

A Behavioral Approach to SDG



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“Disaster Irrigation and Water Management towards Nexus (WEF) and
Sustainable Development Goals”

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Outline

1. Why are we “irrational” when it comes to sustainability?
2. Puzzles in environmental behavior: Why governments do nothing
3. How can we change policy making in order to achieve the SDGS?

Case: Embankments in Assam

“The Role of Narratives in Sociohydrological Models of Flood Behaviors” Leong (2017),
Water Resources Research

Apparent Irrationalities



Jakarta's Great Garuda flood wall



STRAITS TIMES GRAPHICS

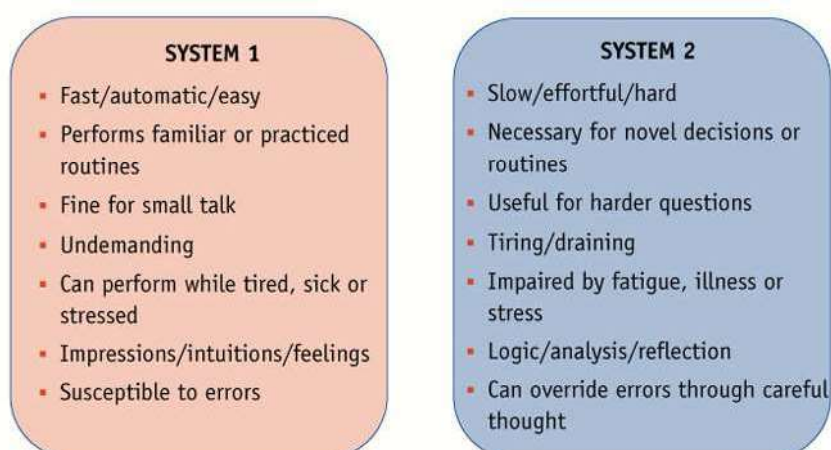
How People Decide

1. System 1 “croc mind” rules us most times
2. Decision Making assumption: “open, full disclosure and information” – but brain is lazy
3. Rational and evidence-based – but not how we decide.

Heuristics/Biases/
Mental shortcuts

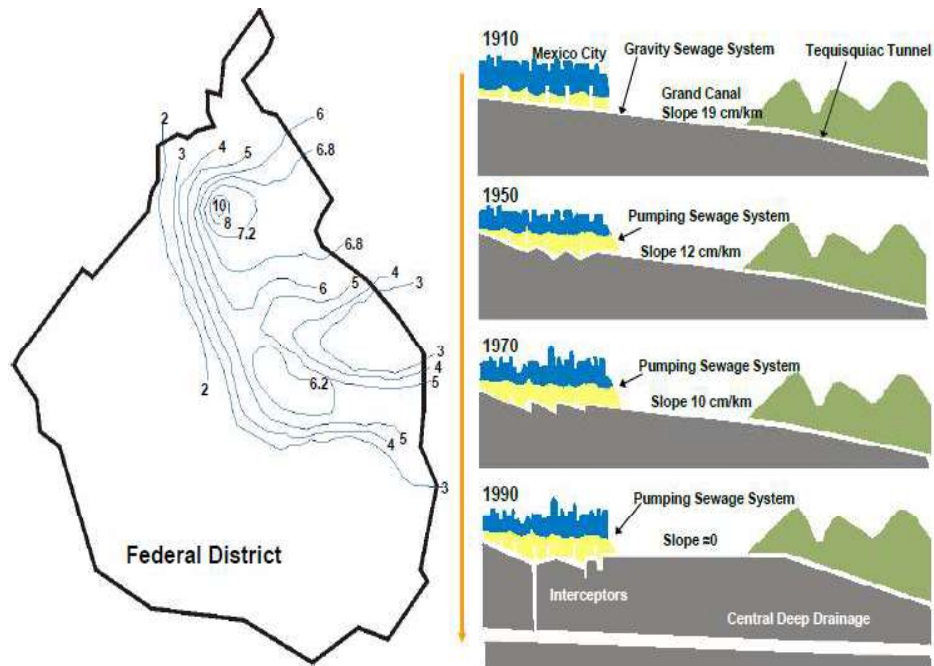
We appeal to reason
and “rationality”

