



Effect of Water Scarcity in the Society: A Mathematical Model

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Received: July 21, 2021; Revised: November 14, 2022

Abstract: Water scarcity is one of the major problems faced by all those living around the world. So, there should be a multiple way approach to be adopted to conquer the water scarcity effects in future. Keeping this in mind, we developed a mathematical model and demonstrated the effect of water scarcity through a deterministic and stochastic formats. The equilibrium point of the model is found and its stability is analyzed analytically. Numerical simulation of both the deterministic and the stochastic model is exhibited to validate our analytical findings. The attainment level of the equilibrium point is demonstrated by using the Runge-Kutta method. The comparison is also made for this equilibrium. The effect of few parameters of the model was exhibited in different figures in the numerical simulation section. Particularly the effect of the water draining rate and the rate of human population affected by water scarcity on each compartment were shown visually through plotting time vs particular compartments. Our results show the better ways for water recovery through the compartments of the model.

Keywords: *water scarcity; local stability; global stability; stochastic model.*

Mathematics Subject Classification (2010): 70Kxx; 70K42; 70K70; 93-XX; 93E03; 93C10; 93C15; 34D20; 34D23; 65C30.

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