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Junping Shi* (jxshix@wm.edu), Department of Mathematics, College of William and Mary, Williamsburg, VA 23187, and **Xiaoli Wang** and **Guohong Zhang**. *Interaction of water and biomass: rich dynamics in a simple model.*

Pattern formation of water-biomass interaction systems in the semi-arid climatic zone have been considered by many ecologists and mathematicians. Here we propose a new model of water and plant interaction with plant death rate decreasing for higher plant density. We rigorously analyze the corresponding ODE model, which reveals rich dynamics including backward equilibrium transcritical bifurcation, saddle-node bifurcations for equilibria and limit cycles, Hopf bifurcations, limit cycle bubble/heart, homoclinic bifurcation, and Bogdanov-Takens bifurcation. This model could serve as an explanation of the sudden desertification of arid regions. (Received September 20, 2015)