

A “Human” Perspective on Deltas

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Not All Social Scientists are Created Equal

- **Economists:** cost-benefit of living in deltas, financial incentives for moving out
- **Psychologists:** perceptions of risk
- **Anthropologists:** culture and community tied to deltaic life
- **Demographers:** pop dynamics in deltas
- **Historians:** historical development of deltas
- **Political Scientists:** policy options, constraints on decision making, power issues
- **Geographers:** sense of place, spatial patterns

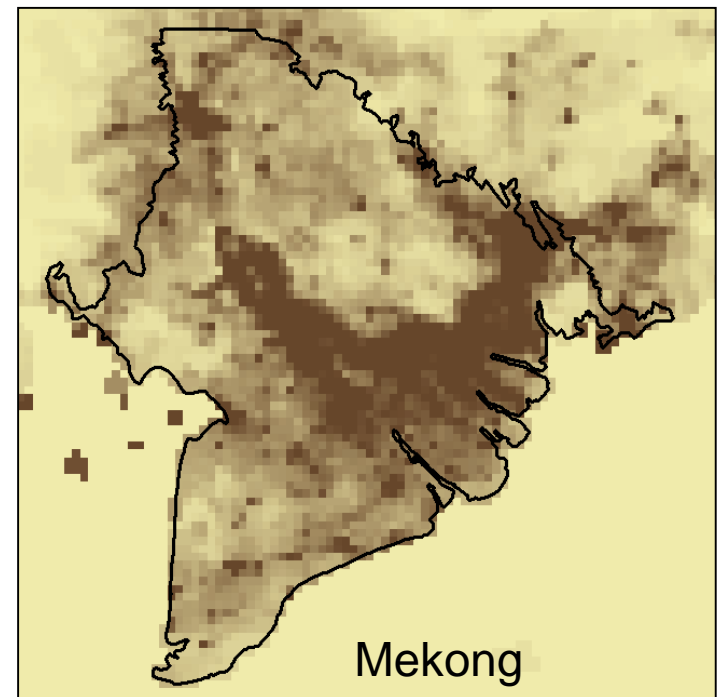
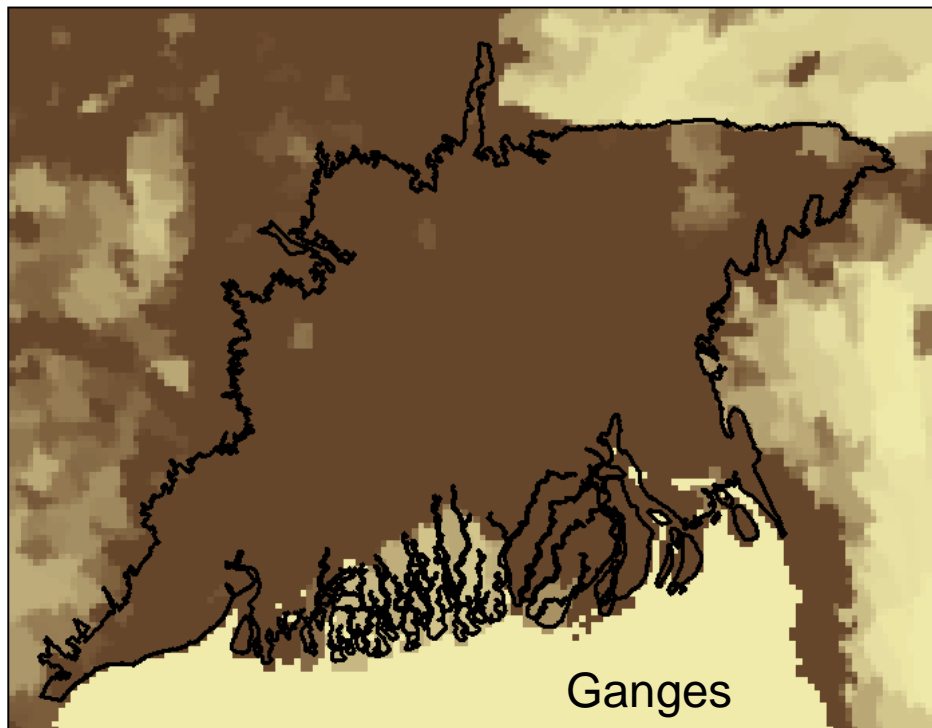
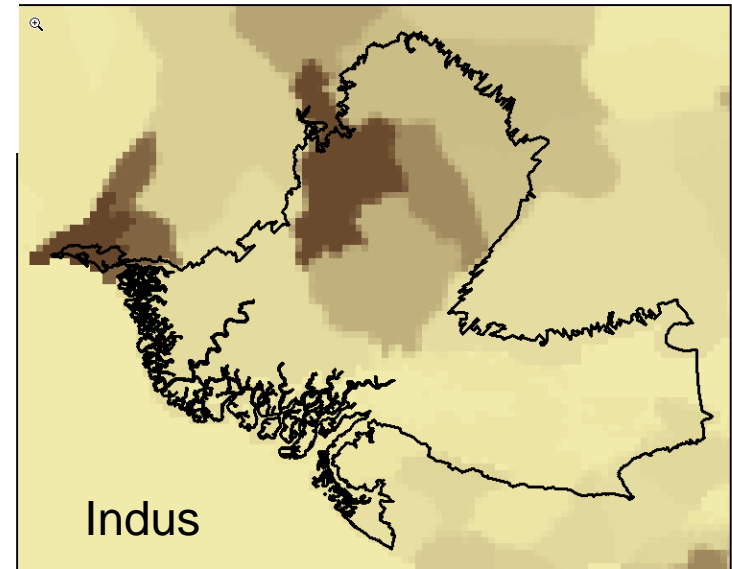
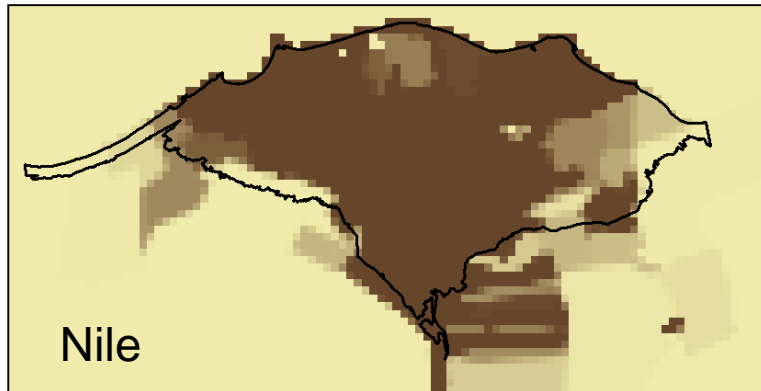
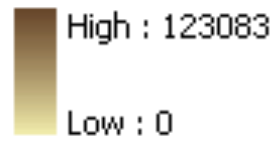
The Four Deltas

AREA	Degrees	Sq. Km.
Ganges	10.5	85,050
Indus	5.0	40,500
Mekong	5.0	55,125
Nile	2.6	21,060

The “Human” Data Sets

- Population size (GPW3)
- Population density (GPW3)
- Urban extents (GRUMP)
- GDP (Sutton & Costanza 2002)
- Poverty (CIESIN infant mortality rates)
- Land Cover (GLC2000)
- % Land in Crops (Ramankutty et al. forthcoming)
- Roads (VMAP0)
- Protected Areas (WDPA 2007)

