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**Welcome**  
To My Talk

**Research and Academic Collaboration  
With UCL IRDR**



**DR BAYES AHMED**

**Lecturer** in Risk and Disaster Science  
**Institute for Risk & Disaster Reduction (IRDR)**  
**University College London (UCL), UK**











*15 May 2019*

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# About UCL – University College London



# UCL (Ranked 10<sup>th</sup> Globally)

1	 Massachusetts Institute of Technology (MIT)	<a href="#">More</a>	United States
2	 Stanford University	<a href="#">More</a>	United States
3	 Harvard University	<a href="#">More</a>	United States
4	 California Institute of Technology (Caltech)	<a href="#">More</a>	United States
5	 University of Oxford	<a href="#">More</a>	United Kingdom
6	 University of Cambridge	<a href="#">More</a>	United Kingdom
7	 ETH Zurich - Swiss Federal Institute of Technology	<a href="#">More</a>	Switzerland
8	 Imperial College London	<a href="#">More</a>	United Kingdom
9	 University of Chicago	<a href="#">More</a>	United States
10	 UCL (University College London)	<a href="#">More</a>	United Kingdom



Risks &  
Reduction

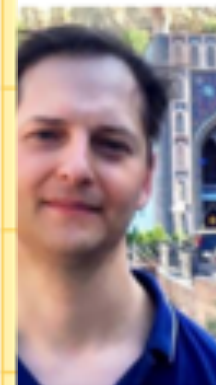
MRes Risk and  
Disaster Reduction



Vicks



Prof David Alexander



Luca Pescaroli



Dr Bayes Ahmed

### IRDR Global Reach

**Europe** Cascading crises, earthquakes, volcanic monitoring

**UK** Emergency planning

**Nepal** Maternal health

**Caribbean** Early warnings, insurance, hurricane damage

**Nigeria** Public health apps, Community participation, Emergency management

**Brazil** Health engagement

**Sub-saharan Africa** Ground water

**Arctic Risk projects**

**Bangladesh** Landslides, water risks, and the Rohingya crisis

**China** Earthquake DRR

**Japan** Earthquake, transitional housing

**Philippines** Housing, shelter and safer schools

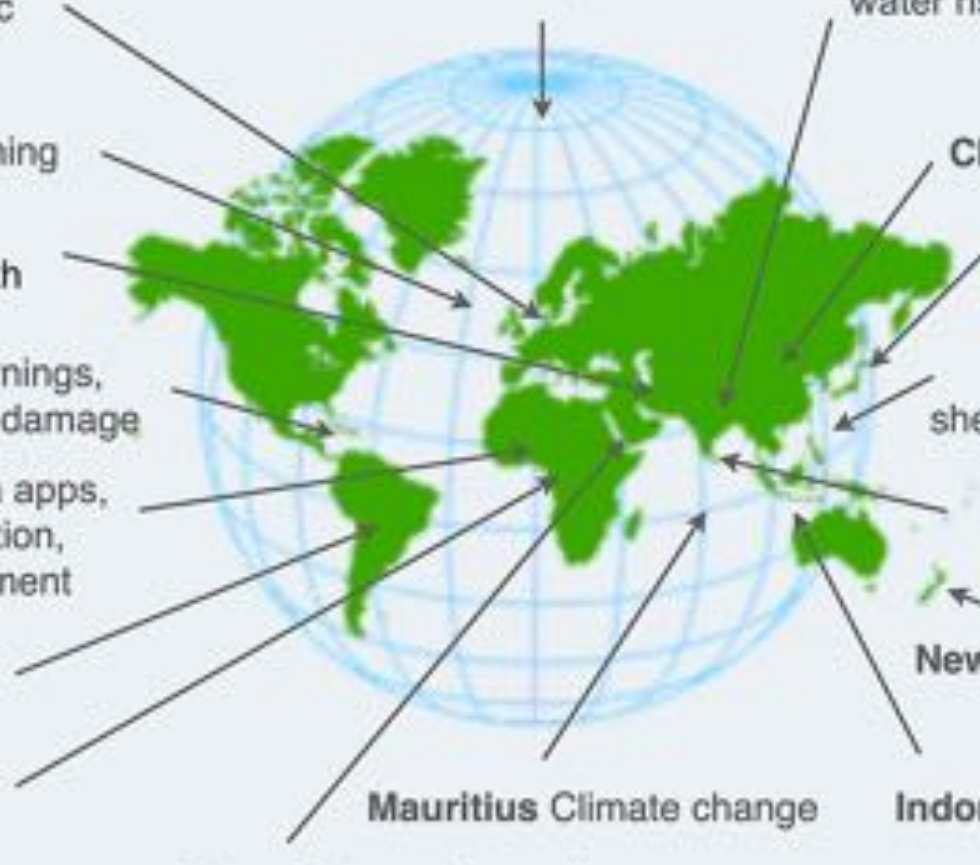
**India** Natural hazards in conflict zones

