
# TMC MM 2.1: Development of production technologies for Bt cotton and improvement of water and nutrient use efficiency with precision farming techniques

**Introduction:**

Currently, the agronomic recommendations developed for conventional hybrids are being advocated to Bt hybrids also. However, considering the higher yield potential, altered morphoframe, shorter duration and more synchronous boll setting, more so in the from the first flush, it would be appropriate to develop site-specific nutrient and water management technologies to harness the higher yield potential of Bt cotton. The project aims to develop site-specific water and nutrient management practices for higher water and nutrient use efficiency.

**Objectives:**

1. To study the effect of in-situ moisture conservation measures in conjunction with integrated nutrient management on the productivity and fibre quality of Bt cotton in rainfed situation.
2. To find out optimum irrigation schedule and nutrient requirement with drip and fertigation and its synergetic effect on water and nutrient use efficiency.
3. To synchronize nutrient application with crop demand.

**Salient findings:**

Three separate experiments were conducted to achieve the above three objectives. Investigations on the evaluation of moisture conservations techniques viz. growing of intercrop, mulching of green manure and opening of alternate furrows indicated that cotton intercroped with green gram / soybean significantly increased seed cotton yield and cotton equivalent yield over other moisture conservation practices in the central zone. However, mulching treatment (with green manure/ straw) was superior to intercropping in north and south zones. Seed cotton yield of Bt grown in the entire central zone was lower than in south and north zone because of the total rainfall was deficit by 30-59% and most of the experiments were conducted under rainfed conditions.

Addition of micronutrients with RDF on soil test basis and 75 % N requirement through inorganic + 25% N through organic manure treatments were found to be superior to other fertilizer N sources . Similar trend was observed in case of water use efficiency and nutrient use efficiency at all the centres. Further increase in the nitrogen supply through organic manure (more than 50 % N) decreased the yield of seed cotton.

In second field experiment on different irrigations and fertilizer levels through drip in Bt cotton, results indicate that irrigation at 0.8 ETcand 1.0 ETcfound economic in obtaining higher seed cotton yield, WUE and fertilizer NUE in all the othree agro- eco regions. Data on different fertilizer levels viz 75%, 100% and 125% RDFthrough drip and 100 % RDFas soil application indicate that 100% RDFand 125 % RDFthrough drip were at par and found superior to achieve higher seed cotton yield as compared to 75% RDF,in all the three agro-eco regions. With reference to nutrient use efficiency, like NUE and KUEwas maximum with 100 RDFas soil application or through drip. Maximum WUE was recorded with the irrigation at 0.8 ETcas compared to other irrigation schedules at all the centres.

In third field experiment on synchronizing Nand K supply with crop demand, results indicate that among the split application of Nand NK, 3 splits of nutrients (at 10, 30, 60 DAS)found superior during the deficit rainfall year over 2 or 4 splits of nutrient of Nand NK at all the centres. In the normal year of rainfall, 3 splits application of Nand NK (at 10,45, 75 DAS)found better in achieving higher yield of Bt cotton. Higher Nand K content were recorded with the 3 splits application of nutrients.