Flood Hazard Analysis using Afghanistan Spatial Data Center

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Afghanistan is susceptible to a range of natural disasters, including flooding, earthquakes, and landslides. The students will examine individual districts of the Kandahar province using the Afghanistan Spatial Data Center as a tool to evaluate the impact of flooding.

This project will have 2 general parts:

1) Information to submit to a table (see below). Students will collect the following information:
   A) Population,
   B) Property,
   C) GSM (Global System for Mobile Communication) coverage.
      + GSM is the baseline format for mobile communication in Afghanistan. Communication is essential when dealing with natural disasters so part of this exercise is focused on gauging the availability of GSM.
2) Students will also examine maps and their databases for:
   A) Health Facilities
   B) Settlements
   C) Road Network
   D) Airports

Part 1

The Hazard Risk Assessment table will be used for Part 1:

Total Population of Area	**Total Number of Buildings**	**Percent Population Impacted (Flood Risk Exposure)**	**Buildings that may be damaged**	**Communication (GSM Coverage)**

Pre – Procedures:

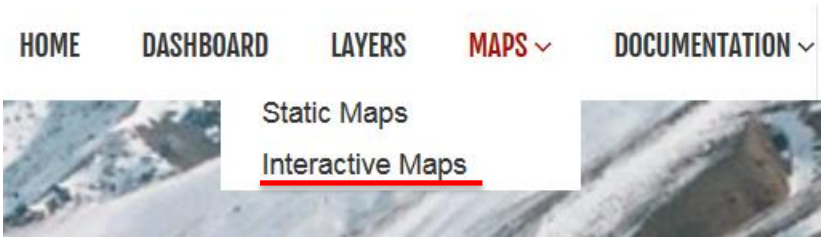
Before beginning this exercise, divide the students into groups and assign them a district from the Kandahar province in Afghanistan (Check Appendix 1 for list of districts)

Procedures

Step 1: Go to the Afghanistan Spatial Data Center (ASDC) website: http://asdc.immap.org. The ASDC contains important spatial data for emergency management purposes.

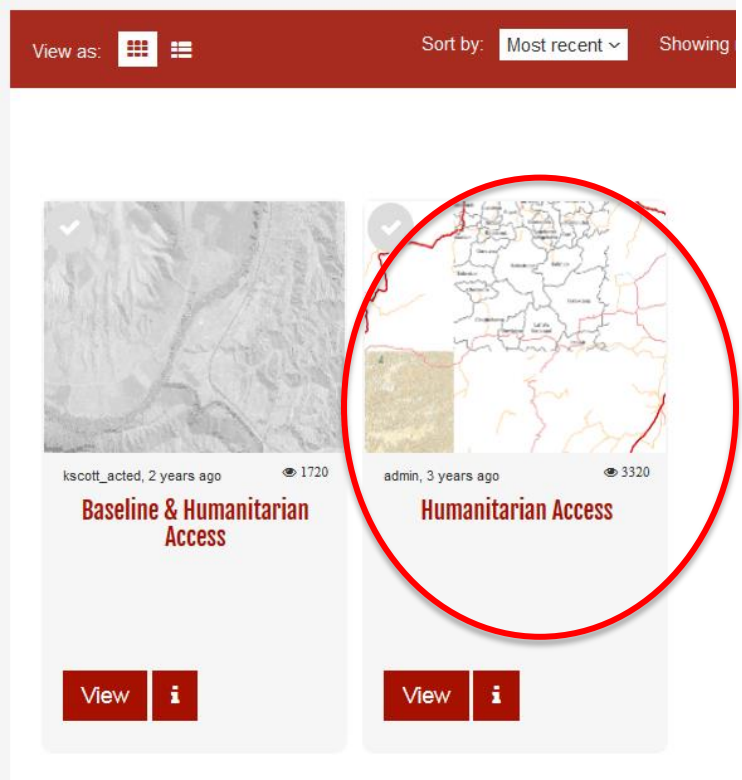
Step 2: In the upper right hand corner of the ASDC homepage is a lock next to "Documentation". Click on it to access the ASDC (or create a new account if you do not already have one. It is required to register with the ASDC in order to proceed.)

Step 3: Once logged in, click on the heading that says "Maps" in the top right corner and choose "Interactive Maps".

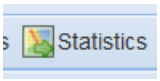


Step 4: In the search bar on the left-hand side, type "Humanitarian Access" and click Search Icon.

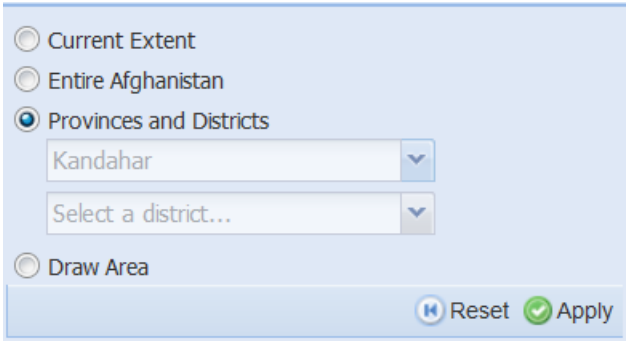
Choose Humanitarian Access. This map will assist the students in completing the table since it contains numerous map layers and vital statistics used for a multitude of emergency management applications.



