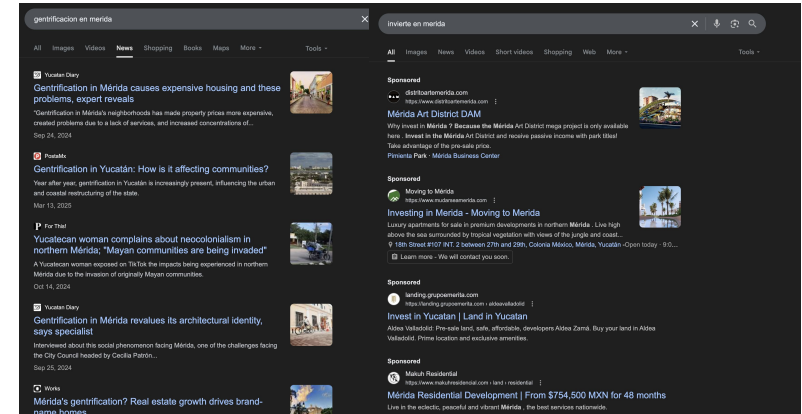


When Growth Displaces: Migration and Indigenous Decline in Yucatán

Practical Data Science
Mid-term Presentation
Ernesto Castillo

Context and motivation

- Urban growth in Yucatán is accelerating, especially in Mérida. Factors like safety, cheap land (relative to other places) and tourism attractiveness make it a prime destination.
- There has been violent displacement of locals, either via fraud, scam or blatant violence.
- Out-of-state migration is reshaping demographic patterns.
- Observation: Indigenous population is declining in urban areas.
- Goal: Explore whether migration is displacing Indigenous residents.

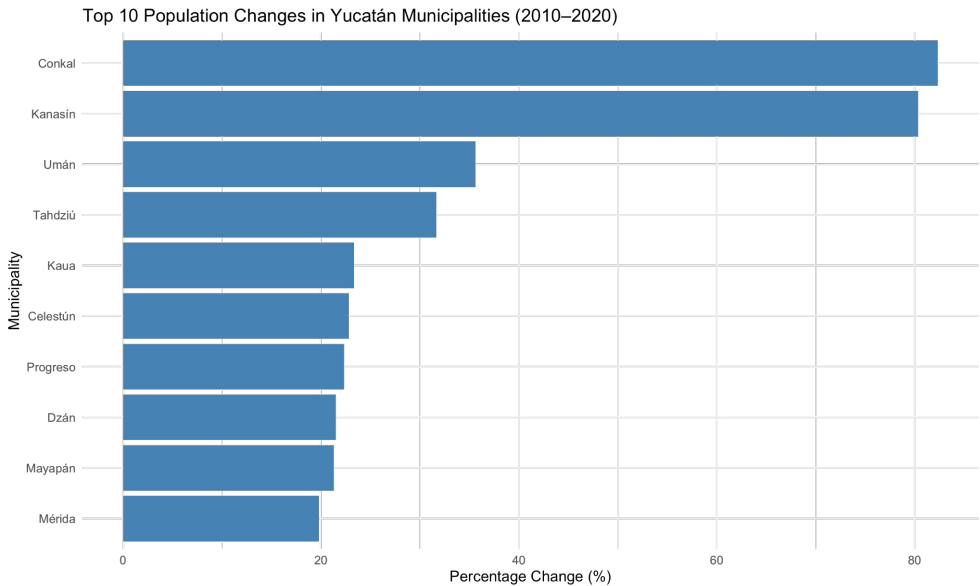


Sources

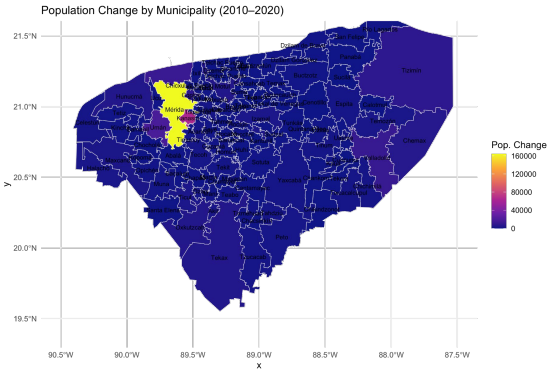
- INEGI Census 2010 & 2020 (Yucatán state)
- Municipality-level demographic and housing data
- Key indicators: total population, place of birth, Indigenous language, housing units
- Tools: R, sf, ggplot2, dplyr, knitr



