The role of economic preferences for climate adaptation
Empirical evidence from fast and slow onset climate hazards

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Based on the papers: Steimanis & Vollan „*Prosociality as response to slow- and fast-onset climate hazards*" and Steimanis, Mayer & Vollan 2021 "*Why do people persist in sea-level rise threatened coastal regions? Empirical evidence on risk aversion and place attachment*"
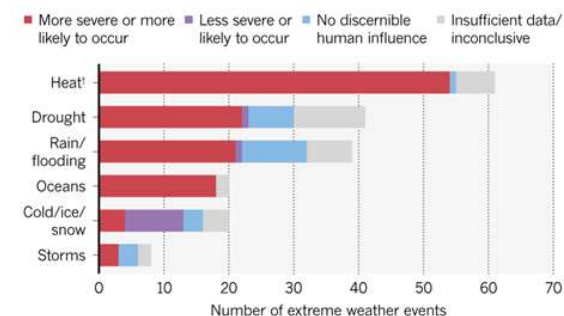
The need for climate adaptation

➢ Even most best-case scenarios of mitigating climate change will result in 2ºC warming until 2100.

➢ Already today more and more people around the globe experience climate hazards such as rising sea levels, flooding, extreme tropical cyclones, and land degradation (IPCC, 2021, 2019).

➢ People in the Global South disproportionally affected due to exposure and vulnerability.

– The United Nations Environment Programme (UNEP) estimates that adaptation costs for developing countries alone will be $140 billion to $300 billion per year by 2030 and $280 billion to $500 billion per year by 2050.

➢ Damages and Adaptation costs exceed the pledged $100 billion for Climate Finance.

– Support in 2018 still below $ 50 billion

– Only 20% of this fund is targeted so far for adaptation


Attribution science
Researchers have published more than 170 studies* examining the role of human-induced climate change in 190 extreme weather events.

- More severe or more likely to occur
- Less severe or likely to occur
- No discernible human influence
- Insufficient data/ inconclusive

Number of extreme weather events

©nature
*Studies from 2004–18 collated by Nature and CarbonBrief. †Heat includes heatwaves and wildfires; Oceans includes studies on marine heat, coral bleaching and marine-ecosystem disruption.

People displaced internally by natural disasters, 2020
Internally-displaced persons are defined as people or groups of people who have been forced or obliged to flee or to leave their homes or places of habitual residence, as a result of natural or human-made disasters and who have not crossed an international border.
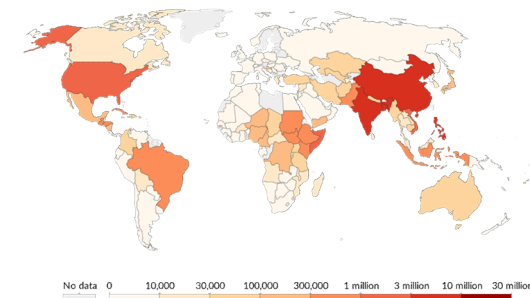
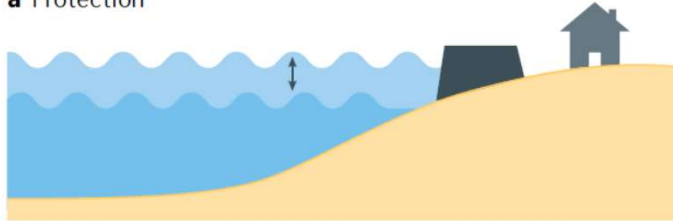Source: Internal Displacement Monitoring Centre (via World Bank)   OurWorldInData.org/natural-disasters • CC BY
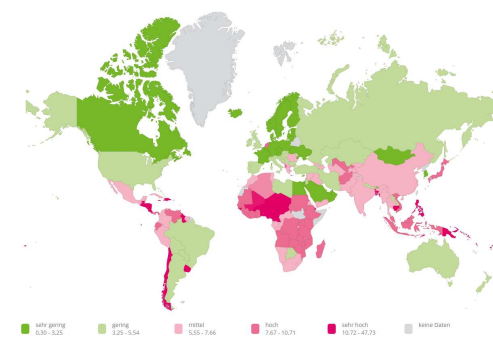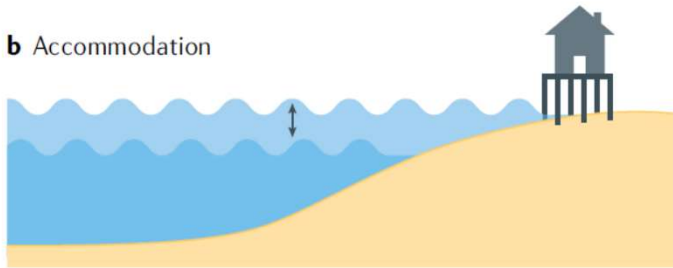
WorldRiskReport 2021 Bündnis Entwicklung Hilft and Ruhr University Bochum
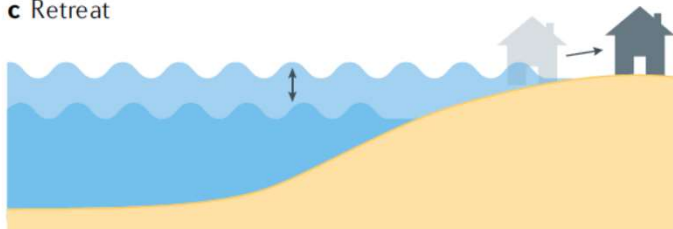
What adaptation options do people have?

a Protection

b Accommodation

c Retreat

Source: Hauer et al. (2020)

➤ **Protection:** (mainly) Urban areas, high-cost

Dikes, elevating districts, retrofitting buildings, flood pumps,…

➤ **Accomodation:** (mainly) Rural areas, lower-cost

Adopting new livelihoods, changing cultivation

Culture of living with impacts: Elevate buildings, early warning systems, …

➤ **Retreat:** Both urban and rural.

Moving to higher ground, urban areas, seasonal movements, international migration

Preconditions that make …

➤ **Accomodation** more likely: Social capital, altruism, Identity to the place

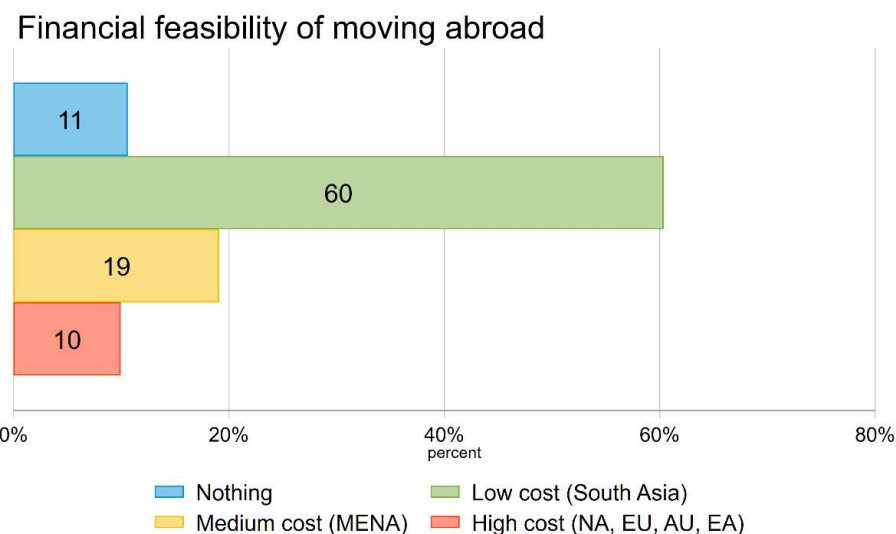➤ **Retreat** more likely: Networks to the new place, financial assets, education, willingness to take risks, …

Economic preferences can shed light on whether people prefer accommodation over retreat … if people are not "trapped" (i.e. involuntary immobile) they can have the right to stay.

Do people have the agency to decide on how to adapt?

Agency

➢ Worldwide, only about 3–4% of people currently live outside of their country of birth (United Nations 2019), with less than 1% of people having migrated from one country to another in the past 5 years

➢ Non-migration is the norm. But are people trapped in their home country? How can we assess the involuntary immobility?

 – 'Soft' factors that affect migration aspirations: Place attachment, risk perceptions, strong local social networks

 – Capacity: Costs of migration, migrant network, education, wealth, passports and visa regulations

Financial capacity

Financial feasibility of moving abroad

- Nothing — 11
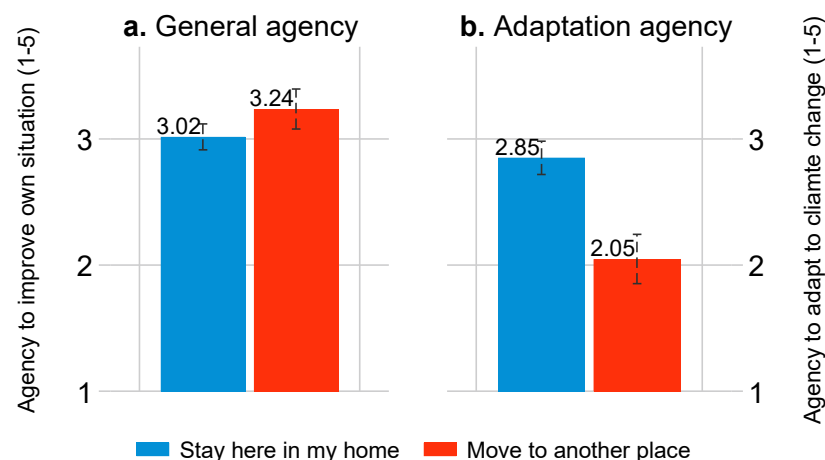- Low cost (South Asia) — 60
- Medium cost (MENA) — 19
- High cost (NA, EU, AU, EA) — 10

• 10% have relatives living in the country they aspire to move to

• Steps needed (open question): 41% passport, 40% visa, 19% language

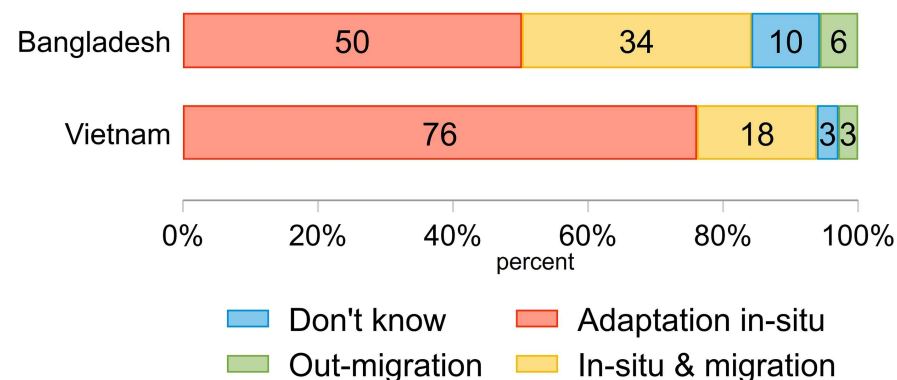# Do people have the agency to decide on how to adapt?

