Guidelines for creating framework data for GIS analysis in low- and middle-income countries

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Health sciences research is increasingly incorporating geographic methods and spatial data. Accessing framework data is an essential pre-requisite for conducting health-related geographic information systems (GIS) research. However, in low- and middle-income countries (LMICs) these data are not readily available—and there is a lack of coordinated data creation and sharing. This paper describes a simple set of strategies for creating high-resolution framework data in LMICs, based on lessons from a maternal health GIS project—"Mapping Outcomes for Mothers"—conducted in southern Mozambique. Data gathering involved an extensive search through public online data warehouses and mapping agencies. Freely available satellite image services were used to create road centrelines, while GPS coordinates of households in the study area were used to create community boundaries. Our experience from this work shows that manual digitizing is becoming cheaper and faster, due to increased availability of free satellite image services and open mapping standards that allow for distributed data capture. Involving mapping agencies in data capture processes will likely promote the scaling up of framework data creation in LMICs. This will benefit health GIS research in these settings.