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VIDA DECISION SUPPORT SYSTEM: AN INTERNATIONAL, COLLABORATIVE PROJECT FOR COVID-19 MANAGEMENT WITH INTEGRATED MODELING

Abstract

The Vida Decision Support System (Vida) is an application of the Environment-Vulnerability- Decision-Technology (EVDT) integrated modeling framework specifically aimed at COVID-19 impact and response analysis. The development of Vida has been an international collaboration involving multidisciplinary teams of academics, government officials (including public health, economics, environmental, and demographic data collection officials), and others from six states: Angola, Brazil, Chile, Indonesia, Mexico, and the United States. These collaborators have been involved with the identification of decision support needs, the surfacing and creation of relevant data products, and the evaluation of prototypes, with the vision of creating an openly available online platform that integrates earth observation instruments (Landsat, VIIRs, Planet Lab's PlanetScope, NASA's Socioeconomic Data and Applications Center, etc.) with in-situ data sources (COVID-19 case data, local demographic data, policy histories, mobile device-based mobility indices, etc.). Vida both visualizes historical data of relevance to decision-makers and simulates possible future scenarios. The modeling techniques used include system dynamics for public health, EO-based change detection and machine learning for environmental analysis, and discrete-event simulation of policy changes and impacts. In addition to the direct object of this collaboration (the development of Vida), collaborators have also benefited from sharing individual COVID-19-related insights with the network and from considering COVID-19 response in a more integrated fashion. This work outlines the Vida Decision Support System concept and the EVDT framework on which it is based. The

international team is using Vida to evaluate the outcomes in several large cities regarding COVID cases, environmental changes, economic changes and policy decisions. It provides an overview of the overlapping and diverging needs and data sources of each of the collaborating teams, as well as how each of those teams have contributed to the development of Vida. The current state of the Vida prototypes and plans for future development will be presented. Additionally, this work will discuss the lessons learned from this development process and their relevance to other integrated applications.