**New Zealand** Earthquake behaviour

**Mauritius** Climate change

**Indonesia** DRR education, safer schools

**Oman** Community resilience



## Masters Programmes

- § Risk, Disaster and Resilience MSc
- § Risk and Disaster Science MSc  
(Data Science and Management Pathway are available)
- § Space Risk and Disaster Reduction MSc
- § Risk and Disaster Reduction MRes

*Duration: Full-time 1 year      Part-time 2 years*

*“I supported London First and the London Fire Brigade by providing scientific evidence for their project whilst doing my MSc.”*

Max Kaiser  
Senior Consultant in Cyber Risk at Deloitte Germany  
IRDR MSc 2015-16

## Contact us

UCL IRDR Admissions tutor  
Dr Rosanna Smith  
Email: [irdr-enquiries@ucl.ac.uk](mailto:irdr-enquiries@ucl.ac.uk)  
Web: [www.ucl.ac.uk/rdr](http://www.ucl.ac.uk/rdr)

 @UCLIRDR



*2016 Amatrice Earthquake,  
EEFIT mission*

Developing leaders and experts in risk and disaster reduction



## Scholarships for overseas-fee students

UCL IRDR call for 4 scholarships for overseas fee paying UCL IRDR masters students who begin their courses in September 2019 is now open. Scholarship values are £12,500 (x2) and £5,000 (x2) , all paid towards overseas fees.

Application deadline is **29th April 2019**.

<https://www.ucl.ac.uk/risk-disaster-reduction/news/2018/nov/announcement-2019-ucl-iridr-masters-scholarships>

UCL IRDR MSc in Risk Disaster and Resilience applicants are eligible for the **Commonwealth Shared Scholarship Scheme**.

The scholarship covers full tuition fees, a maintenance allowance, and air travel to and from the UK at the beginning and end of the programme for students from the Commonwealth.

Applications are open until **14th March 2019**.

<https://www.ucl.ac.uk/prospective-students/scholarships/graduate/overs-master/cwss>

# Academic Background

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**PhD in Disaster Risk Reduction (DRR)** – 2017

Institute for Risk and Disaster Reduction, University College London (UCL), **UK** [Commonwealth Scholar]

**MSc in Geospatial Technologies** – 2011

Joint degree awarded by (European Commission Scholar):

- Westfälische Wilhelms-Universität Münster, **Germany**
- University of Jaume I, Castellón, **Spain**
- University of New Lisbon, Lisbon, **Portugal**