Population

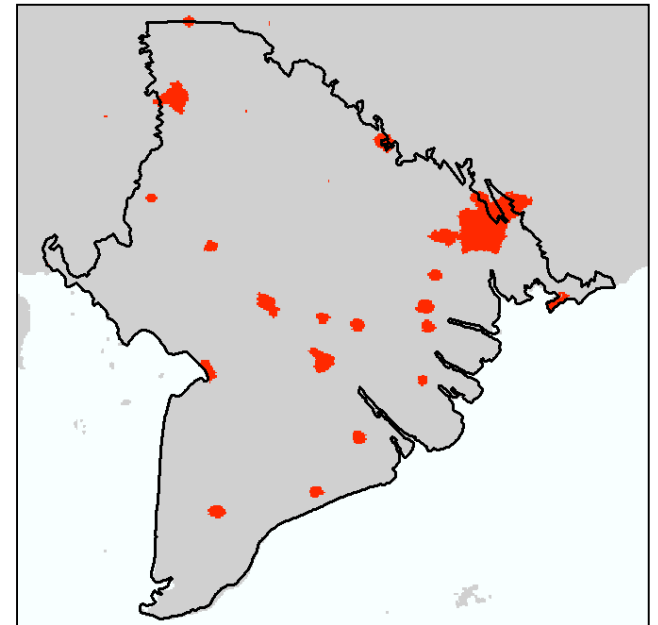
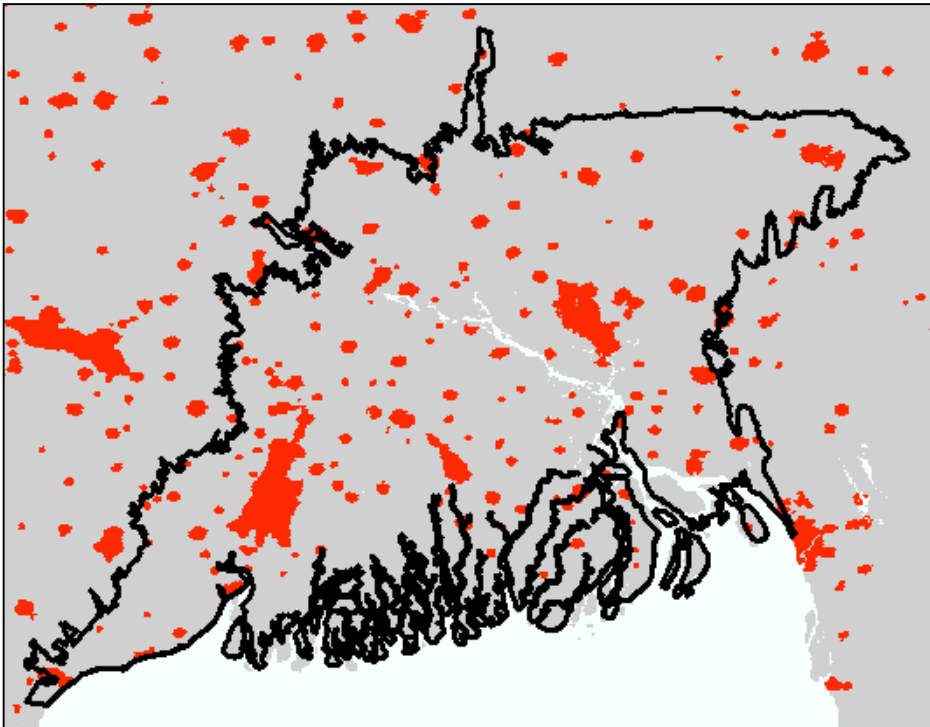
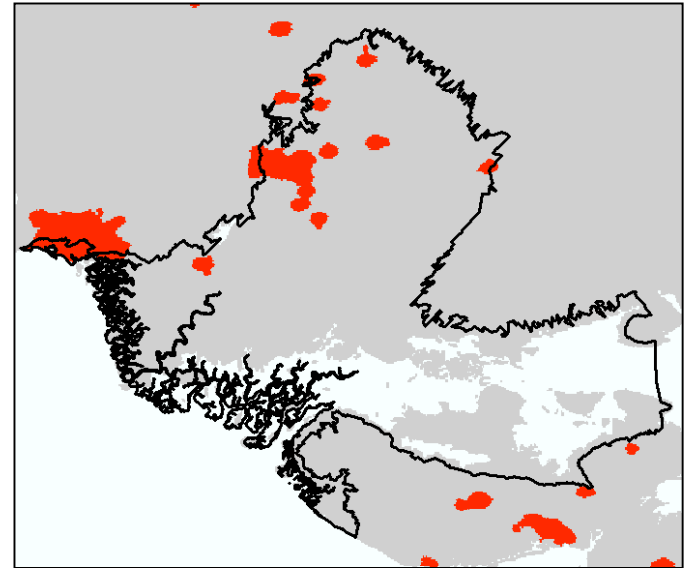
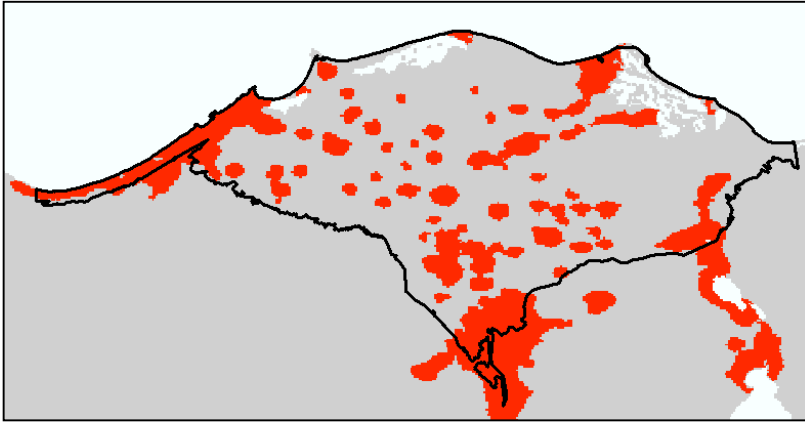


POP DENSITY 2000				
VALUE	MIN	MAX	MEAN	STD
Ganges	118	49,596	1,220	2,043
Indus	21	24,155	240	1,351
Mekong	26	42,173	466	1,388
Nile	-	43,414	1,397	2,245

TOTAL POP 1990					
VALUE	MIN	MAX	MEAN	STD	SUM
Ganges	-	721,265	18,731	31,695	120,759,000
Indus	-	363,610	2,906	17,039	8,827,850
Mekong	447	752,029	8,008	24,331	23,287,300
Nile	-	687,480	18,966	30,074	28,032,300
TOTAL POP 2000					
VALUE	MIN	MAX	MEAN	STD	SUM
Ganges	-	961,070	22,868	39,831	147,427,000
Indus	-	470,525	3,755	22,050	11,406,600
Mekong	529	889,330	9,706	29,066	28,226,100
Nile	-	807,917	22,956	35,162	33,928,700
TOTAL POP 2015					
VALUE	MIN	MAX	MEAN	STD	SUM
Ganges	-	1,745,030	29,336	56,409	189,130,000
Indus	-	685,886	5,456	32,145	16,573,900
Mekong	639	1,074,580	12,107	35,675	35,207,200
Nile	-	963,008	28,632	41,751	42,318,100