Psychological agency

a. General agency

b. Adaptation agency

Agency to improve own situation (1-5)

Agency to adapt to cliamte change (1-5)

3.02

3.24

2.85

2.05

■ Stay here in my home   ■ Move to another place

Those preferring to move to other place have

(a) higher general sense of agency and

(b) lower sense of agency in respect to their ability to adapt to climate change consequences

Adaptation preferences

b Recommended adaptation measures

Bangladesh: 50 | 34 | 10 | 6

Vietnam: 76 | 18 | 3 | 3

0%   20%   40%   60%   80%   100%
percent

■ Don't know   ■ Adaptation in-situ
■ Out-migration   ■ In-situ & migration

Adaptation responses in case of a hypothetical two-foot (61 cm) rise in sea-level within the next five years
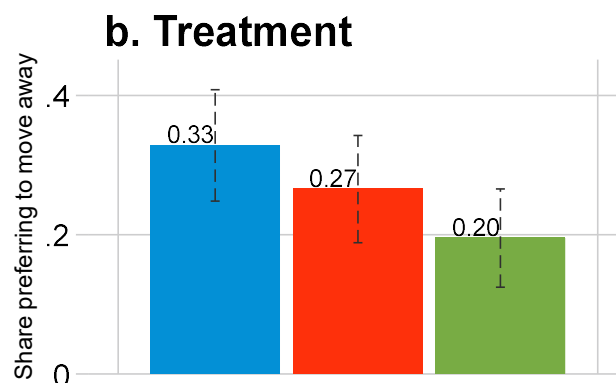
Are decision makers biased?

➢ Accommodation might be a biased response as people might be unwilling to incur sunk costs.
  – Living in a hazardous environment often requires investment into house and productive assets
➢ Three approaches (n=385) carried out as face-to-face interviews.
  a) Natural variation in actual investments: Investments in house and land done in the past
  b) Survey experiment: Increase salience of investments and future hazards
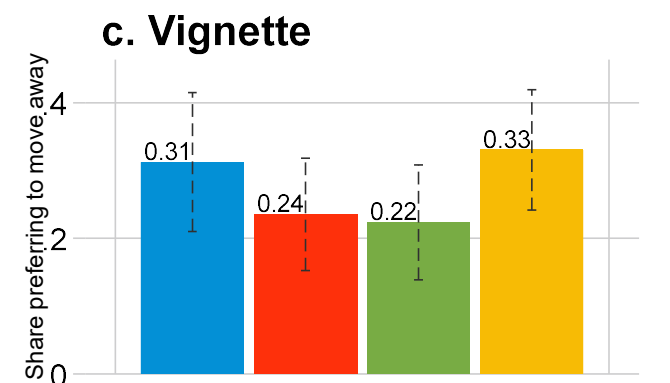 c) Vignette: Hypothetical scenario of high/low investments in close/distant past

a. Correlation

Share preferring to move away
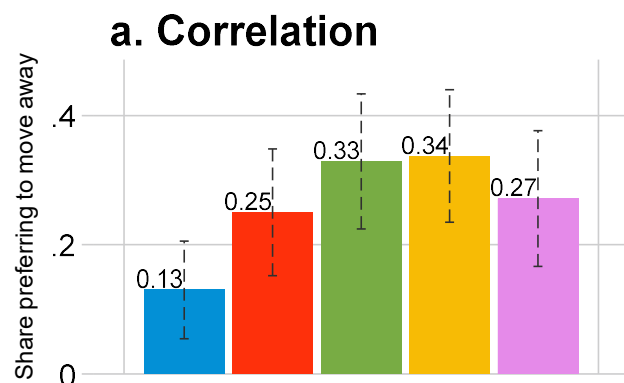
Investments (in 1,000 Taka)
- 0
- 0-40
- 40-80
- 80-200
- >200

Values: 0.13, 0.25, 0.33, 0.34, 0.27

b. Treatment

Share preferring to move away

Salience treatment
- Control
- T1: Sunk Cost
- T2: Sunk Cost + CCC

Values: 0.33, 0.27, 0.20

c. Vignette

Share preferring to move away

Vignette: Attribute levels
- Minor repair last month
- Major repair last month
- Minor repair 3 years ago
- Major repair 3 years ago

Values: 0.31, 0.24, 0.22, 0.33

Literature

➤ **Most people prefer to accommodate** (Adams, 2016; Esteban et al., 2019; Laurice Jamero et al., 2017), **but much less is known about the reasons for this**

  – The Foresight report (2011) stated "…*millions of people will be unable to move away from locations in which they are extremely vulnerable to environmental change. To the international community, this 'trapped' population is likely to represent just as important a policy concern as those who do migrate*."

  – The following literature puts the people and their perceptions of climate change at the center of analysis and focuses on migration *aspirations* and *capacities* to understand climate-related (non) migration (Adger et al., 2021; Bekaert et al., 2021; Bertoli et al., 2020).

  – 'Soft' factors that can explain non-migration: place attachment *(Adams, 2016)*, risk-aversion (Choquette-Levy et al., 2021,)*, low risk perception (Zander et al. 2019,Bekaert et al., 2021; Adger et al., 2021), strong social network at home (Manchin and Orazbayev, 2018)

➤ **Here, we focus on people's (prosocial) preferences (as well as risk, place attachment and sunk cost bias) as our survey items showed that most people can afford to move and perceive to have agency.**

➤ **Very little is known regarding the dynamics of these determinants**

  – Immobile populations may become mobile; people may stay by choice but then find themselves trapped…

  – How do preferences develop among highly affected populations that experience increasing hazards?

Literature

➤ Some initial evidence in Steimanis et al. 2021 from affected coastal populations in river deltas in Bangladesh (n=247) and Vietnam (n=377).

– Focus on regions where people depend on livelihood practices (e.g. fishing and farming) that are highly vulnerable to climate change.

– Respondents who reported experiencing 3 or more climate-related hazards in the past five years tended to be more risk averse, more attached to their place of residence, and more likely to want to move abroad, especially to high-income countries.

– Yet, correlation and not causation.
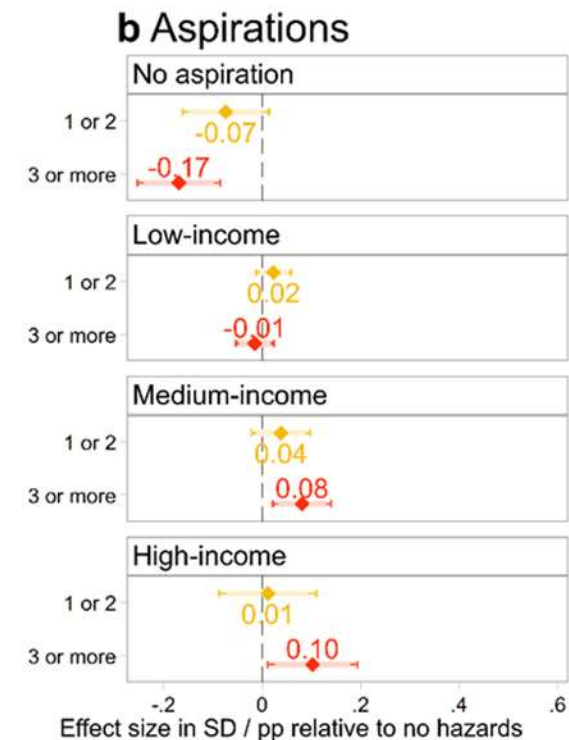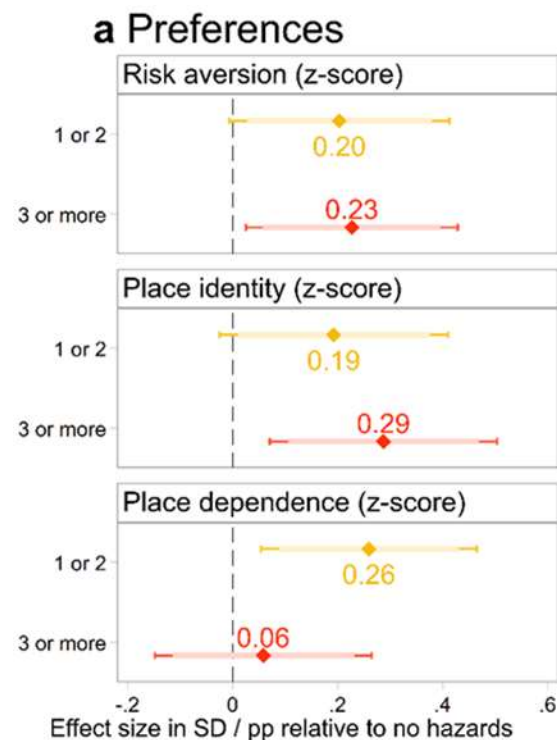
SHORT TERM PRO-SOCIALITY

Are pro-social behaviors affected by exposure to hazards?

Fast onset event (study 1)

➢ In disasters people predominantly support each other and act as one instead of selfishly.
  – underlying psychological mechanism is an emerging shared social identity created by a sense of common fate.
➢ Long-term effects studied by economists both positive (Cassar et al., 2017) and negative (Becchetti et al., 2017).

➢ We investigate
  – whether in-group favoritism emerges
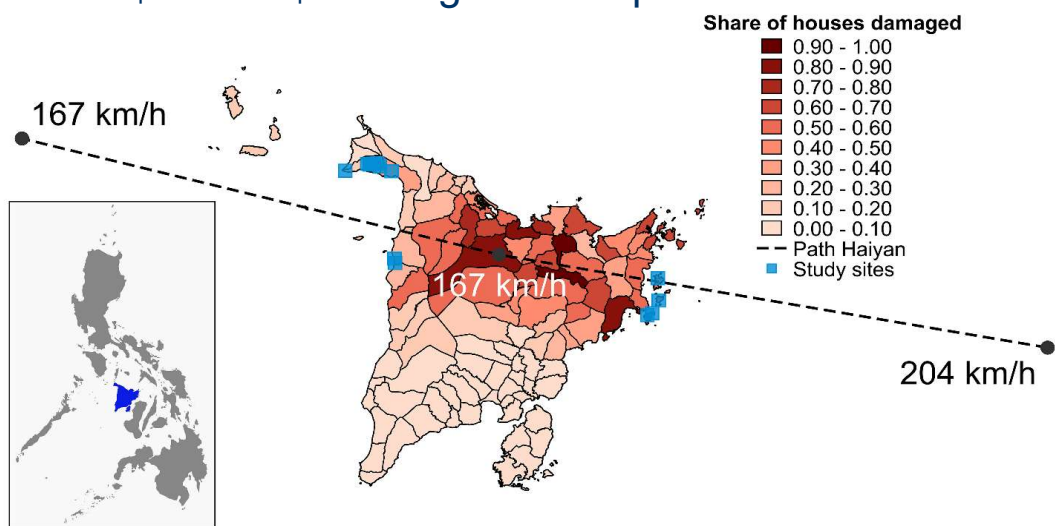 – and whether the context of recovery after the event mediates the effects

Slow onset event (study 2)

➢ No empirical evidence on the effect of slow-onset events on prosociality.
➢ Game theory predicts that prosocial behaviors can only be sustained when there are repeated possibilities of interaction (Dal Bo, 2005; Axelrod & Hamilton, 1984).
  – Supported by lab experiments

➢ We hypothesize that participants who expect that future climate hazards will force them to resettle will respond with more selfish behaviors (i.e. moving from an infinite interaction to a finite interaction).

Study Sites

Fast onset event (study 1)

➤ Lab-in-the-field experiments three years after Typhoon Haiyan with 378 people from 14 randomly selected coastal villages on Panay in 2016.

