WATERSHED GUIDE

# I - CONTEXT

A watershed is an area of land that channels streams and rainfall to a common outlet such as the outflow of a reservoir, mouth of a bay, the ocean, or any point along a stream channel. Delineating, or mapping, watersheds help CRS staff make land management decisions and/or target where to work. Making land management decisions at a watershed level allows the watershed to recharge and facilitates sustainable land management. To be able to make land management decisions at the watershed level, the first step is to map the location of the watersheds. Some countries already have this information available. For countries that do not we have set up an automated process to provide this information. We use the Digital Elevation Model (DEM) of the desired area and run multiple geoprocessing tools in ArcGIS Pro. With the help of Model Builder in ArcGIS Pro and ArcGIS Enterprise – an improved decision-making tool for watershed mapping was developed by Villanova University interns and the Data and Geospatial Analytics Team from GKIM.

# II - OBJECT

Watershed mapping is important because it will help country programs work towards more sustainable management of watershed resources that affect agriculture, disaster risk reduction, flood/landslide management, and water supply infrastructure.

Now, creating a watershed map involves several steps that require not only a good understanding of the process but also a good knowledge of Arcgis functions.

To facilitate this task, the GKIM team, with the help of Villanova interns, created a model in ArcGIS Pro and shared it as a geoprocessing tool in ArcGIS online to allow all users to download it.

# III – DATA AND SOFTWARE REQUIREMENTS

Inputs:

1. Data

* Area of interest
* Digital Elevation Model (Projected): SRTM DEM via [USGS Earth Explorer](http://bit.ly/3oVidOV)2.
* Soil Classification for soil overlay: ISRIC or FAO Soils Portal
* Waterways: OpenStreetMap
* Rainfall Data
* Land Use

These data sets, along with watershed boundaries, can help you make land management decisions. If you happen to have drone imagery that could give us a much better watershed map.

1. Software : ArcGIS Pro

Additional Data Sources:

* HDX (data.humdata.org)
* Local Government sites (hosting their own GIS data)

# IV – MODEL DEPLOYMENT

If you are interested in watershed mapping/ delineation for your program or project,

* Fill out an [ICT4D Services Support Request Form](http://bit.ly/2CUNGLZ)1!
* Prepare the input data
* Get the model **Watershed\_Model.ppkx:** the user needs to have an ArcGIS online account to get the model through the link below

<https://crsorg.maps.arcgis.com/home/item.html?id=97fdfd896b9749aaa17803d170e750b1>

* Open the model with ArcGIS Pro
* Modify the parameters with the prepared data
* Run the model
* Interpret the result

List of parameters to be modified:

* The input parameter : the DEM of the area of interest which is the Area\_of\_interest\_DEM
* The output parameter : the name of the watershed raster which is the RasterT\_Watershed\_Polygon variable

Modele overview

Diagram

Description automatically generated

# V – RESULTS

The output will provide the surrounding watershed areas with additional spatial analysis that can provide insights on soil quality, natural hazards (landslides, floods, etc.), and deforestation. Additional layers like slope, soil classification, and rainfall data can be added for additional insight.

Map

Description automatically generated

# VI – WHAT TRAINING IS AVAILABLE

We have provided a webinar about the tool and the pilot test that the team and Villanova interns completed in Madagascar – the video can be found [here](http://bit.ly/3tpCYp3)3.