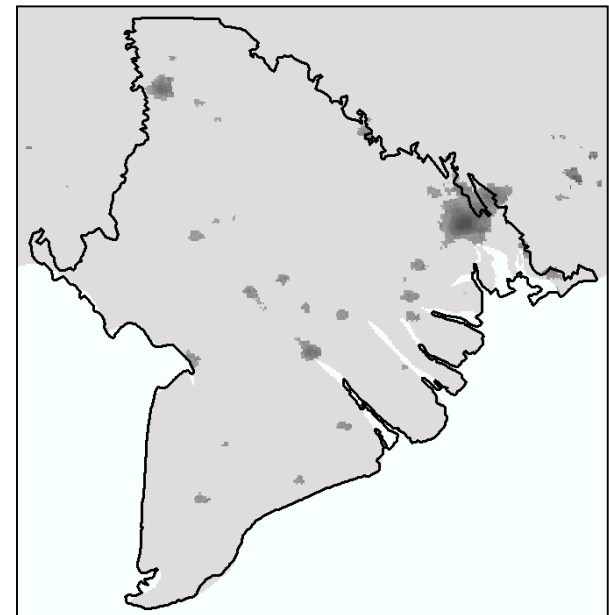
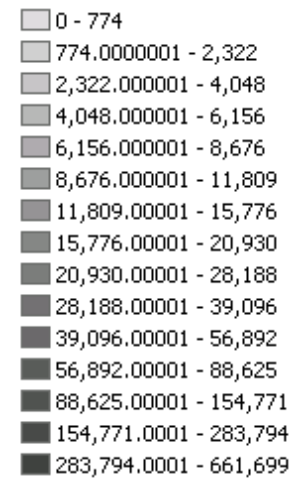
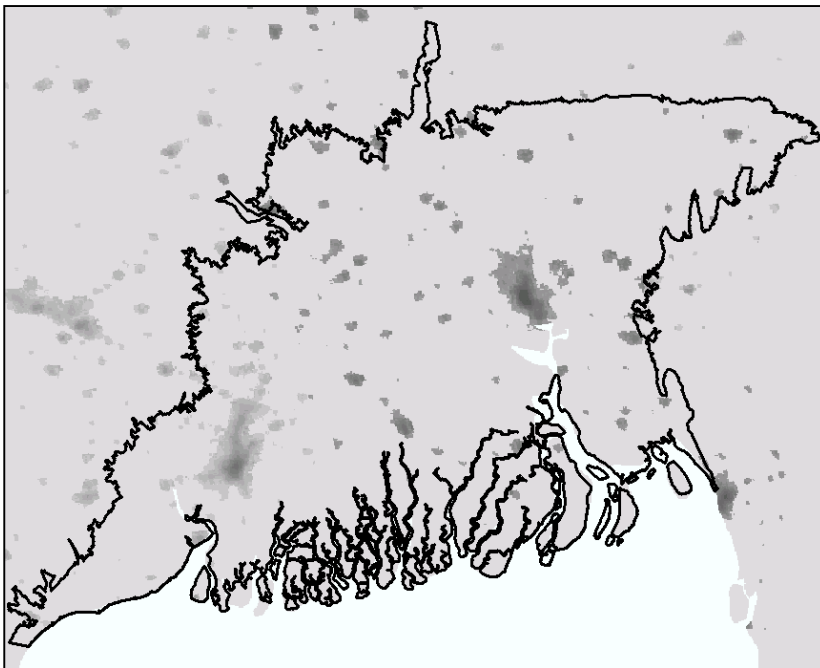
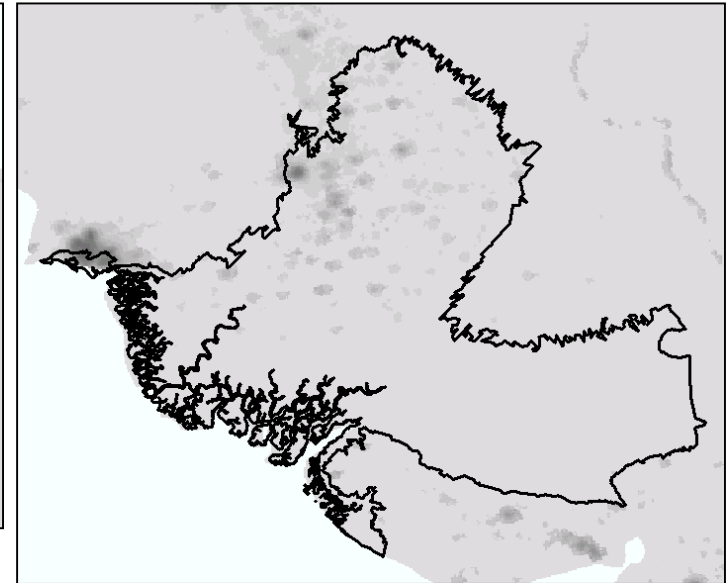
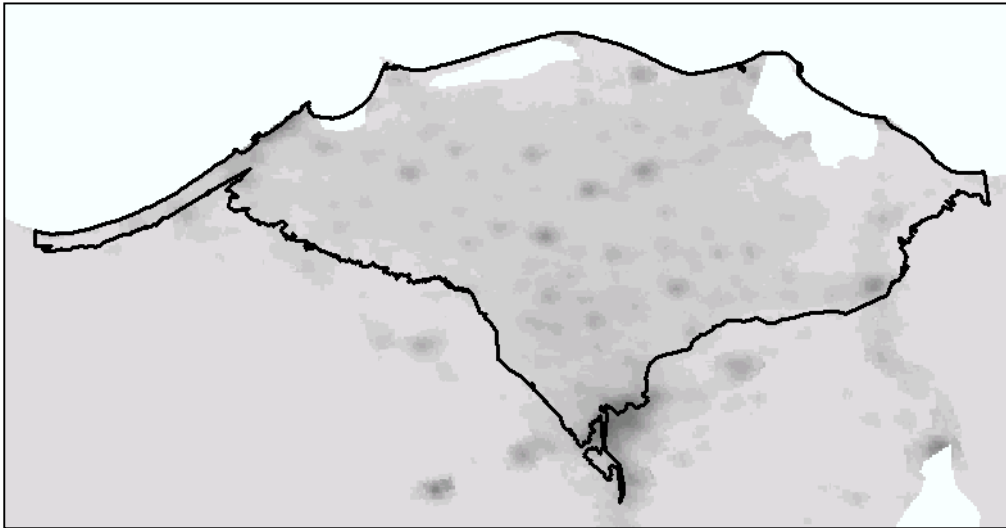
Urban Extent

CIESIN, 2005



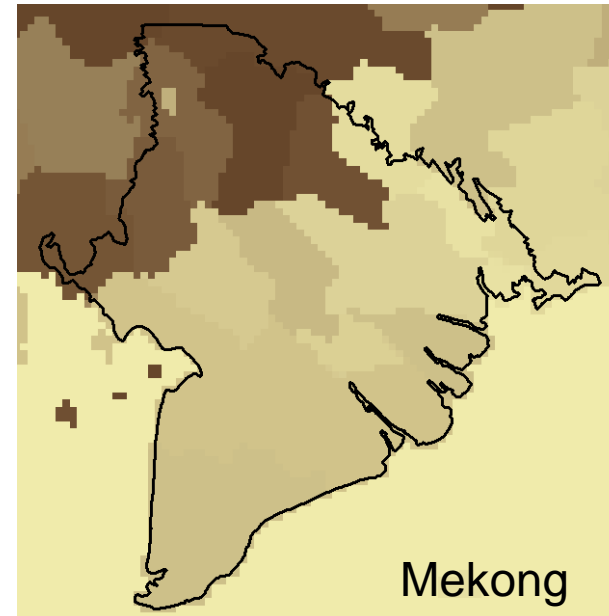
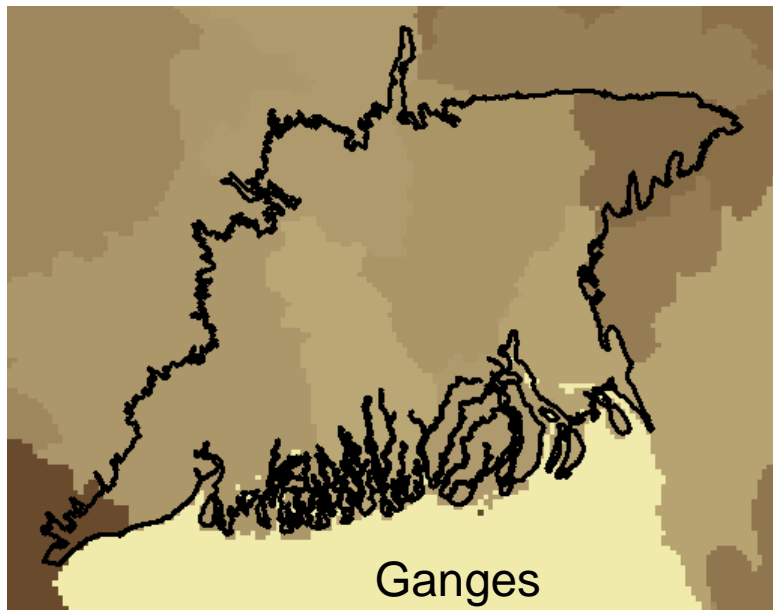
GDP

