DISRUPTION, NOT DISPLACEMENT:

CLIMATE VARIABILITY AND TEMPORARY MIGRATION IN BANGLADESH

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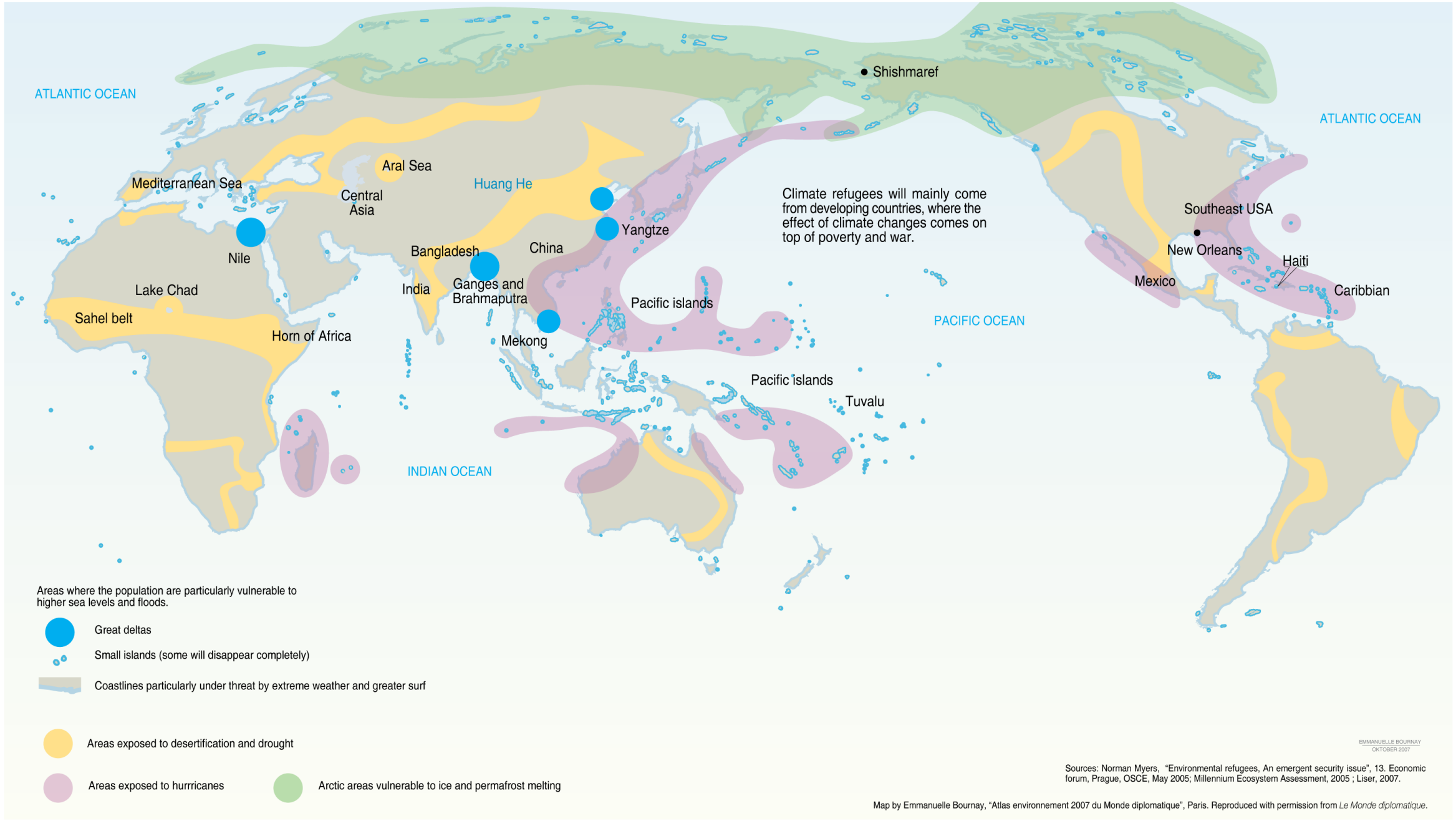
http://i2.cdn.turner.com/cnnnext/dam/assets/140921121713-01-climate-march-horizontal-large-gallery.jpg
CRAIG RUTTLE
FRONTLINES OF CRISIS
FOREFRONT OF CHANGE
POWER TO THE PEOPLE!
CLIMATE JUSTICE
NOW NOW NOW
green love
PEOPLE POWER
PEOPLES CLIMATE MARCH