➤ 80% had houses damaged, recovery costs $990 vs $269 avg. income per month

Share of houses damaged
- 0.90 - 1.00
- 0.80 - 0.90
- 0.70 - 0.80
- 0.60 - 0.70
- 0.50 - 0.60
- 0.40 - 0.50
- 0.30 - 0.40
- 0.20 - 0.30
- 0.10 - 0.20
- 0.00 - 0.10
- – – Path Haiyan
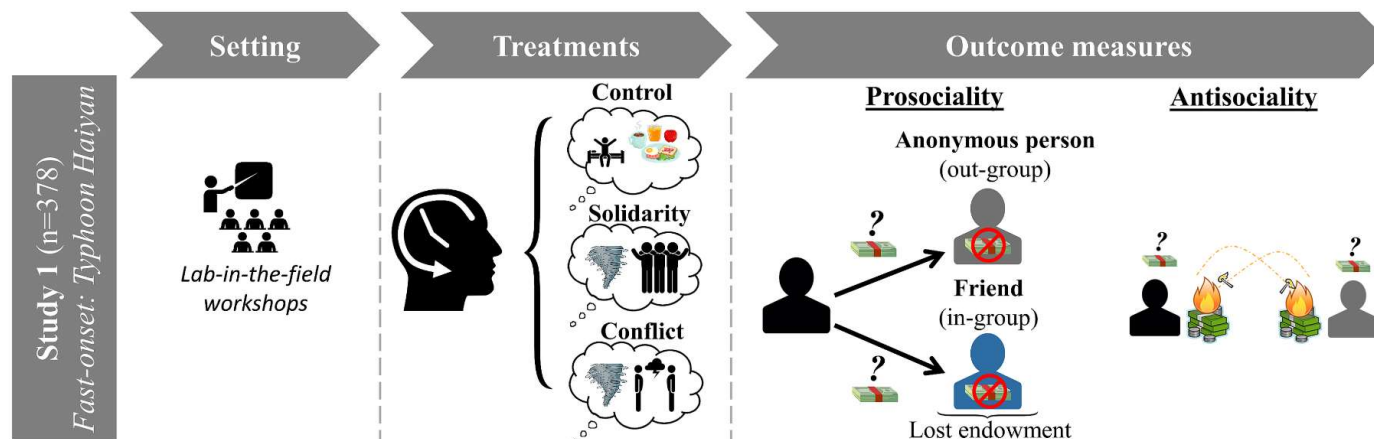- ■ Study sites

167 km/h

204 km/h

Slow onset event (study 2)

➤ 60% of atoll island dwellers think they will have to move in the next five years.

➤ In the low-lying deltas, 40% of participants think that floods and erosion are an 'extreme threat' (10 on a 10-point Likert item).
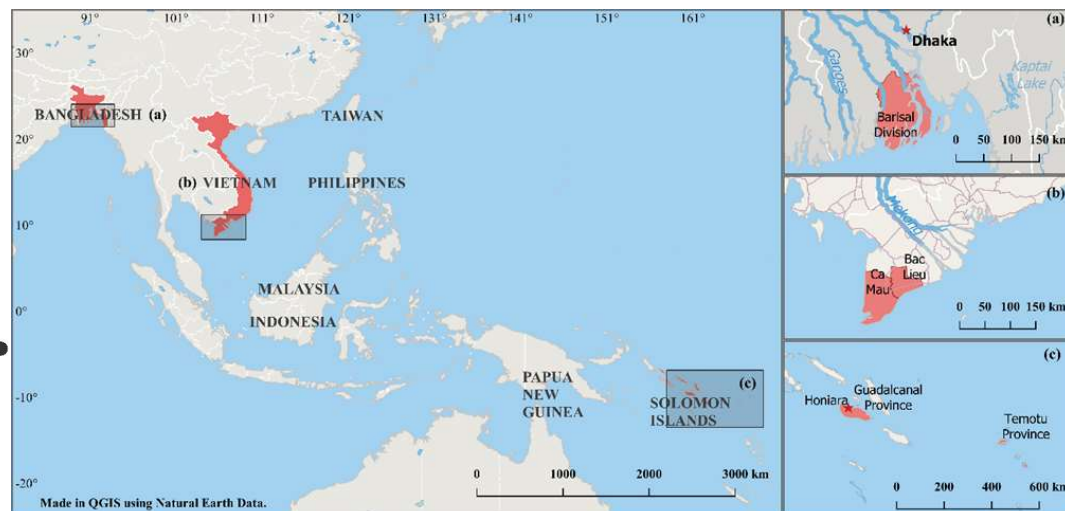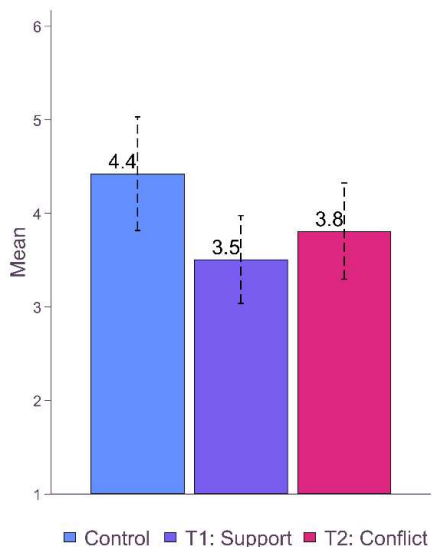
Study Design
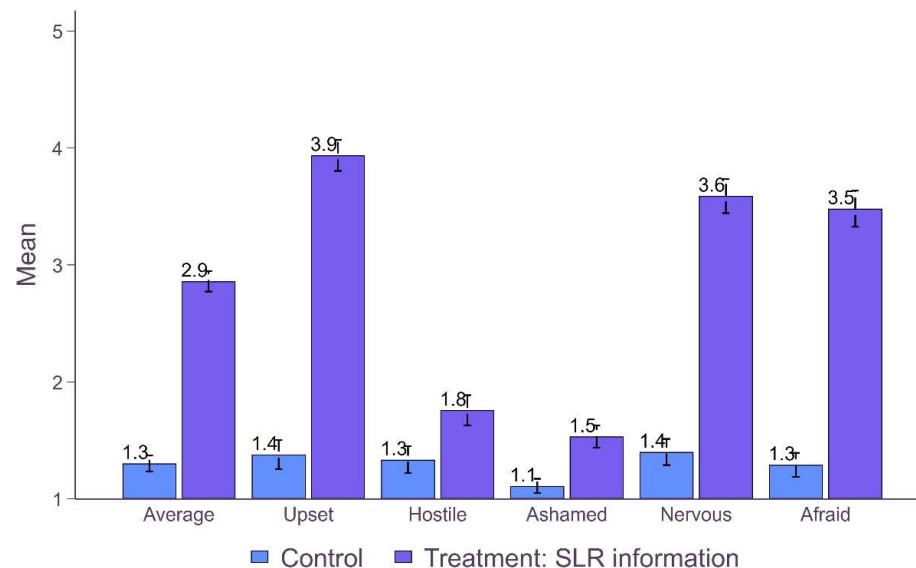
Treatment check

Fast onset event (study 1)

➤ Respondents in the support treatment perceive togetherness as less affected by Haiyan than participants in the control treatment.

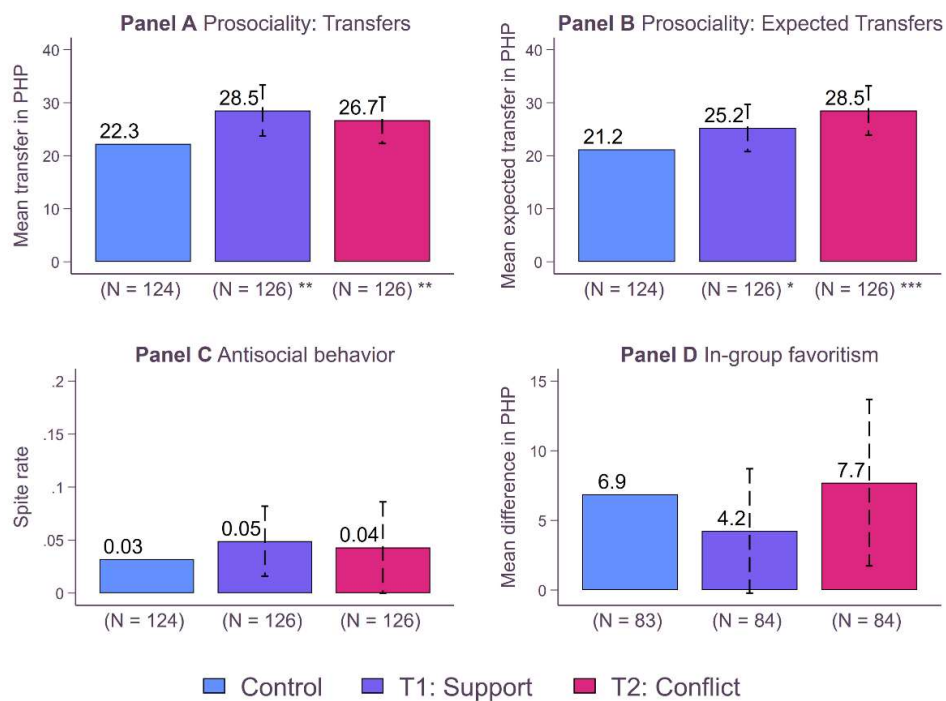➤ The conflict treatment seems to have 'backfired'

Slow onset event (study 2)

➤ Significant increase in negative emotions induced by the information treatment by about 30% compared to the control group

Main Results

Fast onset event (study 1)

Panel A Prosociality: Transfers

- 22.3 (N = 124)
- 28.5 (N = 126) **
- 26.7 (N = 126) **

Mean transfer in PHP

Panel B Prosociality: Expected Transfers

- 21.2 (N = 124)
- 25.2 (N = 126) *
- 28.5 (N = 126) ***

Mean expected transfer in PHP

Panel C Antisocial behavior

- 0.03 (N = 124)
- 0.05 (N = 126)
- 0.04 (N = 126)

Spite rate

Panel D In-group favoritism

- 6.9 (N = 83)
- 4.2 (N = 84)
- 7.7 (N = 84)

Mean difference in PHP

Legend: ■ Control ■ T1: Support ■ T2: Conflict

Slow onset event (study 2)

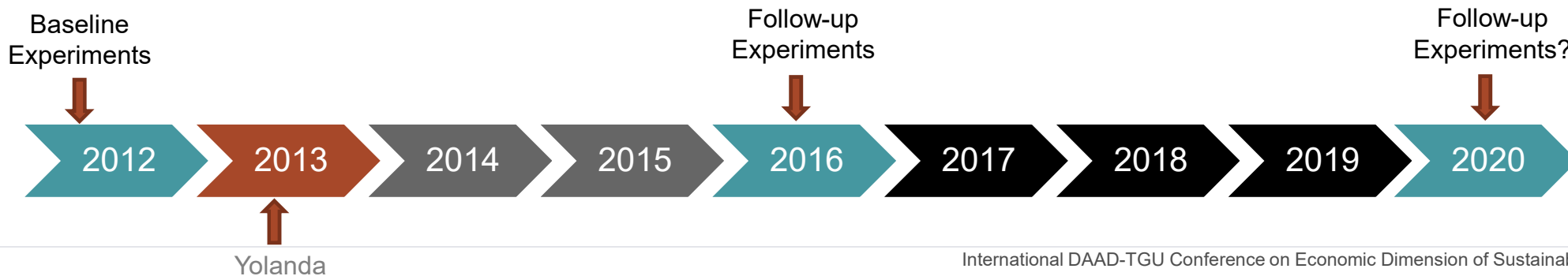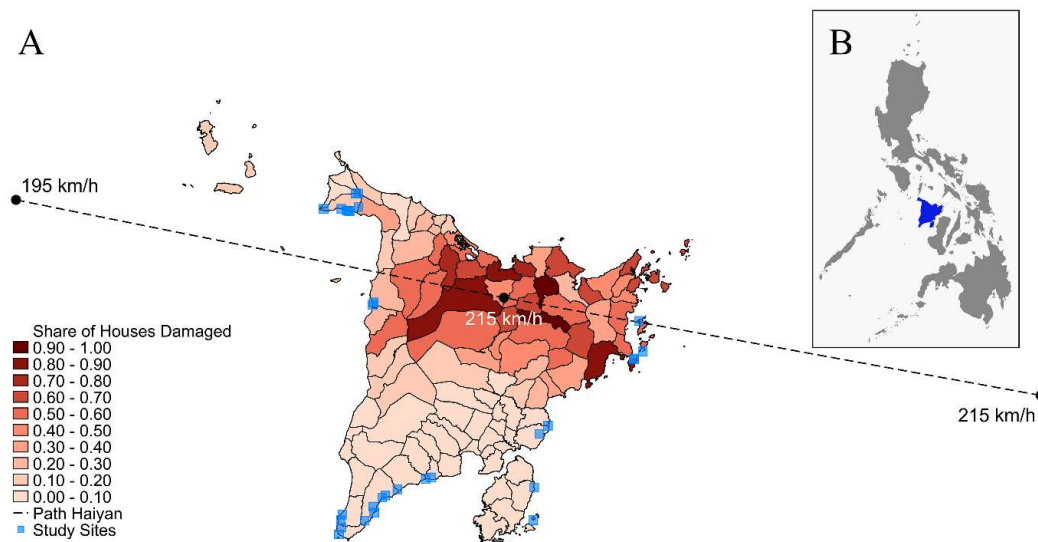|	Dependent variable: Prosociality (z-score)			
	Average treatment effect		Heterogeneous effects	
	(1)	(2)	(3)	(4)
SLR Information (=1)	0.14**	0.14**	0.21***	0.22***
	(0.06)	(0.06)	(0.08)	(0.08)
Relocate belief (=1)			0.17*	0.20*
			(0.10)	(0.11)
SLR Information x Relocate			-0.22*	-0.23*
			(0.13)	(0.14)
Constant	-0.08*	-0.57***	-0.14**	-0.64***
	(0.05)	(0.17)	(0.06)	(0.18)
Country fixed effects	No	Yes	No	Yes
Controls	No	Yes	No	Yes
Observations	1,047	1,039	1,047	1,039
R^2	0.00	0.05	0.01	0.05
Adjusted R^2	0.00	0.03	0.00	0.04

