

Crop yield optimization using genetic algorithm with the CROPWAT model as a decision support system

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■ **ABSTRACT** : Optimization problems involving on field water allocation require the integration of soil moisture balance, root growth simulation for individual crops and rainfall accounting. The FAO CROPWAT model handles all these aspects of crop development and hence this model can be utilized in such optimization problems as a means of reducing modeling complexity. A genetic algorithm based optimization model was formulated with the objective of maximizing the sum of relative crop yields of all crops under a command area considering reservoir water balance and water requirement of individual crops during different growth stages. This model was applied in an on-going river project in Assam, India. The CROPWAT model was used to estimate monthly potential evapotranspiration (PET) of crops as well as effective rainfall values at different probabilities of exceedance of rainfall and then to disintegrate these parameters into decadal (10 day) values, which were then incorporated into the optimization problem as model inputs. The performance of genetic algorithm was evaluated in comparison with the results obtained from a linear programming model. The results compared well.

■ **KEY WORDS** : Potential evapotranspiration, Actual evapotranspiration, CROPWAT, Genetic algorithm

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