Sutton & Costanza,
2001



Poverty

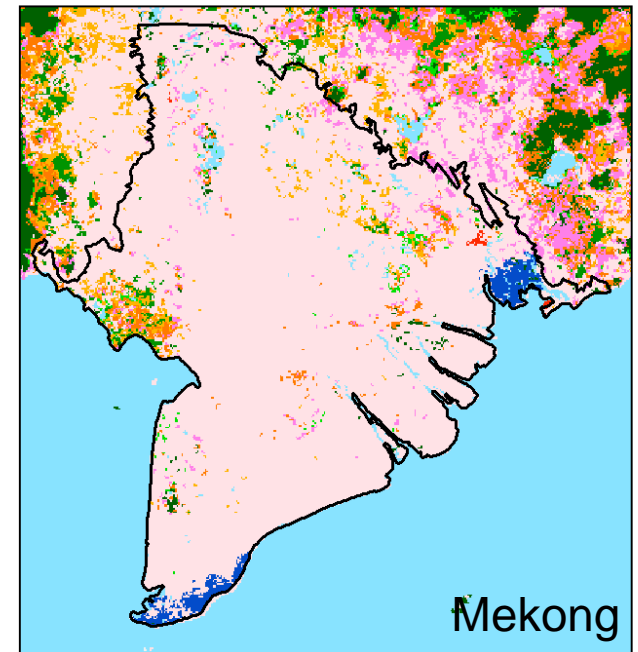
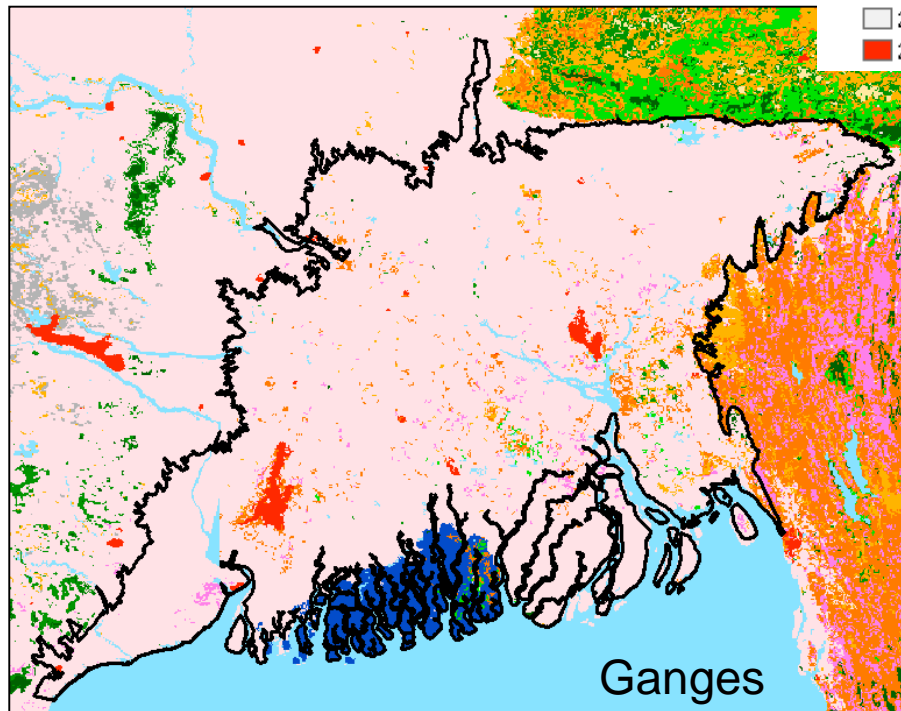
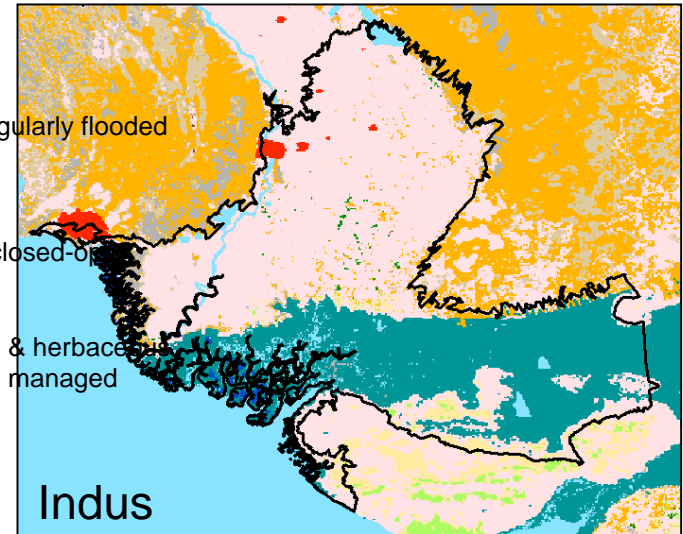
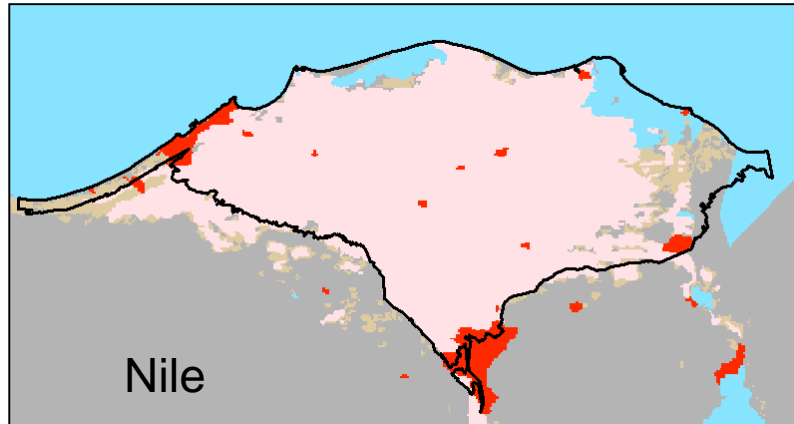
INFANT MORTALITY					
VALUE	MIN	MAX	MEAN	STD	
Ganges	44	110	55	12	
Indus	69	73	72	2	
Mekong	7	133	45	37	
Nile	22	39	27	4	



