**Assessment: Model-Based Geostatistics for Global Public Health**

**Objective:**Students are required to select one of the available REMO datasets and conduct a geostatistical analysis to investigate the spatial distribution of river blindness (onchocerciasis). The assessment should be structured as a comprehensive report addressing the following key components, aligning with the marking criteria.

### **1. Abstract (10%)**

* Provide a concise summary of the report’s content in an engaging style.
* Ensure clarity and brevity while summarizing key findings and conclusions.

### **2. Research Question and Background (15%)**

* Clearly define the research question that will guide your geostatistical analysis.
* Provide relevant background material on river blindness, including its epidemiology, transmission, and impact on public health.
* Include specific background information on the selected country, discussing the disease burden, control efforts, and contextual factors.
* **Examples of Research Questions:**
  + *“What is the spatial distribution of river blindness prevalence, and how do environmental covariates such as rainfall and vegetation cover influence its distribution?”*
  + *“Can light lime emissivity be used as a socio-economic variable and how does it capture the variation in risk compared to other environmental variables?”*
  + *“How can we classify sub-national units into their corresponding prevalence class and inform intervention policies?”*

### **3. Methods and Code (20%)**

* Utilize the available raster files to explore relationships between river blindness prevalence and environmental or socio-demographic covariates.
* Identify and justify which covariates exhibit the strongest association with prevalence.
* Develop a non-spatial Generalized Linear Mixed Model (GLMM) and assess residual spatial correlation.
* Provide a detailed explanation of the methodology, including model assumptions and statistical approaches.

### **4. Results (20%)**

These are suggested steps that you can consider reporting in the Result section to address your selected research question.

* Fit the geostatistical model and provide parameter estimates in a well-formatted table (values up to three decimal places).
* Comment on the estimates and their implications for public health.
* Assess and present results with clear tables, figures, and maps.
* Carry out spatial prediction by creating a suitable grid within the country boundaries.
* If appropriate, draw inferences on the average prevalence for each administrative subdivision (using rgeoboundaries for shapefiles) and report point estimates and 95% prediction intervals in a summary table.
* Generate spatial prevalence maps to identify:  
  + Hotspots where prevalence exceeds 20%.
  + Cold spots where prevalence falls below 5%.

### **5. Discussion and Conclusions (20%)**

* Interpret the results in relation to the research question.
* Discuss the strengths and limitations of the study.

### **6. Presentation and Writing Style (15%)**

* Ensure clarity, coherence, and logical flow throughout the report.
* Use proper academic writing with minimal grammatical or spelling errors.
* Follow consistent referencing and bibliographic formatting.

**Submission Requirements:**

* The report should be no longer than **1,500 words**.
* Include relevant tables, figures, and maps to support the analysis.
* Code and methodological steps should be reproducible, with explanations for key steps.
* Submit both the written report and the associated R scripts.