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 (3.10.1-CAPI-1.16.0). Conversions between both will be slow.
  warnings.warn(
```

```
# Parameters
country = "Sudan"
```

```
Exposure files:
  Exposure_Com_South_Sudan.csv
  Exposure_Com_Sudan.csv
  Exposure_Ind_South_Sudan.csv
  Exposure_Ind_Sudan.csv
  Exposure_Res_South_Sudan.csv
  Exposure_Res_Sudan.csv
```

Sanity checks and formats

```
Sudan
  Exposure/Exposure/Exposure_Com_Sudan.csv
  Exposure/Exposure/Exposure_Ind_Sudan.csv
  Exposure/Exposure/Exposure_Res_Sudan.csv
  Occupants / Dwellings = 5.9
  Reference avg household size (2019) = 5.9
  Population (exposure / UN_2021) = 0.97
  Exposure models  OK
```

Exposure at National level

Summary by occupancy type

OCCUPANCY	OCCUPANTS	BUILDINGS	COST_USD	BUILDINGS_%	COST_USD_%
Res	43.7M	7,067.4K	$91.8B	95.70%	82.62%
Ind	0.0M	92.1K	$6.5B	1.25%	5.85%
Com	0.0M	225.4K	$12.8B	3.05%	11.52%

Other metrics to consider

OCCUPANCY	AREA_SQM	COST_BUILDING_USD	AVG_BUILDING_AREA_SQM	AVG_COST_PER_AREA_USD
Total	622.4M	$89,471.1M	84	$179
Res	553.0M	$76,083.0M	78	$166
Ind	26.2M	$4,286.5M	285	$248
Com	43.1M	$9,101.6M	191	$297

Exposure summary at Admin level 1

NAME_1	COST_USD	BUILDINGS	OCCUPANTS	COST_USD_%	BUILDINGS_%	OCCUPANTS_%
Khartoum State	$19,270.2M	1,280.2K	7,576.9K	17.34%	17.34%	17.34%
South Darfur State	$11,972.7M	795.4K	4,707.7K	10.77%	10.77%	10.77%
Gezira State	$11,266.2M	748.5K	4,429.9K	10.14%	10.14%	10.14%
North Darfur State	$8,823.6M	586.2K	3,469.5K	7.94%	7.94%	7.94%
North Kordofan State	$7,244.9M	481.3K	2,848.8K	6.52%	6.52%	6.52%
Kassala State	$6,706.9M	445.6K	2,637.3K	6.03%	6.03%	6.03%
Red Sea State	$6,476.2M	430.3K	2,546.6K	5.83%	5.83%	5.83%
White Nile State	$6,224.7M	413.6K	2,447.7K	5.60%	5.60%	5.60%
East Darfur State	$5,932.7M	394.2K	2,333.0K	5.34%	5.34%	5.34%
Sennar State	$4,500.1M	299.0K	1,769.7K	4.05%	4.05%	4.05%
West Kurdufan	$4,491.1M	298.4K	1,766.1K	4.04%	4.04%	4.04%
River Nile State	$3,729.8M	247.8K	1,466.8K	3.36%	3.36%	3.36%
Gedarif State	$3,578.8M	237.8K	1,407.5K	3.22%	3.22%	3.22%
Blue Nile State	$2,946.0M	195.8K	1,158.9K	2.65%	2.65%	2.65%
Northern State	$2,341.0M	155.6K	920.9K	2.11%	2.11%	2.11%
South Kordofan State	$2,289.5M	152.2K	900.6K	2.06%	2.06%	2.06%
West Darfur State	$1,929.8M	128.3K	759.6K	1.74%	1.74%	1.74%
Central Darfur	$1,424.4M	94.8K	560.8K	1.28%	1.28%	1.28%

Exposure by simplified taxonomy

Adding `MACRO_TAXO` column

