

## Introduction / Motivation

- Bangladesh is one of the most flood-prone countries in the world with over 57% of its population at risk to flood exposure (Conte, 2022)
- Rural poverty and limited services increase vulnerability to flooding and its impacts
- Pregnant women face disproportionate disadvantages when floods strike, which increases health risks, limits access to healthcare, and causes inadequate nutrition consumption
- Research indicates children under 5 years old, exposed to floods, suffer worsened long term health outcomes (Del Ninno, et al., 2014)

## Methodology

### BIHS 2018-19

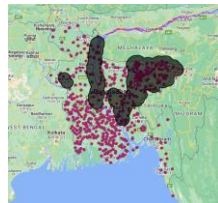
- Cleaned and organized household data
- Analyzed mother and child profile, household profile, and other demographics

### Remotely Sensed Satellite Data

- Used GFD, CHIRPS, and Sentinel 1 for flood and precipitation extent around surveyed households
- Used Google Earth Engine and Python to access and visualize the data

### Child Health Outcomes and Mechanisms

- Combined survey data with satellite data to visualize trends in child health outcomes
- Explored data to identify potential mechanisms

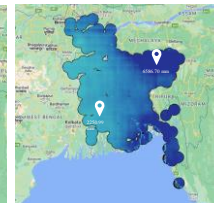


GFD: Flood Extent Buffer Zones (Apr. 2016 – May 2016)

- 20 km buffer zones around flood extent pixels
- Binary values assigned to identify households within flood buffer zone



CHIRPS: Household Buffer Zones



CHIRPS: Precipitation Map (Jan. 2017 – Dec. 2017)

- 20 km buffer zones around surveyed households
- Converted precipitation data into z-scores

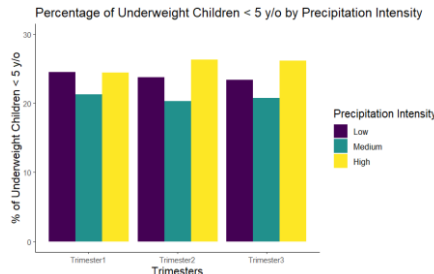
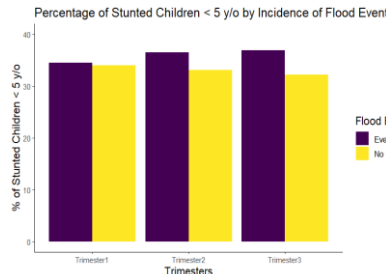
## Research Questions

RQ1: Is prenatal exposure to flooding associated with child health outcomes?

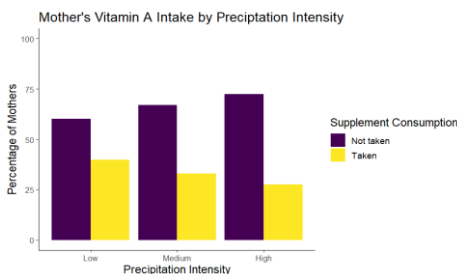
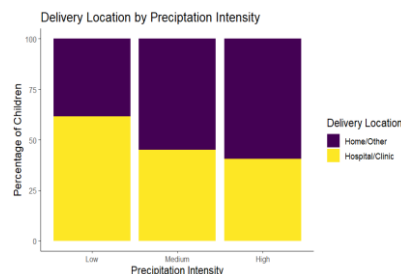
RQ2: What are the mechanisms through which floods affect child health outcomes?

## Results

### Child Health Outcomes



### Mechanisms



## Conclusion / Discussion

- Flooding during third trimesters associated with prevalence of stunting
- Mechanisms suggests women exposed to higher precipitation intensities at the time of pregnancy:
  - Experienced reduced access to antenatal care
  - Lower consumption of essential supplements
- Drinking untreated water increases health risks
- Findings aid development of strategies & interventions for child health in Bangladesh amidst flooding impacts
- Greater insight obtained from analysis on the associations between prenatal exposures to a flood event on child health outcomes

## Data

### Household Survey

Bangladesh Integrated Household Survey (BIHS) 2018-19:

- Nationally representative of rural Bangladesh

### Remote Satellite Sensing

Global Flood Database (GFD):

- Identifies significant global flood events based on news reports

- Uses MODIS satellite imagery to capture flood events

Climate Hazards Group InfraRed Precipitation with Station Data (CHIRPS):

- Detailed rainfall maps at 5000 m spatial resolution

- Captures precipitation in millimeters

Sentinel 1:

- Generates flood extent pixel maps at 10 m spatial resolution using radar imagery

- Limitation: Missing flood data

## Sources

Del Ninno, C., & Lundberg, M. (2005). Treading water: the long-term impact of the 1998 flood on nutrition in Bangladesh. *Economics & Human Biology*, 3(1), 67-96.

Mallett, L. H., & Etzel, R. A. (2018). Flooding: what is the impact on pregnancy and child health?. *Disasters*, 42(3), 432-458.