

# Genetic programming approach on evaporation losses and its effect on possible future climate change for Pilavakkal reservoir scheme

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## *Abstract*

Climate change is the major problem that every human being is facing in this century. The rise in fossil fuel usage increases the emission of 'greenhouse' gases, particularly carbon dioxide continuously into the earth's atmosphere. This causes a rise in the amount of heat from the sun withheld in the earth's atmosphere that would normally be radiated back into space. This increase in heat has led to the greenhouse effect, resulting in climate change. Evaporation losses mainly depend upon temperature along with other climatological parameters directly as well as indirectly.

Accurate modeling and forecasting of these evaporation losses are important for preventing further effects due to climate change. Evaporation is purely non-linear and varying both spatially and temporally. This needs suitable data driven approach to model and should have the ability to take care of all these non-linear behaviour of the system. As such, though there are many empirical and analytical models suggested in the literature, such models should be used with care and caution. Further, difficulties arise in obtaining all the climatological data used in a given analytical or empirical model. Genetic programming (GP) is one such technique applied where the non-linearity exist. GP has the flexible mathematical structure which is capable of identifying the non-linear relationship between input and output data sets. Thus, it is easy to construct 'local' models for estimating evaporation losses. This paper describes a study to determine the effect of possible future climate change on evaporation losses and, hence, water resources, in Pilavakkal reservoir scheme, India.

**Key words:** *Climate change, genetic programming, green house effect.*