Land Cover

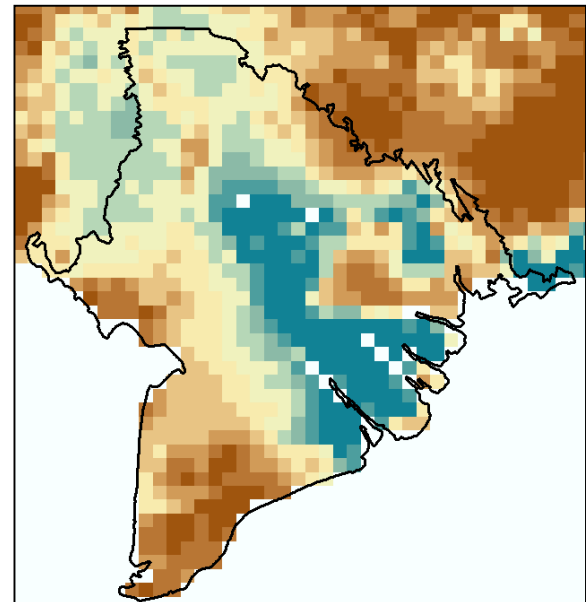
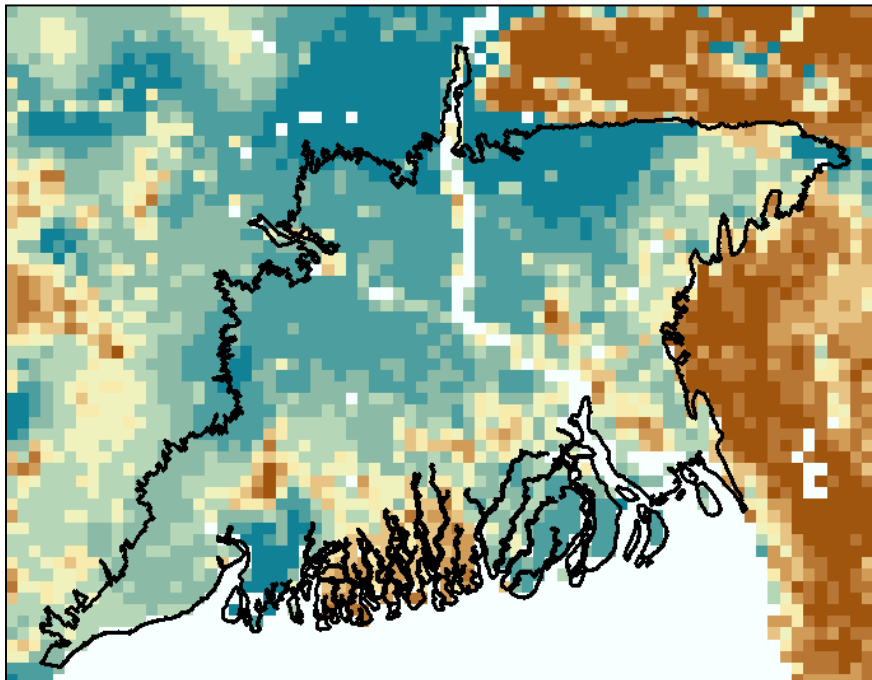
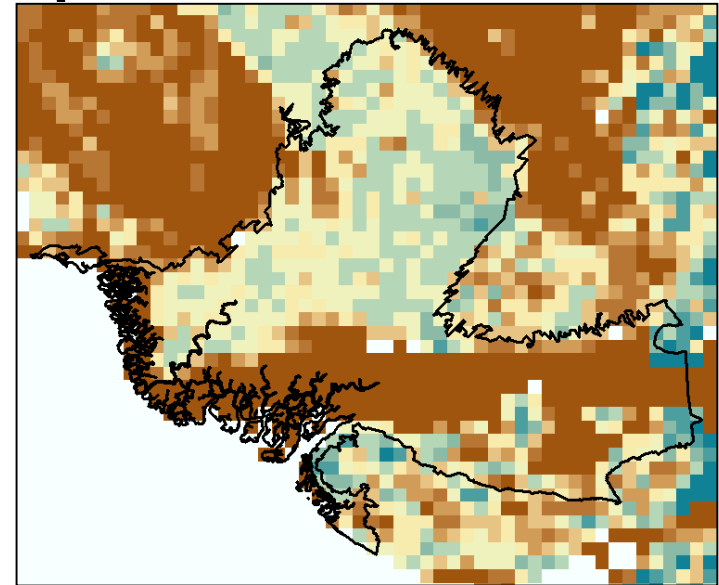
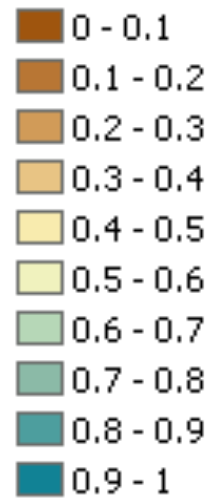
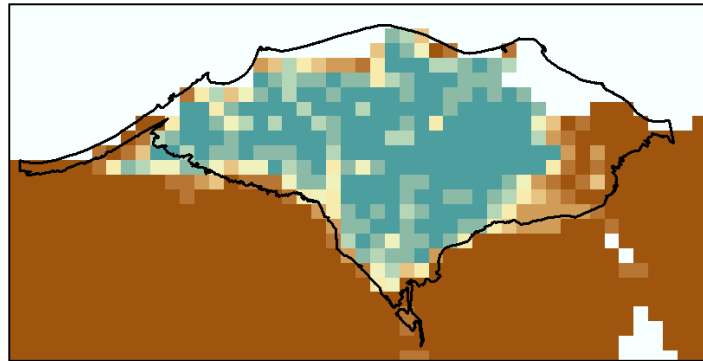
GLC2000

- 1
- 2
- 3 Tree cover, broadleaved,
- 4 open
- 5
- 6
- 7
- 8 Tree cover, regularly flooded
- 9
- 10
- 11
- 12 Shrub cover, closed-op
- 13
- 14
- 15 Flooded shrub & herbaceous
- 16 Cultivated and managed
- 17
- 18
- 19
- 20 Water bodies
- 21
- 22 Artificial surfaces