**Bachelor of Urban and Regional Planning** – 2008

**Bangladesh** University of Engineering and Technology (BUET)

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# Publication Strength

**62** scholarly publications: **27** peer-reviewed articles

Citations: Google Scholar = **695** & Scopus = 322

*h*-index: Google Scholar = **14** & Scopus = 9

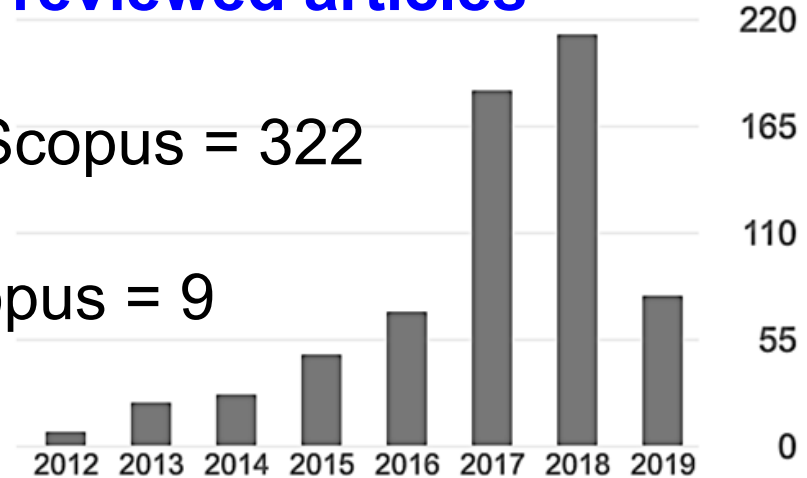
**Notable Journals Covered:**

The **Lancet Global Health** [Impact factor = 17.686]

**The Lancet** [Impact Factor: 53.254]

*“The UCL Lancet Commission on Migration and Health:  
The health of a world on the move”!*

Collaboration with the UCL Institute for Global Health (**IGH**)





# Teaching and Supervision Experience

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**Chittagong University of Engineering & Technology –**  
Disaster Management