LONG TERM PRO-SOCIALITY

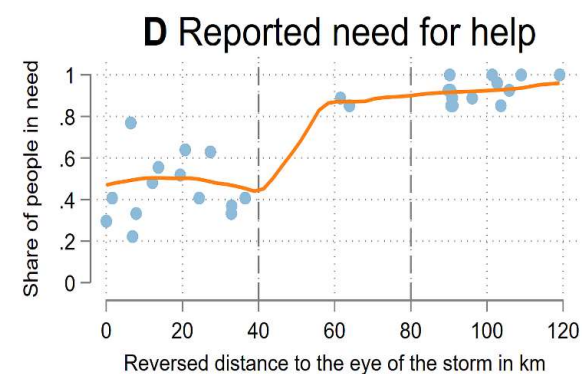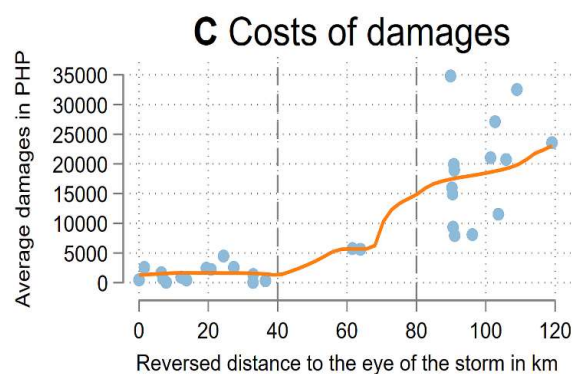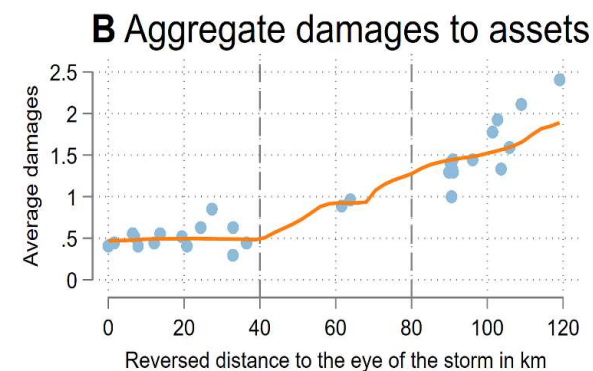Typhoon Yolanda and it's consequences

Study site: Philippines and typhoon Yolanda

➤ Data gathering on the island Panay (Western Visayas)

   – Different levels of exposure to typhoon

➤ Region VI (Western Visayas):

   – Total affected population 3,9 Mio (out of 8 Mio)

   – Damaged houses 482,349 (229,326 totally damaged).

➤ Panay usually unaffected by strong typhoons.

   – Happened after „typhoon season"

A

B

195 km/h

215 km/h

215 km/h

Share of Houses Damaged
- 0.90 - 1.00
- 0.80 - 0.90
- 0.70 - 0.80
- 0.60 - 0.70
- 0.50 - 0.60
- 0.40 - 0.50
- 0.30 - 0.40
- 0.20 - 0.30
- 0.10 - 0.20
- 0.00 - 0.10
- - · Path Haiyan
- ■ Study Sites

Baseline Experiments

Follow-up Experiments

Follow-up Experiments?

| 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |

Yolanda

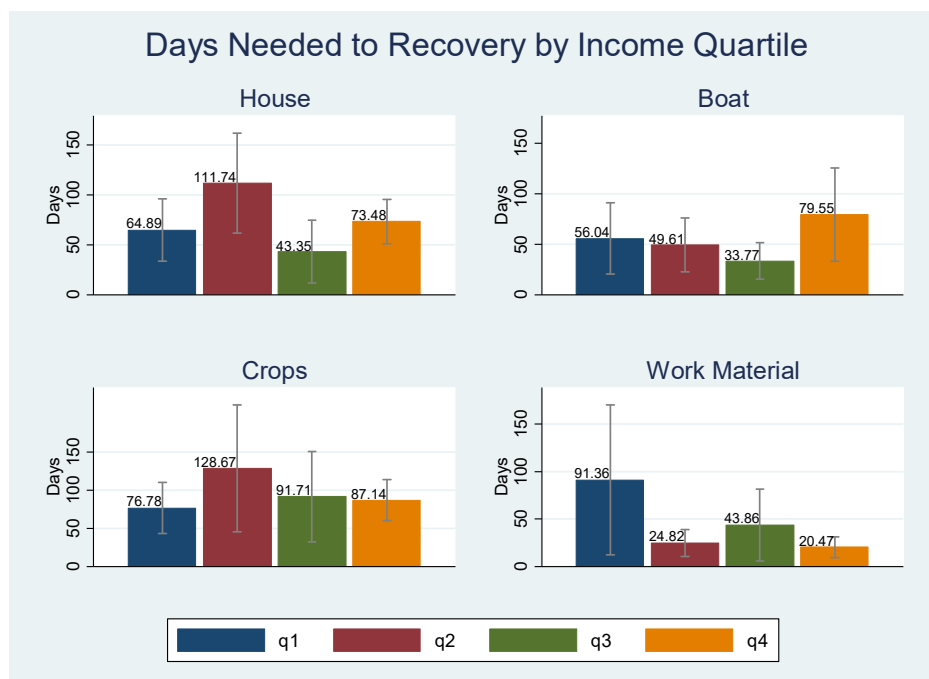# Measure of damage: Exposure and intensity

➤ Reversed distance of village to eye of the storm

➤ Binary measure for high intensity villages
  – No differences between affected and unaffected villages in socio-demographics
  – No attrition bias related to the outcome variables and some due to opportunity costs.

➤ About 95% of individuals were in their own village when Yolanda struck the island

➤ On average participants had about 7.5 hours to react to the incoming typhoon (around 77% below six hours)

A Houses damaged

B Aggregate damages to assets

C Costs of damages

D Reported need for help

Time needed to recover

Days Needed to Recovery by Income Quartile

House

- q1: 64.89
- q2: 111.74
- q3: 43.35
- q4: 73.48

Boat

- q1: 56.04
- q2: 49.61
- q3: 33.77
- q4: 79.55

Crops

- q1: 76.78
- q2: 128.67
- q3: 91.71
- q4: 87.14

Work Material

- q1: 91.36
- q2: 24.82
- q3: 43.86
- q4: 20.47

Legend: q1, q2, q3, q4
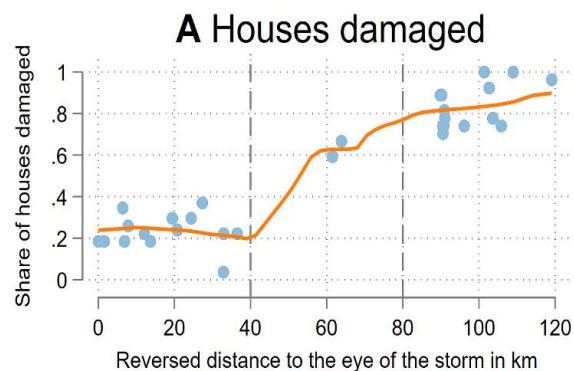
➢ About 56% claimed that their houses were either partially or totally destroyed (83% in high intensity, 28% in low intensity villages)

➢ The average reconstruction duration was 142 days (43% percent above 30 days)

➢ 90% rebuilt their houses at same spot (in municipality with highest intensity – Concepcion – only 76% rebuilt at same spot)

➢ Condition of house after recovery:
   - Worse: 17.2%
   - Same: 26.8%
   - Better: 56%

Measure of pro-social behavior: Solidarity behavior

- Groups of three participants

- Initial endowment: 200 PhP (~4 €)

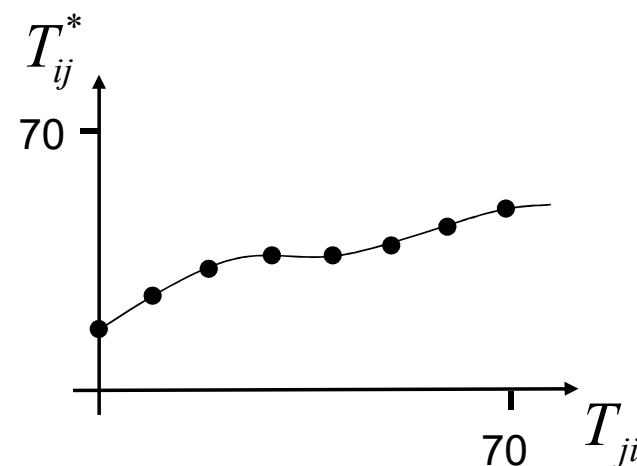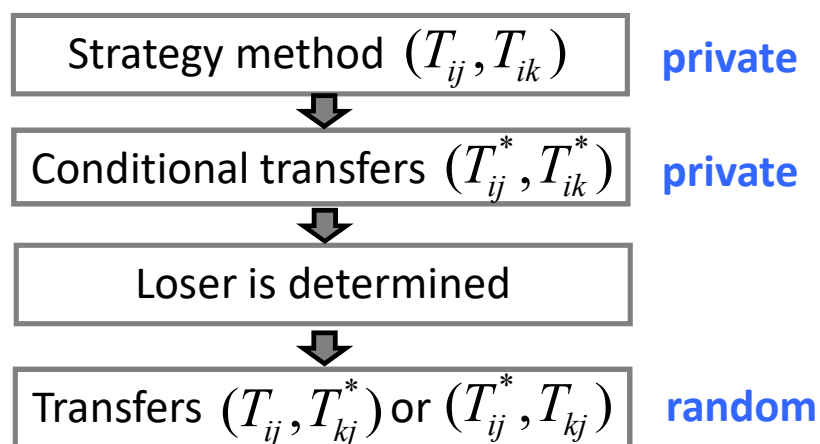- Monthly hh income: 4000 PhP (~70 €)

- One group member faces a loss
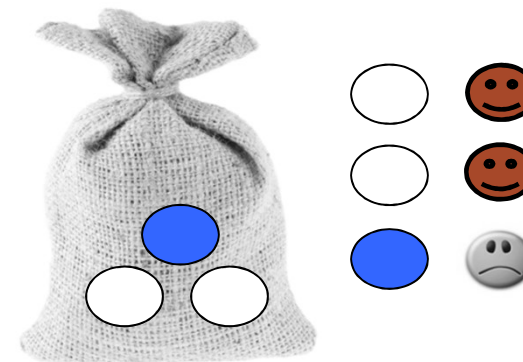
- Winners can compensate the loser

