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CLIMATE CHANGE IMPACT OVER THE HYDRAULIC RESOURCES OF THE PAPAGAYO RIVER BASIN IN MEXICO

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Summary Climate changes occurring at the planetary level are characterized by destructive environmental phenomenon such as droughts, floods, and changes in precipitation. However, this global problem has local solutions. Development and implementation of appropriate policies are required to counteract this global phenomenon. Each region of the world must promote measures against climate change in their countries. These, in turn, must promote the development of optimal policies, programs and local actions to reduce the effects of climate changes on their social and economic activities. These policies should also help populations to best adapt themselves to the new global climatic conditions. The purpose of this study was to analyze the effects of global climate changes at the Papagayo river basin area, a region pertaining located close to the cost of the state of Guerrero in the country of Mexico. Therefore, a general diagnosis of the basin was performed, including the assessment of its main physiographic features such as: hydrology, geology, geomorphology, climatology, soil, vegetation and fauna. The prediction of precipitations at 2, 5, 10, 20, 50, 100 and 500 years was performed based on mean annual rainfall records and using a statistical analysis of 8 probability distribution functions These results were then used to calculate the maximum precipitation in 24 hr weighted mean in respect of each chosen area per climatologic station using an analysis of Thiessen polygons in the Papagayo river basin. These values were used to adjust the average annual precipitation values using unit triangular hydrogram method, as well as the percentage decrease in precipitation in respect to the percentage of decline in flow via a regression analysis. The analysis of the 4 different proposed scenarios in climate change demonstrate that changes in precipitation expected by the year 2050 and 2080 will significantly affect the hydrologic cycle, and area drained by the Papagayo river. Based on the percentage of variation in precipitation obtained by these simulations, we obtained a series of polynomial models describing the percentage of variation in flow as a function of the precipitation rate in the region. These models predict that the water availability at the Papagayo river basin will be importantly reduced due to the influence of the use by the City. Therefore, there is urgent need to take local measures to reduce the consequences of this prediction. Such policies should include the ecological conservation of the local ecosystem and a more rational use of the vital fluid.