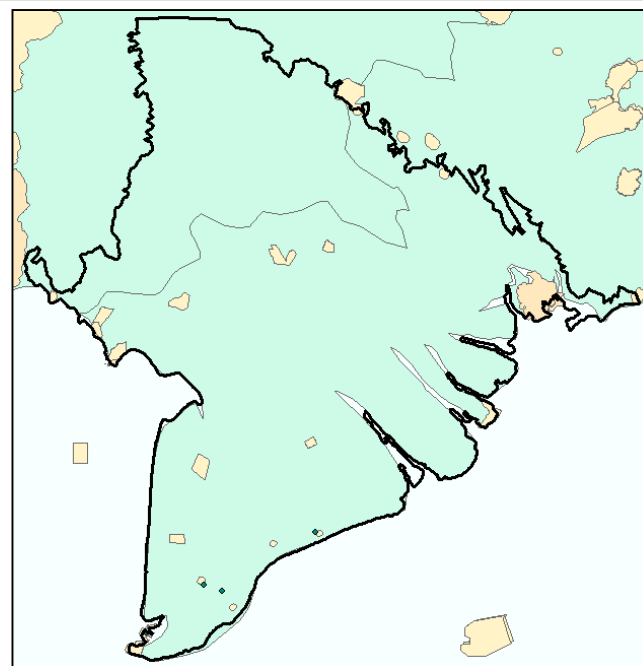
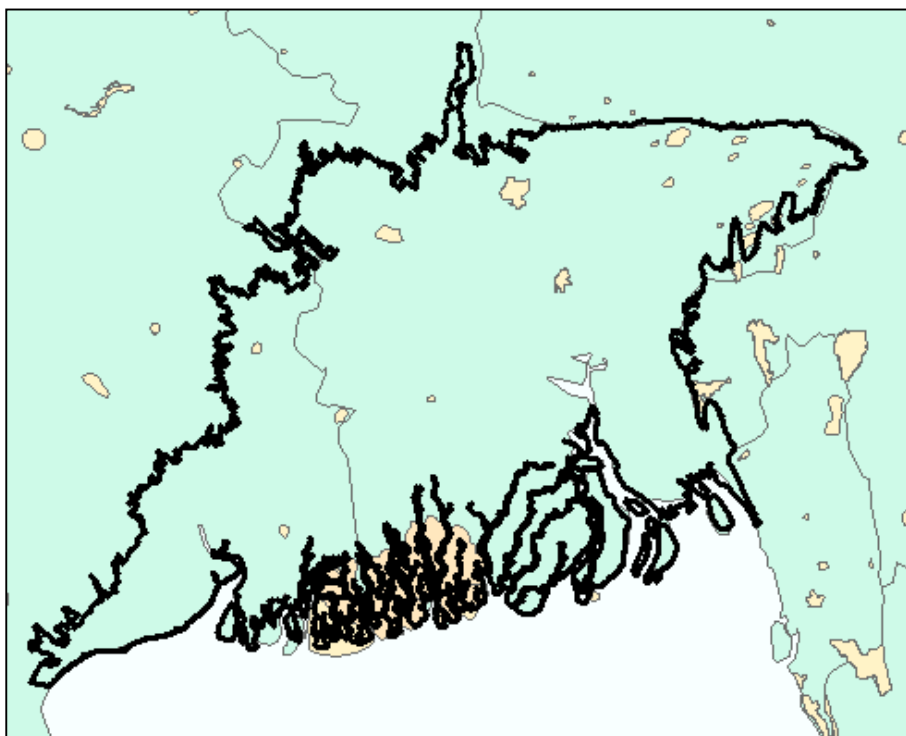
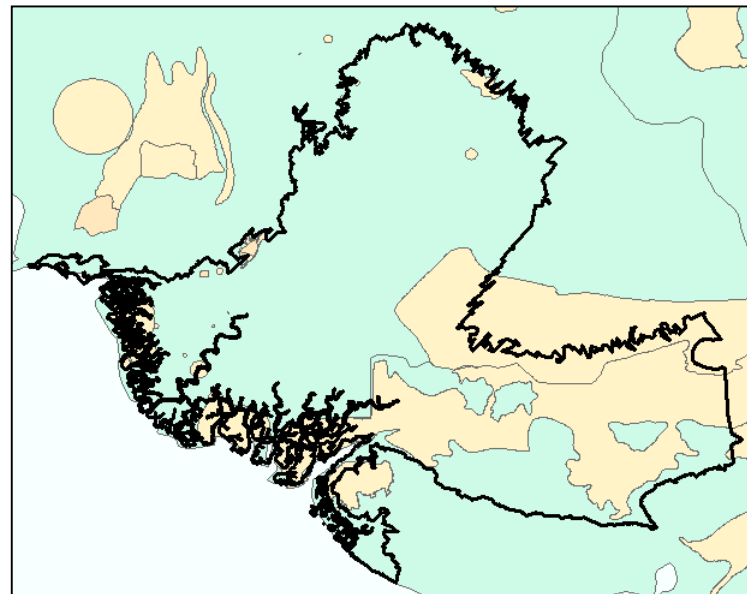
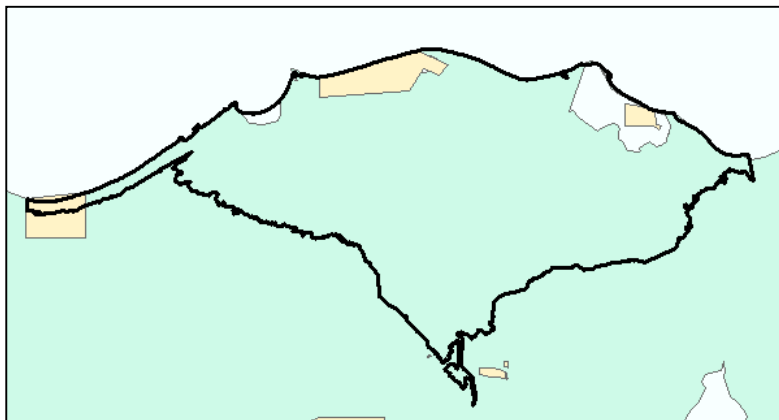


Proportion Land in Crops

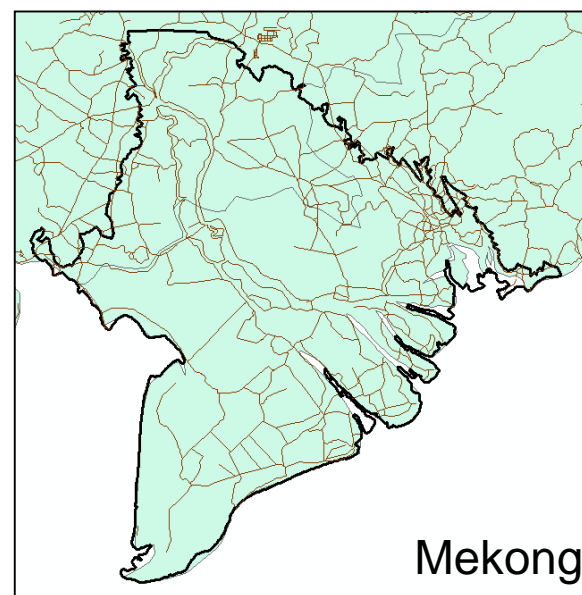
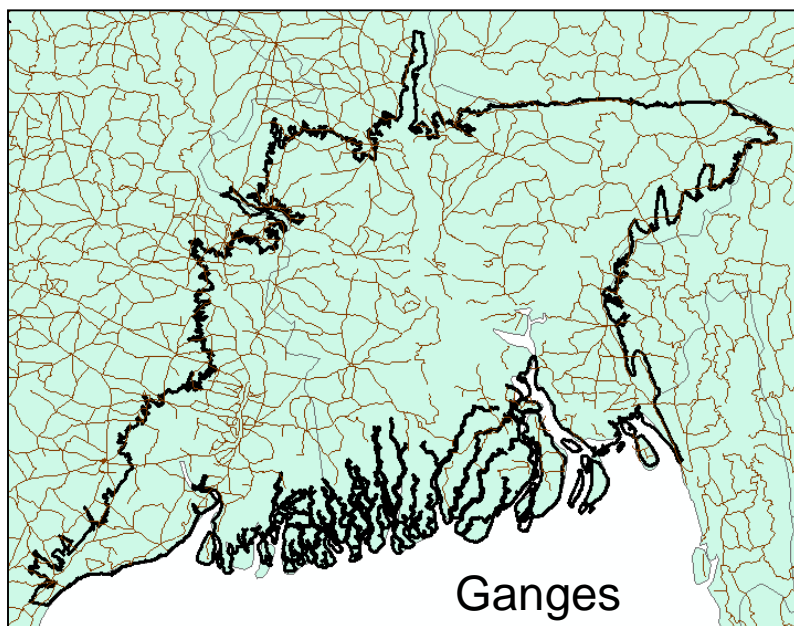
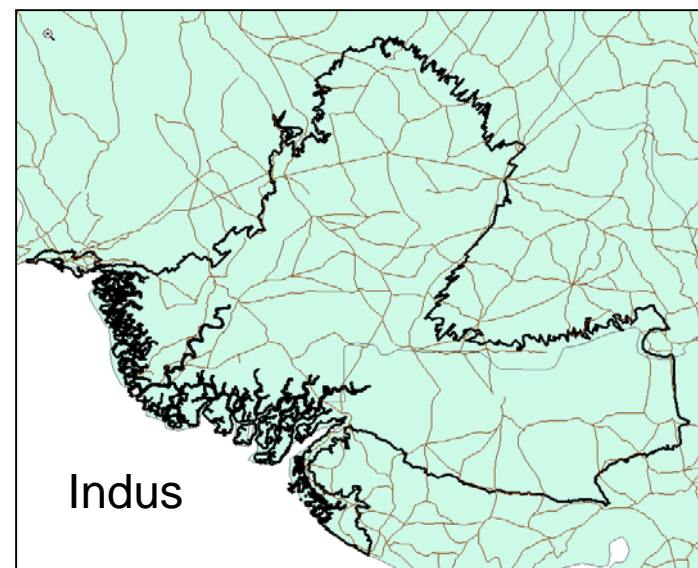
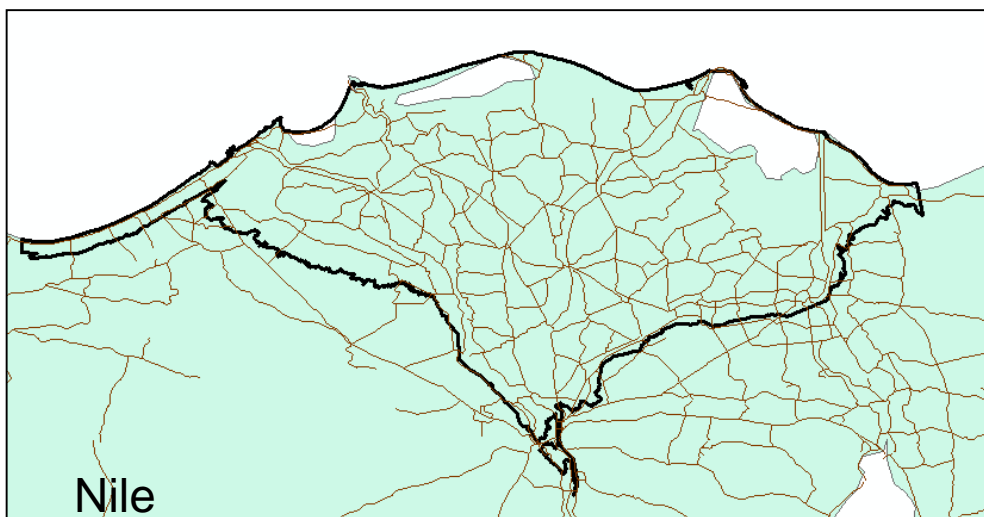
Ramankutty et al.
forthcoming



