COUNTRY EXPOSURE MODEL

Review main statistic of a exposure model and create summaries for a given Country.

```
/home/risk/venvs/py38w/lib/python3.8/site-packages/geopandas/_compat.py:111: UserWarning: The S
hapely GEOS version (3.9.1-CAPI-1.14.2) is incompatible with the GEOS version PyGEOS was compil
ed with (3.10.0-CAPI-1.16.0). Conversions between both will be slow.
  warnings.warn(
```

```
# Parameters
country = "Afghanistan"
```

```
Exposure files:
  Exposure_Com_Afghanistan.csv
  Exposure_Ind_Afghanistan.csv
  Exposure_Res_Afghanistan.csv
```

Sanity checks and formats

```
Afghanistan
 ../Exposure/Middle_East/Exposure_Com_Afghanistan.csv
 ../Exposure/Middle_East/Exposure_Ind_Afghanistan.csv
 ../Exposure/Middle_East/Exposure_Res_Afghanistan.csv
 Occupants / Dwellings = 7.8
 Reference avg household size (2019) = 8.0
 WARNING - Check population:
   Exposure population = 28224.0k
   UN 2021 population = 39835.0k
   Population (exposure / UN_2021) = 0.71
 Exposure models  OK
```

Exposure at National level

Summary by occupancy type

OCCUPANCY	OCCUPANTS	BUILDINGS	COST_USD	BUILDINGS_%	COST_USD_%
Res	28.2M	2,775.3K	$48.0B	85.87%	45.39%
Ind	0.0M	116.8K	$13.3B	3.61%	12.57%
Com	0.0M	339.8K	$44.5B	10.52%	42.04%

Other metrics to consider

OCCUPANCY	AREA_SQM	COST_BUILDING_USD	COST_PER_CAPITA	AVG_BUILDING_AREA_SQM	AVG_COST_PE
Total	274.4M	$66.0B	$3,749	85	
Res	159.2M	$38.4B	$1,702	57	
Ind	17.7M	$5.3B	$471	152	
Com	97.5M	$22.2B	$1,576	287	

Exposure summary at Admin level 1

NAME_1	COST_USD	BUILDINGS	OCCUPANTS	COST_USD_%	BUILDINGS_%	OCCUPANTS_%
Kabul	$22,697.2M	562.6K	4,576.4K	21.45%	17.41%	16.21%
Hirat	$8,514.7M	232.8K	1,971.2K	8.05%	7.20%	6.98%
Nangarhar	$8,514.1M	182.8K	1,575.3K	8.05%	5.66%	5.58%
Balkh	$5,936.7M	176.6K	1,437.7K	5.61%	5.47%	5.09%
Kandahar	$4,956.4M	146.0K	1,316.4K	4.68%	4.52%	4.66%
Kunduz	$3,626.8M	118.0K	1,052.2K	3.43%	3.65%	3.73%
Ghazni	$3,620.9M	144.8K	1,347.2K	3.42%	4.48%	4.77%
Hilmand	$3,057.0M	104.4K	957.1K	2.89%	3.23%	3.39%
Baghlan	$2,942.4M	108.4K	947.2K	2.78%	3.36%	3.36%
Takhar	$2,872.5M	111.4K	987.6K	2.71%	3.45%	3.50%
Badakhshan	$2,842.3M	126.9K	1,159.0K	2.69%	3.93%	4.11%
Faryab	$2,626.7M	105.2K	926.2K	2.48%	3.25%	3.28%
Paktika	$2,617.2M	50.4K	472.8K	2.47%	1.56%	1.68%
Ghor	$2,351.8M	74.5K	713.3K	2.22%	2.31%	2.53%
Kapisa	$2,146.1M	44.6K	370.3K	2.03%	1.38%	1.31%
Parwan	$2,083.6M	79.5K	688.4K	1.97%	2.46%	2.44%
Jawzjan	$1,985.3M	65.8K	562.1K	1.88%	2.04%	1.99%
Khost	$1,912.8M	65.6K	593.9K	1.81%	2.03%	2.10%
Farah	$1,902.1M	59.6K	525.4K	1.80%	1.84%	1.86%
Daykundi	$1,674.6M	53.2K	489.4K	1.58%	1.65%	1.73%
Maydan Wardak	$1,586.7M	62.6K	567.8K	1.50%	1.94%	2.01%
Paktya	$1,579.8M	57.4K	534.2K	1.49%	1.78%	1.89%
Laghman	$1,561.8M	53.8K	460.4K	1.48%	1.67%	1.63%
Sari Pul	$1,503.2M	63.4K	579.5K	1.42%	1.96%	2.05%
Badghis	$1,500.3M	60.0K	577.5K	1.42%	1.86%	2.05%
Logar	$1,316.2M	45.8K	405.3K	1.24%	1.42%	1.44%
Bamyan	$1,277.8M	52.6K	462.4K	1.21%	1.63%	1.64%
Kunar	$1,221.3M	52.0K	466.0K	1.15%	1.61%	1.65%
Uruzgan	$1,124.2M	40.9K	349.0K	1.06%	1.27%	1.24%
Nimroz	$1,068.5M	19.9K	171.3K	1.01%	0.62%	0.61%
Samangan	$1,047.5M	45.2K	401.7K	0.99%	1.40%	1.42%
Zabul	$1,026.2M	31.6K	280.1K	0.97%	0.98%	0.99%
Nuristan	$594.8M	17.1K	152.9K	0.56%	0.53%	0.54%
Panjsher	$532.9M	16.5K	146.9K	0.50%	0.51%	0.52%