System 1 and 2 in action: Decisions by doctors

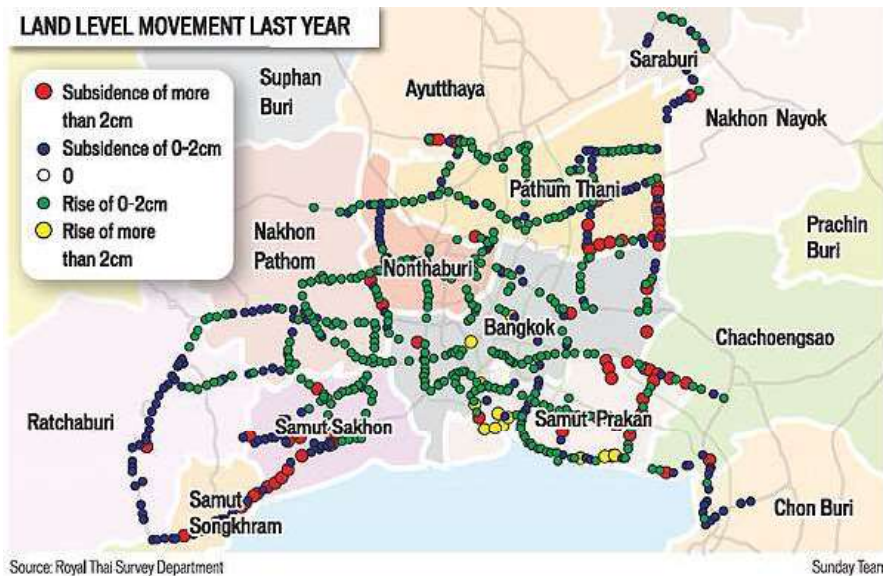


Finding: A Higher Case Load leads to greater reliance on System 1

Mexico Sinking



Bangkok Sinking



What is a behavioural approach?

1. Psychology + Economics
(limits to classical econs)
2. Incentives to change behavior
3. Something that governments
have been using for a long time.

Recap #1: Why are we irrational?

How we think people decide
vs how they *really* decide



“Irrationality”



What can governments do?

1. Nothing

Why bureaucrats do nothing when it comes to Sustainability

- Risk calculus of costs and benefits for their actions
- Blame (-) Credit (+)



Three relationships:

- Considerations and ascriptions of credit and blame
- ‘Credit and blame’ and ‘credit claiming and blame avoidance’
- ‘Reactive ex-post’ and ‘anticipatory ex-ante avoidance and claims’

Risk, blame, credit

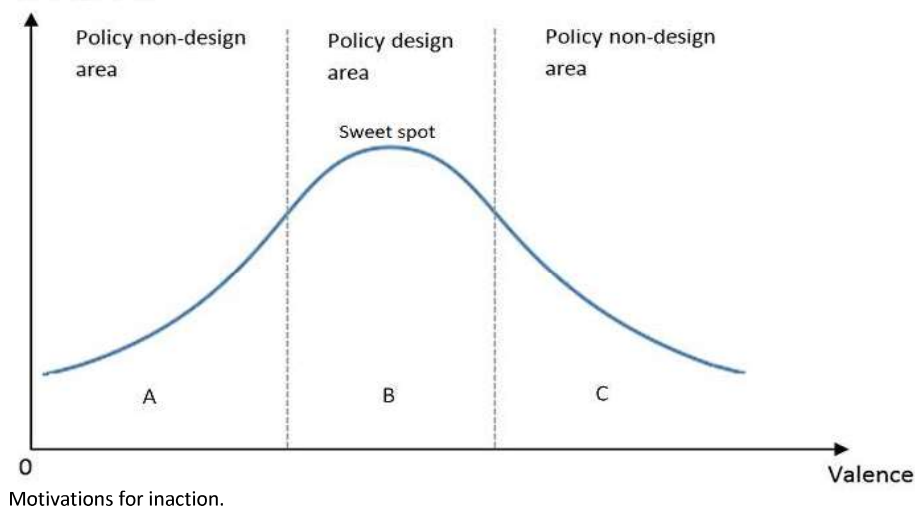
- Asymmetry in blame and credit worthiness and its ascription
 - Decision-making behaviour is more closely linked to the anticipation and avoidance of policy failures than to claiming credit (Risk of blame)
- Why so?
 - The act of coping itself may create a (false) sense of resilience, and may result in the withholding of blame if individuals are said to be responsible for their fates rather than policy-makers
 - Blame avoidance and credit claiming are related less to inherent human traits and personality quirks than they are functions of rational behaviour in given institutional contexts (ie System 1)