ATLANTIC OCEAN
Shishmaref
ATLANTIC OCEAN
Aral Sea
Mediterranean Sea
Central Asia
Huang He
Yangtze
Climate refugees will mainly come from developing countries, where the effect of climate changes comes on top of poverty and war.
Southeast USA
New Orleans
Haiti
Nile
Bangladesh
China
Mexico
Caribbian
Lake Chad
India
Ganges and Brahmaputra
Pacific islands
Sahel belt
Horn of Africa
Mekong
PACIFIC OCEAN
Pacific islands
Tuvalu
INDIAN OCEAN
Areas where the population are particularly vulnerable to higher sea levels and floods.
Great deltas
Small islands (some will disappear completely)
Coastlines particularly under threat by extreme weather and greater surf
Areas exposed to desertification and drought
Areas exposed to hurrricanes
Arctic areas vulnerable to ice and permafrost melting
EMMANUELLE BOURNAY
OKTOBER 2007
Sources: Norman Myers, "Environmental refugees, An emergent security issue", 13. Economic forum, Prague, OSCE, May 2005; Millennium Ecosystem Assessment, 2005 ; Liser, 2007.
Map by Emmanuelle Bournay, "Atlas environnement 2007 du Monde diplomatique", Paris. Reproduced with permission from Le Monde diplomatique.

WE ASK:

1 How do flooding, temperature, and precipitation impact temporary migration decisions in Matlab, Bangladesh?

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2 How do socioecological factors impact vulnerability?

WE FIND:

1 Flooding, heat, and rain disrupt temporary migration rather than inducing permanent migration

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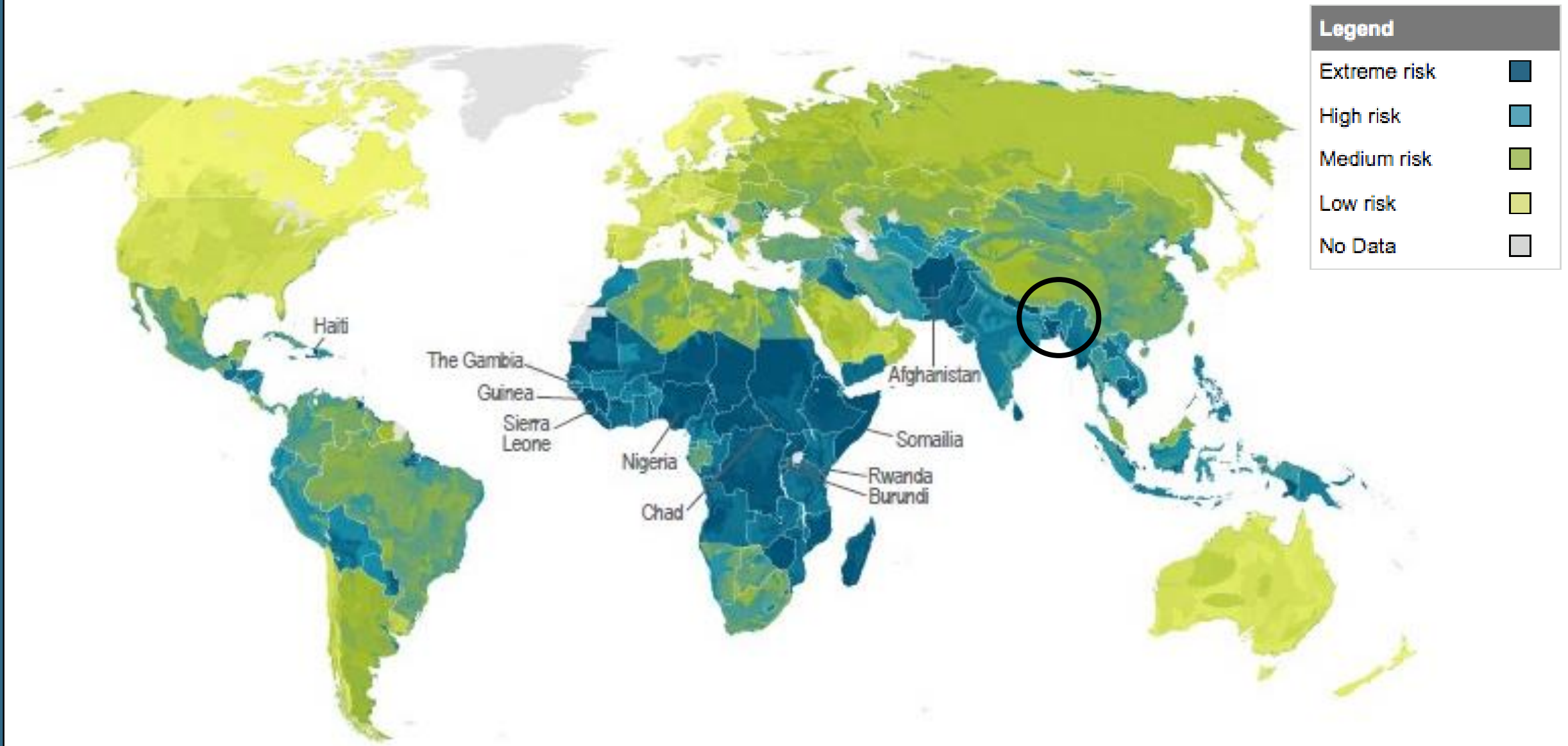
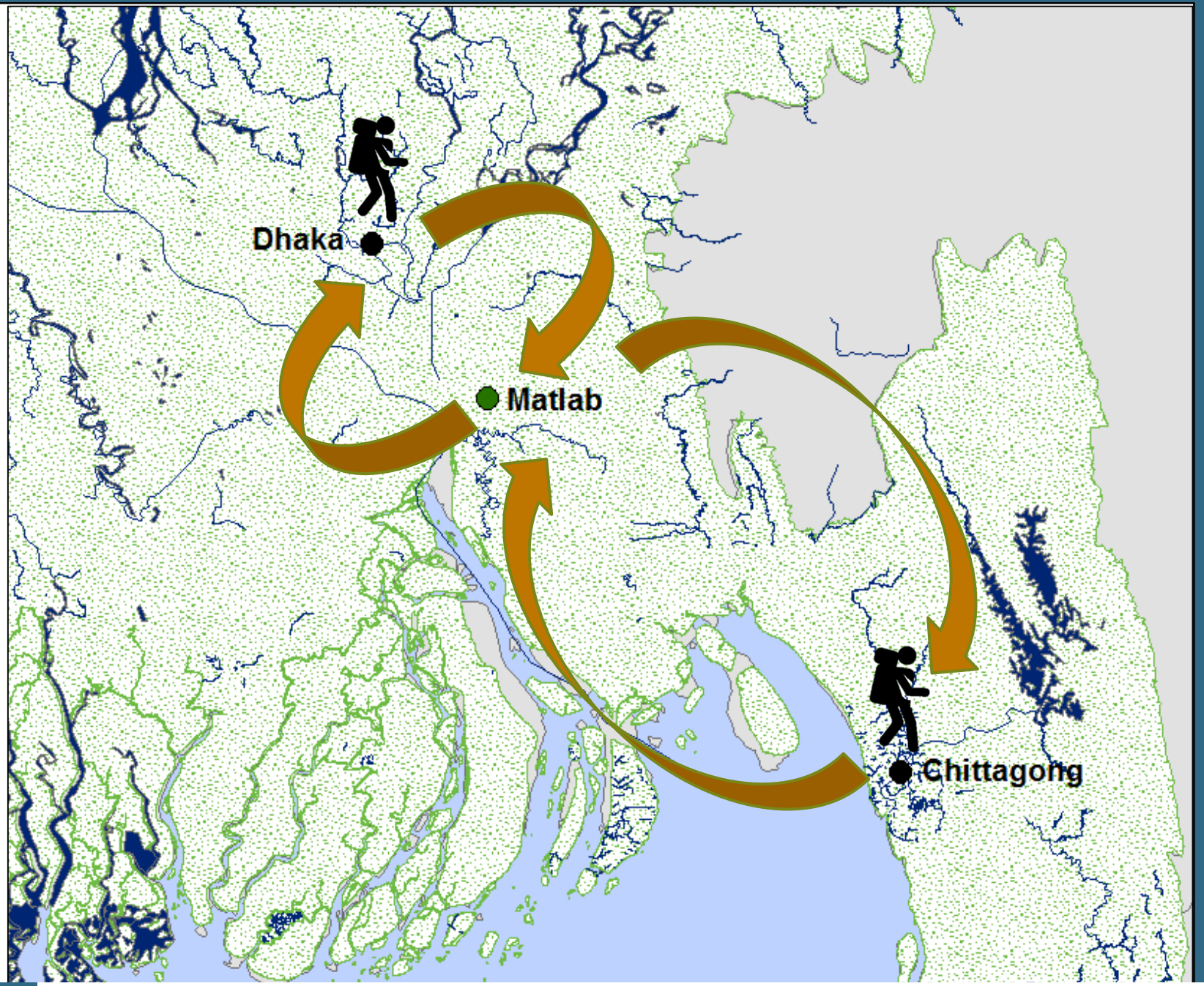
2 These disruptions are gendered



