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Title : STOCHASTICS MODELS OF ANNUAL PRECIPITATIONS, ITS EFFECTS ON HUMAN ACTIVITIES IN THE TROPICAL SAVANNAH, THE EXPERIENCE IN NIGERIA

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Abstract :

This paper presents some illustrations of Markov chain models with non-stationary and constant transition probabilities to study data of the Reservoir elevation of Shiroro dam in the dry and raining seasons, the data of annual rainfall in Minna and the area of land lost to desert encroachment in a year in Nigeria respectively. A three State model was considered for the reservoir elevation, four State model for Rainfall/crop production and six State model for the savannah vegetations. The first two models were considered for discrete States and continuous time, the third model presents a Semi-Markov and a Gap size models with a cost structure. The non-homogeneous model indicates an optimal of 40% and 49% transition probabilities at equilibrium for dry season and wet season respectively. The model for precipitation/crop cultivation show that in the long run 14% of annual rainfall shall be low rainfall, 34% annual rainfall will be moderate rainfall also well spread, 47% of the annual rainfall shall be high rainfall and 5% of the annual rainfall shall be moderate rainfall not well spread respectively. The Semi-Markov and a gap size models indicates a slow and continuous loss of Nigeria cropland of about nine hundred and three square kilometres in about seventy nine years. The cost of growing a piece of sahel grassland into a sudan savannah could be negligible as long as there are no human interference. Stochastic models are important tools that could be used to