#2: Why governments do nothing I

Policy non-design: "Do nothing"

Policy	Outcomes	Processes	Inputs
Design	Instrumental package	Lasswellian formulation	Experience knowledge
Non-design	Static n-d space	Bargaining, trade-offs, log-rolling, venal, corrupt behaviour	Expectations of political gain, risk of blame, inaction

Policy reaction



Protests over water- Bangalore



Bangalore, India

12 September 2016

Conflict over access to water from River Cauvery

*Hundreds of pro- Karnataka activists staged protests on streets across the city following the Indian Supreme Court's order that 12,000 cusec of water from the River Cauvery to be released to Tamil Nadu for the next 10 days. **Violent protesters burnt at-least two dozen vehicles** bearing Tamil Nadu registration numbers and been set ablaze on different parts of the State*

Protests over water- São Paulo



São Paulo, Brazil

11 February 2015

Protest over lack of water during drought

Demonstrators protest over the lack of water in front of a riot police barricade at Paulista Avenue in Sao Paulo, Brazil on February 11, 2015. The state of Sao Paulo and its metropolitan region has been suffering its worst drought in 80 years

Credits: <http://www.gettyimages.co.uk/detail/news-photo/demonstrators-protest-over-the-lack-of-water-in-front-of-a-news-photo/463206688#demonstrators-protest-over-the-lack-of-water-in-front-of-a-riot-at-picture-id463206688>

Protests over water- Ireland



Dublin, Ireland

10 December 2014

Protesting against government's plan to charge water

Tens of thousands of people poured into the streets of Dublin and other Irish cities on Wednesday in an angry protest against the government's plan to start billing for water and sewer service

Meantime, in Kathmandu...

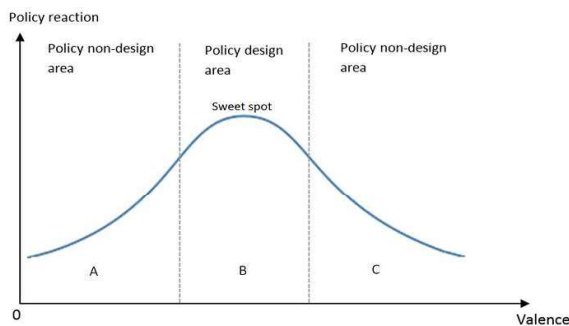
Credits: <http://www.irishtimes.com/news/environment/how-the-world-saw-ireland-s-water-charge-protests-1.2034326>

Protests over water?



Kathmandu, Nepal

Residents lining up to get water from spouts



Credits

https://www.google.com.sg/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=&url=http%3A%2F%2Fpurewatermovement.org%2Fclean-water-for-everyone%2F&bvm=bv.132479545,d.cGc&psig=AFQjCNE9ZI_AwvPBhl2Wb9QMTpi51Ue2wg&ust=1473999376289142

#2: Why governments do nothing II

How we think people decide
vs how they *really* decide



"Irrationality"



Why governments do nothing I : Risk of blame

Why governments do nothing II: Paradox of social
resilience (Adaptations)

Levee Effect

1. Over-reliance on embankments as flood control measure >>> flood-related fatalities when embankments failed (Osti and Nakasu [2014])
2. Even without levee failure, construction of levees *itself* can increase water surface elevations (Heine and Pinter, 2012).