Population Growth Overview



MUN	NOM_MUN	Population2010	Population2020	PopulationChange	PercentageChange
13	Conkal	9143	16671	7528	82.34
41	Kanasín	78709	141939	63230	80.33
101	Umán	50993	69147	18154	35.60
73	Tahdziú	4447	5854	1407	31.64
43	Kaua	2761	3405	644	23.32
11	Celestún	6831	8389	1558	22.81
59	Progreso	53958	66008	12050	22.33
25	Dzán	4941	6003	1062	21.49
49	Mayapán	3269	3965	696	21.29
50	Mérida	830732	995129	164397	19.79
28	Dzilam de Bravo	2463	2936	473	19.20
3	Akil	10362	12285	1923	18.56
92	Tixcacalcupul	6665	7888	1223	18.35
21	Chichimilá	7952	9406	1454	18.28
100	Ucú	3469	4049	580	16.72
19	Chemax	33490	38934	5444	16.26
87	Tetiz	4725	5464	739	15.64
61	Río Lagartos	3438	3974	536	15.59
56	Oxkutzcab	29325	33854	4529	15.44



In-State VS Out-of-State Migration

MUN	NOM_MUN	BornInState2010	BornInState2020	BornInStateChange	PercentageChange	PercentageChangeToMunicipalityPop	PercentageChangeToTotalPop
41	Kanasín	69163	120754	51591	74.59	65.55	2.64
13	Conkal	8660	12431	3771	43.55	41.24	0.19
73	Tahdziú	4426	5778	1352	30.55	30.40	0.07
101	Umán	47441	61094	13653	28.78	26.77	0.70
43	Kaua	2713	3310	597	22.01	21.62	0.03
25	Dzán	4812	5835	1023	21.26	20.70	0.05
49	Mayapán	3252	3903	651	20.02	19.91	0.03
11	Celestún	6251	7555	1304	20.86	19.09	0.07
3	Akil	10139	11949	1810	17.85	17.47	0.09
92	Tixcacalcupul	6575	7638	1063	16.17	15.95	0.05
12	Cenotillo	3607	3551	-56	-1.55	-1.51	0
88	Teya	1943	1884	-59	-3.04	-2.98	0
8	Calotmul	3888	3706	-182	-4.68	-4.44	-0.01
86	Tepakán	2164	2047	-117	-5.41	-5.26	-0.01
9	Cansahcab	4567	4294	-273	-5.98	-5.81	-0.01

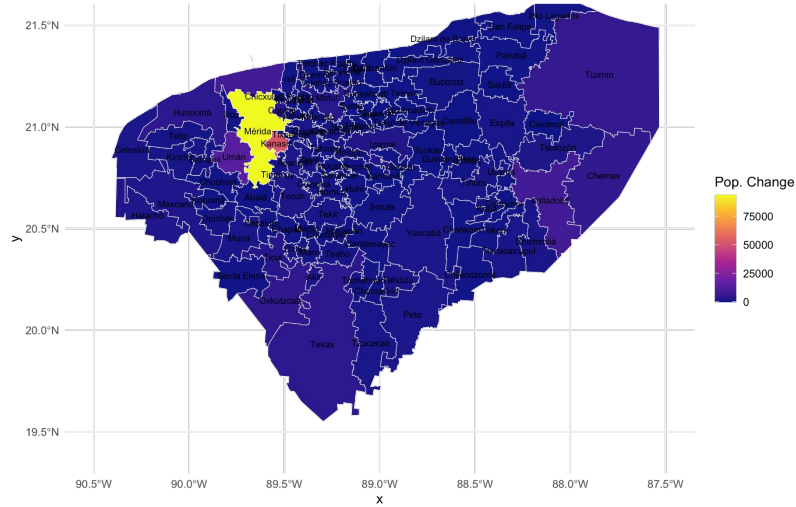
"Population Changes Born in Yucatán (2010-2020)"

