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Downscaling climate information for local disease mapping

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Abstract

In a changing world, the disease dynamics may also change due to other socio-economics factors. Scientists need to better understand how the dynamics of the diseases respond to variations in global and regional climate. Climate variability affects every region of the world and the diseases are not necessarily limited to specific regions, so that vectors may become endemic in other regions. The area of human health impacts of climate is an extremely complex one, which requires the interdisciplinary efforts of health professionals, climatologists, biologists, and social scientists to analyze the relationships among physical, biological, ecological, and social systems relevant to health impacts. Climate data at local level are needed to evaluate the dynamics of vector-borne disease through health-climate models and most of the times the climatological databases are not adequate to use in human health models. Climate data at higher spatial resolution can be produced by statistical downscaling using historical observations but the method is limited by the availability of high-resolution historical data.

Since the 90s', the statistical downscaling of climate data has been an important priority on the Agrometeorology Group of the Food and Agriculture Organization of the United Nations (FAO) to avoid the lack of climate data at local level, required for agricultural planning and operational activities. Since 1995, date of the first spatial interpolation software for climate data, more advanced applications have been developed such as SEDI (Satellite Enhanced Data Interpolation), LocClim (Local Climate Estimator) and the New_LocClim in collaboration with the Deutscher Wetterdienst (German Weather Service). To develop these tools, an important effort has been made to improve the FAO climate database including at present more than 30,000 stations worldwide and expanding the database from developing countries coverage to global coverage.

The paper provides a general background on the relationships climate/diseases and then a technical overview of the FAO applications on spatial interpolation.