Lack of adaptation in face of large but ultimately ineffective infrastructure = “levee effect”

- Di Baldassarre et al. [2015].

Adaptation Effect

“enhanced coping and adaptation capacities” gained by the community during earlier experience of flooding.

Reaction to small and frequent floods

>> “adaptation effect”

[Penning-Rowsell, 1996; IPCC, 2012; Mechler and Bouwer, 2014]

The diagram is a causal loop diagram showing the relationships between various factors in a flood risk management system. The nodes are: Flood Losses, Public Pressure for Action, Public Pressure for Compensation, Actual Risk, Actual Hazard, Probability of Disastrous Floods, Height of River at Overbank Flow, Community Readiness and Flood Response Skills, Population/Development on Flood Plain, Experience & Understanding of Floods, Floodplain Development, Levee Extent/Height, Frequency Small/Medium Floods, Perceived Hazard, Perceived Vulnerability, Government Flood-Relief Schemes, and Compensation. The diagram identifies four reinforcing loops (R1, R2, R3, R4) and shows the signs of the feedback loops (+ for reinforcing, - for balancing). The diagram also shows the signs of the direct effects between the nodes.

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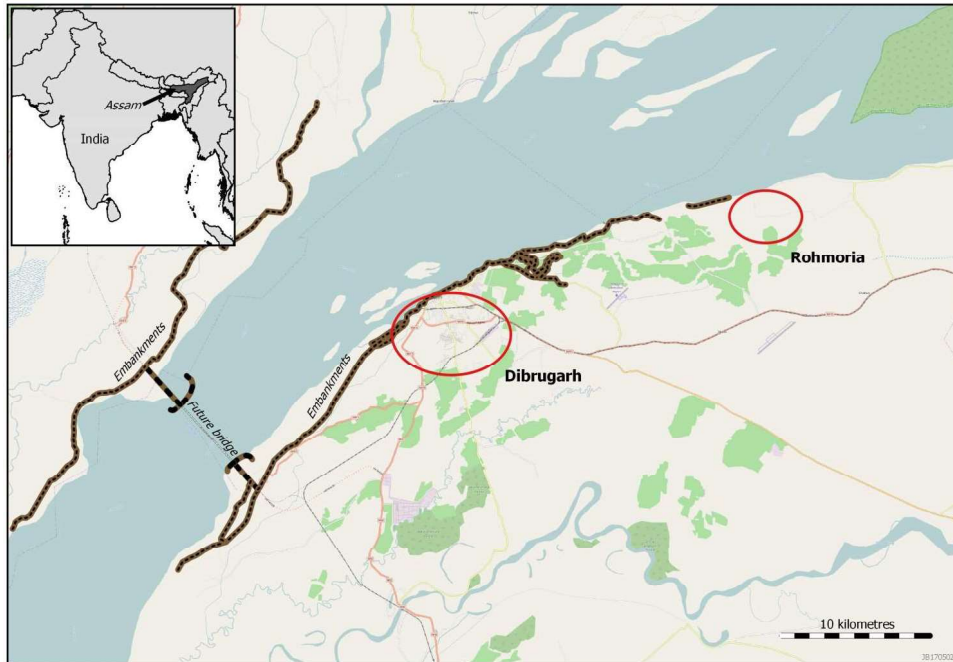
graph TD
    FL[Flood Losses] -- "+" --> AR[Actual Risk]
    FL -- "+" --> PPA[Public Pressure for Action]
    FL -- "+" --> PPC[Public Pressure for Compensation]
    AR -- "+" --> AH[Actual Hazard]
    AR -- "+" --> PPF[Probability of Disastrous Floods]
    AH -- "+" --> PPF
    PPF -- "+" --> HROF[Height of River at Overbank Flow]
    HROF -- "+" --> LEH[Levee Extent/Height]
    LEH -- "-" --> FSMF[Frequency Small/Medium Floods]
    FSMF -- "-" --> PH[Perceived Hazard]
    PH -- "+" --> PR[Perceived Risk]
    PR -- "+" --> PD[Population/Development on Flood Plain]
    PD -- "-" --> CRFS[Community Readiness and Flood Response Skills]
    CRFS -- "+" --> PPF
    CRFS -- "-" --> AR
    PD -- "+" --> EUF[Experience & Understanding of Floods]
    EUF -- "+" --> FPD[Floodplain Development]
    FPD -- "+" --> FL
    FPD -- "+" --> LEP[Levee Extent/Height]
    LEP -- "-" --> FSMF
    LEP -- "-" --> PH
    LEP -- "-" --> PV[Perceived Vulnerability]
