Digging in?
Migration preferences in communities affected by climate change – evidence from Bangladesh

Arne Wiig , Chr. Michelsen Institute, Norway.

Minhaj Mahmud, Bangladesh Institute of Development Studies, Bangladesh

Ivar Kolstad, Department of Accounting, Auditing and Law, Norwegian School of Economics & Chr. Michelsen Institute, Norway.

Päivi Lujala, Geography Research Unit, P.O. Box 8000, FI-90014 University of Oulu, Finland & Chr. Michelsen Institute, Norway.

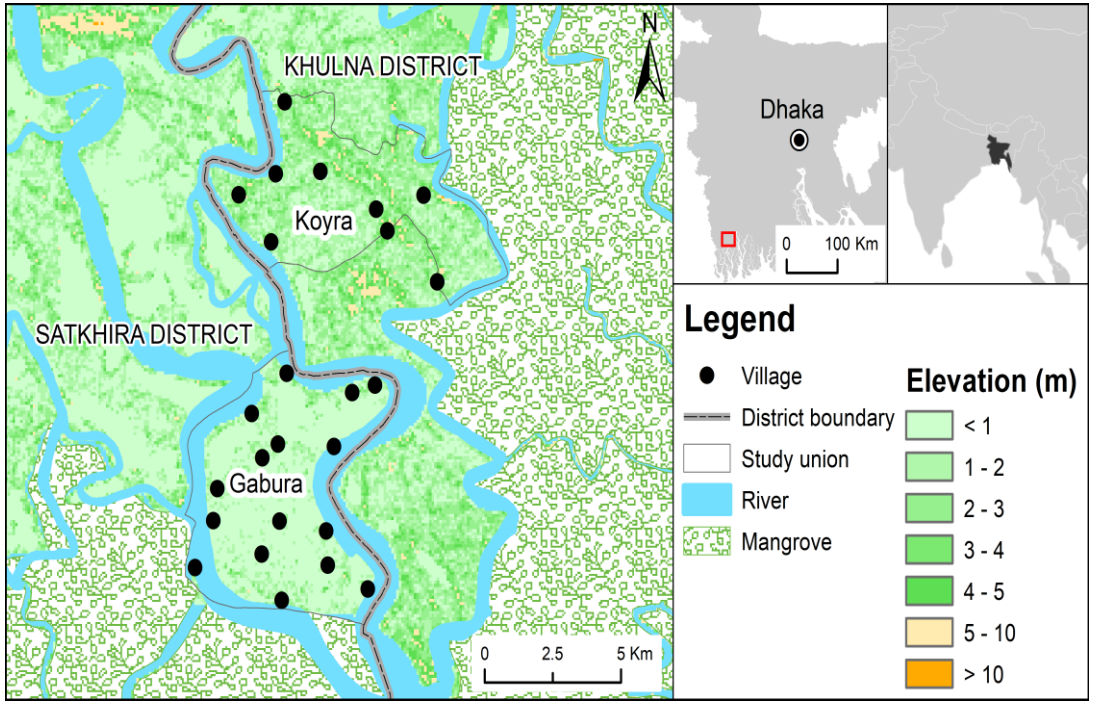
Sosina Bezu, Chr. Michelsen Institute, Norway

Motivation and research questions

- 143 million people in Africa, Asia, and Latin America will become internally displaced by 2050 as a result of climate change (Rigaud et al., 2018). "by 2050 one in every 7 people in Bangladesh will be displaced by climate change" (Comprehensive Disaster Management Programme, 2015:4).
- Escalating climate related stress raises the question whether households are prepared for displacement.
- To what extent is migration perceived as an accessible adaptation strategy by poor household exposed to climate related hazards?
  - Focus on household migration intentions, not factual migration
  - Do previous experiences with shocks matter?
  - Do resource constraints matter for internal migration?

Context

	Study areas	
Population	**Selected villages**	**Respondents**
7800 in Koyra	**9**	**205**
6800 in Gabura	**16**	**205**



South Bangladesh

Preview of results

- Few households in these areas expect to relocate elsewhere over the coming five-year period.
- Fast onset events such as cyclones will eventually be the main reason, not slow changing environmental factors like increasing soil salinity.
- Households having experienced environmental shocks do not express higher migration intentions or expectations of future shocks.
  - Selection
  - Preferences change, but control for risk attitudes
  - Control for resources and vulnerability
- Household migration predictions correlate non-linearly with household assets; the poorest and the richest households are the most likely to move.