http://www.earthtimes.org/newsimage/Maplecroft_Climate_Change_Risk_Atlas_22011_311.jpg

Temporary migration increases agricultural household resilience

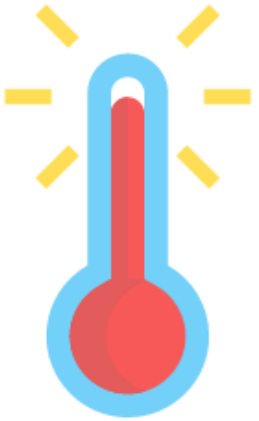


Dartmouth
Flood
Observatory

1986-2003

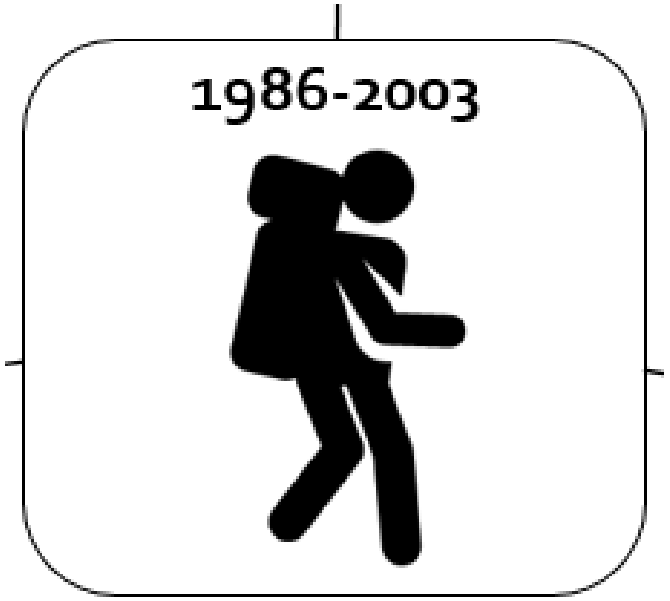
NASA

NASA



Matlab Demographic
Surveillance System (ICDDR,B)

Migration

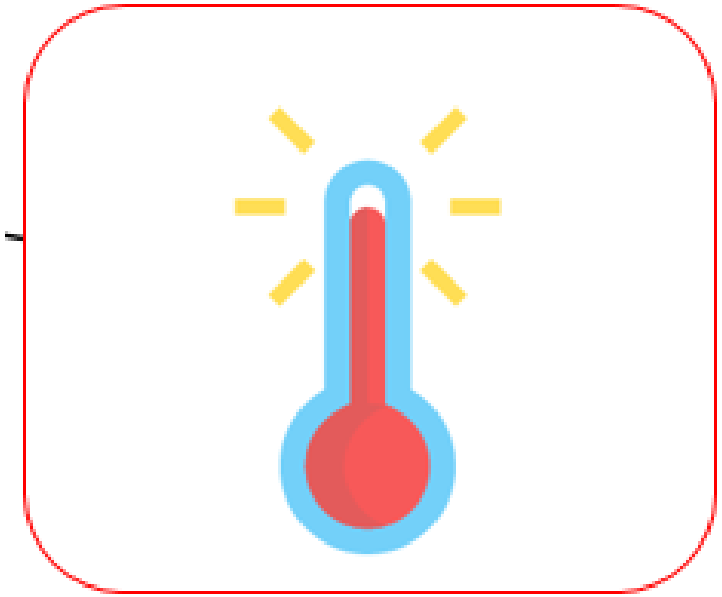


- ICDDR,B Matlab Demographic Surveillance System
- Person-month data: 216 months (1986-2003), 225,000 individuals
- Dichotomous
- 13% of study population migrated at some point during study period
- Median migration length: 2 years

Rainfall

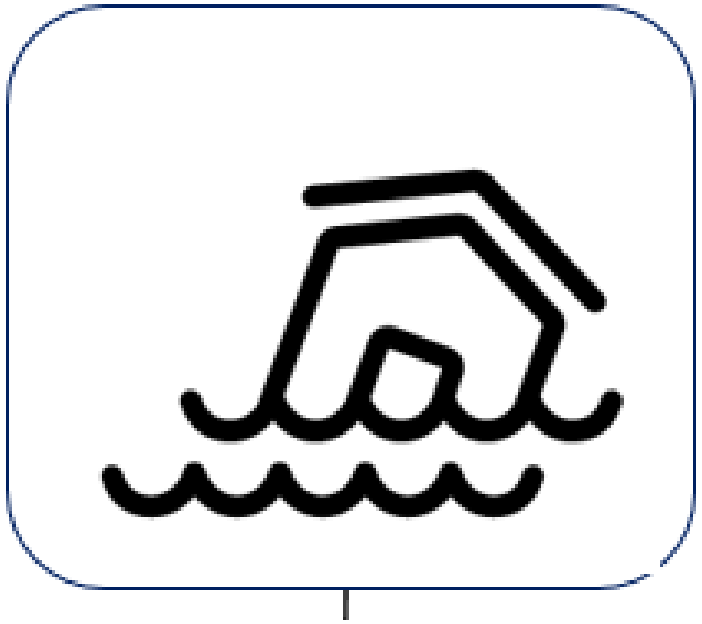
- NASA Prediction of Worldwide Energy Resource (POWER) database (NASA 2015)
- Continuous
- Monthly total ranged from 0 to 540 mm (mean 138 mm)

Heat



- NASA Prediction of Worldwide Energy Resource (POWER) database (NASA 2015)
- Continuous
- Monthly total ranged from 20 to 34 C (mean 27 C)

