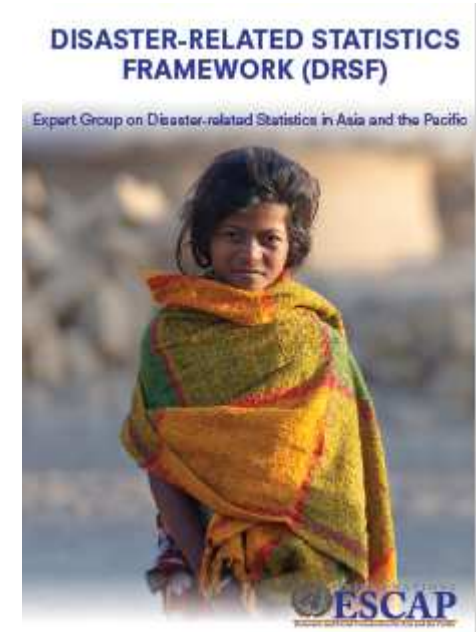


Basic Data Requirements for Geo-based Risk Assessment

30-31 January
Almaty, Kazakhstan



Definition of a disaster

“A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts.”

- (adopted at UN General Assembly, Dec., 2016)



$$\text{Risk} = f(\text{Hazard exposure}, \text{Vulnerability}, \text{Capacity})$$

Hazard:

a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation

Vulnerability:

the conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards

Coping capacity:

factors for resilience of household, businesses, communities, regions and whole countries against external shocks in the form of a disaster

Risk Measurement Model

$$Risk = f(\text{Hazard Exposure}, \text{Vulnerability}, \text{Capacity})$$

Scale of Analysis



Hazards

<i>Main Event</i>	<i>Family</i>
Earthquake Mass Movement Volcanic Activity	Geophysical
Flood Landslide Wave Action	Hydrological
Convective Storm Extratropical Storm Extreme Temperature Fog Tropical Cyclone	Meteorological
Drought Glacial Lake Outburst Wildfire	Climatological
Animal Incident Disease Insect Infestation	Biological
Impact Space Weather	Other: • Environmental • Technological

Muli-hazard disasters

<https://volcano.si.axismaps.io/>

Exposure Measurement

- Population (i.e. census) data
- Land, infrastructure, social-economic activities