- Transfer ∈ {0,10,20,30,40,50,60,70}
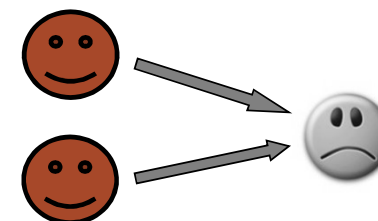
Measure of pro-social behavior: Solidarity preference

➢ Allows for classification of types

- – Conditional Helper: The amount given is monotonically increasing in amount given by other; correlation between amount given by other and own amount is >=.84 , and difference between min and max amount given at least 30PHP
- – Altruists: always giving 60 or 70 PHP
- – Egoists: always giving 0, 10 or 20 PHP

Strategy method (T_{ij}, T_{ik})	**private**
Conditional transfers (T_{ij}^{*}, T_{ik}^{*})	**private**
Loser is determined	
Transfers (T_{ij}, T_{kj}^{*}) or (T_{ij}^{*}, T_{kj})	**random**

Distribution and Stability

Table 1.   Summary statistics: 1 year before Haiyan

|	N	Mean	SD	Min	Max
Panel A: Outcome variables (2012)					
Type: Conditional Helper (=1)	450	0.43	0.50	0	1
Type: Egoist (=1)	450	0.24	0.42	0	1
Type: Altruist (=1)	450	0.07	0.25	0	1
Type: Unconditional Helper (=1)	450	0.23	0.42	0	1
Type: Unclassified (=1)	450	0.03	0.17	0	1
Conditional cooperation area	450	1.10	0.55	0	3
Game 2: Transfer (0, 70)	450	32.07	19.20	0	70
Game 3: Transfer (0, 70)	450	35.22	19.53	0	70
Average Transfer (0, 70)	450	33.64	16.63	0	70
Game 2: Expected Transfer (0, 70)	450	27.51	18.88	0	70
Panel B: Individual Characteristics (2012)					
Age (years)	450	41.95	10.25	18	71
Female (=1)	450	0.60	0.49	0	1
Education: Elementary (=1)	450	0.27	0.44	0	1
Education: High School (=1)	450	0.53	0.50	0	1
Education: Higher Education (=1)	450	0.21	0.41	0	1
Household head (=1)	450	0.50	0.50	0	1
Married (=1)	450	0.82	0.38	0	1
Fisher (=1)	450	0.27	0.45	0	1
Household size	450	5.08	1.84	1	11
HH income per month in PHP	450	3,818	3,602	400	31000
Reduced meals in last month (=1)	450	0.65	0.48	0	1
Most people can be trusted (=1)	450	0.30	0.46	0	1
General optimism (1, 5)	450	3.87	0.87	1	5
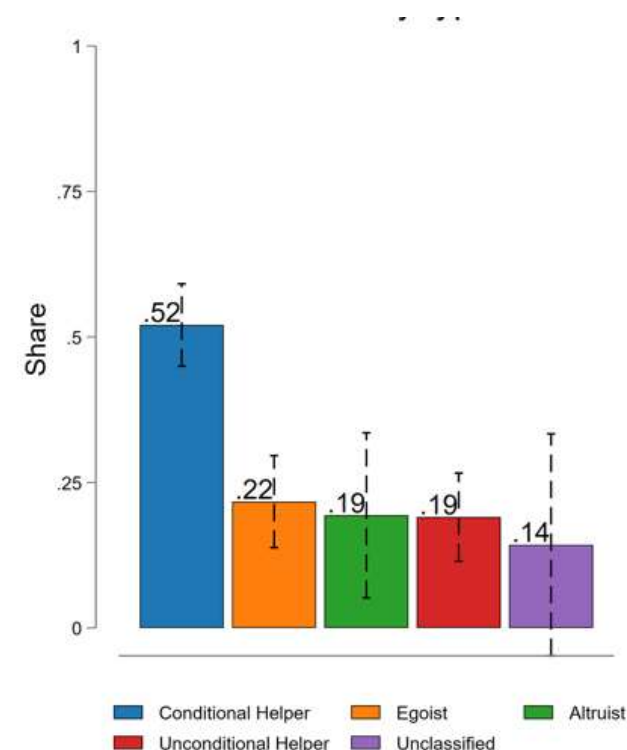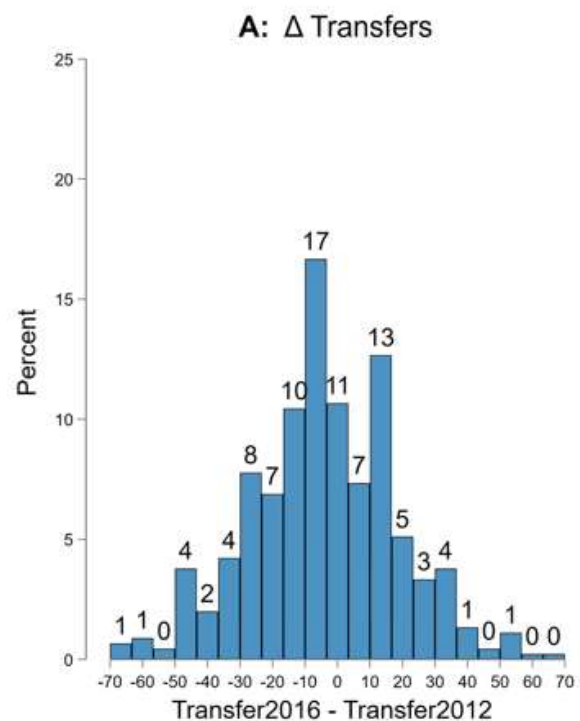
Is pro-social behavior affected in the long run?

VARIABLES	Δ Average transfers			
	(1)	(2)	(3)	(4)
Distance eye reversed in km	-0.045**	-0.051**	-0.287***	-0.296***
	(0.021)	(0.022)	(0.072)	(0.069)
Distance eye reversed squared			0.002***	0.002***
			(0.001)	(0.001)
2012 DV	-0.679***	-0.679***	-0.672***	-0.671***
	(0.063)	(0.062)	(0.063)	(0.061)
Δ Expected Transfer	0.349***	0.343***	0.354***	0.349***
	(0.035)	(0.034)	(0.036)	(0.034)
Δ Trust national government		-1.297**		-1.384**
		(0.588)		(0.600)
Δ Generalized trust		2.514		2.130
		(1.534)		(1.497)
Δ General optimism		-0.176		-0.107
		(0.502)		(0.501)
Δ Adjusted HH income (log)		-0.169		-0.332
		(0.687)		(0.675)
Constant	21.098***	21.761***	24.160***	24.856***
	(2.110)	(2.136)	(2.466)	(2.447)
Observations	450	447	450	447
Adjusted R-squared	0.521	0.523	0.528	0.530
F-Test: Control changes		0.217		0.226
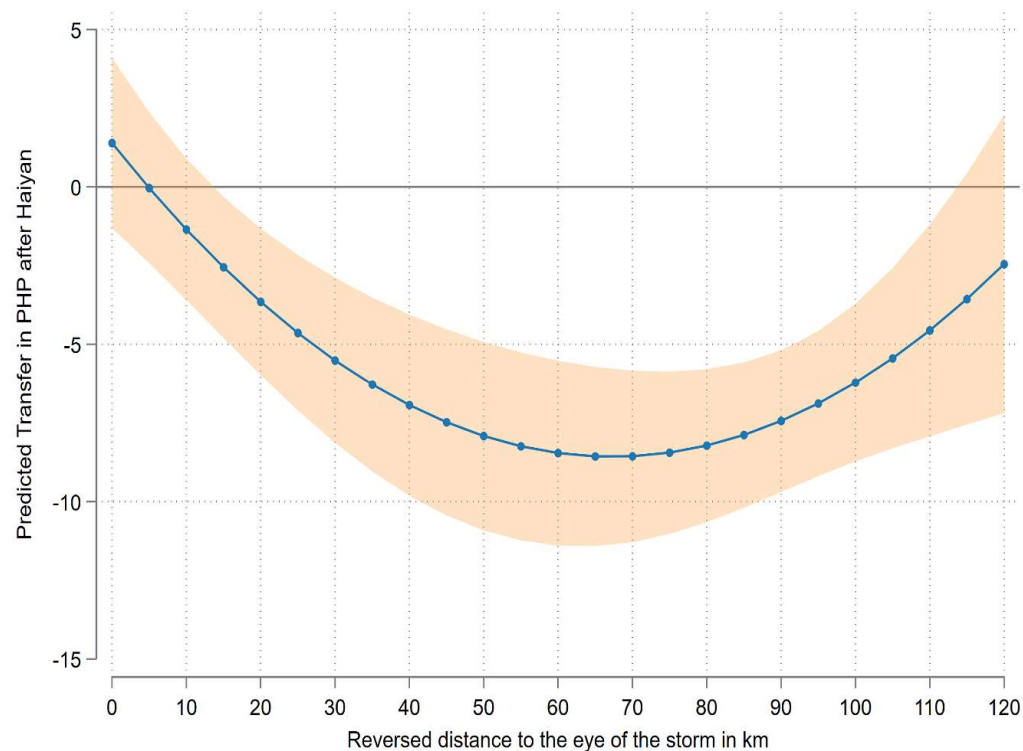
Is pro-social behavior affected in the long run?
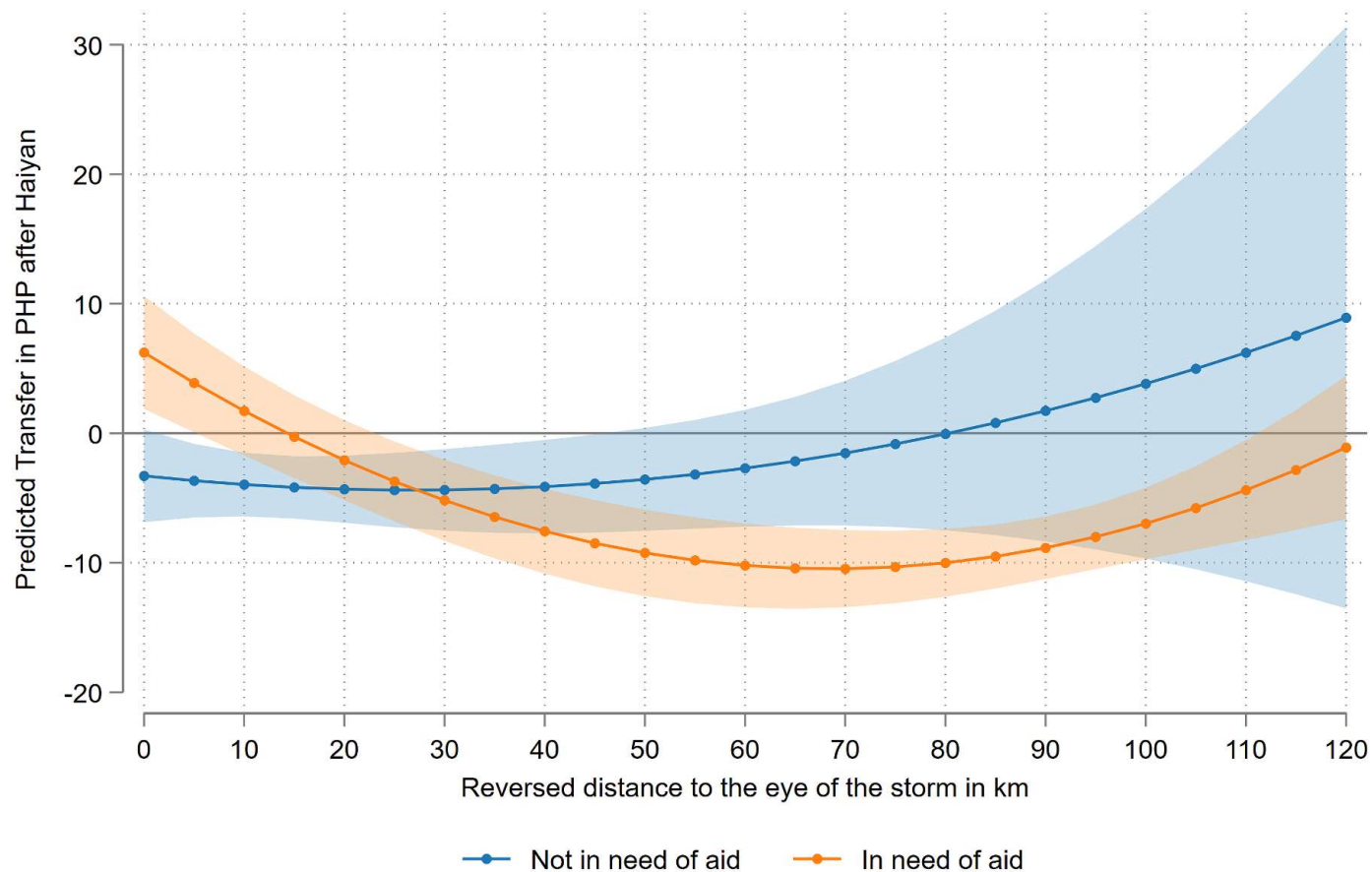
Interaction effects with being in need of aid indicate that in highly affected communities, people that were in need of aid gave less while the few people that were not in need transfer more