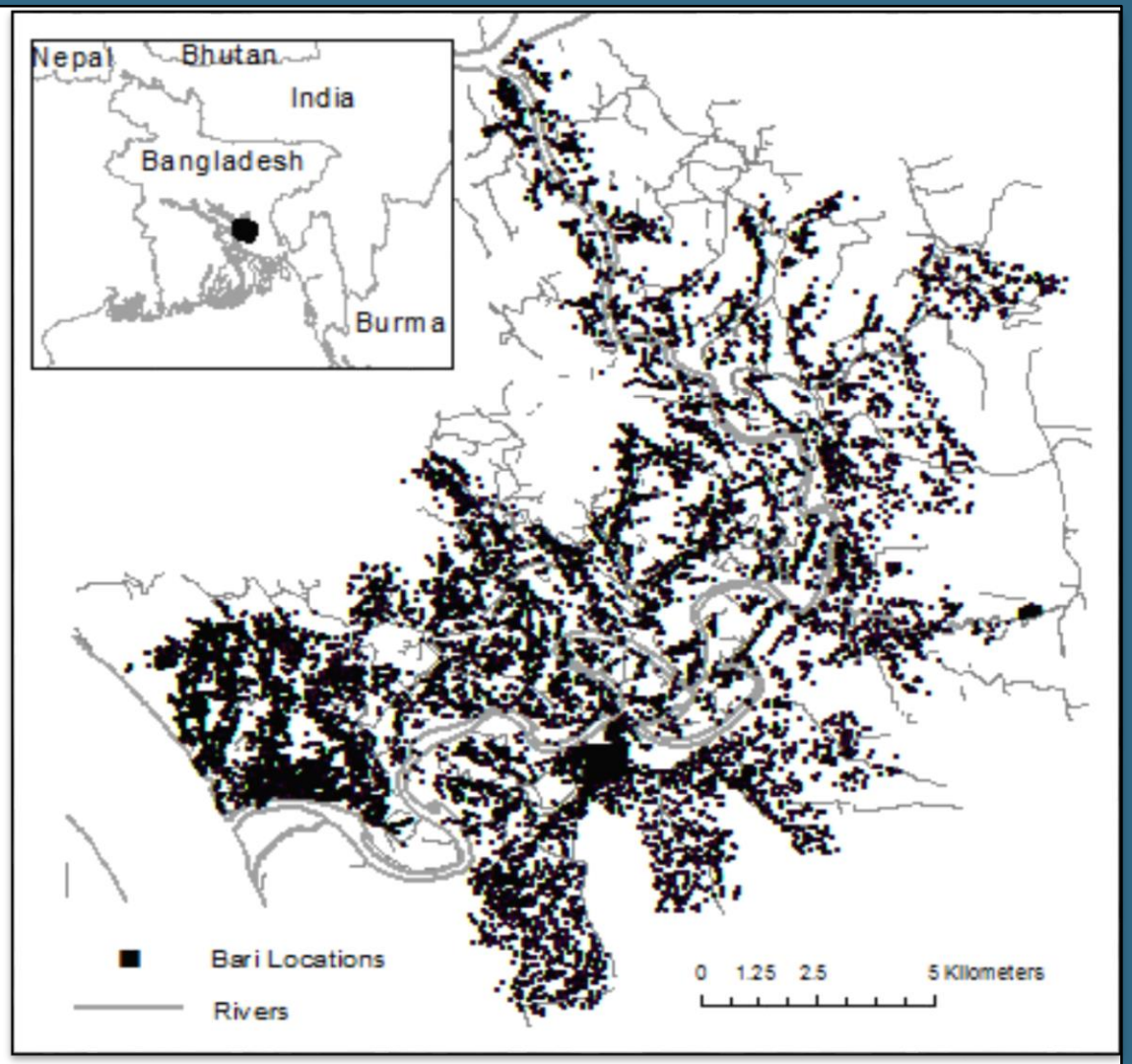
Flooding



- Dartmouth Flood Observatory (Brakenridge 2014)
- Dichotomous
- 15 flood events (17% of months)
- Spells average 2.5 months

To tackle our question, we analyzed…

- Matlab Demographic Surveillance System (ICDDR,B)
- Remotely sensed historical climate measures
- Time period: 1986-2003



Analytic Approaches

- Discrete time survival models (linear + squared transformation for climate variables)
- 1 month (month of exposure)
- 12 month moving average
- 24 month moving average
- Discrete time survival models + climate interacted with socioenvironmental controls

