DEltas, vulnerability and Climate Change: Migration and Adaptation (DECCMA)

Perceived Environmental Risks and Expected Outcomes as Motivations for Migration Decisions

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DECCMA

Impacts World 2017 - Counting the true costs of climate change

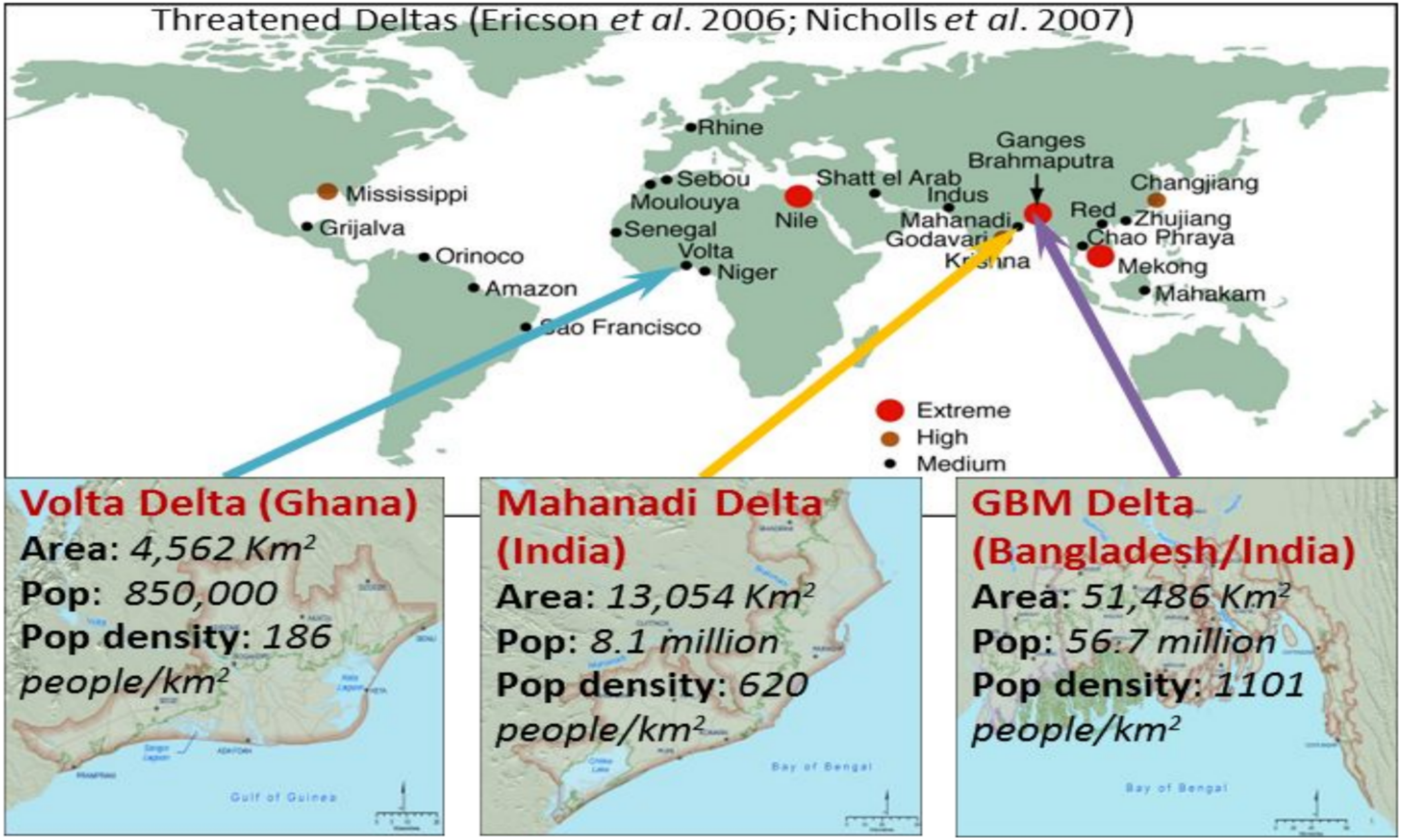
DEltas, Vulnerability and Climate Change: Migration and Adaptation (DECCMA, 2014-18)

Key research questions:

1. What are the advantages and disadvantages of migration as an adaptation to climate stress compared with in situ resilient responses for men and women in the delta?