**University of Dhaka –** Risk Sensitive Landuse Planning, and  
Hazard Analysis Lab

**Bangladesh Institute of Planners (BIP) –** Professional GIS  
Certificate Course

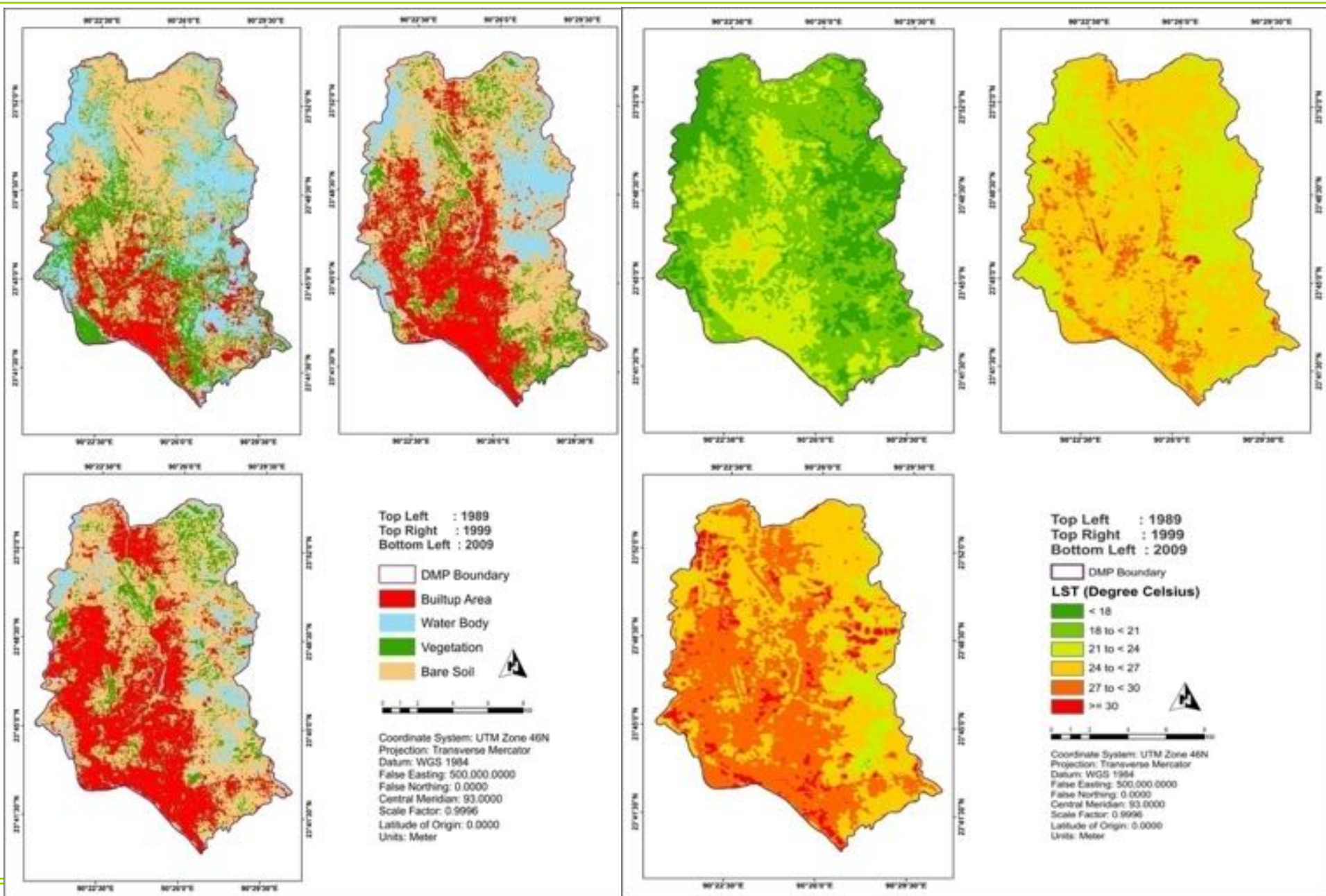
- **Quantitative & Qualitative Research Methods**
  - **Natural Hazards Risk**
  - **Fundamentals of Statistical and Geospatial Analysis**
  - **Advanced Geoinformatics in Risk Modelling**
-