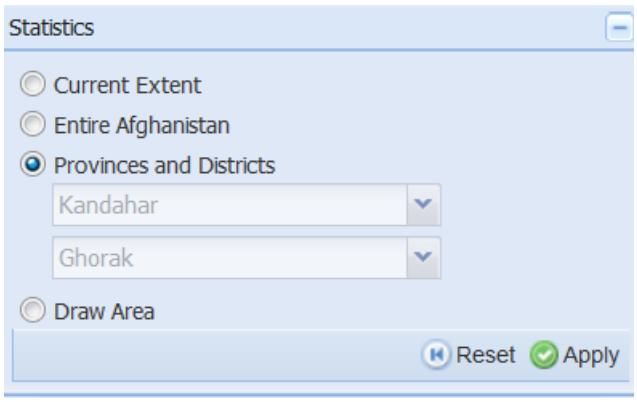
Step 5: You will see a large view of the country of Afghanistan. First click “Statistics” tool from the toolbar, which will appear on the right side of the screen. For the purposes of this exercise, the district example is Ghorak. (The information on the Afghanistan Spatial Data Center is constantly updated. This example was created on August 2, 2018, so your answers for this example may be different.)



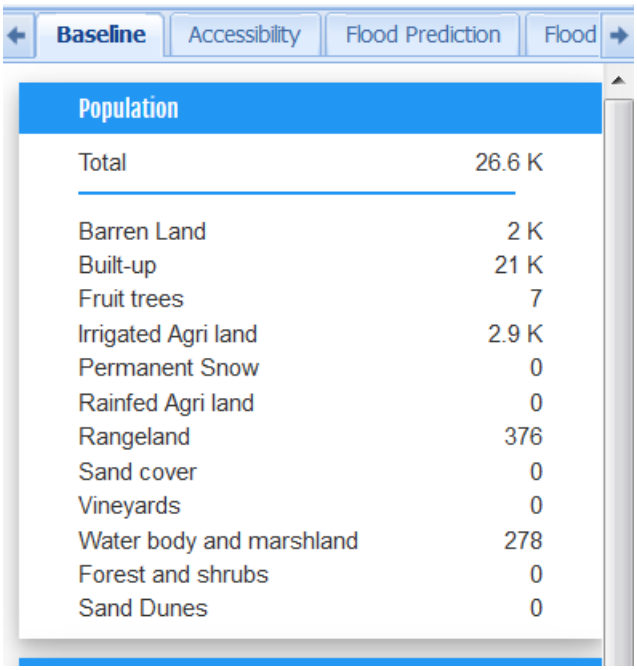
After clicking Statistics, select Provinces and Districts and from the drop-down list of Provinces and Districts, choose Kandahar in the top drop down.



Then select your assigned district in the second drop down menu then click “Apply” (Ghorak). This will outline the district. This will allow the user to examine only statistics from the Ghorak District. Your numbers will be different.



Step 6: The first column in the hazard assessment table requires the total population. The total population will be needed in later steps. The total population can be found under the baseline tab in the right-hand pull-down menu. For the Ghorak District the total population is 26,600. Add this value to your table. Then move down the menu and find the total number of buildings – 3,586

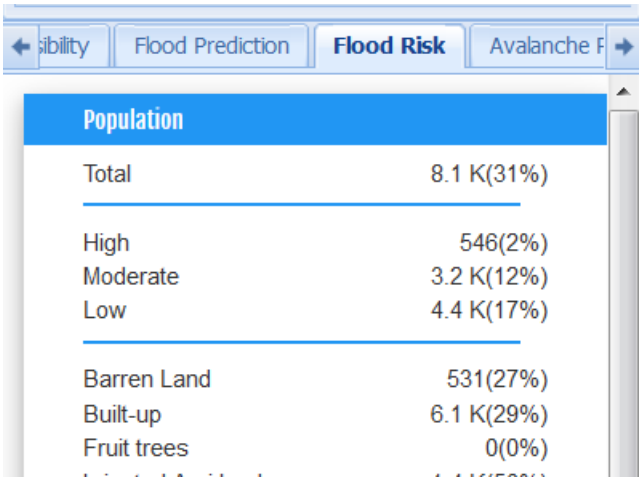


Total Population of Area	Total Number of Buildings	Percent Population Impacted (Flood Risk Exposure)	Buildings that may be damaged	Communication (GSM Coverage)
26,600	3,586			

Step 7: The next step is to determine flood risk exposure as low, moderate, or high. Individual classifications can be given in case specific scenarios but for the purpose of this exercise

a) Low flood risk exposure is classified as being 25% or under,
b) Moderate flood risk exposure as 26%-50%, and
c) High flood risk exposure as 51%-100%.