MUN	NOM_MUN	BornInOtherState2010	BornInOtherState2020	BornInOtherStateChange	PercentageChange	PercentageChangeToMunicipalityPop	PercentageChangeToTotalPop
13	Conkal	382	3950	3568	934.03	39.02	0.18
41	Kanasín	7940	20552	12612	158.84	16.02	0.64
28	Dzilam de Bravo	184	484	300	163.04	12.18	0.02
50	Mérida	112871	188353	75482	66.87	9.09	3.86
101	Umán	3376	7881	4505	133.44	8.83	0.23
65	San Felipe	44	165	121	275	6.58	0.01
59	Progreso	6081	9198	3117	51.26	5.78	0.16
83	Telchac Puerto	89	168	79	88.76	4.58	0
20	Chicxulub Pueblo	74	251	177	239.19	4.3	0.01
11	Celestún	507	783	276	54.44	4.04	0.01
1	Abalá	25	28	3	12	0.05	0
89	Ticul	1468	1419	-49	-3.34	-0.13	0
62	Sacalum	69	54	-15	-21.74	-0.33	0
5	Bokobá	28	20	-8	-28.57	-0.39	0
68	Sinanché	141	118	-23	-16.31	-0.74	0

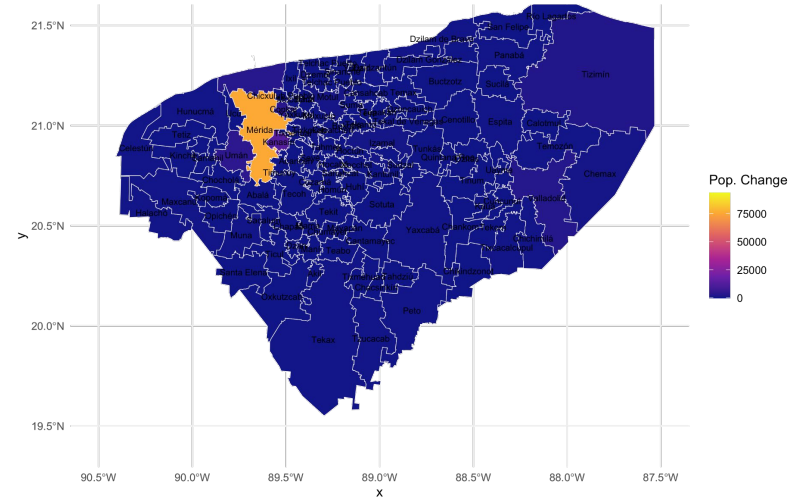
"Population Changes from outside of Yucatán (2010-2020)"