2. How can government policy promote more climate-resilient and successful outcomes for men and women in the delta?

Study areas



Threatened Deltas (Ericson et al. 2006; Nicholls et al. 2007)
Rhine
Sebou
Moulouya
Mississippi
Grijalva
Orinoco
Amazon
Sao Francisco
Senegal
Volta
Niger
Nile
Shatt el Arab
Indus
Ganges
Brahmaputra
Mahanadi
Godavari
Krishna
Changjiang
Red
Zhujiang
Chao Phraya
Mekong
Mahakam
Extreme
High
Medium
Volta Delta (Ghana)
Area: 4,562 Km²
Pop: 850,000
Pop density: 186 people/km²
Gulf of Guinea
Mahanadi Delta (India)
Area: 13,054 Km²
Pop: 8.1 million
Pop density: 620 people/km²
Bay of Bengal
GBM Delta (Bangladesh/India)
Area: 51,486 Km²
Pop: 56.7 million
Pop density: 1101 people/km²
Bay of Bengal

DECCMA project brief overview

Key characteristics:

- 5 year programme
- ~140 researchers from 7 countries
- 3 deltas, 4 study areas
- Participatory
- Transdisciplinary
- Gender sensitive

Main research topics:

- Governance
- Bio-physical modelling
- Migration/Resettlement
- Adaptation
- Economics
- Integration

Of the 2330 migrants, how many indicated environmental reasons as the first driver of migration?

16 or 0.6%

Of the 2330 migrants, how many indicated economic reasons as the first driver of migration?

1614 or 63%

Introduction

- Migration theories such as Neoclassical microeconomic (Harris and Todaro 1970) and NELM (Stark and Bloom 1985) analyse motivations associated with either individual choice or returns for the household.
- One of the research frontiers in the environment-migration nexus is to examine process underlining migration decision-making.
- We argue that migration decisions are influenced by perceptions of environmental change and expected outcomes in addition to environmental change as objectively identified.

Methodology

- Sending area survey data stratified by risk-hazard level for all four deltas (N=6000)
  - Frequency counts
  - Cross tabulations
  - Significance tests (Chi-square, ANOVA)
  - Regression analysis

- Regression Analysis (dependent variable migration yes/no)
  - Build multi-level logistic regression models for each Delta
  - Independent variables included in the stepwise model are:
    - Perceived exposure to drought, flood, erosion, salinity, storm surges, cyclone
    - Perceived environmental change
    - Perceived impact on economic security
    - Socioeconomic characteristics (age, formal education, income, hh size)

Results Logistic Regression Model 4 – India Mahanadi

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B) Lower	Upper
Step 1[a]	FLOOD(1)	.565	.233	5.892	1	.015*	1.760	1.115	2.777
	DROUGHT(1)	.400	.158	6.382	1	.012*	1.491	1.094	2.033
	EROSION(1)	.155	.150	1.069	1	.301	1.168	.870	1.566
	SALINITY(1)	.320	.179	3.187	1	.074	1.377	.969	1.955
	STORMSURGES(1)	-.075	.145	.267	1	.605	.928	.699	1.232
	CYCLONE(1)	-.891	.355	6.310	1	.012*	.410	.205	.822
	MONSOON(1)	-.036	.222	.027	1	.870	.964	.624	1.490
	RAIN(1)	-.210	.376	.311	1	.577	.811	.388	1.695
	TEMP(1)	-1.423	1.048	1.845	1	.174	.241	.031	1.878
	C_RIVERFLOOD(1)	-.051	.161	.099	1	.753	.951	.694	1.302
	C_COASTALFLOOD(1)	-.571	.171	11.197	1	.001***	.565	.404	.789
	CC_R_EROSION(1)	.159	.153	1.084	1	.298	1.172	.869	1.582
	C_SALINIZATION(1)	.256	.171	2.230	1	.135	1.291	.923	1.806
	C_DROUGHT(1)	.267	.190	1.973	1	.160	1.306	.900	1.895
	HHSize	.004	.034	.012	1	.911	1.004	.939	1.073
	AGE	.007	.005	2.250	1	.134	1.007	.998	1.017
	EDU			1.520	3	.678			
	EDU(1)	.193	.271	.507	1	.476	1.213	.713	2.064
	EDU(2)	.282	.235	1.433	1	.231	1.326	.836	2.103
	EDU(3)	.174	.235	.551	1	.458	1.190	.752	1.885
	LIVELI(1)	-.211	.140	2.276	1	.131	.810	.616	1.065
	NETWORK(1)	.139	.138	1.014	1	.314	1.149	.877	1.505
	IMPACT(1)	.395	.179	4.891	1	.027*	1.485	1.046	2.107
	Income	.000	.000	.118	1	.731	1.000	1.000	1.000
	Constant	-.552	1.206	.210	1	.647	.576		

