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Low Cost Soilless Crop Production Using Matrix Irrigation System for Problem Soil Areas

Tamil Nadu has the waste land area of about 8.25 lakh hectares. Utilization of these wastelands with conserved water use under matrix suction irrigation system using soilless container media to grow vegetables will be a boon to the farmers. Organic substrates and industrial by products have the potential to support plant growth as growing media. Here conservation of water is achieved, because for growing a vegetable crop only 80 mm of water is required per season. Similarly, enhanced fertilizer use efficiency is achieved through the use of slow release fertilizers/ water soluble fertilizers. Horticultural crops play a vital role in completing the problems of malnutrition by contributing to national income by sharing almost one fifth of the total income from agricultural produce. Growing horticultural crops generates employment in rural areas. By this method, problematic salt affected areas can very well be used for cultivation of vegetables in containers laid on open land, alternative to conventional soil tilling and sowing methods. By managing the cultivation of crops, farmers will be benefitted by gaining experience in the new technology of efficient nutrient and water management as well as crop production and protection aspects of soilless container media cultivation.

SOILLESS CROP PRODUCTION

Container media by matric suction irrigation is a new low-cost soilless technique recently standardized in TNAU for growing pandal vegetables in problem soil areas. It is a labour saving, water conservative and nutrient efficient technique that can be easily established in any unproductive flat lands. By this method problematic salt affected areas can very well be used for cultivation of vegetables in containers laid on open land, alternative to conventional soil tilling and sowing methods. For the purpose, in unproductive land area, container media - matric suction irrigation system supported structure will be established with a pandal layout. Pandal vegetable crops like snake gourd, ribbed gourd, etc., or bushy vegetable crops like brinjal, bhendi, etc., will be grown according to seasons and seed germination and establishment capacity will be executed to farmers under soilless media. By managing the cultivation of crops, farmers will be benefitted by gaining experience in the new technology of efficient nutrient and water management as well as crop production and protection aspects of soilless container media cultivation. Huge volume of agricultural and industrial waste produced annually in India can be recycled by using them as an organic source for agriculture. Vegetable production requires efficient management of irrigation water since it requires water throughout its growing cycle. Judicious use of the available water through efficient methods of water application becomes necessary to enhance the yield and water use efficiency.

Bottom of containers where growing media is placed. The water as well as nutrient loss is prevented since there is no drainage/ leaching. Moisture is kept at optimum range always in growing media from sowing to harvest. Fertilization is possible at right concentration by placing fertilizer pellet pack that has been standardized recently as a new method for steady nutrient supply to crops or adding fertilizer solution.

Conventional agriculture uses soil as medium for growing plants as it provides anchorage, nutrients, air, and water for plant growth. However, soil possesses serious limitations for plant growth at times

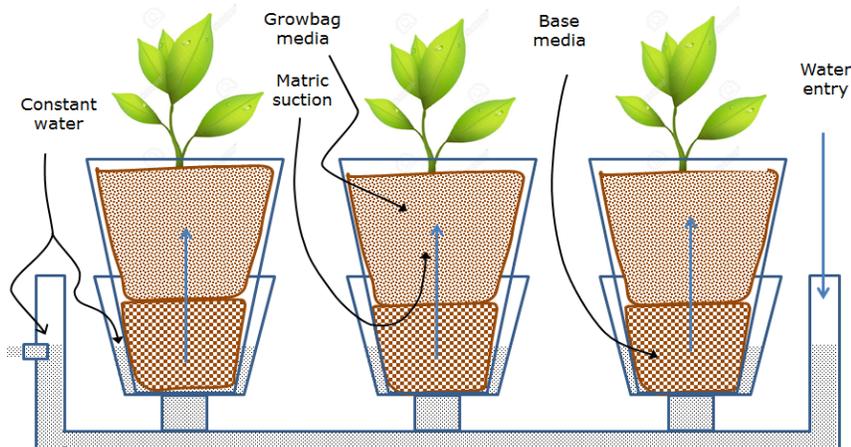


Figure 1. Sketch of soilless crop production along with matric suction irrigation in pots

(Adopted from Kannan and Arulmozhiselvan, 2019).

due to the presence of unsuitable soil Ph, disease causing organisms and nematodes, unfavorable soil compaction, poor drainage, degradation due to erosion, etc. Moreover, open field agriculture is difficult as it involves large space, lot of labour and large volume of water. In order to supplement the production targets of vegetables in problem soil areas, newer techniques of soilless system along with matric irrigation suction can be adopted which virtually replaces open land soil cultivation in field. Among soilless cultivation methods, container media cultivation is one of the most efficient methods to achieve increase in yields. By shifting to cultivation in soilless container media it is possible to have much better control of crops over several crucial factors, including water, oxygen and nutrients towards improving performance of crops. The use of space, nutrient and water are all inherently more efficient in container media culture, which simultaneously also increase the economic efficiency and profitability for growers.

CONCLUSION

Hence, practice of container media - matric irrigation system in phased manner will boost the vegetable production in problem soils of Tamil Nadu.