



## Surge-flow alternate furrow irrigation for enhancing water productivity in semiarid regions

B KRISHNA RAO<sup>1</sup>, P R BHATNAGAR<sup>2</sup>, TRUPTI KAMBLE<sup>3</sup>, R S KUROTHE<sup>4</sup>, P K MISHRA<sup>5</sup>,  
RASHMI SHARMA<sup>6</sup>, ANAND KUMAR<sup>7</sup> and V C PANDE<sup>8</sup>

*Department of Science and Technology, Technology Bhavan, New Delhi 110 016*

Received: 22 August 2017; Accepted: 23 May 2019

### ABSTRACT

The rainfed regions of India are characterized by aberrant behaviour of monsoon rainfall, eroded and degraded soils with multiple nutrient and water deficiencies, declining groundwater table and poor resource base of the farmers are major constraints for low and unstable yields. The successful production of rainfed crops largely depends on how efficiently soil moisture is conserved *in situ* or the surplus runoff is harvested, stored and recycled for supplemental irrigation and these are inevitable options to sustain rainfed agriculture in climate change scenario. For better use of harvested or recharged rainwater in *rabi* season, needs to evaluate and modify the present irrigation practices for enhancing the water productivity of rainfed regions. Keeping these considerations in view, an experiment was conducted during 2014–16 in farmer's fields of Panchmahal, Gujarat under Department of Science and Technology to study the effect of various furrow irrigation techniques on water saving, water productivity and yield of fennel (*Foeniculum vulgare* Mill.) crop. The treatments contained different furrow irrigation techniques such as furrow irrigation, plough furrow irrigation, alternate furrow irrigation with and without surge flow. The experimental data proved that the alternate furrow with surge flow irrigation is the best method that saves up to 78% of irrigation water without affecting the crop growth and yields. The surge flow, alternate furrow irrigation increased the water productivity and amount earned from unit of water over the check basin method of irrigation by 4 times. The saved irrigation water can bring the additional area under cultivation of high-value crops like fennel and vegetable during *rabi* season.

**Key words:** Alternate furrow, Fennel, Semi-arid region, Surge flow, Water productivity