- Probabilistic hazard mapping

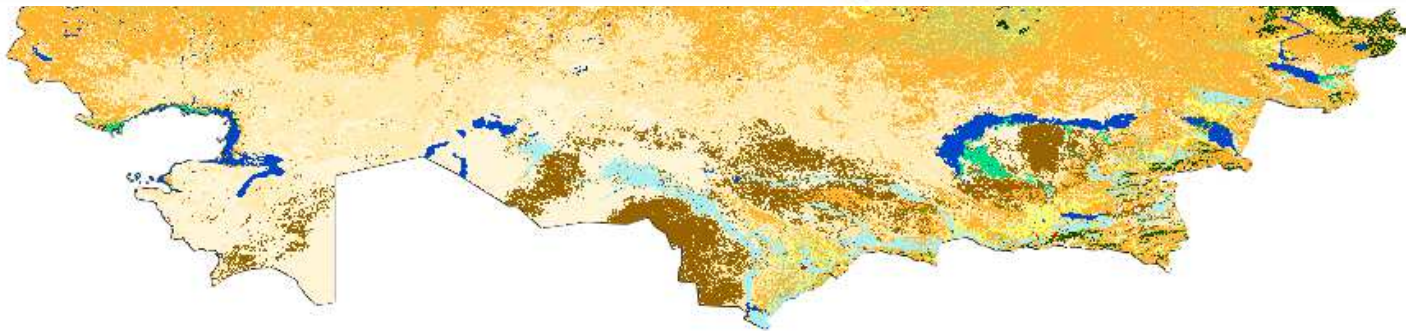
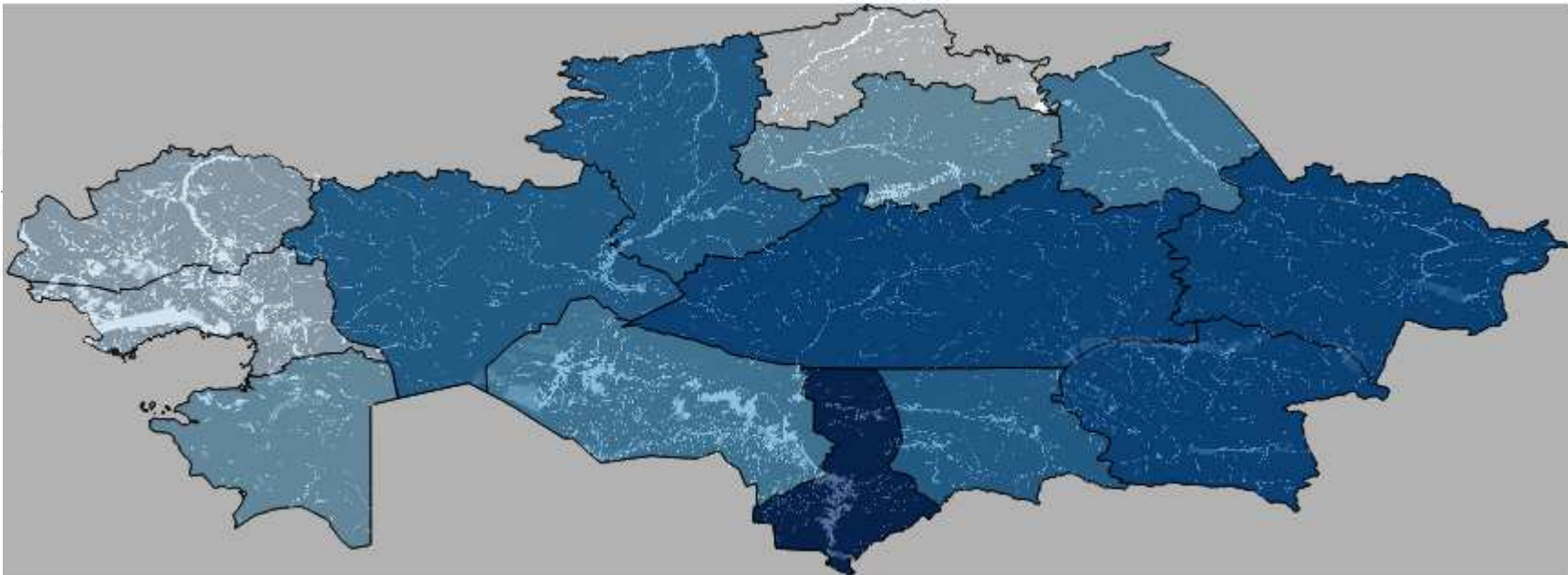


Exposure
element (e.g.
population)