# Recent Research Grants

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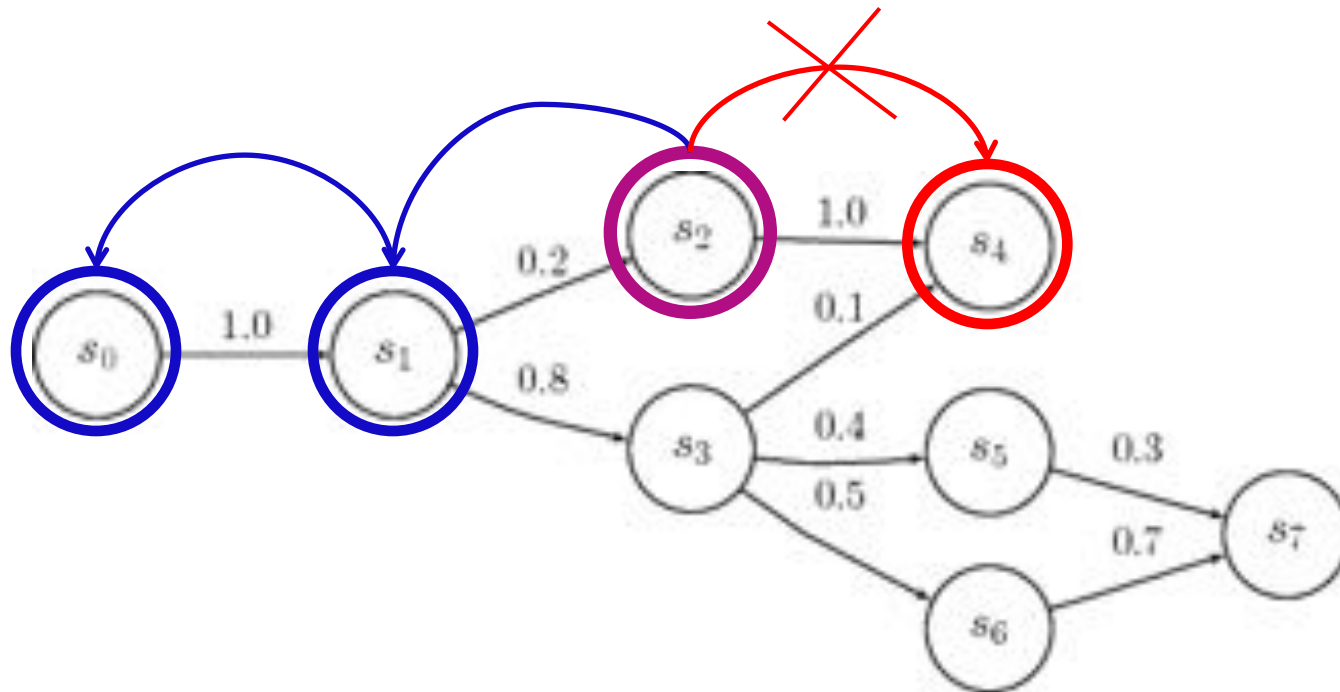
1. **Project Coordinator:** **"Resilient Futures for the Rohingya Refugees"**; £500,000 funded by the Royal Society (Grant Scheme: Challenge-led Grants); March 2019 – September 2021.
  2. **Project Coordinator:** **"Rohingya Journeys of Violence and Resilience in Bangladesh and its Neighbours: Historical and Contemporary Perspectives"**; £300,000 funded by the British Academy (Grant Scheme: Sustainable Development Programme 2018); September 2018 – December 2020.
  3. **Project Coordinator:** **"The Rohingya Exodus: Issues and Implications for Stability, Security and Peace in South Asia"**; £50,000 funded by the British Academy (Grant Scheme: Tackling the UK's International Challenges 2017); January 2018 – March 2019.
  4. **Researcher-Investigator:** **"INSPIRE: Indonesia School Programme to Increase Resilience"**; £120,000 funded by the Newton Fund Institutional Links Programme and British Council in the UK; March 2018 – December 2019.
  5. **Project Coordinator:** **"Response of Disasters through Resilience: Addressing Extreme Climatic Disasters to Annihilate the Insecurity of Food, Nutrition and Livelihood – A Study on Disaster Affected Areas in Bangladesh"**; £100,000 funded by the UNDP China and International Center for Collaborative Research on Disaster Risk Reduction (ICCR-DRR), Beijing, China; January – December 2017.
  6. **Researcher-Investigator:** **"Increasing Resilience to Environmental Hazards in Border Conflict Zones"**; £170,795 funded by the UK Natural Environment Research Council (NERC), the Arts & Humanities Research Council (AHRC), and the Economic & Social Research Council (ESRC); January – December 2017.
  7. **Project Coordinator:** **"Evaluation of the Vulnerability to Resilience (V2R) Programme"**; £20,000 funded by the British Red Cross (BRC); January – May 2016.
  8. **Project Coordinator:** **"Developing a Dynamic Web-GIS based Early Warning System for the Communities Living with Landslide Risks in Chittagong, Bangladesh"**; US\$25,000 funded by the USAID and NASA. Implemented by BUET-Japan Institute of Disaster Prevention and Urban Safety (BUET-JIDPUS), Bangladesh University of Engineering and Technology (BUET); June 2014 – September 2015.
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# Spatial Distribution of Land Surface Temperature (LST)