Protected Areas

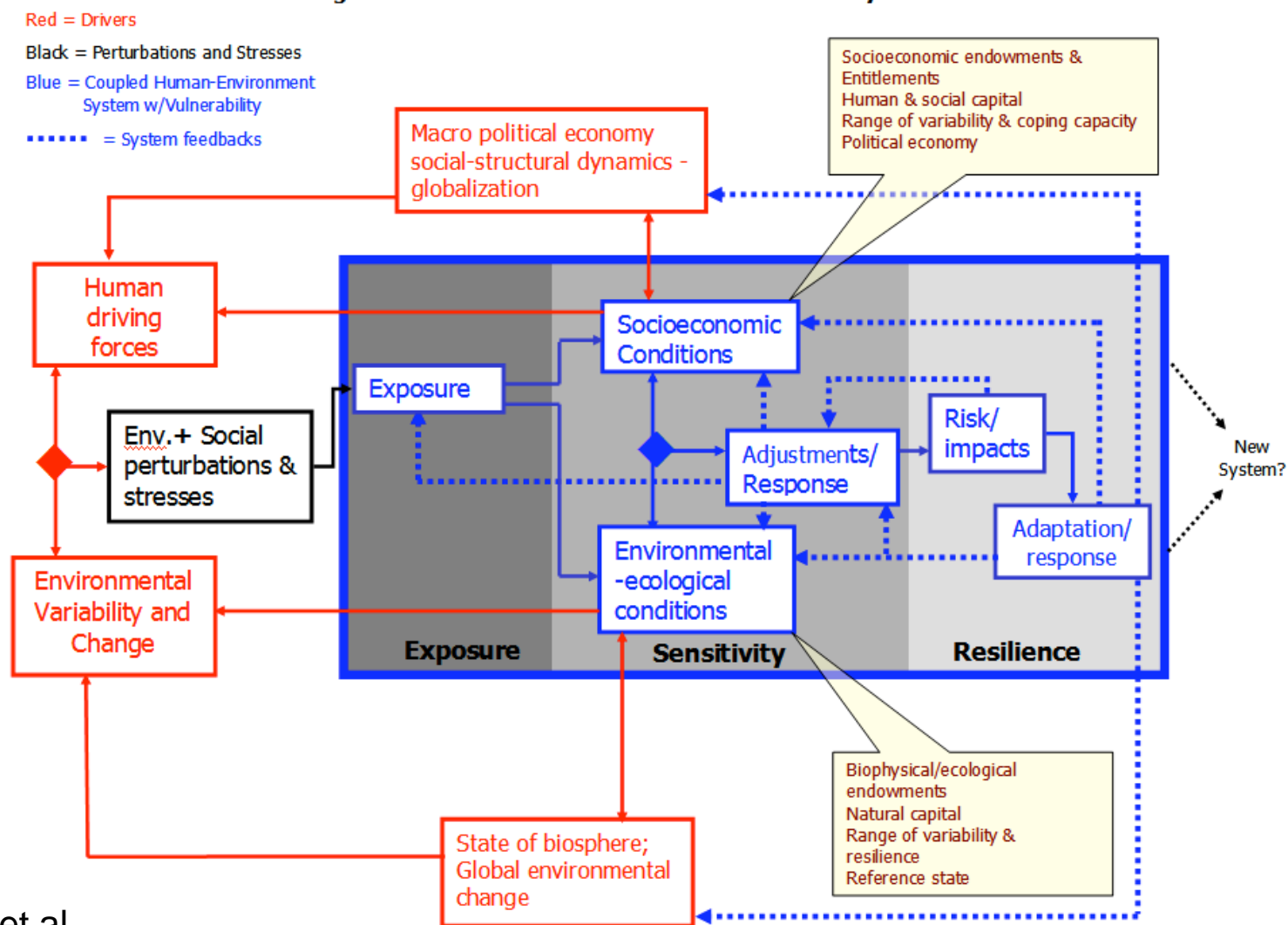


Roads



Vulnerability is More than Population Exposed

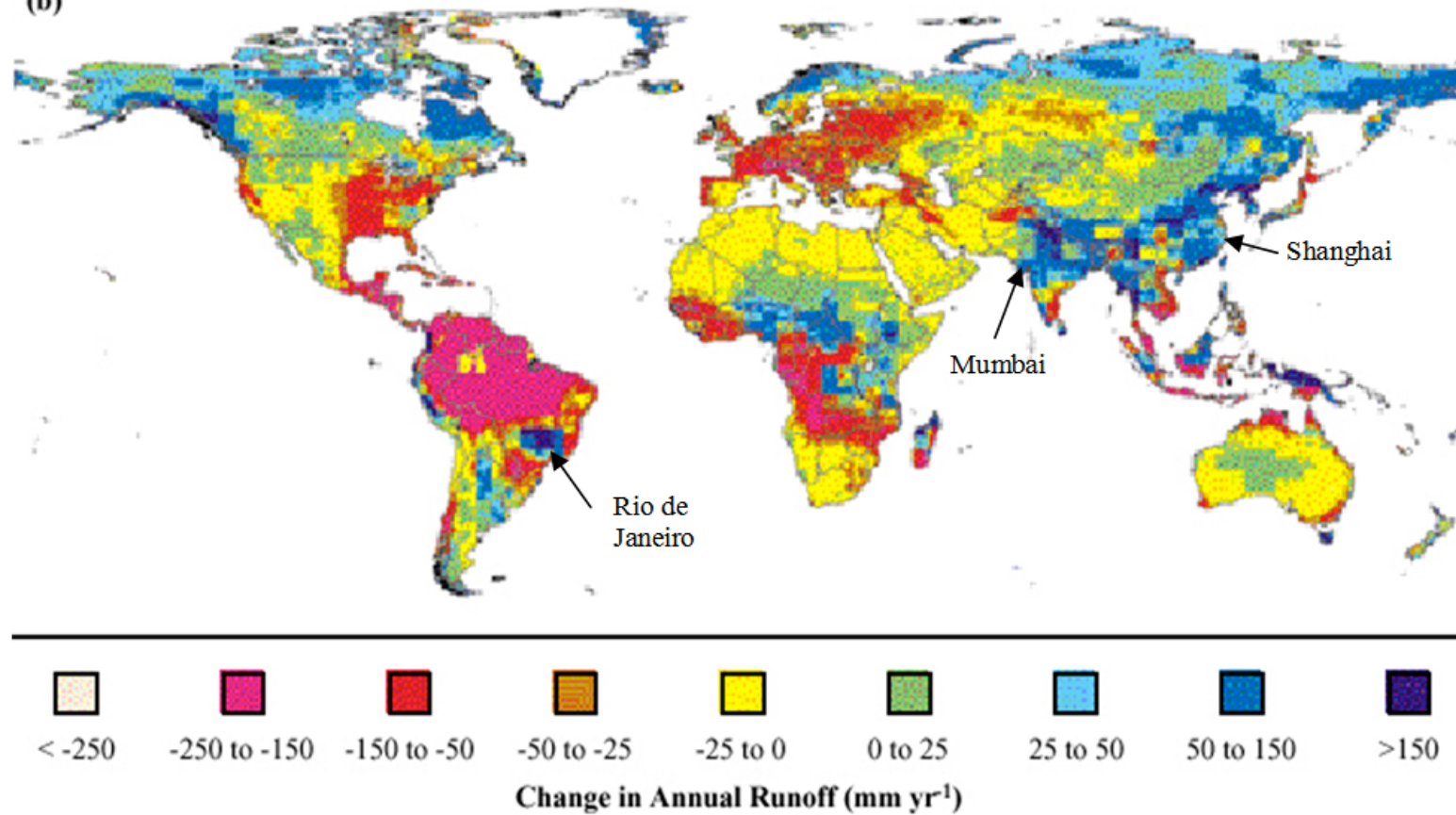
Figure 1. Extended Framework for Vulnerability