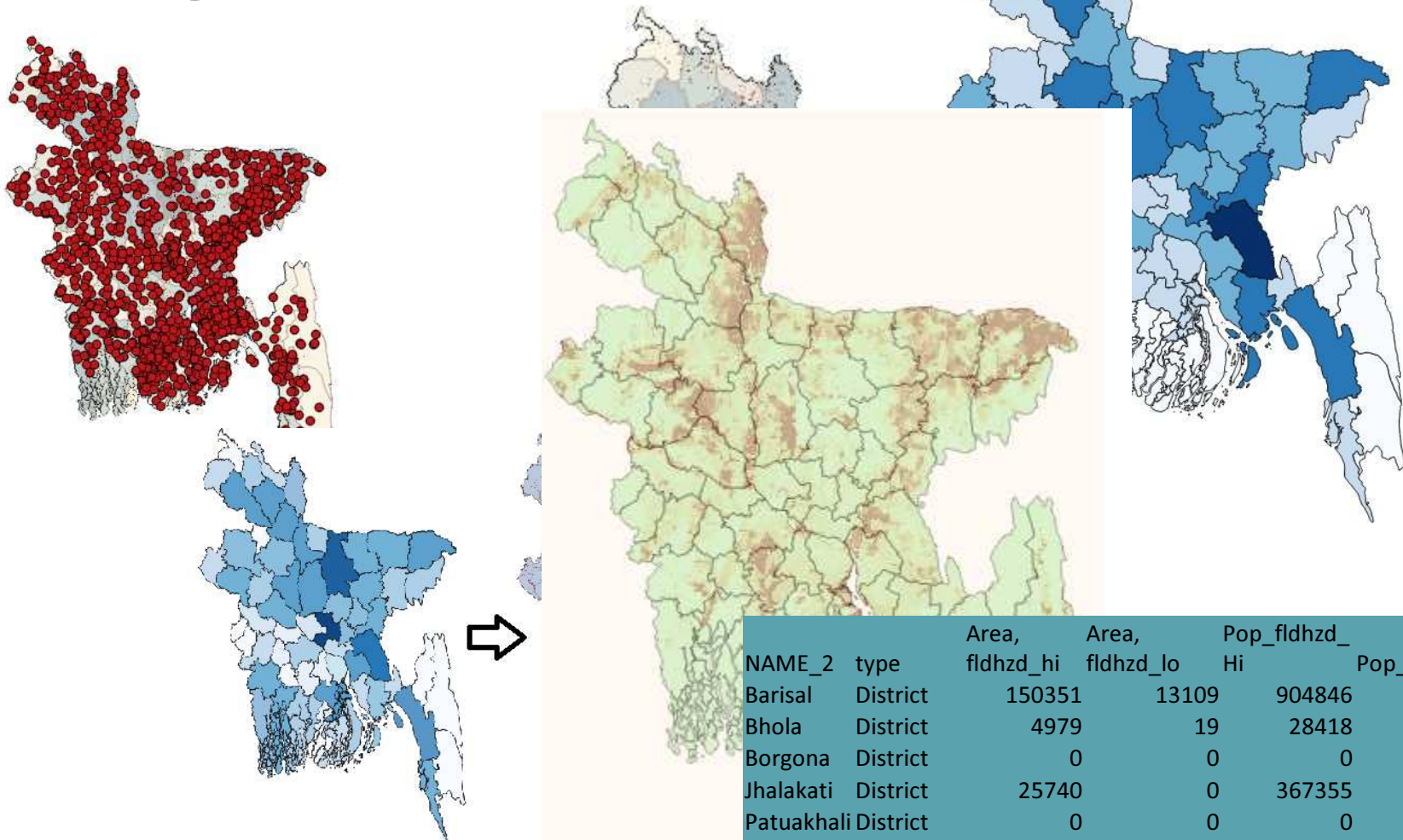
Probable flood
inundation
area



Hazard Exposure sample inputs



Hazard Exposure sample analysis (Bangladesh pilot study)



There are many sources of vulnerability



Can you share some examples, please?

Poverty Mapping

Huge and growing demand for timely and reliable poverty data

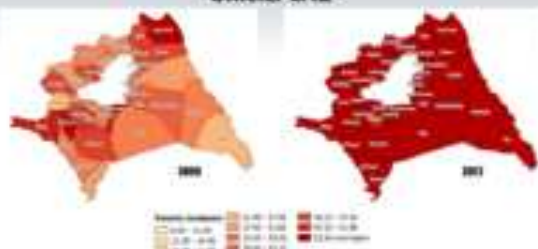
- Social protection targeting
 - cash transfers
 - employment facilitation
- Monitoring & Evaluation
 - Impact of inflation, disasters, and other shocks to welfare

DATA SOURCE	DATA COLLECTION VEHICLE	FREQUENCY	GRANULARITY	FEATURES
Philippine Statistics Authority – Direct Estimates	Family Income and Expenditure Survey (FIES)	Every 3 years	Regional	<ul style="list-style-type: none"> Has an exhaustive set of questions to measure income and expenditure items Only reliable at regional level
Philippine Statistics Authority – Targeting System for Poverty Reduction	Family Assessment Form	Not regularly collected	Village-level	<ul style="list-style-type: none"> Used Proxy Means Test to estimate income Provides granular estimates but has only been done twice (2006 and 2010)
Community-Based Monitoring Systems	CBMS Accelerated Poverty Profiling, Paper Track	Annual	Village-level	<ul style="list-style-type: none"> Provides granular and relatively frequent estimates, but only for select villages
Philippine Statistics Authority – Small Area Estimates	FIES, census	Every 3 years	Municipal	<ul style="list-style-type: none"> Provides granular estimates and covers almost all municipalities and cities Uses a more sophisticated method to estimate poverty (SLL method)

