevant to this research conducted by other researchers. Nair (2018) stated that, the application of organic manure results in improved soil physicochemical and biological parameters, mitigating nutrient deficiencies and consequently fostering optimal plant growth and increased crop productivity. Due to this it improved soil health through organic manure enhances the storage life and nutritional value of horticultural crops while also improving their overall quality. Conversely, excessive use of chemical fertilizers can increase the susceptibility of crops to diseases and pests. Organic manure application does not demonstrate any discernible influence on production levels, which remain satisfactory. Zhao et al. (2024) evaluated that the amount of nutrients supply and soil organic matter were positively correlated with the average grain production. This revealed that because of soil organic matter affects the uptake of nutrients, it positively affects crop yields. So, their findings demonstrated that applying the organic manure enhances soil qualities and increases crop productivity.

Bayu et al. (2006) noted that increase the total nitrogen and organic carbon of a soil due to addition of farm yard manure; cow dung (Ewulo et al., 2007) and compost (Angelova et al., 2013). The increased soil TN with increasing rate of cow dung showed that remarkable amount of N would be available for plant because of increased organic matter and favourable pH (Zupanc and Justin, 2010). The addition of doses of compost and plant nutrient had significant effect

on vegetable growth of vegetables expressed by higher number of leaves, plant height and stem girth. Ewulo et al. (2007) also reported that the improved plant growth and yield of pepper under different doses of cow dung. The use of compost for soil amendment increased the organic matter content and improved the physical properties of the degraded soil (Abegunrin et al., 2016). Application of animal dung was found necessary to improved farm productivity of upland vegetable crops (Daño & Midmore, 2002). Wu et al. (2024) noted that applying moderate amounts of organic manure is most effective in improving microbial resources in rhizospheric soil, without causing over-application of organic fertilizer or any adverse effects. Our results suggested that the application of compost and plant nutrients had positive impact on vegetables growth.

### Conclusion

Creativity of vegetable garden on infertile land using farm techniques gives an inspiration to farmer to adopt a maximum infertile land as to progress in farming. Plantation of vegetables on land to avoids soil erosion, increase soil quality, production and soil nutrient. For this way they take a good and healthy vegetable production to give a great economic benefit to farmer and people. Thus, if all farmers transform barren and waste land into fertile land for cultivation, it will lead to significant sustainable improvements in farming.

### References

1. Abegunrin, T., Awe, G. & Ateniola, K. (2016). Soil Amendment for Vegetable Production: An Example with Cow Dung Manure and Eggplant (*Solanum melongena*). International Journal of Current Microbiology and Applied Sciences, 5(8), 901–915. <https://doi.org/10.20546/ijcmas.2016.508.102>
2. Angeloya, V. R., Akova, V. I., Artinova, N. S. & Ivanov, K. I. (2013). The effect of organic amendment on soil chemical characteristics. Bulg. J. Agric. Sci. 19(5), 958-971.
3. Basnet, N., & Chidi, C. L. (2019). Impact of pesticide and fertilizer on human health: a case study in Godawari area, Lalitpur, Nepal. The Geographic Base, 6, 65–76. <https://doi.org/10.3126/tgb.v6i0.26168>
4. Bayu, W., Rethman, N. F., Hammes, P. S. & Alemu, G. (2006). Application of farmyard manure improved the chemical and physical properties of the soil in a Semi-Arid area in Ethiopia. Biological Agriculture & Horticulture, 24(3), 293–300. <https://doi.org/10.1080/01448765.2006.9755027>
5. Chatterjee, R. & Thirumdasu, R. K. (2014). Nutrient management in organic vegetable production. International journal of food, agriculture and veterinary sciences ISSN: 2277-209X, vol. 4(3).
6. Daño, A. M. & Midmore, D. J. (2002). Analyses of Soil and Water Conservation Technologies in Vegetable Based Upland Production System of Manupali Watershed. 12th ISCO Conference, Beijing. <https://tucson.ars.ag.gov/isco/isco12/VolumeIV/AnalysesofSoilandWaterConservationTechnologies.pdf>

7. Ewulo, B., Hassan, K. & Ojeniyi, S. (2007). Comparative effect of cowdung manure on soil and leaf nutrient and yield of pepper. *International Journal of Agricultural Research*, 2(12), 1043–1048. <https://doi.org/10.3923/ijar.2007.1043.1048>
8. Katyayan, A. (2019). *Fundamental of Agriculture*, Kushal Publication's and Distribution, pp. 231-235.
9. Nair, A. (2018). *Importance of Soil Fertility in Vegetable Crop Production*, Department of Horticulture, Iowa State University, Ames, IOWA.
10. Poikayil, G. (2021). *The Indian Express News Published: 28th January 2021*.
11. Sanasha, 2014, <https://www.slideshare.net/sanasha999/ishita-manures-fertilizers>
12. TNAU, 2016 [https://agritech.tnau.ac.in/ta/org\\_farm/orgfarm\\_introduction.html](https://agritech.tnau.ac.in/ta/org_farm/orgfarm_introduction.html)
13. Verma, P., Tomar, B. & Ttipathi, L. K. (2021). Role of Organic Manure in Agriculture: a Review. *Marumegh*, 6(3), 22-28.
14. Wu, Z., Han, X., Chen, X., Lu, X., Yan, J., Wang, W., Zou, W., & Yan, L. (2024). Application of organic manure as a potential strategy to alleviate the limitation of microbial resources in soybean rhizospheric and bulk soils. *Journal of Integrative Agriculture*, 23(6), 2065–2082. <https://doi.org/10.1016/j.jia.2023.10.021>
15. Zhao, N., Ma, J., Wu, L., Li, X., Xu, H., Zhang, J., Wang, X., Wang, Y., Bai, L., & Wang, Z. (2024). Effect of organic manure on crop yield, soil properties, and economic benefit in Wheat-Maize-Sunflower rotation System, Hetao Irrigation District. *Plants*, 13(16), 2250. <https://doi.org/10.3390/plants13162250>
16. Zupanc, V. & Justin, M. Z. (2010). Changes in soil characteristics during landfill leachate irrigation of *Populus deltoides*. *Waste Management*, 30(11), 2130–2136. <https://doi.org/10.1016/j.wasman.2010.05.004>
- 17.