DISCUSSION

Discussion

➢ With climate hazards increasing in frequency and severity, is a focus on prosociality a well-adapted coping strategy for future climate change? Does successful adaptation convey a (misleading) sense of long-term security?

- Traditional approach to dealing with hardship
- Emotional support by family, friends and neighbors reduces fears and worries about future events.
- Helping others and collectively rebuilding homes provides people with stronger bonds, social relations, and potentially a narrative of 'stay and fight'.
- Participants prefer cooperative strategies that require collective efforts, such as building sea walls (65%), planting mangroves (42%) more often than individual action – e.g., moving away (38%).
- People are reluctant to leave even when resettlement is available *(Jamero et al., 2017)*
  - Case study of 4 Filipino islands that subsided due to an earthquake in 2013: People experience 135 flooding days a year and having a relocation settlement on the mainland…

➢ As pro-sociality, risk aversion and place attachment are negatively associated with migration it may follow that people need extra incentives to move out of highly affected regions.

Discussion

➢ Our findings are consistent with

  – views that migration will mostly take place within countries at small distances.

  – growing body of literature on the endogeneity of preferences (resource scarcity, conflict, market integration, historical events).
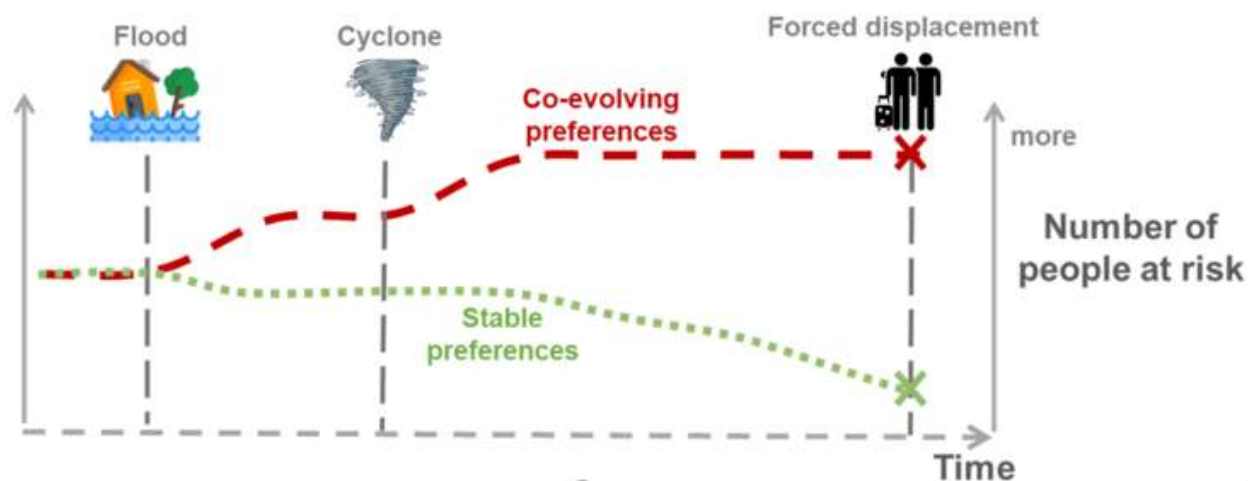
➢ (Not)migrating is a complex decision. An additional factor when analyzing future policies is to take into account that preferences are endogenous to the experience of natural disasters.

  – Being „trapped" vs. „the right to stay" – (im)mobility is a dynamic process.

Discussion

Imagine that the place where you currently live will be uninhabitable in the future, for example, due to sea level rise or permanent flooding.
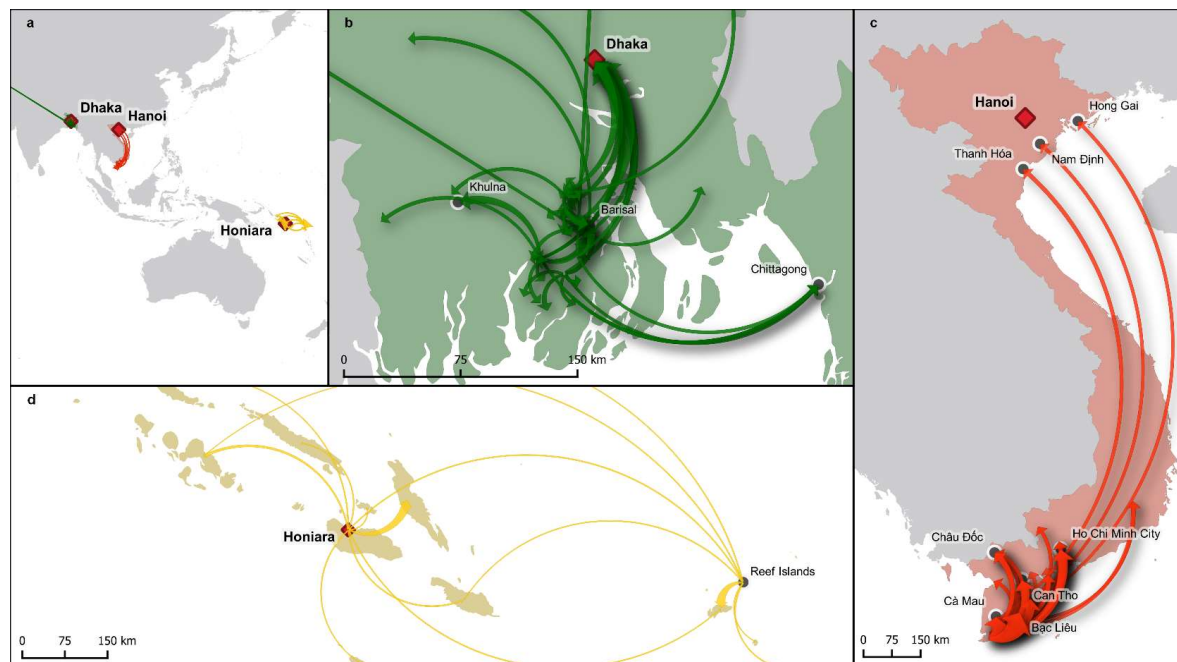
- *Where would you go permanently?*

➤ Share of people with no option:
- Solomon Islands: 49%
- Bangladesh: 39%
- Vietnam: 37%
- Out of 1,326 respondents only 3 mentioned going abroad.

➤ Of those with option: People would move to similarly threatened places.
- Vietnam: median 90 km
- Bangladesh: median 27 km

➤ Unpreparedness: Danger of climate induced poverty and displacement.

Thank you for your attention, questions please!

We are especially grateful to our local research assistants in all study sites who significantly contributed to the success of the data collection and thereby the whole project as well as all participants that agreed to take part in the experiments and surveys.

Backup Slides

Limitations

➢ Limited generalizability: are participants representative?

  – There is already a lot of heterogeneity within the different sampled regions

  – The situation in Sub-Saharan Africa might be very different, given the colonial and migration history, geographical closeness to the EU, different climate impacts (rainfall, droughts) and resource use systems.

➢ Lack of realism? (experimental tasks are unrealistic, artificial)

  – The intent was to test different theories and enhance our understanding of relevant mechanisms

  – Experimental measures of pro-social behavior capture only monetary trade-offs of decision-making.

  – Pro-social behaviors are only one factor which influences the potential for migration. We have no data to show if pro-social behaviors are indeed correlated with adaptive capacity and reduced pressures to migrate.

Data Overview I

Solomon Islands 2017	Bangladesh 2018	Vietnam 2019
Social preferences • ($) SVO task in workshop with in- & out-group differentiation • ($) Trust game in workshop • ($) Spite game in workshop • ($) Honesty task in workshop • Reciprocity (survey items) • Place attachment (survey items) **Risk preferences** • ($) Risk game in workshop **Time preferences** • Staircase & other survey measurements **Other** • Big 5 • Life orientation test (optimism)	**Social Preferences** • ($) DG game in survey • ($) Spite game in survey • Trust (survey items) • Reciprocity (survey items) • Place attachment (survey items) **Risk preferences** • ($) staircase in survey **Time preferences** • Staircase & other survey measurements **Other** • Big 5 • Life orientation test (optimism)	**Social Preferences** • ($) DG game in survey • Trust (survey items) • Reciprocity (survey items) • Place attachment (survey items) **Risk preferences** • ($) staircase in survey **Time preferences** • Staircase & other survey measurements **Other** • Big 5

Data Overview II

| Solomon Islands 2017	Bangladesh 2018	Vietnam 2019

Climate Change Perception
• CC risk appraisal
• CC adaptation
 	
Information processing
  • Importance of information sources
  • Relevance of information (eroding vs. non-eroding)
	Climate Change Perception
	• CC risk appraisal
	• CC adaptation
	  • Strategies recommended to others
	  • Self efficacy
	
	Information processing
	  • Trust in information sources
	  • Ignoring information
		Climate Change Perception
		• CC risk appraisal
		• CC adaptation
		  • Strategies recommended to others
		  • Self efficacy
		
		Information processing
		  • Trust in information sources
		  • Ignoring information
		  • Avoiding information
		  • Sharing information

Migration • Destinations for temp & permanent replacement • Reasons for choosing that place	**Migration** • Destinations for temp & permanent replacement • Reasons for choosing that place • Estimated costs and difficulties • Preference for legal/illegal migration	**Migration** • Destinations for temp & permanent replacement • Reasons for choosing that place • Estimated costs and difficulties
Networks • Social networks (ppl. to rely on) • Participation in community activities	**Networks** • Social networks (ppl. to rely on) • Participation in community activities	**Networks** • Social networks (ppl. to rely on) • Participation in community activities

Impact appraisal

➤ Overall perception of impacts is high:

   – Past (last 10 years) and future perception of SLR impact are higher for more exposed people

   – Perception of future impacts is significantly higher compared to recalls of the past.