In-State VS Out-of-State Migration

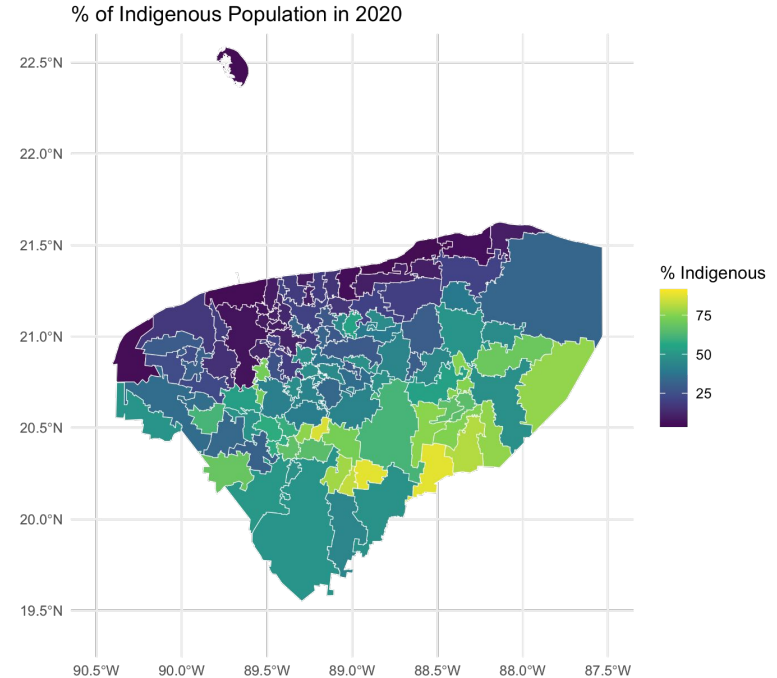
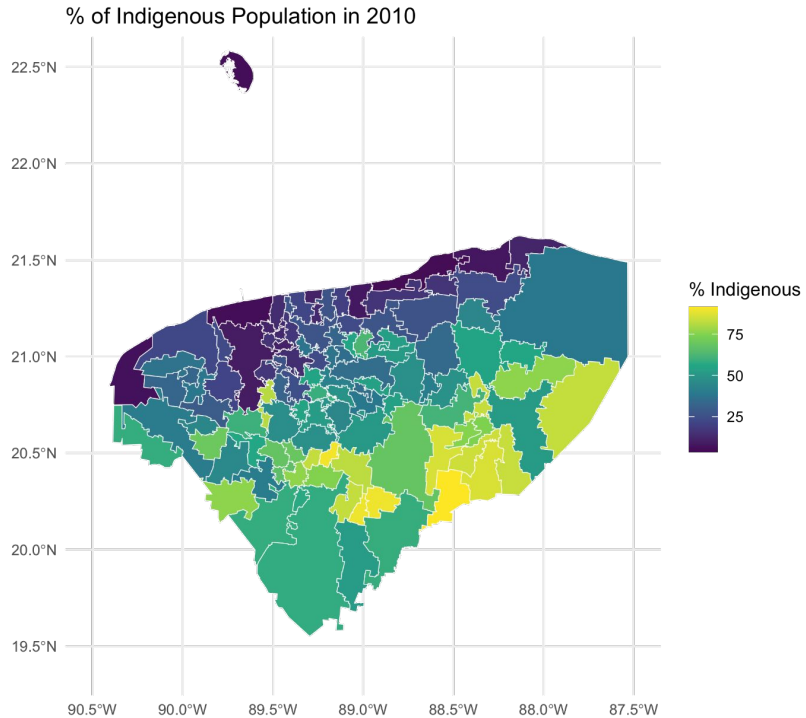
Population Change from Within Yucatán (2010–2020)