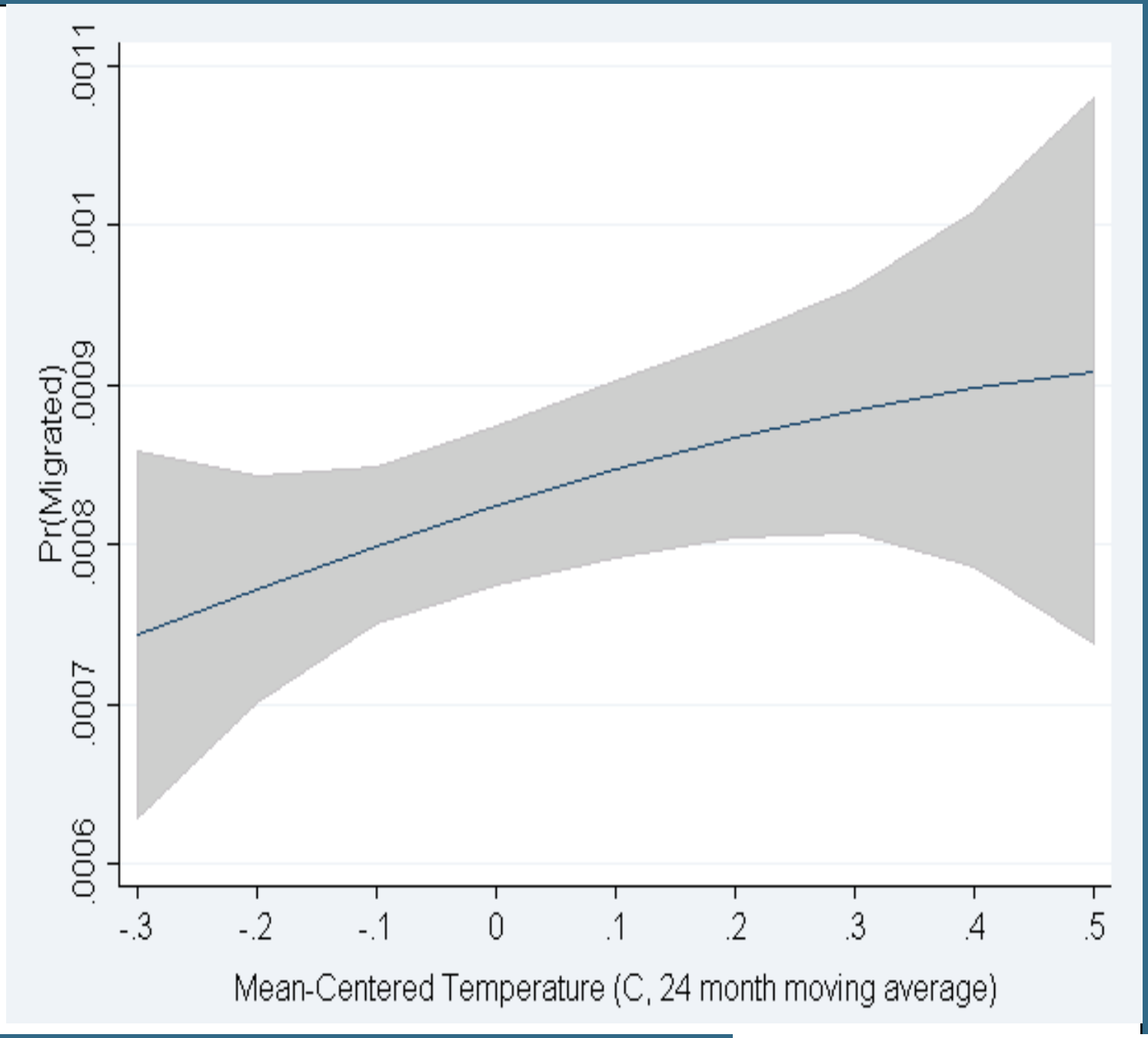
http://i.telegraph.co.uk/multimedia/archive/00782/floods-pump_782280c.jpg