Migration literature and our contribution

- Environmental shocks and migration. Preferences for staying seems **strengthened** (dig in) by shock experience
  - Existing theories: Modest if any effect on migration: Flooding in Gray and Mueller (2012), earthquakes in Halliday (2006), cyclones in Pajaron and Vasques (2020) and natural disasters in Bohra Mishra (2014)
  - But: Groeger and Zylberberg (2016) find larger effects on migration

- Find u-shaped relationship between predicted household mobility and household wealth, suggesting that both the poorest and the richest migrate ("must versus can") contrast to Dustmann and Okatenka (2014) and the literature on trapped population

Data and Methodology

Survey and experimental data

- Descriptive analysis
- Regression analysis
- Discrete choice experiment

Perceived likelihood of moving: Expected probability very low

Question: How likely is it that your household will move away permanently in the next five years?

Response (probability or %)	No shock	One or more shocks	Total %
Certain we will stay (0%)	90.9	84.9	88.8
More likely that we stay than that we move (25%)	4.6	10.3	6.6
As likely that we stay as that we move (50%)	2.3	4.1	2.9
More likely that we move than that we stay (75%)	1.5	0.0	1.0
Certain that we move (100%)	0.8	0.7	0.7
%	100	100	100

Perceived Likelihood of damages from climatic events

Question: How likely is it that your land or other livelihood sources will be substantially damaged from flooding salinization, river erosion, mangrove forest degradation, storm or cyclones?

Response (probability)	No shock	One or more shocks	Total
Almost certain that there will be substantial damage	8	4	7
More likely to have substantial damage than not to have	47	52	49
As likely that have substantial damage than not to have	39	40	39
More likely not to have substantial damage than to have	3	3	3
Almost certain that there will be no substantial damage	3	1	2
%	100	100	100

TABLE A1. DEFINITION OF MAIN VARIABLES FOR REGRESSION ANALYSIS

Variable	Explanation
Intention to migrate	Respondent responses to question "How likely is it that your household will move away permanently in the next five years?" (0% - Certain I will stay, 25% - More likely that I stay than that I move, 50% - As likely that I stay as that I move, 75% - More likely that I move than that I stay, 100% - Certain that I move
Expectation damages	"How likely is it that your land or other livelihood sources will be substantially damaged from flooding salinization, river erosion, mangrove forest degradation, storm or cyclones?" (Almost certain that there will be substantial damage, (100%) - More likely to have substantial damage than not to have, (75%)- As likely that have substantial damage than not to have, (50%) -More likely not to have substantial damage than to have, (25%) -Almost certain that there will be no substantial damage (0%)
Shock experience index	Shock experience index is a summary index based on the number of positive responses on the following questions: "During the last five years, did you or your household experience environmental shocks leading to substantial damage to your house because of flooding, river erosion, storm or cyclones?", " During the last five years, did you or your household experience environmental shocks leading to substantial damage to land or other livelihood sources because of flooding, salinization, river erosion, mangrove forest degradation, storm or cyclones? " During the last five years, did you or your household experience environmental shocks leading to substantial damage to land or other livelihood sources because of flooding, salinization, river erosion, mangrove forest degradation, storm or cyclones? " (dummy variables, 1 -yes, 0-no)
Asset index	Household asset index based on factor analysis of the following asset variables: ownership of house, bicycle, radio, TV, motor vehicle or motorcycle, mobile phone, computer, number of rooms the household occupies and land owned

Controlling for a number of variables important in migration studies (gender, age, risk, social network, past migration history, village fixed effects……

Mobility intentions and expectations of damages (OLS)

Shock experience has no significant effect on intention to migrate and expectation of damages.

Decreasing wealth for the poor increases their mobility projections while increasing wealth for the rich increases them (U-shaped curve)