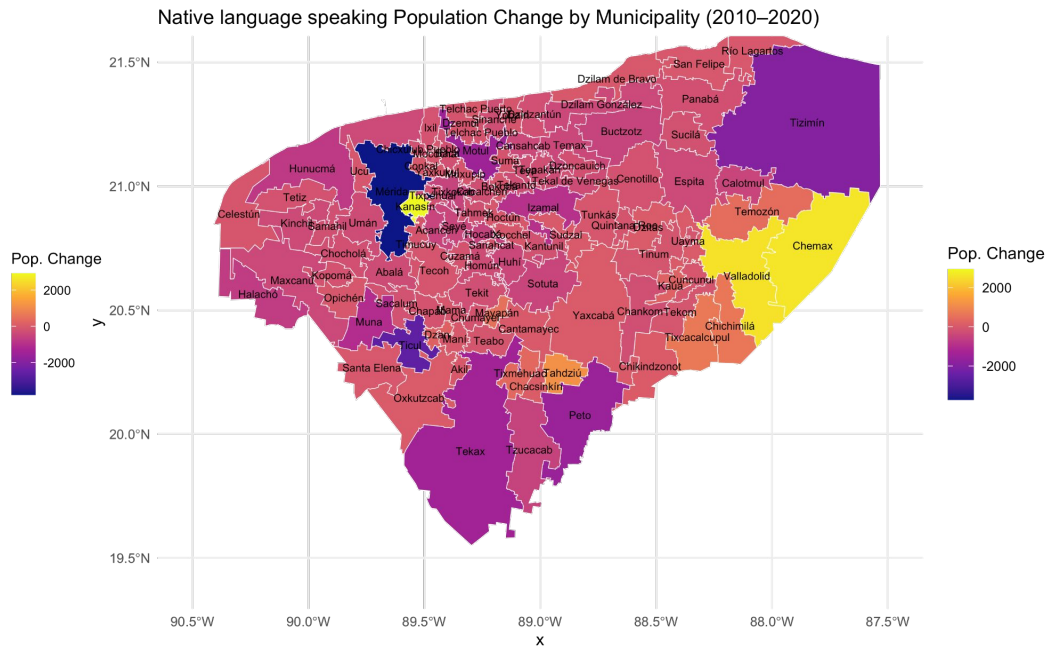
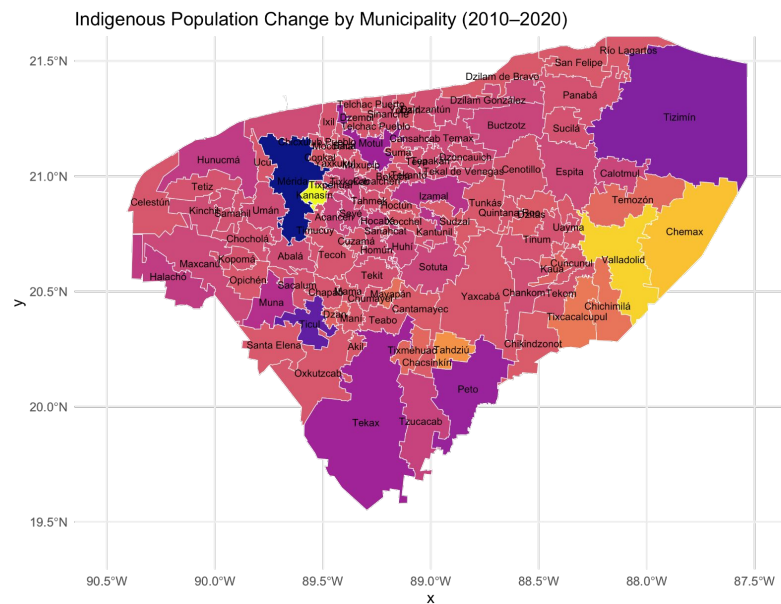
Population Change from Other States (2010–2020)

