Diara (Riverbed) Cultivation System: Production Practices, Pest Management and Marketing of Bottle Gourd Crop

[1]M. Venu Gopal Reddy, [2]G. Pradeep Kumar, [3]Y. Sreyas Yagnik, [4]I. Alekhya Reddy, and [5] D. Geeta Priyanka

[1,2,3,4,] M.Sc. scholar, Department of Horticulture (Vegetable Science), School of Agriculture Sciences, Malla Reddy University, Hyderabad, Telangana 500043

[5,] Assistant Professor, Department of Horticulture (Vegetable Science), School of Agriculture sciences, Malla Reddy University, Hyderabad, Telangana 500043

Abstract

Diara or riverbed cultivation is a traditional farming system practiced on sand-deposited lands formed within river channels. These areas are widely used for off-season vegetable production, especially bottle gourd and other cucurbit crops, due to the availability of residual soil moisture from nearby rivers. About 68% of bottle gourd cultivation occurs in diara lands, contributing significantly to summer vegetable supply in India. The system is characterized by sandy soils, shallow groundwater, and seasonal availability after flood recession. Farmers adopt pit and trench planting methods along with organic inputs, mulching, and protective thatching to manage extreme temperature conditions. Integrated nutrient, water, pest, and disease management practices are essential for successful cultivation. Major challenges include pest infestations, diseases, and mineral deficiencies due to nutrient leaching in sandy soils. Despite constraints, diara farming ensures early production, continuous income, and better market prices. This system plays a crucial role in vegetable supply chains and rural livelihoods in riverine regions.

Introduction

Diara or riverbed land is formed inside rivers due to sand deposition and is widely used for off-season vegetable cultivation, especially bottle gourd crops, through traditional farmer practices. The term "Diara" comes from "Diya," meaning earthen lamp, as the shallow depressions in the land resemble lamps during the rainy season. About 68% of bottle gourd cultivation is done in riverbed areas, contributing nearly 70–75% of total production in summer. These lands are also called khaddar, char, kachhar, doab, and other local names. Major riverbeds include the Ganga, Yamuna, Narmada, and Krishna systems across India. Common crops grown are cucumber, bitter gourd, bottle gourd, watermelon, muskmelon, and pumpkin. These lands support early vegetable production due to underground moisture from nearby rivers. They are generally flat, sandy, and available for cultivation for one season after floods, making them important for seasonal income and vegetable supply.

Classification of Diara Land Based on Location from the Main Stream

Diara lands can be grouped into three types depending on how close they are to the main river channel.

Main riverbed (lowland) diara: These are the actual riverbeds where sand deposits range from fine to coarse. Such areas become available for cultivation during the non-monsoon period, usually from December–January to May–June, until the early rains begin.

Main land (medium land) diara: These areas lie along the riverbanks and their width varies from place to place. They are often flooded during the rainy season when the river swells. The depth and extent of these diara lands differ depending on the location.

Upland diara: Over time, continuous deposition raises these areas, making them less prone to flooding compared to the main land diara. In practical terms, these lands are quite similar to normal agricultural fields and can be managed in much the same way.

Cultivation Practices in Diara Land

Land preparation: Farmers select riverbed plots that lie perpendicular to the flow of the river. After floodwaters recede during October–November and the southwest monsoon ends, the land is prepared by digging pits, trenches, or channels for planting.

Systems of planting: Different planting methods are followed depending on labour availability and farmer preference.

Pit system of planting: In this method, pits about 0.5 m in diameter and 1 m deep are dug, spaced 1–3 m apart depending on the crop. Several seeds are sown in each pit, and weaker seedlings are later removed. Sometimes smaller circular pits (35–45 cm diameter and about 90 cm deep) are also used.

Ditch system of planting: Trenches are dug in a north-west direction to manage moisture and temperature. Each trench is about 1 m deep, with spacing of 1–2 m for crops like cucumber and bitter gourd, and around 3 m for watermelon,

bottle gourd, and pumpkin. Seeds are sown at 0.5–1 m spacing. Trenches are filled with organic materials such as farmyard manure (FYM), oil cakes, or decomposed waste before sowing, usually done in November–December.

In colder regions of north-west India, protection is provided using grass stubbles (like *Saccharum spontaneum*). This helps reduce sand drifting, protects plants from cold winds, supports vine growth, and prevents damage from hot summer winds.

Bottle gourd varieties: Popular varieties include Kashi Ganga, Kashi Kiran, Kashi Kundal, Kashi Kirti, and Kashi Bahar (hybrid).