   – Past perception very high in Solomon Islands, which could mean that any change in pro-social behaviors might have already happened.
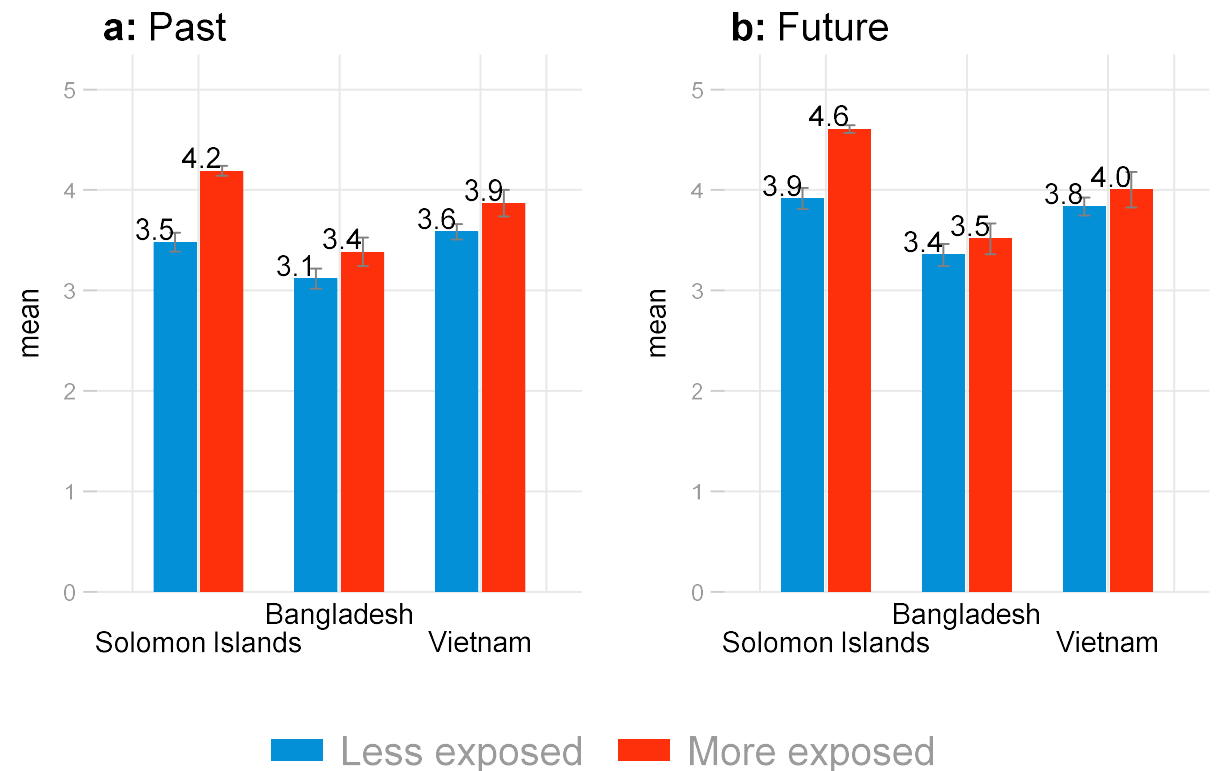
back

Risk appraisal: Relocation
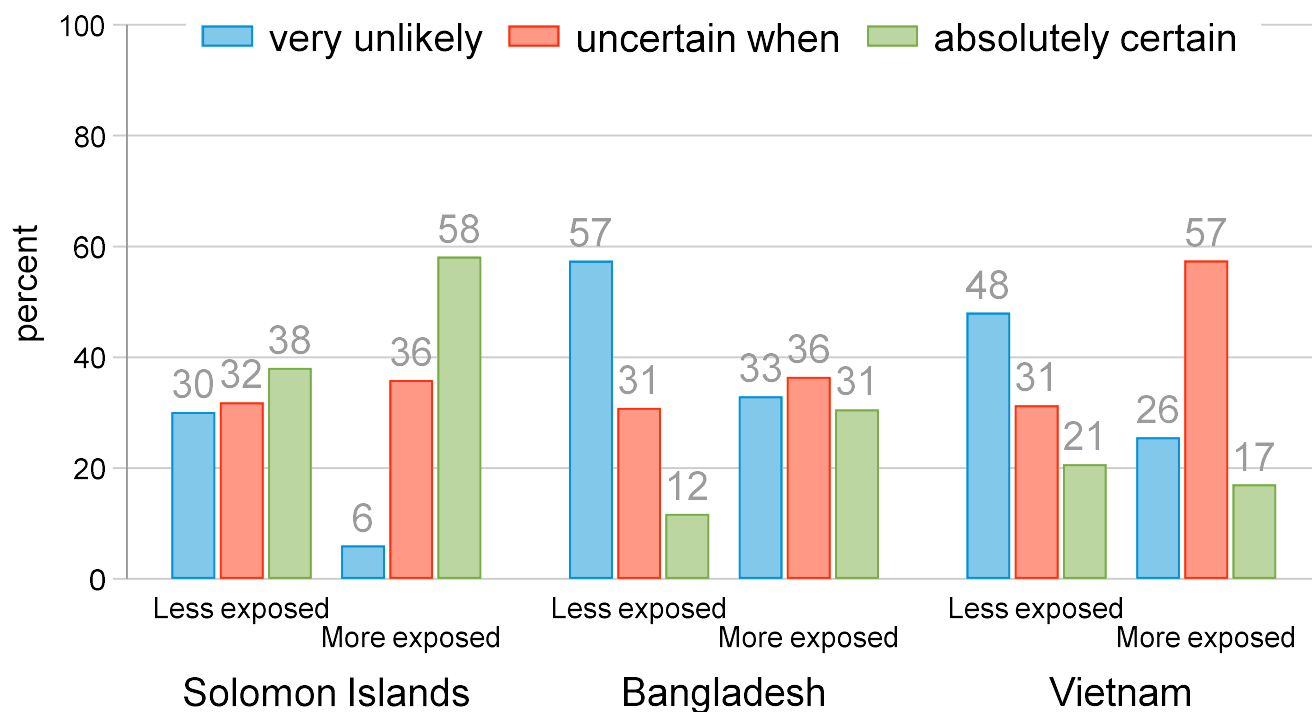
- Relocation belief is significantly higher in the strongly exposed regions.
- Substantial variation between regions: Displacement risk most present in Solomon Islands on both higher and lower lying islands. Nearly 60% belief that they have to relocate in the next 5 years due to SLR.

Incentives and wording

➤ Sufficiently large incentives (PPP adjusted)
  – Solomon Islands: $10.7±1.6 the three to four-hour workshops
  – Bangladesh: $3.6±1 for the ~45-minutes survey
  – Vietnam: $7.3±2.6 for the ~45-minutes survey

➤ Neutral language, avoiding hints regarding the purpose of the experiment:
  – E.g. when invited for the workshop, we would only say it is "a workshop an decision making"

➤ We try to avoid spillovers between sessions:
  – In Solomon Islands (small communities) both sessions were run directly one after the other to avoid cross-talk between participants

➤ Payments in private.

Experimental variation: Priming

2. Priming climate change impact and displacement: "What is focal is causal."

➤ We use videos (local language) of about 3min length to make the impacts of SLR salient for participants using testimonials of people that are in a comparable situation and showing visual impacts.

➤ Between regions we hold the content about the impacts of rising sea-levels *(land erosion, floods, stronger high-tides; saltwater intrusion, loss of harvest)* comparable and vary whether migration as a consequence is shown:

  – Solomon Islands: We do not show migration as a way to adapt.

  – Bangladesh: Many are forced to leave their home and migrate; "move together"; "Many already moved multiple times"

  – Vietnam: Same as in Bangladesh but we additionally vary the relocation belief – group vs. individual - using two hypothetical scenarios.

Treatment
Balancing

Methodology: Priming in the field

➢ The video was watched individually by participants on tablets:

  – Treatment on session level in study 1 (Solomon Islands (SI)), no video for control

  – Randomly assigned on the individual level in survey experiments (Bangladesh (BD) & Vietnam (VN)); owl video for control

  – Priming checks: Future consequnces of behavior (pretests SI), impact and risk appraisal, emotions (BD & VN), government help (VN)

Priming Checks

➢ Then decisions were taken using pen and paper, after respondents successfully answered control questions.

  – Results are robust when including all respondents.

➢ We exclude respondents from the analysis that could not remember key aspects of the priming video.
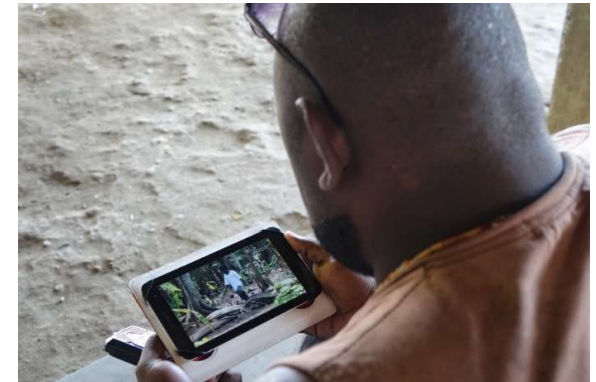
Philippines: Measuring Solidarity

➢ A variant of the game by Selten and Ockenfels (1998)
➢ Played by three players (two friends, one anonymous)
  – both universalistic (random villager) and particularistic (friend)
  – uncompensated (one-shot, anonymous)
➢ Endowment: 200 PHP
➢ One player loses endowment (determined by a lottery)
➢ The remaining „winners" decide whether and how much they transfer to the losing player (ex-ante strategy method)
➢ One shot game with simultaneous decisions
➢ Transfer ∈ {0,10,20,30,40,50,60,70}

➢ Baseline: Game played as described
➢ Primed: Game played after priming on Typhoon
  – T1: Recall positive effects / things caused by Yolanda
  – T2: Recall negative effects / things caused by Yolanda
  – C: Recall what they had for breakfast
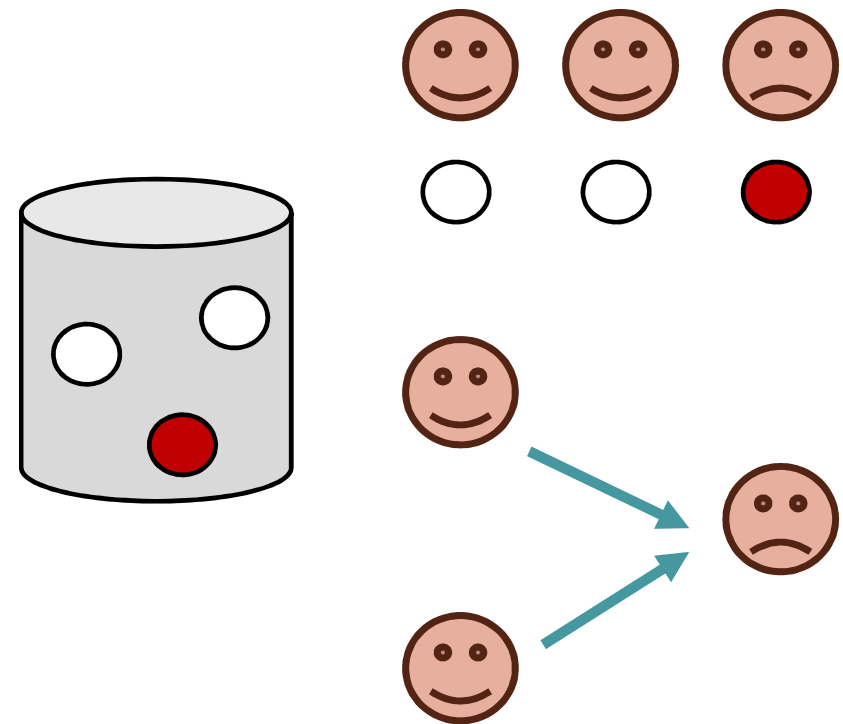
Does solidarity change due to the experience of typhoon Haiyan?

an interviewee from Maliogliog perceives villagers after Haiyan as *"more alert for typhoons [and] more helpful with each other"*.