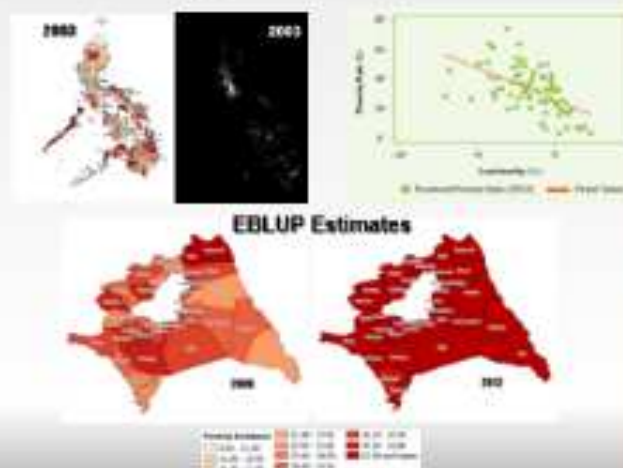
Conventional small area estimates require further validation

LANAO DEL SUR	2008	2008	2012	2016
Poverty Incidence	38.6	48.7	67.3	66.3
Coeff. of Variation	18.4	15.5	8.0	4.82

Official SAE



Using innovative data sources



- ✓ Reliable and timely data is crucial for targeting
- ✓ Quality data is needed in evaluating of "shocks" and of policies to poor
- ✓ **Big data complements conventional data to ensure better devt outcomes**

Ref.: Asian Development Bank (A. Martinez)

Coping Capacity

- Household preparedness,
- Early warning systems coverage
 - **Sendai Framework Indicator G-5:** *Percentage of population exposed to or at risk from disasters protected through pre-emptive evacuation following early warning.*
- Resilience: (e.g.) costs and length of time of reconstruction
 - Proxy indicators: examples, please?



Summary example

Hazard	Exposure	Vulnerability	Coping capacity

% of households with at least 5 days stored food & water	% of District Covered by early warning systems	Location of schools, No. of students
Poverty incidence		
Landslide	Unusual number of days without precipitation	Pollution Land cover map
		Poverty incidence Pollution



A few examples in practice...

inaRISK

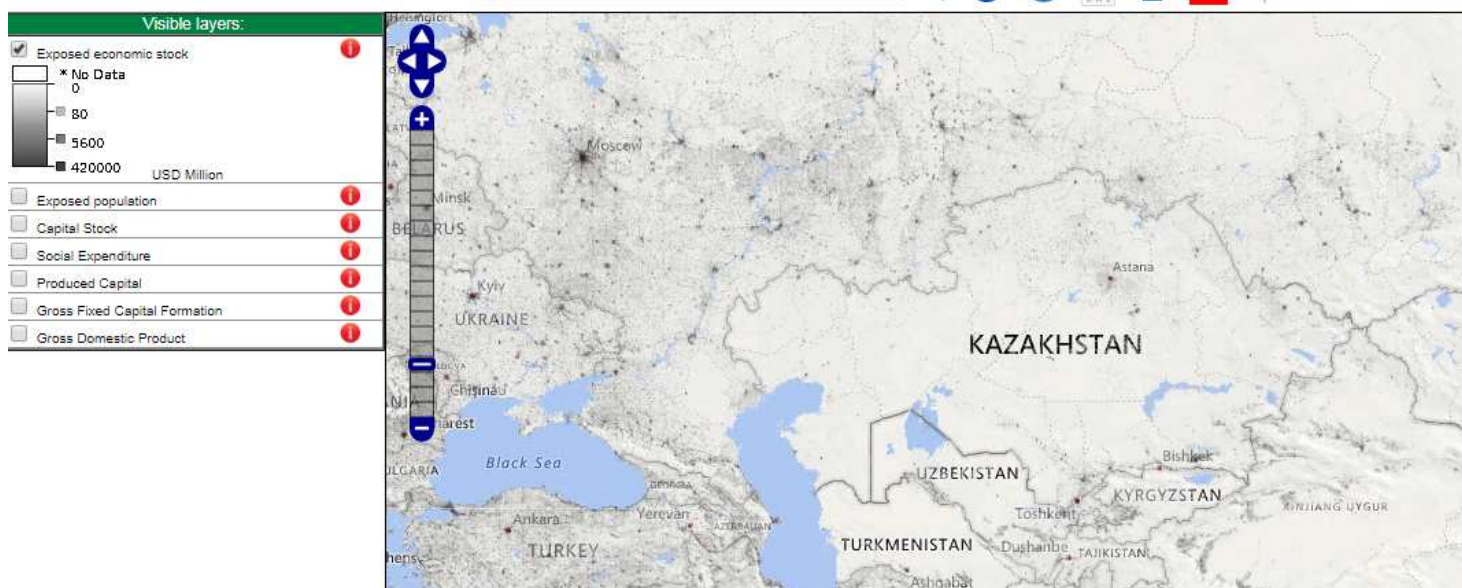
how risky is your place?



