JUST AGRICULTURE
multidisciplinary e-Newsletter

Special Cultural Practices in Vegetable Production

Chetna Shaktawat, Arpan Sain, Basavaraj and Ananya Mishra
Assistant professor, Bhupal Nobels University, Udaipur, Rajasthan

ARTICLE ID: 47

Abstract

Even though vegetables are essential for both national welfare and food security, there is a discrepancy between recommended consumption and existing output levels. unique cultural operations' effects on vegetable production to improve quality and productivity. Modern farming techniques must be used to address this. Important practices are covered, including the use of plant growth regulators (PGRs), mulching, drip watering, crop rotation, protected cultivation, precision farming, training, and pruning. Some other key procedures include effective pollination, de-leafing, fruit thinning, staking, topping, and de-suckering. These methods, which are customized for certain vegetable crops, seek to raise agricultural sustainability, lower input costs, and increase production. By combining these techniques, crop yields and quality may be greatly increased, satisfying changing agricultural market needs.

Introduction

Even though India is the world's second-biggest producer of veggies, only 210g are available daily, a significant 300g/day difference between output and the recommended per capita diet. These discrepancies are mostly caused by differences in crop production and management techniques among various soil and climate conditions. A few crucial cultural behaviors are necessary to address these issues and improve productivity. They include crop rotation, timely acquisition of high-quality seeds, efficient weed control, appropriate irrigation, balanced fertilization, and insect control. Due to their competition for nutrients and water, weeds and plants need to be controlled manually or using herbicidal methods. Vegetable development requires enough water, and irrigation systems that send water straight to the roots are very helpful in this regard.

Special cultural operations:

A. **Harnessing Drip Irrigation for Water Efficiency:** Production of vegetables must be managed well about irrigation. Farmers who live in drought-prone areas can think about installing drip irrigation systems to save water. Drip systems minimize weed development

JUST AGRICULTURE
multidisciplinary e-Newsletter

and maximize efficiency by delivering water straight to the roots, in contrast to conventional flood irrigation methods. This method produces crops that are healthier and hardier while also conserving water and maintaining consistent soil humidity.

B. **Embracing Mulching for Soil Health:** Mulching is an essential technique for maintaining soil moisture levels and managing the growth of weeds. Farmers use a variety of strategies to protect the soil from the intense summer heat and avoid damage. Straw or plastic sheets are organic materials that may be used to cover the soil to retain moisture, reduce weeds, and stop erosion. The mulch provides the soil with nutrients as it breaks down, promoting the growth of plants and the production of fruits.

C. **Implementing Crop Rotation for Pest Management:** Crop rotation is crucial for preserving soil fertility and preventing damage from pests and diseases. Farmers minimize their dependency on pesticides by upsetting the life cycle of pests and reducing their spread by rotating crops with non-similar ones and incorporating leguminous crops. In addition to maintaining soil fertility and structure, rotational cropping encourages sustainable agriculture for next generations.

D. **Protected cultivation:** Vegetables grown in controlled polyhouses, greenhouses, and net houses have higher yields and better quality. Because this method allows for year-round production, high-value crops like tomatoes, cucumbers, potatoes, lettuce, spinach, and other vegetables are especially well-suited to it.

E. **Adopting Technologies Precision Farming:** A state-of-the-art method of crop management is precision nutrition and irrigation management in vegetable farming, made possible by sophisticated technical instruments. Farmers are using precision agriculture tools more and more in the digital farming era to customize crop yields. These technologies, which enable data-driven decision-making and result in greater yields with less input, include GPS-guided devices, drone monitoring, and soil testing.

F. **Training and pruning:** The practices of training and pruning are essential for improving the quality and quantity of vegetable crops. Staking and trellising are two training methods used to maximize exposure to sunlight and enhance airflow. Pruning, on the other hand, entails removing sick or damaged sections, thinning leaves, and suckers. To reduce plant stress and increase yield, timing and technique are crucial.

JUST AGRICULTURE
multidisciplinary e-Newsletter

G. **De-suckering:**De-suckering is the act of eliminating suckers, which are small shoots that emerge from the rear of leaves and provide the plant with drinking water, from crops like tomatoes and eggplant. Redirecting the plant's energy from excessive development toward fruit production occurs when suckers are removed. When growing tomatoes, de-suckering is routinely trimming off lateral branches to preserve the intended plant structure, increase airflow, lower the risk of disease, and improve the quantity and quality of the fruit.

H. **Staking:** To stimulate growth and increase output, staking is a frequent method in a variety of vegetable crops, including tomatoes, cucumbers, beans, and peas. With this technique, structures like trellises and poles are used, allowing plants to trail or climb as they get bigger. Staking raises the height of the plants, keeps the fruits off the ground, and enhances ventilation, which lowers the chance of illness. Trellises help support the vines of cucumbers, beans, and peas, which facilitates picking and improves the quality of the produce.