* =p <.05, *** =p .001

Results Logistic Regression Model 4 – India IBD

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1[a]	FLOOD(1)	-.031	.196	.025	1	.874	.969	.661	1.423
	DROUGHT(1)	.207	.260	.636	1	.425	1.230	.739	2.047
	EROSION(1)	.223	.310	.520	1	.471	1.250	.681	2.295
	SALINITY(1)	-.430	.324	1.760	1	.185	.651	.345	1.227
	STORMSURGES(1)	-.111	.322	.119	1	.730	.895	.476	1.683
	CYCLONE(1)	.046	.179	.065	1	.798	1.047	.737	1.486
	MONSOON(1)	.239	.176	1.835	1	.176	1.270	.899	1.795
	RAIN(1)	.176	.266	.438	1	.508	1.192	.708	2.007
	TEMP(1)	.027	.337	.006	1	.937	1.027	.531	1.988
	RIVERFLOOD(1)	.202	.203	.989	1	.320	1.223	.822	1.821
	COASTALFL(1)	-.296	.246	1.445	1	.229	.744	.459	1.205
	C_R_EROSION(1)	-.377	.262	2.072	1	.150	.686	.411	1.146
	SALINIZATION(1)	.310	.239	1.684	1	.194	1.364	.853	2.180
	DROUGHT_A(1)	.092	.192	.232	1	.630	1.097	.753	1.597
	AGE	-.003	.006	.272	1	.602	.997	.986	1.008
	EDU			7.980	3	.046*	.878		
	EDU(1)	.741	.390	3.610	1	.057	2.098	.977	4.507
	EDU(2)	.745	.380	3.842	1	.050*	2.106	1.000	4.434
	EDU(3)	.355	.391	.825	1	.364	1.427	.663	3.072
	LIVELI(1)	-.314	.178	3.111	1	.078	.730	.515	1.036
	HHSIZE	.082	.020	16.537	1	.001***	1.085	1.043	1.129
	NETWORK(1)	.099	.155	.409	1	.523	1.104	.815	1.497
	IMPACT(1)	-.074	.204	.131	1	.718	.929	.623	1.385
	Income	.000	.000	5.084	1	.024*	1.000	1.000	1.000
	Constant	-2.918	.642	20.687	1	.000	.054		

* = p < .05 , *** = p .001

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Key messages

- Consistent with the literature, at household level, it is shaped by different motivations and drivers

- Environmental causes are likely to be an underlying factor impacting on other socioeconomic dimensions of households.

- Individual perceptions of environmental risk and general wellbeing are central to how individuals respond to adversities. These vary greatly and are context specific.

- This is very relevant where future climatic changes manifests themselves in the form of slow- or sudden-onset events, potentially triggering a range of responses including migration, in-situ adaptation etc, particularly from low-lying coastal areas in developing countries.

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Thank you!

