

Towards Viksit Bharat@2047 Technological Innovations and Policy Options for Eastern Region



ICAR Research Complex for Eastern Region

ICAR Parisar, P.O. Bihar Veterinary College
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Towards Viksit Bharat@2047: Technological Innovations and Policy Options for Eastern Region

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Modified Drip Fertigated Mulched Planting System for Commercial Cultivation of Vegetable in East India Plateau

Period of Development: 2018 - 2023

Developers:

BK Jha, SK Naik, AK Thakur, JS Chaudhary, AK Singh

Background:

Vegetables were grown generally under conventional surface irrigation method in Eastern Plateau and Hill region of India and are characterized by high labour and pumping costs. In this method, the major proportion of irrigation water is lost by surface evaporation, deep percolation and other losses, resulting in lower irrigation efficiencies. Moreover, there is a tendency of farmers to apply excess water when it is available. Drip irrigation, with its ability to provide small and frequent water applications directly in the vicinity of the plant root zone has attracted interest because of decreased water requirement and possible increase in production

Description of the technology:

The soil-plant interaction may help in maximizing crop productivity with simultaneous improvement in the soil quality. A field experiment with six treatments (flat-bed, broad-bed, and ridge-furrow, with/without 25-micron polythene mulch) was conducted using drip irrigation. Cauliflower (120:45:45 kg NPK/ha) and eggplant (60:40:40 kg NPK/ha) were grown in succession, with weekly fertigation for 16 weeks. Drip irrigation was applied thrice weekly (cauliflower) and four times weekly (eggplant) for 30 minutes per session. The mulching with polythene increased temperature and moisture during the early growing season, but lowered temperature during the later growing season, ensuring a favorable coupling of temperature and moisture to improve the yield of cauliflower and eggplant. The broad-bed and ridge-furrow systems of planting enhanced the soil nutrient status compared to the flat-bed system, irrespective of polythene mulching. The SMBC, acid phosphatase, and dehydrogenase activity was highest in mulched ridge-furrow planting. The highest yield of cauliflower curd and eggplant fruit was obtained in mulched ridge-furrow planting. The results concluded that the soil moisture, soil temperature, soil available nutrient, microbial biomass carbon, dehydrogenase activity, phosphatase activity, and yield of crops performed better in mulched ridge-furrow planting. The ridge-furrow with polythene mulching provides an excellent opportunity to enhance crop productivity, while maintaining and increasing soil quality in hot and sub-humid climate in eastern regions of India.

Commercial potential:

The technology can be offered through consultancy services, licensed, or outsourced to the State Agricultural Department, Private Sector & Agri-Entrepreneurs, RKVY, NGOs, and farmers' groups for effective implementation and outreach.

Impact:

Drip irrigation with polythene mulching enhances fertilizer-use efficiency through frequent nutrient application while improving soil moisture retention and topsoil temperature. It is highly efficient for water-scarce areas, ensuring sustainable and productive vegetable cultivation



Raised bed polythene mulched drip fertigation in vegetable

Agro-ecoregions suitability:

Hot and sub-humid climate in eastern regions of India.

Reference:

Naik, S.K., Jha, B.K. and Singh, A.K. 2022. Drip Fertigated Planting Systems with Polythene Mulching on Cauliflower–Eggplant Cropping Systems in Hot and Subhumid Climate: Impact on Soil Health and Crop Yield. *Communications in Soil Science and Plant Analysis*, 53(10):1261-1276.