<http://inarisk.bnpb.go.id>



ISDR Global Assessment Report Risk Data Platform

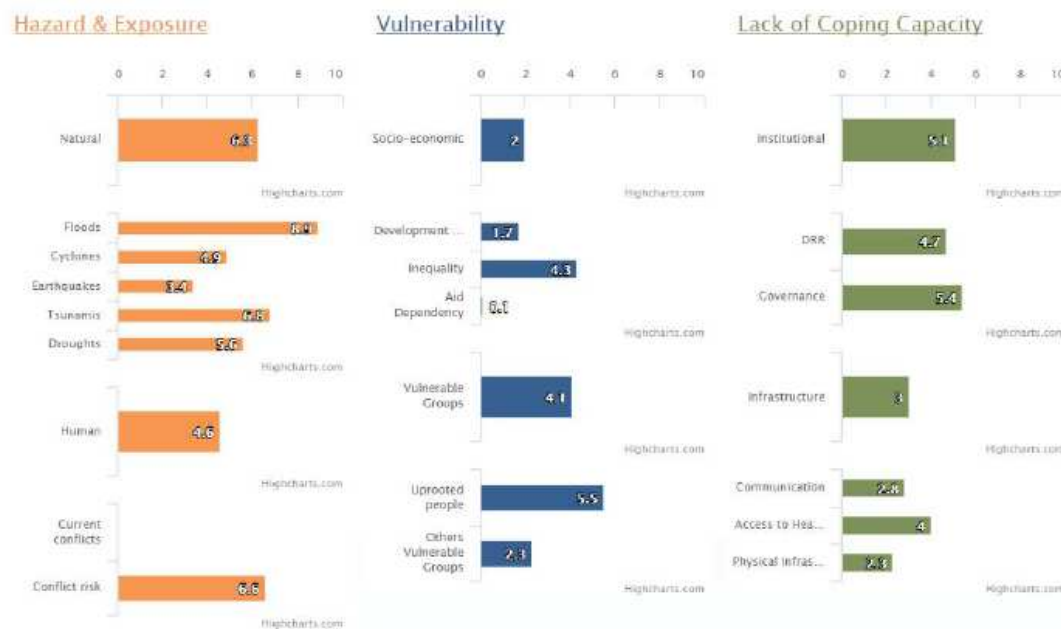


<https://risk.preventionweb.net/capreviewer/main.jsp?countrycode=g15>

INFORM

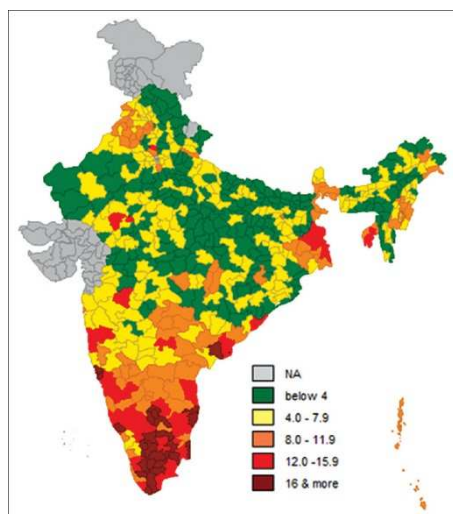
INDEX FOR RISK MANAGEMENT

Sample of National Scale IMPACT Index Score for Disaster Risk

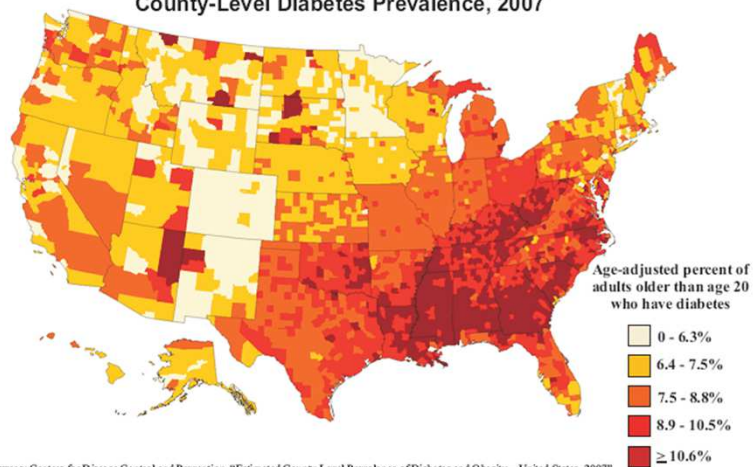


<http://www.inform-index.org/>

Risk Assessment has broad applications

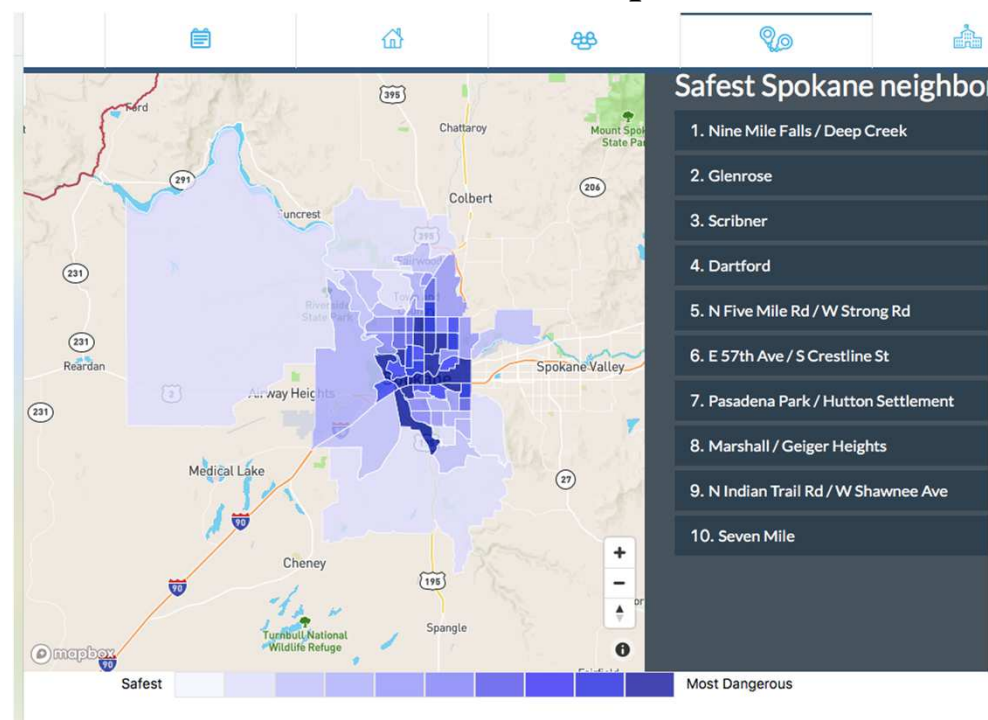


County-Level Diabetes Prevalence, 2007



Sources: Centers for Disease Control and Prevention, "Estimated County Level Prevalence of Diabetes and Obesity—United States, 2007" *Morbidity and Mortality Weekly Report* 58 No. 45 (Nov. 20, 2009):1259-1263.

Crime heat map



Recommendations

- Start with basics
 - compilation of relevant data in GIS
- Select simple baseline indicators:
 - Exposure of population
 - Area of exposure (by land use type)
 - Disaggregation of potential vulnerability and coping capacity variables (where feasible)
 - Coverage of early warning systems
- Link work with Disaster-related Statistics Framework (DRSF) and complementary efforts from UNECE Task Force Measuring Extreme Events and Disasters (TF-MEED)

Thank you!



Image src.: <https://www.worldatlas.com/articles/endangered-mammals-of-kazakhstan.html>