    PV -- "-" --> GFRS[Government Flood-Relief Schemes]
    GFRS -- "+" --> C[Compensation]
    C -- "+" --> PR
    C -- "+" --> PPC
    PPC -- "+" --> PPA
    PPA -- "+" --> FL
    R1((R1  
Severity))
    R2((R2  
Inexperience))
    R3((R3  
Floodplain Development))
    R4((R4  
Compensation))
  
```

Making sense of flood-risk behavior

Infrastructure	Large	Q1 “Levee Effect”	Q2
		Q3	Q4 “Adaptation Effect”
	Small		
		Status Quo	Adapt
Social Resilience			

11

Paradox of embankments



Field work



River embankments as flood management strategy

National Policy on Floods (1954) = building of embankments.

Between 1954 and 1990, length of embankments more than doubled.

Today, more than 5,000 km of embankments have been built in the Brahmaputra Valley.



Stone spurs were built as energy dissipators to protect embankments from scouring and erosion.

(Fieldwork April, Dec 2016)



Embankments have afforded some form of flood protection. Villages mushroomed around embankments, such as this village school. But also susceptible to breaches.

Assam:
42 million hectares of land
98 million people affected
➤ 5 million hectares agricultural lands destroyed
> 1,700 human lives lost

Analysis

Four main narrative groups.

Main distinction between those with high social resilience (F3, 4, 6 and 8) and those who are more fragile (F1, 2, 5 and 7).

Resilience is based on two grounds.

The first group (4 and 6) which we call “Engineers” is characterized by informed views on infrastructure, with F4 recognizing that strong infrastructure can mitigate flood problems – strongly agreeing with statements such as:

“I think we suffered less from floods because of the embankments. (11)”

“In those parts of the state where lack of embankments is causing floods, construction of dykes should be expedited without any delay. (16)”

F6 meanwhile also takes an engineering perspective, arguing that poor infrastructure could lead to floods:

“Building embankments from all sides can not contain the river during floods. When river swells, the embankments will breach. (39)”

Method: Narratives

Q Method: Factor Analysis

1. help to identify the different narrative coalitions.
2. Q is not used in isolation, but to uncover a specific problem pointed out by Gober and Wheeler [2015] on the empirical limits of Di Baldassarre et al. [2015] model
