

Research Paper :

## Efficient utilization of harvested water through indigenously fabricated gravity operated drip irrigation system

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### ABSTRACT

Bastar plateau zone of Chattisgarh state, receives an annual rainfall of 1400 – 1600 mm. Even though, after receiving such an abundant quantity of rainfall, still mono cropping system exists in the region. Suitable irrigation system was to be designed for the tribal farmers with low farm holding capacity to manage and create irrigation facility at their own home stead garden or as locally known as *badi*. Topography of the region plays a vital role in creating hindrances for suitable harvesting and conservation of runoff. Due to undulating and uneven topography, gravity operated drip irrigation system was designed for irrigating small patch of *badi* using indigenous materials like level plastic pipe and used medical syringes. The technology proved to be a blessing for the tribal farmers with low farm holdings for increasing the production and cropping intensity by increasing the irrigated area. The indigenous drip irrigation system is designed for 300 sqm area and the traditional drip system was designed for 0.1 ha of holdings. The design was based on developing gravitational water head by creating an overhead tank of 400 ltrs with height of 2-3 ft for indigenous drip system and 500 l with height of 5-6 ft. The low cost indigenous type drip irrigation system using main line of 12 mm diameter flexible pipe and with 6 mm diameter flexible level pipe as the laterals. Used medical syringe needles were used for drippers or emitters. Two different types of needles of 18 and 22 nos were used to fabricate the system. Tomato was grown during *Rabi* season followed by cultivation of bottle guard during summer season, by irrigating daily with 400 l of water. Over the last two years, tomato and bottle guard were successfully grown in *Rabi* and summer season with mean yield of 32.9 tonnes/ha and 12.4 tonnes/ha and average benefit cost ratio as 11.91 and 5.01, respectively. Looking on to the success over the small patch of *badi*, gravity operated pressure compensating traditional drip irrigation system was designed for 0.1 and 0.2 ha of upland farming situation. The system is successfully operated at 15 farm families at Bhataguda and Turenar villages, Jagdalpur Block, Dist. – Bastar covering a total area of 1.5 ha. Different vegetables viz., chilli, brinjal and tomato are grown under this irrigation system.

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**Key words :** Harvested water, Drip irrigation system, Conservation of run off

Soil and water are the precious natural resources and must be conserved as possible. Bastar, the tribal predominant district of Chhattisgarh state is famous for its natural vegetation and topography. The district consists of a major portion of tribal inhabitant who due to their ignorance were involved in primitive method of cultivation practices and were confined to only mono cropping system. Although the area receives normal rainfall of 1413.2 mm with an average annual rainfall of 1213.6 mm, most of the rainwater goes waste in the form of runoff. This runoff often attains erosive velocity due to highly

undulating topography of the region. Soil loss always has a very devastating effect on the fertility of the field and in turn on the yield of the crop. Even though, after receiving such an abundant quantity of rainfall, still mono cropping system exists in the region. Conservation structures play a vital role in improving the soil condition and maintaining the fertility of the field on sustainable basis. Suitable irrigation system was to be designed for the tribal farmers with low farm holding capacity to manage and create irrigation facility at their own home stead garden or as locally known as *badi*. Topography of