Environmental factors play a minor role for migration, so does occupation

Robustness analysis: Logit and probit

	(1)	(2)	(3)	(4)
Dependent variable	Intention to migrate	Intention to migrate	Expectation damages	Expectation damages
Shock experience index	0.009	0.013	0.001	0.006
	(0.01)	(0.01)	(0.01)	(0.01)
Asset index		-0.043**		-0.009
		(0.02)		(0.02)
Asset index squared		0.004*		0.002
		(0.00)		(0.00)
House vulnerability index		0.005		-0.025***
		(0.01)		(0.01)
Household size		0.000		-0.000
		(0.00)		(0.00)
Primary		0.007		-0.034*
		(0.02)		(0.02)
Secondary		0.035		-0.006
		(0.03)		(0.03)
Higher secondary school		0.151		-0.183**
		(0.10)		(0.07)
Tertiary		0.075*		0.016
		(0.05)		(0.05)
Farming own land		0.035		0.056
		(0.03)		(0.04)
Gathering		-0.006		0.059
		(0.03)		(0.04)
Day labour		0.009		0.053*
		(0.02)		(0.03)
Employee		-0.043		-0.046
		(0.06)		(0.08)
Selfemployed		-0.009		0.024
		(0.03)		(0.04)
Male		0.047*		-0.095**
		(0.03)		(0.04)
Age		-0.001		0.001
		(0.00)		(0.00)
Head		-0.057**		0.066*
		(0.02)		(0.04)
Years lived in community		0.000		-0.000
		(0.00)		(0.00)
Times moved		0.029		-0.033**
		(0.02)		(0.01)
Impatience index		0.004		0.003
		(0.01)		(0.01)
Risk index		-0.009		0.004
		(0.01)		(0.01)
Network migrants		0.000		-0.000
		(0.00)		(0.00)
Social network		-0.002		-0.004
		(0.01)		(0.01)
Constant	0.041***	0.184**	0.638***	0.710***
	(0.01)	(0.09)	(0.01)	(0.06)
Village fixed effect	No	Yes	No	Yes
r2	0.002	0.165	0.000	0.423
N	410	409	410	409

Assume conditions are the same in the areas you could move to under the two scenarios and that the cost of moving remain the same. Under which scenario would you be more likely to move away permanently with your household?"

10 Blocks. Orthogonal design. Randomized order.
One example of a scenario. Each respondent 6 comparisons (scenarios), that is 12 observations.

FIGURE 1. SAMPLE CHOICE SET IN DISCRETE CHOICE EXPERIMENT

Attribute	Explanation	ScenarioA	ScenarioB
House	State of your house	Damaged, in need of considerable and costly repair	Destroyed, needs to be completely rebuilt
Wages/earnings	What you can earn in a day through employment or running a business	For every 100 Taka you earn today, you only earn 80 Taka	Same as today
Protection	Protection provided by, for example, shelters and dykes	Much worse than today	Same as today
Prospects for children/health and education	Prospects for the children and grandchildren in your household	Same as today	Much worse than today
Nature-based livelihood sources (other than agriculture)	Ability to use the natural environment to hunt, fish and gather	For every 10 kg hunted/fished/gathered today, only able to hunt/fish/gather 8 kg	Able to hunt/fish/gather half the quantities compared to today
Agricultural productivity	Agricultural production in your village	Same as today	For every 10 kg produced today, only able to produce 8 kg
Water	Access to clean drinking water	Price much higher or access much worse than today	Same as today
choice_set 23 block 4			

Main Results from Discrete choice experiment: Conditional Logit Analysis Odds ratio

Those who have experienced many shocks are less inclined to move if future conditions get worse.

	All	No shock	One or more shocks
Wages	0.997	0.955	1.151
	(0.11)	(0.14)	(0.23)
House damaged	1.067	1.249***	0.805**
	(0.06)	(0.09)	(0.08)
House destroyed	1.139**	1.239***	1.031
	(0.07)	(0.09)	(0.10)
Agricultural productivity	0.925	0.781*	1.267
	(0.11)	(0.11)	(0.25)
Nature-based livelihood sources	1.135	1.043	1.367
	(0.13)	(0.15)	(0.26)
Access to water (higher price)	0.993	1.122**	0.793***
	(0.04)	(0.06)	(0.06)
Prospects children (getting worse)	0.918**	0.945	0.870**
	(0.04)	(0.05)	(0.06)
Protection (getting worse)	0.938	0.916*	0.991
	(0.04)	(0.05)	(0.07)
r2_p	0.004	0.011	0.023
N	4920	3168	1752

Conclusions

- Low preparedness of migration as an adaptation strategy to climate change
- Few see migration as an adaptation strategy
- Fast onset events like cyclones leading to destruction of houses most important reason for moving
- Staying preferences seem strengthened for those experienced shocks
- Not so easy to apply migration as an adaptation strategy in communities that have already been repeatedly hit by environmental shocks
- But: A selective sample and cross-sectional data