3. “condenses the variation of views, opinions and ideas into a set of basic positions, problem definitions or dimensions underlying the debate.” van Eeten [2001]

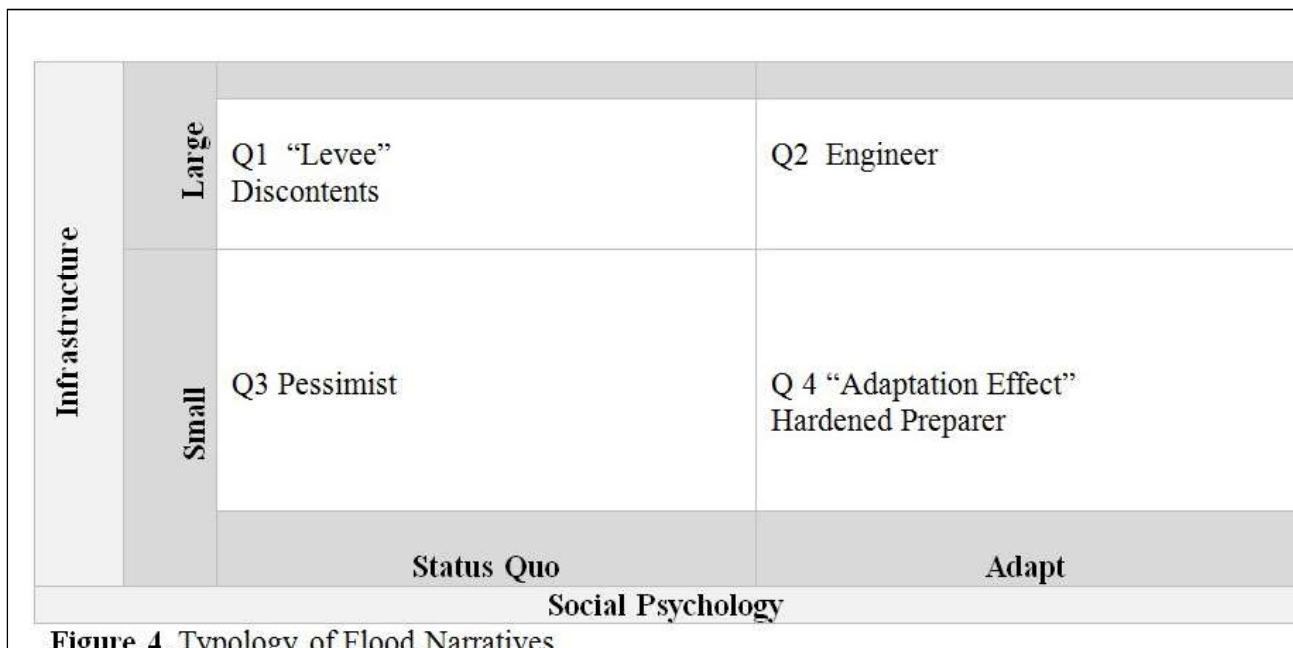
Data:

1. > 200 statements from newspapers in English, Nepalese: The Himalayan Times, The Kathmandu Post, as well as local videos and television channels and NGO sites. – redacted to 50
2. Tested on 50 villagers, men and women
3. The matrix was factor analyzed using the PQMETHOD software.
4. eight principal component factors. Varimax rotation was used and resulted in eight identifiable factors.

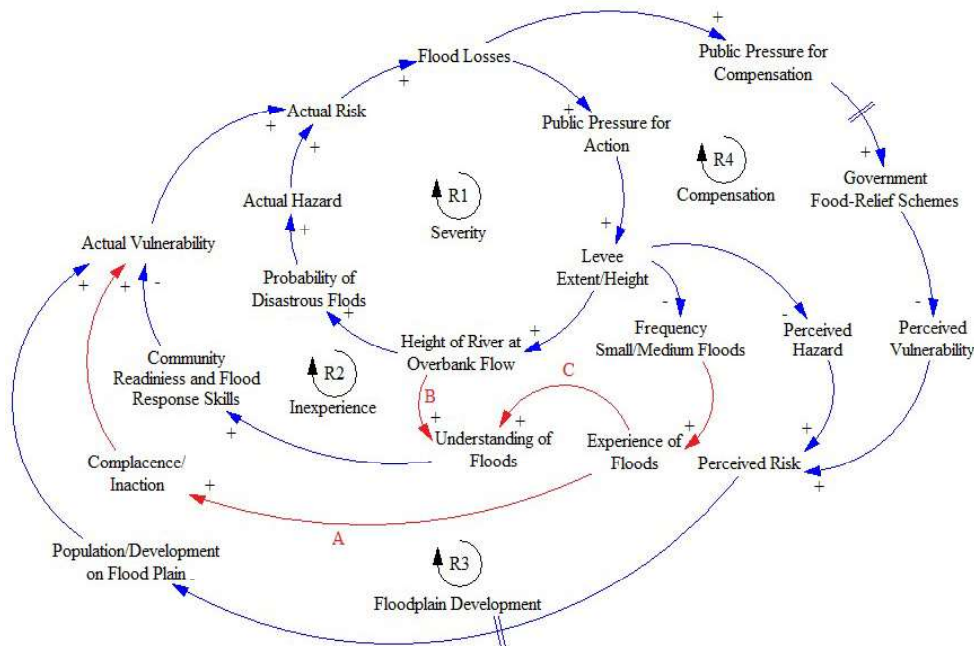
- Factor 1: Unhappiness with Government efforts (Discontents)
- Factor 2: Complaints about current situation (Discontents)
- Factor 3: Use of Local knowledge (Hardened Preparers)
- Factor 4: Belief in Strong Infrastructure as Solution (Engineers)
- Factor 5: The Pessimists (Anger with Government for Poor Infrastructure)
- Factor 6: Diagnosis of Poor Infrastructure as Problem (Engineers)
- Factor 7: Anger with government The Pessimist (No target for blame, contra Discontents)
- Factor 8: Changed behaviour after floods The Hardened Preparer

Four narrative groups:

Engineer
Pessimist
Hardened adaptor
Discontents



Modified System Dynamics



#3 Flood narratives as impetus for change

1. Empirical test of the social-hydrologic model.
 >> The framework is not just a binary one between levee effect and adaptation
2. Alternative paths as show in system dynamic diagram – explanatory value of narratives
3. Policy implications:
 Reduce reliance on small/frequent floods
 Increase cultivation of “engineers”, demonstration effect in no-flood areas.

Takeaways

1. Why are we “irrational” when it comes to sustainability? System 1
2. Why governments do nothing: 1. Blame. 2. Paradox Resilience
3. How can we change policy making in order to achieve the SDGS? Powerful narratives

Handout: “The Role of Narratives in Sociohydrological Models of Flood Behaviors”

Thank you

- Collaborations welcome
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Thank you!



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Q factors