I. **Topping:** When planting or covering vegetable crops, such as potatoes and tomatoes, the plant's apical meristem or terminal growth zone must be removed. This encourages bushier growth and more blooming locations by focusing the plant's energy on lateral development and fruit production. Depending on the variety and growth circumstances, topping is usually done after plants reach a specified height or after a given number of fruits have set. Topping can increase fruit quality and productivity.

J. **Pollination:** In greenhouse vegetable growing, excellent yields and quality depend on efficient pollination. In settings where natural pollinators may be sparse, producers frequently turn to manual techniques like hand-pollination, which entails moving pollen from blossom to flower. Effective pollination management involves several key elements, including timely pollination that is coordinated with flower reception, luring pollinators with companion planting, and frequent monitoring.

K. **De-leafing:** In order to increase plant development and productivity, complete leaf clearance—the removal of leaves—is frequently necessary for greenhouse vegetable production. This procedure lowers humidity, improves air and light penetration, and lessens the chance of illnesses like powdery mildew. Additionally, it promotes effective photosynthesis, which is essential for a healthy fruit crop. Timely leaf picking ensures energy distribution, optimal ripening, and high. All things considered, this focused

JUST AGRICULTURE
multidisciplinary e-Newsletter

approach is critical to preserving plant health and increasing yields in tropical vegetable crops.

L. **Fruit thinning:** In vegetable crops, thinning is an essential procedure that involves removing surplus fruit in a targeted manner to improve quality and output. Thinning produces larger, higher-quality produce while lowering the danger of illnesses and pests by giving the surviving fruits plenty of room, nutrients, and sunshine. The amount of plants and their spacing are carefully considered. Higher and better yields are produced by proper thinning of crops including tomatoes, peppers, eggplants, cucumbers, melons, and squash.

M. **Soil sterilization:** In order to improve overall plant health in vegetable crops, soil sterilization is crucial for getting rid of soil-borne diseases, insects, and weed seeds. To heat the soil to a high temperature, this process uses methods like steam, solarization, and chemical treatments. Having pests under control improves the quality and yields of crops by keeping the agricultural environment cleaner. This method is especially helpful for crops produced in raised beds or containers, as well as greenhouse production, where soil-related problems are frequently encountered.

N. **Plant growth regulators (PGRs):** In vegetable crops, plant growth regulators (PGRs) play a critical role in controlling growth and development. These hormones influence pathways such as abscisic acid, gibberellins, auxins, and cytokinins. In order to ensure uniform development in protected crops like tomatoes and cucumbers, PGRs are essential in regulating stem height. Additionally, they improve stress tolerance, seedling vigor, and seed germination. Vegetable crop output, quality, and uniformity can all be improved by using PGRs correctly, but it's crucial to adhere to dose and time recommendations. Before using, one should take local laws into account. For example, cytokinins encourage flowering and shoot growth, gibberellins help fruit development in cucumbers and melons, abscisic acid facilitates seed germination, paclobutrazol regulates stem elongation in tomatoes, and auxins like NAA stimulate root growth and fruit set in peppers and tomatoes.

Conclusion:

In conclusion, farmers may dramatically boost crop productivity, lower input costs, and gain more market power by customizing cultural activities for vegetable crops. By putting these suggestions into reality, crop-specific sustainable agriculture methods that adapt to changing consumer needs are promoted. This method not only makes vegetable production more

JUST AGRICULTURE
multidisciplinary e-Newsletter

profitable and successful overall, but it also helps farmers adapt to the constantly changing agricultural landscape.

References:

Kårlund, A., Kyttä, V., Pellinen, T., Tuomisto, H. L., Pajari, A. M., Kolehmainen, M., & Saarinen, M. (2024). Validating nutrient selection for product-groupspecific nutrient indices for use as functional units in life cycle assessment of foods. British Journal of Nutrition, 1-23.

Kruidhof, H. M., & Elmer, W. H. (2020). Cultural methods for greenhouse pest and disease management. Integrated Pest and Disease Management in Greenhouse Crops, 285-330.

Rather, A. M. U. D., Hajam, M. A., Bhat, M. S. A., & Malik, M. I. (2023). Horticulture: Principles and practices. Academic Guru Publishing House.

Sau, S., Bhattacharjee, P., Kundu, P., & Mandal, D. (2023). Banana. In Tropical and Subtropical Fruit Crops (pp. 1-62). Apple Academic Press.

Sharma, K. K., Chawla, S., & Singh, M. C. (2024). Protected Cultivation: Technology, Constraints, and Its Global Status. Cultivation (pp. Academic Press.

Zahid, G., Iftikhar, S., Shimira, F., Ahmad, H. M., & Kaçar, Y. A. (2023). An overview and recent progress of plant growth regulators (PGRs) in the mitigation of abiotic stresses in fruits: A review. Scientia Horticulturae, 309, 111621.