"[there is] no impact: we helped each other during those times [but] after that no more".
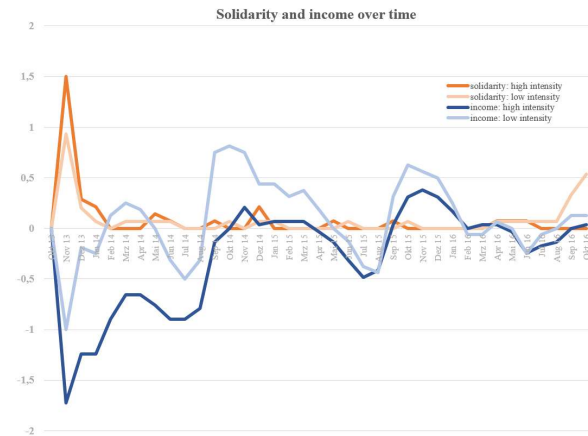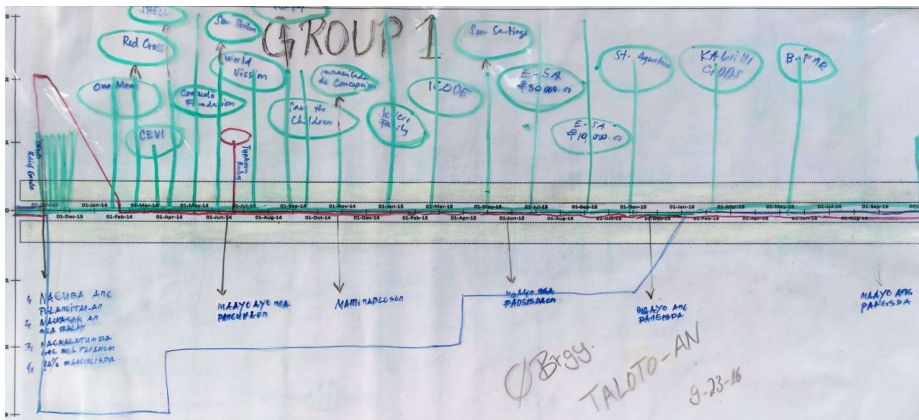
Solomon Islands: SVO task

➤ 6 dictator decisions produces an unique angle that measure their pro-sociality.
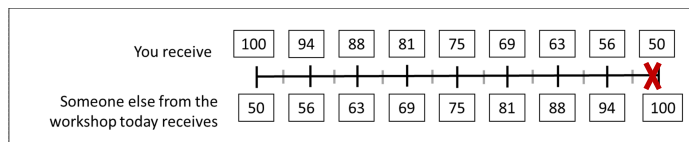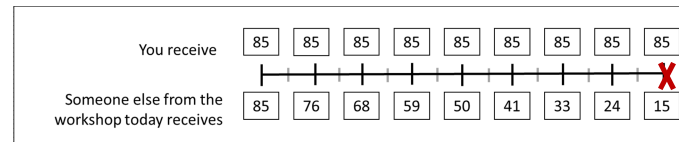
   – People can also be categorized as altruistic, pro-social, individualistic or competitive based on angles.

➤ Social value orientations are elicited on the slider-measure, two examples:

$$\textit{Altruist maximizes:}$$
$$U\left(p^{self}; p^{other}\right) = p^{other}$$

$$\textit{Competitor maximizes:}$$
$$U\left(p^{self}; p^{other}\right) = p^{self} - p^{other}$$
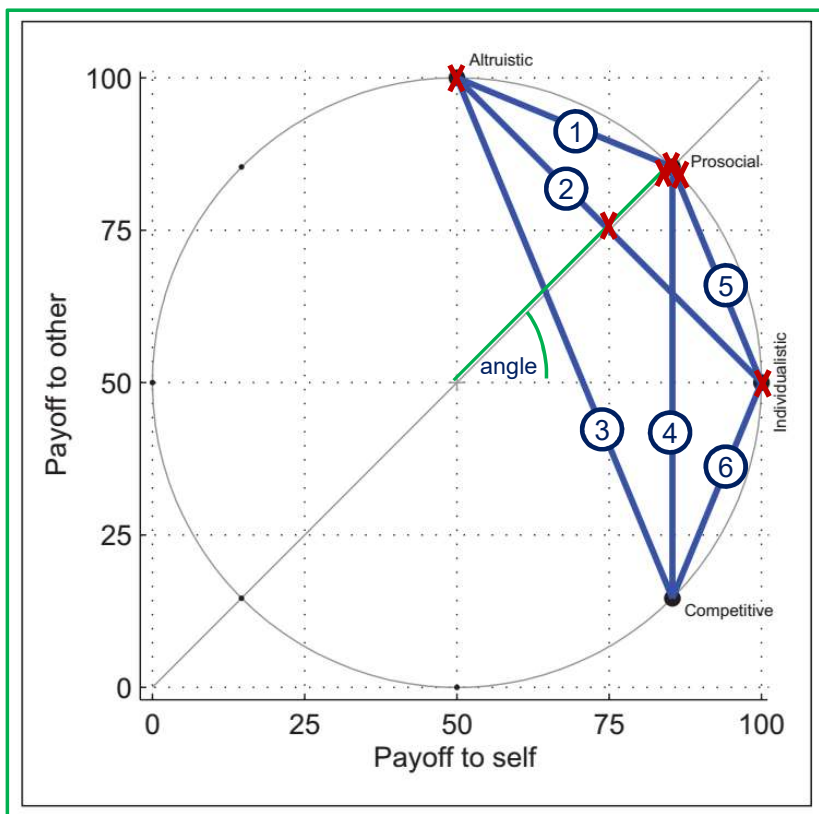
You receive	100	94	88	81	75	69	63	56	50
Someone else from the workshop today receives	50	56	63	69	75	81	88	94	100

You receive	85	85	85	85	85	85	85	85	85
Someone else from the workshop today receives	85	76	68	59	50	41	33	24	15

Solomon Islands: SVO task

Resulting Angle = 45° → perfectly Prosocial

Solomon Islands: Treatment balance

Variable	(1) Control Mean/SD	(2) Video Mean/SD	t-test Difference (1)-(2)
Female	0,30	0,34	-0,03
	[0,46]	[0,47]	
Age(years)	33,69	34,03	-0,34
	[14,04]	[13,59]	
No education	0,05	0,06	-0,00
	[0,22]	[0,23]	
Primary education (6 years)	0,35	0,41	-0,06
	[0,48]	[0,49]	
Some secondary education	0,60	0,54	0,07
	[0,49]	[0,50]	
Household size	7,10	6,49	0,60
	[4,06]	[3,85]	
Married	0,59	0,58	0,01
	[0,49]	[0,49]	
Born here	0,64	0,62	0,02
	[0,48]	[0,49]	
Monthly income in USD	77,77	86,52	-8,75
	[128,43]	[141,60]	
Monthly HH income in USD	378,32	290,36	87,96
	[658,28]	[374,70]	
N	214	198	

Bangladesh: Treatment balance

Variable	(1) Control Mean/SD	(2) Treatment Mean/SD	t-test Difference (1)-(2)
Female	0.50	0.47	0.03
	[0.50]	[0.50]	
Age (years)	35.23	34.95	0.28
	[12.39]	[11.79]	
Education (years)	7.52	7.81	-0.29
	[4.44]	[4.89]	
Household size	5.13	5.15	-0.03
	[1.79]	[1.81]	
Married	0.80	0.78	0.02
	[0.40]	[0.42]	
Born in this village	0.63	0.69	-0.06
	[0.49]	[0.47]	
Goes to prayer daily	0.60	0.62	-0.02
	[0.49]	[0.49]	
Muslim	0.80	0.84	-0.04
	[0.40]	[0.37]	
Monthly income (converted to USD)	64.22	64.53	-0.31
	[103.16]	[88.90]	
Monthly household income (converted to USD)	328.18	223.44	104.75
	[1171.64]	[169.04]	
N	104	99	
F-test of joint significance (F-stat)			0.25
F-test, number of observations			203

Vietnam: Treatment balance

Variable	(1) Control Mean/SD	(2) Community Mean/SD	(3) Individual Mean/SD	t-test Difference (1)-(2)	t-test Difference (1)-(3)	t-test Difference (2)-(3)
Female	0.62	0.59	0.65	0.02	-0.03	-0.06
	[0.49]	[0.49]	[0.48]			
Age(years)	44.38	44.56	45.83	-0.18	-1.45	-1.27
	[14.11]	[14.40]	[14.12]			
Education (years)	5.98	6.85	6.25	-0.87	-0.28	0.59
	[4.12]	[4.26]	[4.71]			
Household size	3.89	4.09	4.02	-0.20	-0.13	0.07
	[1.23]	[1.37]	[1.33]			
Married	0.79	0.75	0.84	0.04	-0.05	-0.09
	[0.41]	[0.43]	[0.37]			
Born in this village	0.78	0.76	0.68	0.02	0.11*	0.09
	[0.41]	[0.43]	[0.47]			
Monthly income(converted to USD)	285.49	226.55	211.42	58.94	74.07	15.13
	[774.23]	[192.18]	[181.76]			
Monthly household income(converted to USD)	738.08	726.91	498.45	11.16	239.62	228.46
	[1958.73]	[1360.72]	[365.39]			
Observations	125	93	102			
F-test of joint significance (F-stat)				0.84	0.96	0.77
F-test, number of observations				216	225	195

Why are pro-social behaviors important?

➢ They are predictive of a broad range of behaviors such as helping friends, donating and real-world behaviors such as resource use and maintenance (*Fehr & Leibbrandt, 2011 or Kosfeld & Rustagi, 2015*)

➢ Spur cooperation in "intact communities", i.e. community-based activities to provide public goods (adaptation measures), helping each other or control natural resource use

➢ If pro-social behaviors are systematically affected by SLR, this would affect the time until displacement through changes in resource use, adaptive capacities or more generally community governance / health.

Recommended adaptation actions to a 50cm rise in local sea-level.

Seawalls: 63%

Moving within village: 43%

Migration: 43%

Beach nourishment: 21%

Planting mangroves: 38%

Other: 4%

Do people want to relocate?

"We rather die and drown with our island than leaving it. Elsewhere I have no land, no meaning."

"You can take this person as far away as you can from his place, but this place will always remain in the heart. I belong here. You cannot get rid of that (…) and this person will always be mindful of his island"

"We connect very much with our land. Even if we migrate to the States, we never stop thinking about our land. We want to return, we want to have a place to stay when we sometimes visit. And we want our bodies to be with our families."

Do people relocate when things get really bad?

➢ People are attached to the places they live at *(Jamero et al., 2017)*
  - Case study of 4 Filipino islands that subsided due to an earthquake in 2013
  - People now experience relative sea-level rise well within the projected interval of the IPCC (0.28 m–0.98 by 2100)
  - 135 flooding days a year and having a relocation settlement on the mainland…
  → We do not learn anything about why these people decided to stay (return) and adapt in place!

Do more aware respondents mention different adaptation strategies?

➤ Even though respondents are aware of the risks, they still recommended adaptation strategies.

➤ Respondents with high impact and risk appraisal:

   – Mention more adaptation strategies (Chi2, p=0.00)

   – Less likely to mention no adaptation action (Chi2, p=0.028)

   – Less likely to mention only local adaptation actions (Chi2, p=0.003)

   – More likely to mention migration (combined only migration & both) (Chi2, p=0.000)

	Total	Gap1.1: Low impact	Gap 1.2: High impact& low risk	Both high impact & risk
Adaptation actions	(1)	(2)	(3)	(4)
Number	2.09	1.68	1.96	2.24
Do nothing	0.05	0.10	0.05	0.04
Only local	0.62	0.61	0.71	0.58
Only Migration	0.07	0.02	0.03	0.09
Local & migration	0.26	0.27	0.21	0.29
Observations	828	99	246	483