Factor Scores for factor 4		Factor							
Factor 4: The Engineers		1	2	3	4	5	6	7	8
Statements (Original statement numbering in parentheses)									
1.	I think we suffered less from floods because of the embankments. (11)	2	2	2	2	0	2	-1	-1
1.	In those parts of the state where lack of embankments is causing floods, construction of dykes should be expedited without any delay. (16)	0	0	1	2	-1	1	1	2
1.	The government may not be able to stop nature's fury, but surely they can do lot more to prevent heavy death toll and damage to properties. (26)	1	1	2	2	0	-1	0	-2
1.	Open fields and wetlands previously acting as water catchment areas are fast being filled by real estate construction escalating the problems of flooding each year. (33)	0	0	-2	2	0	1	0	0
1.	All existing embankments along the Brahmaputra need to be strengthened to prevent flooding. (15)	2	1	1	2	1	2	-1	0
1.	Mere short term measures like building temporary embankments are just not reliable. (21)	-2	-2	1	2	-1	0	1	-2
1.	This river is our home; we know each and every current of it, their change in direction, behavior and so on. (50)	-2	-1	0	2	0	-1	0	0

Factor 5: The Pessimists (No target for blame, contra Discontents)		1	2	3	4	5	6	7	8
Statements (Original statement numbering in parentheses)									
1.	There is no government machinery to address aftermaths of such big disasters (floods). Minimum humanitarian assistance like food, drinking water, medicine is provided. (13)	0	0	0	0	2	1	-1	1
1.	The situation getting grim day by day with the government hardly taking any initiative in construction and maintenance of embankments. (14)	-1	-1	1	-1	2	1	1	0
1.	Government authorities are still beating round the bush without addressing the actual issue. (34)	2	0	0	0	2	-2	-1	1
1.	I feel defeated as a citizen of this country unheard by the political class. (42)	0	2	-2	-1	2	0	2	-1
1.	There is no end to our misery. Each year we are being reduced to beggars. (8)	1	-1	-2	-1	2	2	2	-1
1.	The administration seldom visits the areas to assess actual damage. (12)	1	1	2	1	2	-1	2	2
1.	Natural disasters have become intense and more damaging these days. (48)	-1	0	1	1	2	0	2	-1
1.	Every year we face the flood fury, but nothing changes. We are left to rebuild our lives all alone. (2)	2	1	2	0	2	0	1	0