MACRO_TAXO	COST_USD	BUILDINGS	OCCUPANTS	COST_USD_%	BUILDINGS_%	OCCUPANTS_%
MUR	$42,814.9M	2,355.3K	13,735.1K	38.52%	31.89%	31.42%
W	$29,749.1M	2,018.2K	11,903.5K	26.77%	27.33%	27.23%
ADO/E	$26,440.8M	2,187.8K	13,189.4K	23.79%	29.63%	30.18%
RC	$4,047.9M	91.1K	678.9K	3.64%	1.23%	1.55%
MCF	$3,310.9M	113.0K	678.9K	2.98%	1.53%	1.55%
OT	$2,529.0M	596.4K	3,522.4K	2.28%	8.08%	8.06%
S	$2,256.0M	23.0K	0.0K	2.03%	0.31%	0.00%

Exposure by taxonomy

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

MACRO_TAXO	TAXONOMY	COST_USD	BUILDINGS	COST_USD_%	BUILDINGS_%
ADO/E	MUR+ADO/LWAL+CDN:H:2/RES	$11,997.1M	697,873	12.02%	9.87%
W	W+WWD/LWAL/CDN:H:1/RES	$8,830.9M	1,041,206	8.85%	14.73%
MUR	MUR+CB/LWAL+CDN:H:2/RES	$8,808.8M	461,174	8.83%	6.52%
ADO/E	MUR+ADO/LWAL+CDN:H:1/RES	$7,284.9M	715,772	7.30%	10.12%
W	W+WWD/LWAL+CDN:H:2/RES	$6,232.8M	435,075	6.25%	6.15%
MUR	MUR+CL/LWAL+CDN:H:2/RES	$5,371.0M	281,192	5.38%	3.98%
	MUR+CB/LWAL+CDN:H:1/RES	$5,348.9M	472,995	5.36%	6.69%
W	W/LWAL+CDL/H:2/RES	$4,432.2M	193,364	4.44%	2.74%
MUR	MUR+STRUB/LWAL+CDN/H:2/RES	$3,630.7M	237,601	3.64%	3.36%
	MUR+CL/LWAL+CDN/H:1/RES	$3,261.4M	288,397	3.27%	4.08%
ADO/E	EWV/LN+CDN/H:1/RES	$2,997.9M	706,937	3.00%	10.00%
W	W/LWAL+CDL/H:3/RES	$2,722.6M	77,263	2.73%	1.09%
	W/LWAL+CDL/H:1/RES	$2,691.3M	198,327	2.70%	2.81%
MUR	MUR+STRUB/LWAL+CDN/H:1/RES	$2,204.7M	243,693	2.21%	3.45%
	MUR+STDRE/LWAL+CDN/H:2/RES	$1,909.9M	99,993	1.91%	1.41%
OT	ME+MEO/LWAL+CDN/H:1/RES	$1,904.5M	449,103	1.91%	6.35%
W	W/LWAL+CDL/H:2/COM	$1,875.0M	21,889	1.88%	0.31%
	W/LWAL+CDL/H:1/COM	$1,826.1M	43,777	1.83%	0.62%
ADO/E	MUR+ADO/LWAL+CDN/HBET:3-6/RES	$1,586.1M	9,416	1.59%	0.13%
RC	CR/LFINF+CDL/H:3/RES	$1,342.5M	32,381	1.35%	0.46%
ADO/E	MUR+ADO/LWAL+CDN:H:2/COM	$1,210.1M	19,013	1.21%	0.27%
	MUR+ADO/LWAL+CDN/H:1/COM	$1,178.6M	38,035	1.18%	0.54%
MUR	MUR+CB/LWAL+CDN/HBET:3-6/RES	$1,164.6M	6,218	1.17%	0.09%
	MUR+STDRE/LWAL+CDN/H:1/RES	$1,159.7M	102,554	1.16%	1.45%
W	W/LWAL+CDL/H:3/COM	$1,138.3M	7,299	1.14%	0.10%
RC	CR/LFINF+CDL/H:2/RES	$1,092.7M	40,521	1.10%	0.57%
MCF	MCF+LWAL+CDL/H:2/RES	$1,051.7M	36,706	1.05%	0.52%
MUR	MUR+CB/LWAL+CDN/H:1/COM	$956.9M	12,028	0.96%	0.17%
	MUR+CB/LWAL+CDN/H:1/COM	$932.0M	24,064	0.93%	0.34%
	MUR+CB/LWAL+CDL/H:1/IND	$880.4M	18,105	0.88%	0.26%
S	S+SL/LFM+CDN/H:1/IND	$768.3M	10,150	0.77%	0.14%
MUR	MUR+CL/LWAL+CDN/HBET:3-6/RES	$710.1M	3,786	0.71%	0.05%
	MUR+CB/LWAL+CDN/2/IND	$640.3M	6,032	0.64%	0.09%
MCF	MCF+CB/LWAL+CDL/H:1/RES	$638.6M	37,646	0.64%	0.53%