This percentage can be found under Flood Risk tab.
In the Ghorak district, 31% of the population is classified as being at some risk for flooding which would be defined as Moderate.

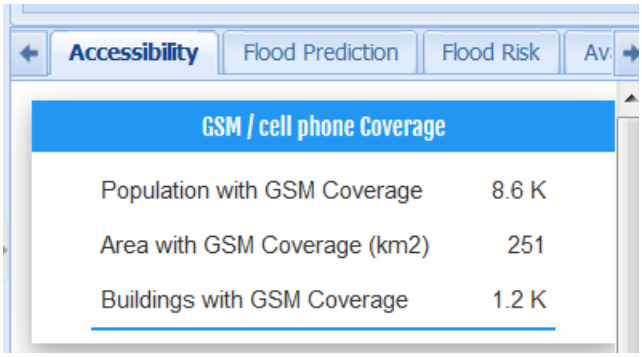


Total Population of Area	Total Number of Buildings	Percent Population Impacted (Flood Risk Exposure)	Buildings that may be damaged	Communication (GSM Coverage)
26,600	3,586	31%		

Step 8: The next piece of information is examining possible damaged property. Scroll down to the "Buildings" heading to determine this risk. We found that there are 1,097 buildings in this region that may be damaged from flooding. Use this number to fill in the "Property that may be damaged" heading in the hazard assessment table. This is important because damage to buildings and property is a large expense when recovering from flood damage and is important to take into account when trying to determine hazard risk. Then divide the Amount of Buildings Damaged by the Total Number of Buildings and multiply it by 100% at that to the table (See below)

Total Population of Area	Total Number of Buildings	Percent Population Impacted (Flood Risk Exposure)	Buildings that may be damaged	Communication (GSM Coverage)
26,600	3,586	31% (Moderate)	1097 (30.6%)	

Step 9: Next determine the total population that has access to GSM coverage. This information can be found by selecting the tab that says “Accessibility” in the Statistics tool. At the top of the list, there is a heading - “GSM/cell phone Coverage”. In this district, 8,600 people have GSM coverage. Add this number to the Communication (GSM Coverage) heading in the hazard assessment table. This will help determine how many people in this region have access to warning information when an area is at risk for a flood. Remember this does not just include those in the Flood Risk area, but all people in the district.



Total Population of Area	Total Number of Buildings	Percent Population Impacted (Flood Risk Exposure)	Buildings that may be damaged	Communication (GSM Coverage)
26,600	3,586	34% (Moderate)	1097 (30.6%)	8,600

Step 10: Finally determine the level of accessibility of GSM. The criteria used can vary between specific cases but for the purpose of clarity in this exercise the same percentage categories again are - Low accessibility will be 25% and under, moderate accessibility will be 26% to 50%, and high accessibility will be 51% to 100% To find the percentage you must apply some basic math by dividing the value received for the Communication (GSM Coverage) (8,600) by the Total Population of Area (26,600) and multiply by 100. This will yield a result of 32.3% which falls under the category of Moderate Accessibility.

Total Population of Area	**Total Number of Buildings**	**Percent Population Impacted (Flood Risk Exposure)**	**Buildings that may be damaged**	**Communication (GSM Coverage)**
26,600	3,586	34% (Moderate)	1097 (30.6%)	8,600 (32.3%) Moderate

Step 11: Table has been completed. Just based on this information, how would you rate the flood risk of this district? Why? Please proceed to Part 2.

Part 2

Step 12 Turn on the Flood Risk Zones (100 year interval)

Step 13 Zoom into your district and describe the Flood Risk areas (i.e. mostly in the northern area, zone covers southeast corner to northwest corner, etc.)

Step 14 Now turn on each of the following layers (one at a time) and describe location of the features.

A) Health Facilities Tier 1
B) Health Facilities Tier 2
C) Health Facilities Tier 3
D) Road Network
E) Airports

Step 15 Also examine these features in regards to an emergency situation. Here are some example questions, but you should come up with your own.

A) How many of the roads are in the Flood Risk Zones. How will this impact response?
B) How many of the hospitals are in the Flood Risk Zones. How will this impact response?
C) Which district seems most prepared using the factors you analyzed? Why?

Step 16: Finally each group of students should present their Part 1 and Part 2 findings to the class. Presentation sections

A) Introduction

B) Analysis of Table Information
C) Analysis of Assigned Layers
D) Discussion of Vulnerability of District
E) Conclusion

Step 17: After all the presentations, students should order the districts from most to least prepared and indicate their rationale for the list.

Appendix 1: Districts in Kandahar

District
Arghandab
Arghistan
Daman
Ghorak
Kandahar
Khakrez
Maruf
Maywand
Miyanishin
Nesh
Panjwayi
Reg
Shahwalikot
Shorabak
Spinboldak
Zheray