The gas turbines are generally used for large scale power generation. The basic gas turbine cycle has low thermal efficiency, which decreases in the hard climatic conditions of operation, so the cycles with thermodynamic improvement is found to be necessary. Among several methods shown their success in increasing the performances, the steam injected gas turbine cycle (STIG) consists of introducing a high amount of steam at various points in the cycle. The main purpose of the present work is to improve the principal characteristics of gas turbine used under hard condition of temperature in Algerian Sahara by injecting steam in the combustion chamber. The suggested method has been studied and compared to a simple cycle. Efficiency, however, is held constant when the ambient temperature increases from ISO conditions to 50°C. Computer program has been developed for various gas turbine processes including the effects of ambient temperature, pressure ratio, injection parameters, standard temperature, and combustion chamber temperature with and without steam injection. Data from the performance testing of an industrial gas turbine, computer model, and theoretical study are used to check the validity of the proposed model. The comparison of the predicted results to the test data is in good agreement. Starting from the advantages, we recommend the use of this method in the industry of hydrocarbons. This study can be contributed for experimental tests