

Modelling the Dynamics and Optimal Control Strategies of Terrorism within the Southern Borno State Nigeria

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Abstract : Terrorism, which remains one of the largest threats faced by various nations and communities around the world, including Nigeria, is the calculated use of violence to create a general climate of fear in a population to attain particular goals that might be political, religious, or economical. Several terrorist groups are currently active in Nigeria, leading to attacks on both civil and military targets. Among these groups, Boko Haram is the deadliest terrorist group operating majorly in Borno State. The southern part of Borno State in North-Eastern Nigeria has been plagued by terrorism, insurgency, and conflict for several years. Understanding the dynamics of terrorism is crucial for developing effective strategies to mitigate its impact on communities and to facilitate peace-building efforts. This research aims to develop a mathematical model that captures the dynamics of terrorism within the southern part of Borno State, Nigeria, capturing both government and local community intervention strategies as control measures in combating terrorism. A compartmental model of five nonlinear differential equations is formulated. The model analyses show that a feasible solution set of the model exists and is bounded. Stability analyses show that both the terrorism free equilibrium and the terrorism endemic equilibrium are asymptotically stable, making the model to have biological meaning. Optimal control theory will be employed to identify the most effective to prevent or minimize acts of terrorism. The research outcomes are expected to contribute towards enhancing security and stability in Southern Borno State while providing valuable insights for policymakers, security agencies, and researchers. This is an ongoing research.

Keywords : modelling, terrorism, optimal control, susceptible, non-susceptible, community intervention

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