Exposure by simplified taxonomy

Adding `MACRO_TAXO` column

MACRO_TAXO	COST_USD	BUILDINGS	OCCUPANTS	COST_USD_%	BUILDINGS_%	OCCUPANTS_%
RC	$61,268.1M	487.6K	2,529.1K	57.90%	15.09%	8.96%
ADO/E	$20,065.7M	1,619.7K	16,209.9K	18.96%	50.12%	57.43%
MCF	$10,785.6M	240.2K	2,130.4K	10.19%	7.43%	7.55%
MUR	$8,803.8M	568.6K	5,128.3K	8.32%	17.59%	18.17%
W	$2,385.3M	246.6K	1,925.0K	2.25%	7.64%	6.82%
MR	$1,837.2M	61.5K	293.2K	1.74%	1.90%	1.04%
S	$676.7M	7.4K	8.5K	0.64%	0.23%	0.03%

Exposure by taxonomy

Showing only taxonomies that represent 90% of the total `COST_USD`

MACRO_TAXO	TAXONOMY	COST_USD	BUILDINGS	COST_USD_%	BUILDINGS_%
RC	CR+CIP/LFM/HEX:1/IND	$10,639.7M	100,992	11.24%	3.67%
ADO/E	MUR+ADO/LWAL+DNO/HEX:2/RES	$6,007.8M	177,067	6.35%	6.44%
RC	CR+CIP/LFINF+DNO/HBET:1-3/COM	$5,156.9M	56,873	5.05%	2.07%
ADO/E	MUR+ADO/LWAL+DNO/HEX:3/RES	$4,776.3M	62,564	5.05%	2.27%
RC	CR+CIP/LFINF+DNO/HBET:4-7/COM	$4,400.9M	7,700	4.65%	0.28%
	CR+CIP/LFM+DNO/HBET:4-7/COM	$4,275.8M	7,481	4.52%	0.27%
ADO/E	MUR+ADO/LWAL+DNO/HEX:1/RES	$3,986.6M	469,985	4.21%	17.09%
	CR+CIP/LFINF+DUC/HBET:4-7/COM	$3,922.4M	6,863	4.14%	0.25%
	CR+CIP/LFM+DUC/HBET:4-7/COM	$3,752.7M	6,566	3.97%	0.24%
RC	CR+CIP/LDUAL+DUC/HBET:3-5/RES	$3,424.2M	15,248	3.62%	0.55%
	CR+CIP/LFINF+DUC/HBET:1-3/COM	$3,421.5M	37,734	3.62%	1.37%
	CR+CIP/LFM+DUC/HBET:1-3/COM	$3,361.2M	37,069	3.55%	1.35%
	CR+CIP/LFM+DNO/HBET:1-3/COM	$3,361.2M	37,069	3.55%	1.35%
MCF	MCF/HBET:4-7/COM	$3,219.1M	5,632	3.40%	0.20%
	MCF/HBET:1-3/COM	$3,034.1M	47,802	3.21%	1.74%
ADO/E	EU+ETO/LWAL/HEX:2/RES	$2,335.2M	608,132	2.47%	22.11%
RC	CR+CIP/LFM/HEX:2/IND	$1,994.9M	9,468	2.11%	0.34%
MUR	MUR+CBS/LWAL+DNO/HEX:1/RES	$1,962.8M	231,401	2.07%	8.41%
RC	CR+PC/LWAL+DNO/HBET:1-3/COM	$1,792.2M	19,765	1.89%	0.72%
W	W+WLI/HEX:1/RES+RES1	$1,763.4M	165,316	1.86%	6.01%
MUR	MUR+CBS/LWAL+DNO/HEX:2/RES	$1,661.1M	48,956	1.76%	1.78%
ADO/E	EU+ETO/LWAL/HEX:2/RES	$1,556.8M	101,355	1.65%	3.69%
MR	MR/HBET:1-3/COM	$1,519.6M	23,942	1.61%	0.87%
RC	CR+PC/LWAL+DNO/HBET:4-7/COM	$1,435.0M	2,511	1.52%	0.09%
MCF	MCF+CBS/LWAL/HEX:2/RES	$1,227.3M	36,173	1.30%	1.32%
RC	CR+CIP/LWAL+DNO/HEX:2/RES	$1,119.5M	20,017	1.18%	0.73%
	MCF+CBS/LWAL/HEX:3/RES	$1,109.8M	14,469	1.17%	0.53%
MCF	MCF+CBS/LWAL/HEX:1/RES	$1,104.6M	130,223	1.17%	4.73%
MUR	MUR+CLBRS/LWAL+DNO/HBET:2/RES	$920.8M	27,139	0.97%	0.99%
RC	CR+CIP/LWAL+DNO/HEX:3/RES	$910.3M	7,233	0.96%	0.26%
MUR	MUR+CLBRS/LWAL+DNO/HBET:1/RES	$867.7M	102,291	0.92%	3.72%
ADO/E	EU+ETR/HEX:2/RES	$843.5M	54,912	0.89%	2.00%
RC	CR/LFINF/HEX:2/RES	$809.7M	14,477	0.86%	0.53%
	CR/LFINF/HEX:3/RES	$751.5M	5,972	0.79%	0.22%
MUR	MUR/HBET:1-3/COM	$742.8M	40,958	0.78%	1.49%
RC	CR+CIP/LWAL+DNO/HEX:4/RES	$731.0M	3,255	0.77%	0.12%
RC	CR/LFM+DUC/HEX:3/RES	$729.9M	5,800	0.77%	0.21%