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Results Logistic Regression Model 4 – GBM Bangladesh

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1[a]	FLOOD(1)	.143	.132	1.170	1	.279	1.153	.891	1.494
	DROUGHT(1)	-.156	.153	1.034	1	.309	.856	.634	1.155
	EROSION(1)	.403	.207	3.792	1	.042*	1.496	.997	2.245
	SALINITY(1)	-.007	.139	.003	1	.957	.993	.755	1.304
	STORMSURGES(1)	-.296	.157	3.564	1	.059	.744	.547	1.011
	CYCLONE(1)	.233	.149	2.446	1	.118	1.262	.943	1.691
	MONSOON(1)	.137	.157	.762	1	.383	1.147	.843	1.560
	RAIN(1)	-.533	.282	3.586	1	.058	.587	.338	1.019
	TEMP(1)	-.117	.537	.048	1	.827	.889	.310	2.550
	Riverflooding(1)	-.259	.138	3.505	1	.061	.772	.588	1.012
	Coastalflooding(1)	-.021	.160	.017	1	.896	.979	.715	1.340
	CoastalRivererosion(1)	.320	.155	4.277	1	.039*	1.377	1.017	1.865
	Salinization(1)	.127	.129	.980	1	.322	1.136	.883	1.461
	Drought_A(1)	-.077	.124	.382	1	.537	.926	.726	1.181
	HHSize	-.165	.036	21.468	1	.001***	.848	.790	.909
	AGE	.014	.004	11.866	1	.001***	1.015	1.006	1.023
	EDU			5.091	3	.165			
	EDU(1)	.226	.273	.684	1	.408	1.253	.734	2.139
	EDU(2)	.188	.268	.496	1	.481	1.207	.715	2.040
	EDU(3)	.456	.266	2.937	1	.087	1.577	.937	2.656
	LIVELI(1)	.438	.155	7.984	1	.005*	1.550	1.144	2.101
	NETWORK(1)	.379	.147	6.605	1	.010*	1.460	1.094	1.949
	Income	.000	.000	1.211	1	.271	1.000	1.000	1.000
	IMPACT(1)	.047	.142	.111	1	.739	1.049	.793	1.386
	Constant	-1.263	.725	3.031	1	.082	.283		

* =p <.05 , *** =p .001

Results Logistic Regression Model 4 – Volta

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1[a]	FLOOD(1)	-.011	.141	.006	1	.939	.989	.750	1.305
	DROUGHT(1)	.477	.155	9.410	1	.002	1.611	1.188	2.185
	EROSION(1)	.179	.142	1.587	1	.208	1.196	.905	1.580
	SALINITY(1)	-.047	.151	.098	1	.755	.954	.709	1.283
	STORMSURGE(1)	.143	.136	1.093	1	.296	1.153	.883	1.507
	MONSOON(1)	.308	.264	1.361	1	.243	1.361	.811	2.283
	RAIN(1)	-.054	.320	.028	1	.866	.947	.506	1.775
	TEMP(1)	-.156	.306	.260	1	.610	.856	.470	1.558
	RIVERFLOOD(1)	.232	.160	2.116	1	.146	1.262	.922	1.726
	COASTALFLOOD(1)	-.264	.192	1.899	1	.168	.768	.527	1.118
	C_R_EROSION(1)	-.079	.182	.189	1	.664	.924	.647	1.320
	SALINIZATION(1)	-.205	.156	1.734	1	.188	.815	.600	1.105
	DROUGHT_A(1)	-.180	.155	1.350	1	.245	.835	.617	1.132
	HH_size	.024	.026	.852	1	.356	1.024	.973	1.078
	AGE	.050	.004	141.862	1	.000	1.052	1.043	1.061
	EDU			1.076	3	.783			
	EDU(1)	-.152	.325	.220	1	.639	.859	.454	1.624
	EDU(2)	.017	.318	.003	1	.956	1.018	.546	1.897
	EDU(3)	-.074	.311	.057	1	.811	.929	.505	1.708
	LIVELI(1)	-.192	.138	1.932	1	.165	.826	.630	1.082
	NETWORK(1)	.247	.182	1.827	1	.176	1.280	.895	1.829
	IMPACT(1)	.461	.153	9.071	1	.003	1.586	1.175	2.141
	Income	.000	.000	.022	1	.881	1.000	1.000	1.000
	Constant	-2.892	.563	26.399	1	.000	.055		

* =p<.05 , *** =p .001