Flooding
=
decreased
migration

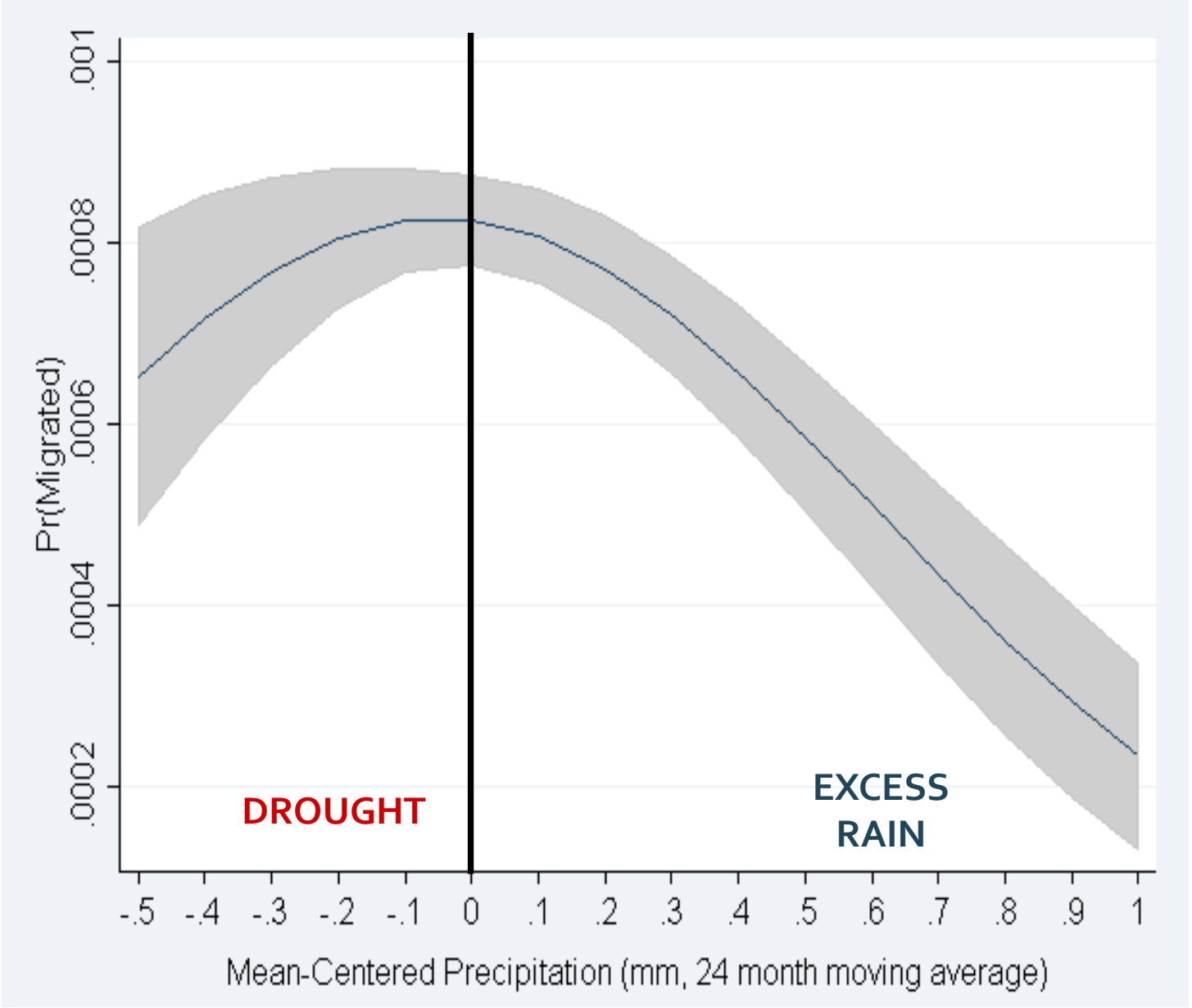
Increased temperature

=

Increased future migration



Drought = decreased future migration

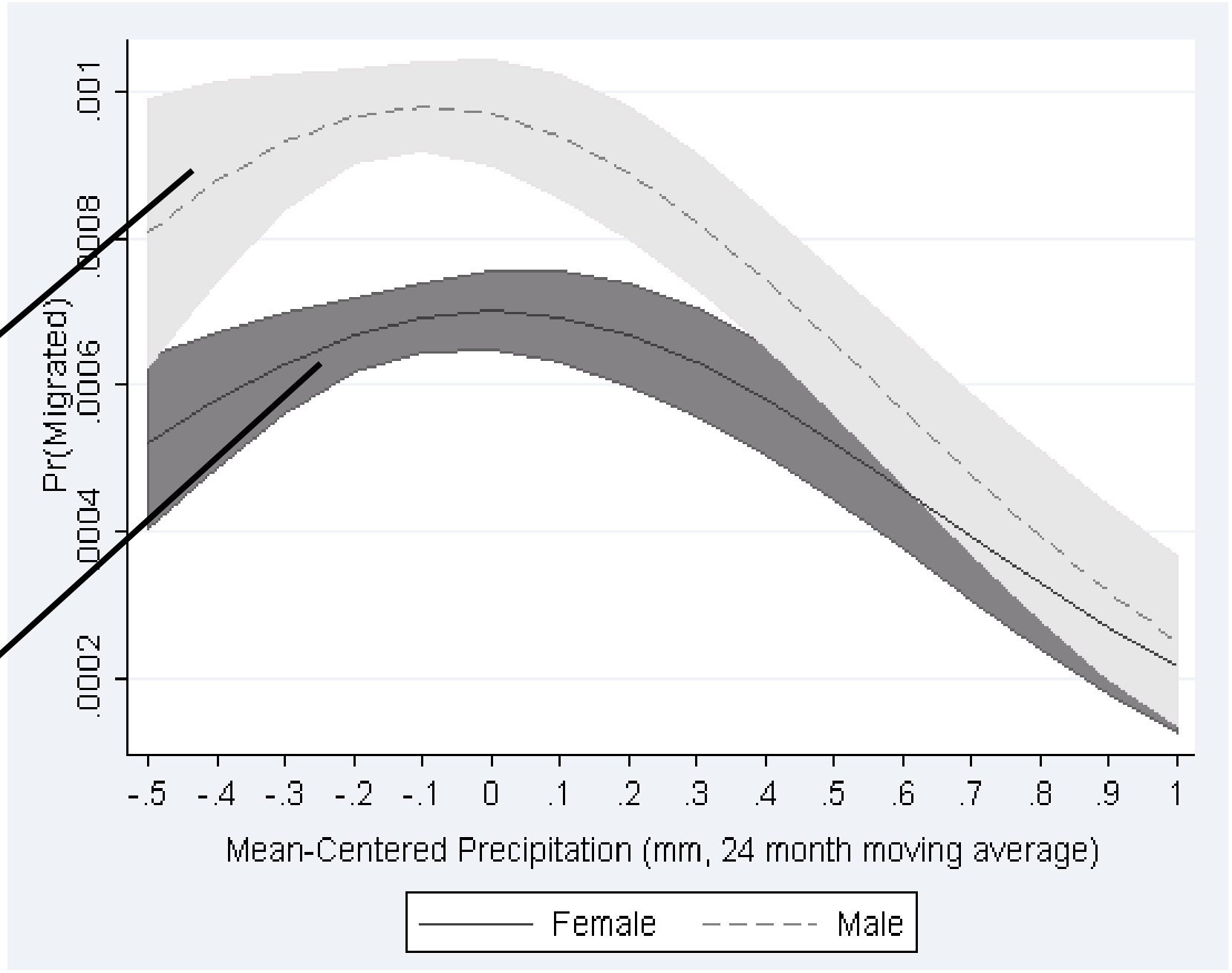


Excess rain = decreased future migration

Precipitation x Gender

Male

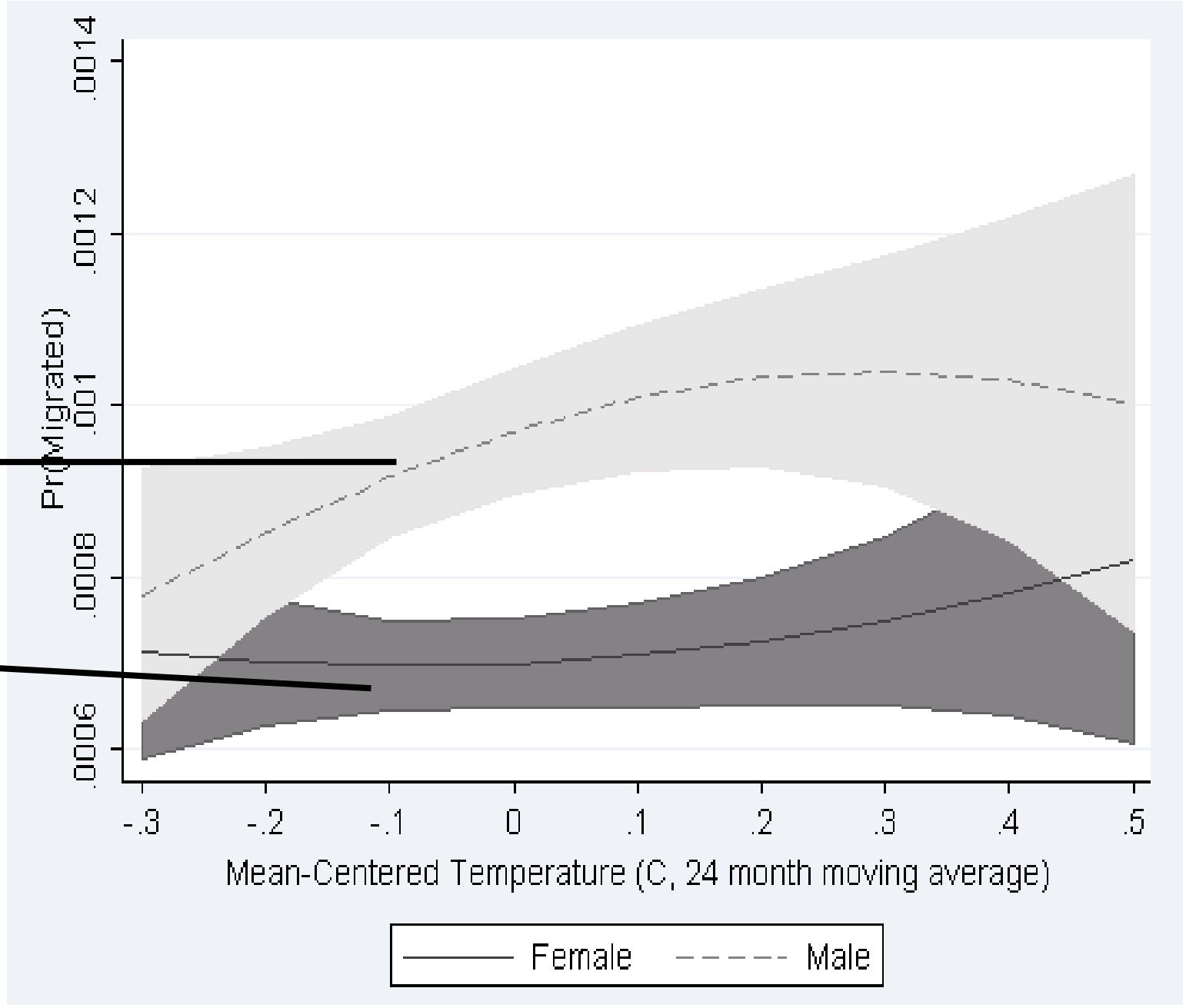
Female



Temperature x Gender

Male

Female



Conclusions

- Flooding decreases migration
- Drought and high rainfall decrease migration in the medium-term
- Extended periods of heat stress increase migration
- Climate related migration patterns differ for women and men

Acknowledgements

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