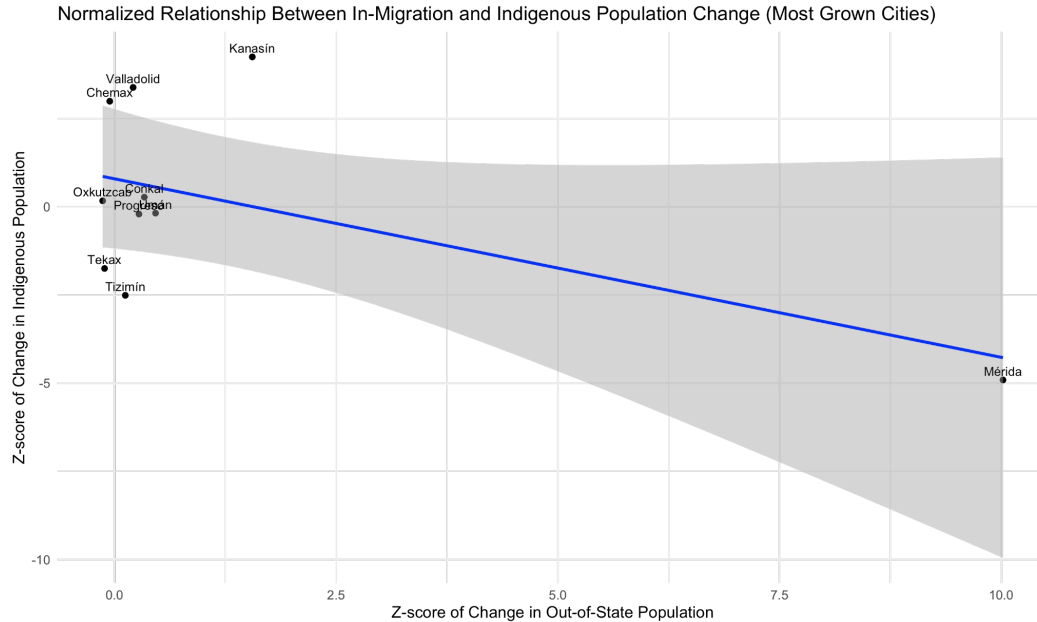


Share of Indigenous population 2010 vs 2020



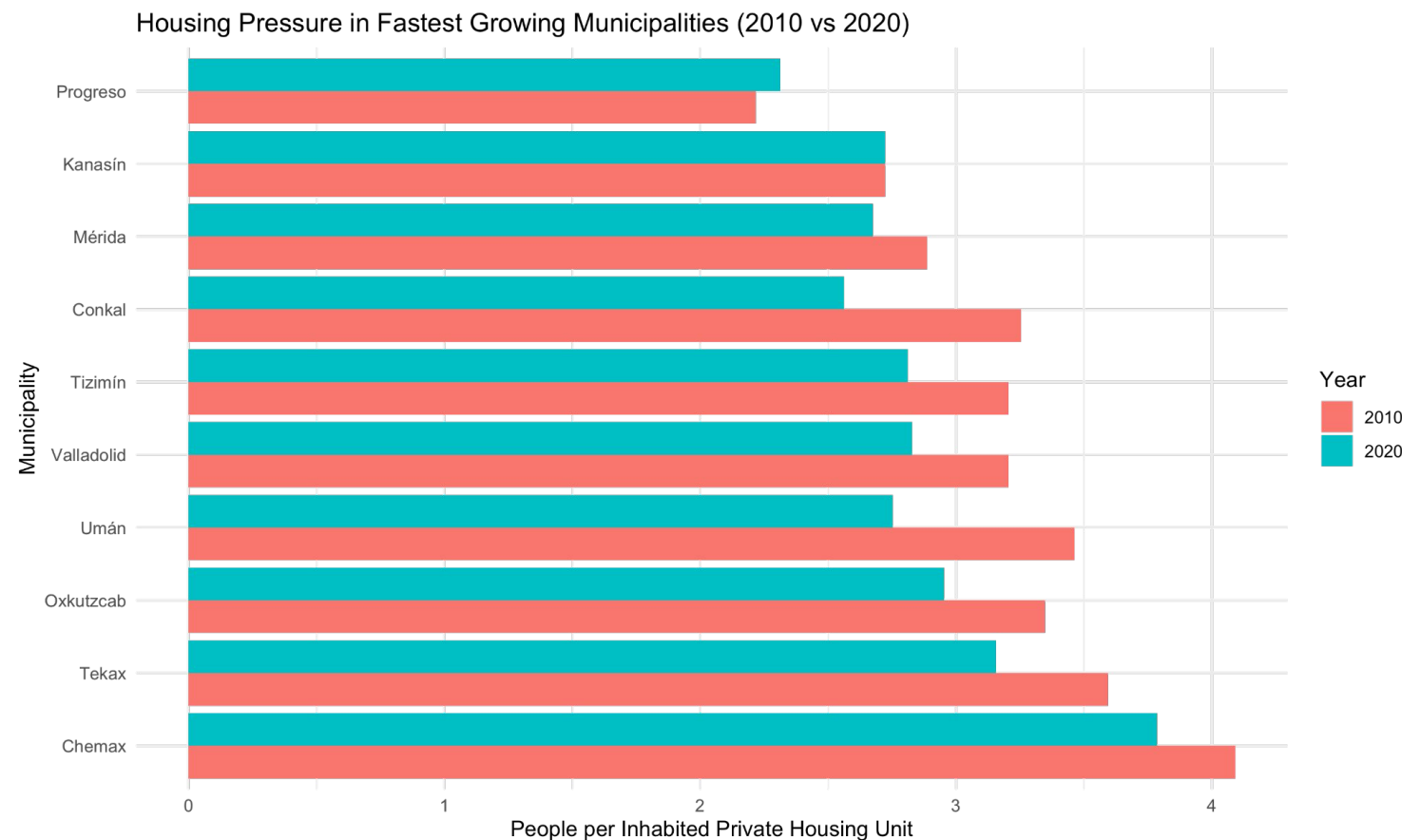
Change in indigenous population and native language speaking population.





- **Moderate negative correlation:** $r = -0.40$, $p < 0.001$
- **Municipalities with more in-migration tend to lose Indigenous population**
- **Mérida** is the most extreme case, but the trend holds across the state
- Supports the hypothesis that **urban growth may be displacing Indigenous communities (correlation not causality)**

Housing pressure in fastest growing municipalities



Conclusion and next steps

- Indigenous population is declining in fast-growing cities like Mérida
- Housing pressure is decreasing, possibly due to wealthier residents or temporary households (AIRBNB)
- Migration is statistically linked to Indigenous population decline (correlation not causation)
- Was this trend present before 2010, will it be in 2030?
- Key questions remain: quality of life, service capacity, and cultural impact