Seed rate, treatment, and sowing: Seed rate varies by crop. Early sowing is done in the first half of November to early December, while early January is suitable for late sowing. Seeds are sown in trenches at 45–60 cm spacing and 3–4 cm depth, usually two seeds per spot. For better germination in cold conditions, seeds are pre-soaked for 24 hours and kept warm in moist conditions until sprouting begins before sowing.

Weed management: Common weeds include *Euphorbia hirta*, *Polygonum* species, *Eclipta prostrata*, *Fimbristylis dichotoma*, and *Sida* species. These are removed manually, as the sandy soil makes uprooting easy. Chemical herbicides are avoided to prevent contamination of river water and harm to humans, animals, and aquatic life.

Thatch preparation: In areas with low winter temperatures (1–2°C), young plants are protected using thatch made from paddy straw, grass, or sugarcane leaves. Grass is also spread in February as mulch to protect plants from heat, reduce sand temperature, and prevent vine damage from strong winds.

Cropping pattern: Mixed cropping is commonly practiced. Watermelon and muskmelon are often grown together. Other combinations include summer squash, bottle gourd, round melon, cucumber, sponge gourd, bitter gourd, long melon, ridge gourd, and pointed gourd depending on the region.

Harvesting and yield: Fruits are harvested at tender and edible stages, usually every 2–3 days to maintain quality. Harvesting begins from February–March for off-season crops and continues up to June or October. Early produce fetches better prices in the market.

Role of pollinators: Cucurbit crops rely heavily on cross-pollination, mainly by honeybees. However, in diara lands, bee activity may be limited due to dry conditions and low visibility of flowers. To improve pollination, sunflower is planted at a rate of 100–150 plants per hectare to attract pollinators.

Nutrient management: Organic manures such as FYM, compost, neem cake, or groundnut cake are applied initially. River silt is used to improve moisture retention. At thinning stage, 30–60 g urea per pit is applied. After 25–30 days, fertilizers are applied in split doses, mainly nitrogenous fertilizers, in shallow trenches away from the plants.

Water management: Cucurbits develop deep roots that help them access underground moisture. Initially, pitcher irrigation is given until roots reach deeper moisture layers. Later, drip or sprinkler irrigation can be used efficiently to minimize water loss and nutrient leaching.

Mineral Deficiencies in Diara Land

Mineral deficiencies are commonly seen in cucurbit crops grown in diara lands due to the absence of rich sub-soil and proper layers of silt and alluvium. The sandy soil causes high nutrient leaching, leading to poor retention of macro and micronutrients. As a result, plants show nutrient deficiencies that affect growth, development, and yield.

Harvesting of Bottle Gourd in Diara Land

Bottle gourd is harvested at the tender and edible stage for better quality. Harvesting is done every 2–3 days after fruit set as the crop matures quickly. Delay in harvesting leads to hard, fibrous, or hollow fruits with low market value. Proper maturity is identified by tender skin and suitable fruit size depending on variety.

Handling and Post-Harvest Management

Handling

Fruits should be handled carefully to avoid bruising. They are cut from the vine using a sharp knife or secateurs, leaving a small stalk to extend shelf life. Overstacking should be avoided to prevent damage.

Post-Harvest Management

Cucumbers and melons are stored in cool, humid conditions, while pumpkins and squashes are kept in cool, dry, ventilated places. Regular sorting is needed and damaged fruits should be removed to prevent spoilage.

Conclusion

Diara cultivation of bottle gourd is an important traditional farming system practiced on riverbed lands, enabling off-season vegetable production by utilizing residual soil moisture. Despite sandy soils and challenges like nutrient leaching, pest and disease pressure, and environmental stress, farmers successfully grow crops using improved practices

such as pit and trench planting, organic manuring, mulching, and integrated pest and nutrient management. This system plays a key role in providing early market supply, continuous income, and better returns to farmers in riverine regions. Proper harvesting, handling, and post-harvest management further help maintain quality and reduce losses. Overall, diara cultivation of bottle gourd is a productive and economically important practice that supports both vegetable availability and rural livelihoods.

References

Pandey, S., Dubey, R. K., Singh, S., Kumar, S., Singh, S., & Behera, T. K. (2023). Diara land cultivation of cucurbitaceous crops. *Indian Horticulture*, *68*(2), 77-81.

Yadav, L., Kumar, S., & Yadav, K. K. Agri-India TODAY.

* * * * * * * * *