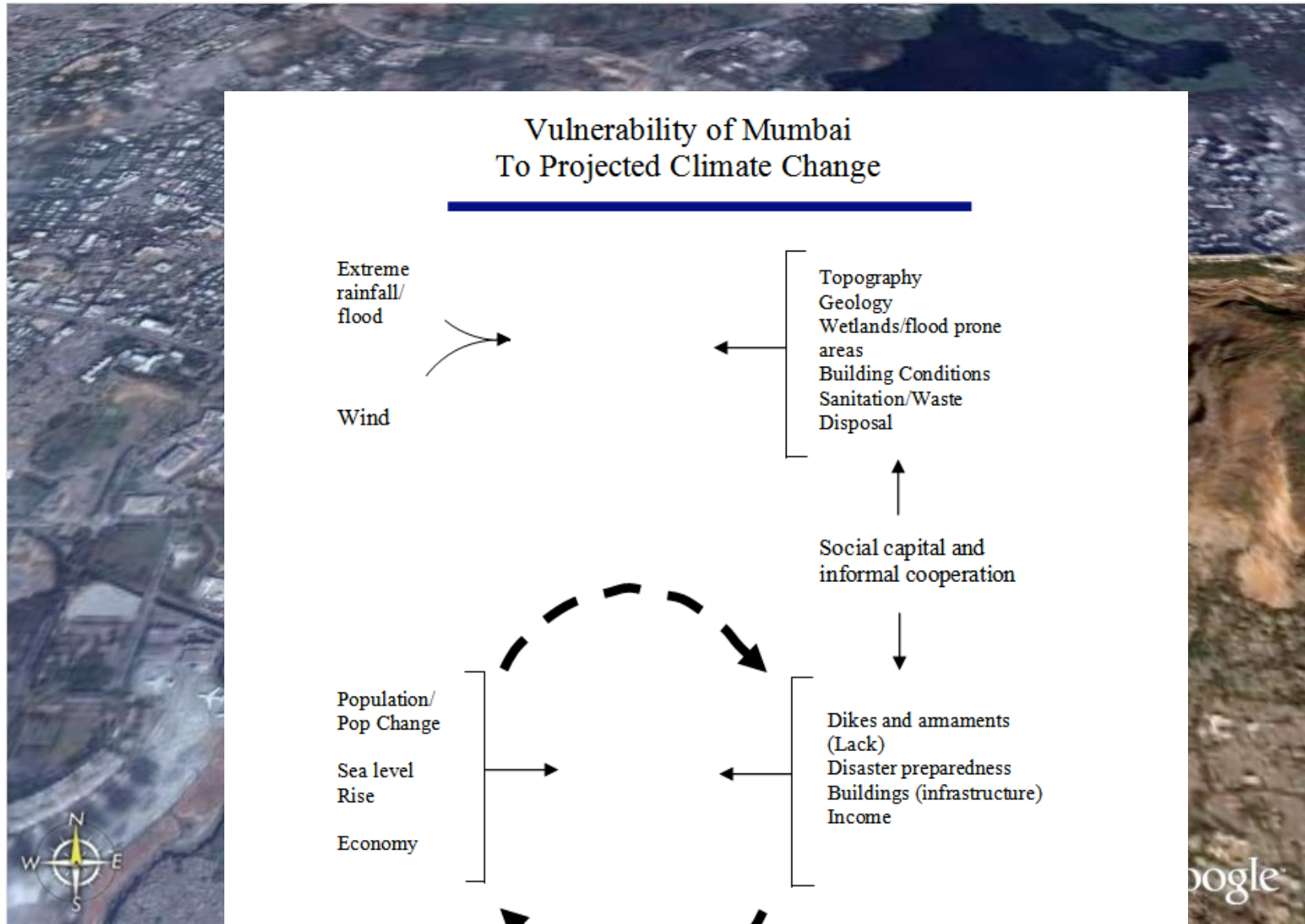
Tale of Three Cities

Figure 3. Case Study Locations Superimposed on Map of Potential Changes in Runoff

(b)



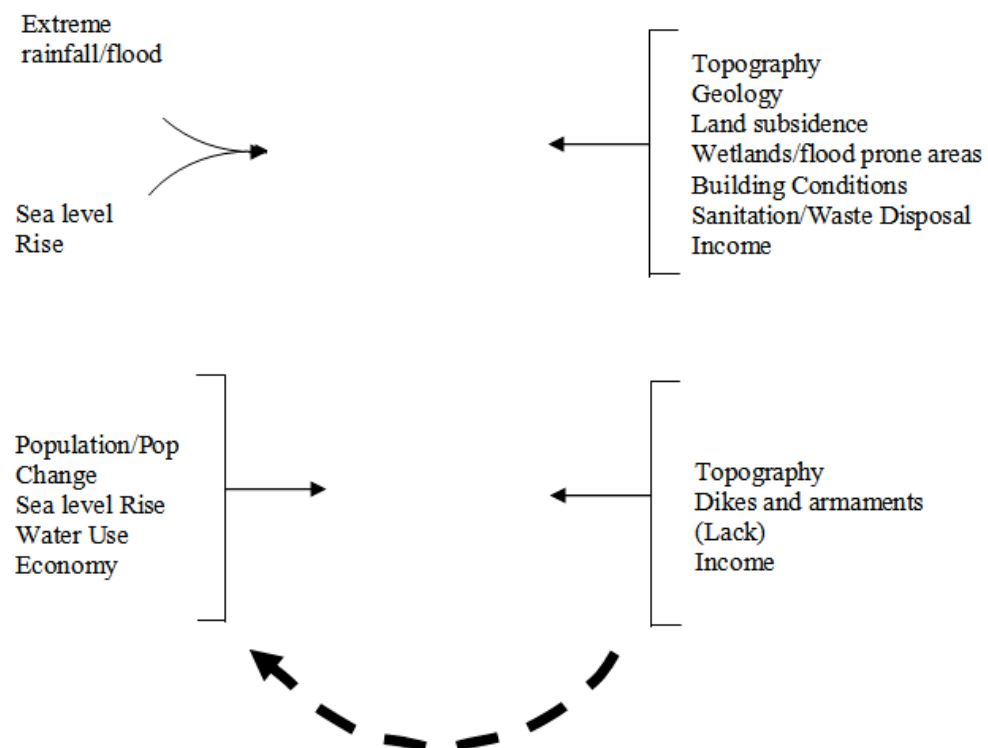
Source: IPCC Third Assessment Report – Working Group II Technical Summary, 2001



Mithi River drains
uplands and
Mumbai City



Vulnerability of Shanghai To Projected Climate Change



Conclusions

- Human-environment interactions are complex and require input from multiple social (as well as natural) science disciplines
- Deltas are a useful focal area in which to view human-environment interactions
- Vulnerability frameworks may be one way of approaching this work – and there is a rich and growing literature on this