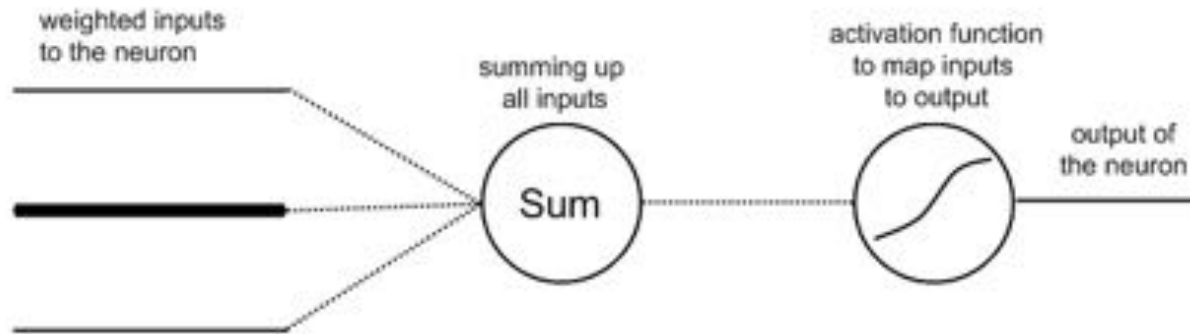
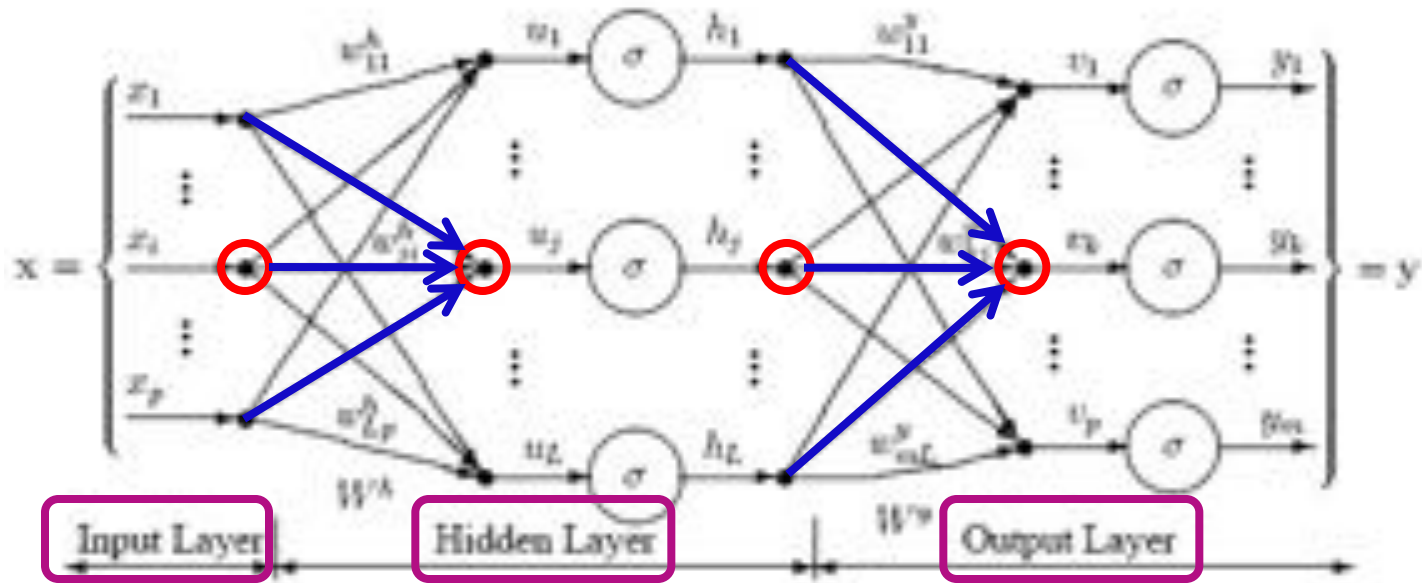


# Markov Chain Analysis

A Markov chain is a discrete random process with the property that **the next state depends only on the immediately preceding state(s) [6]**

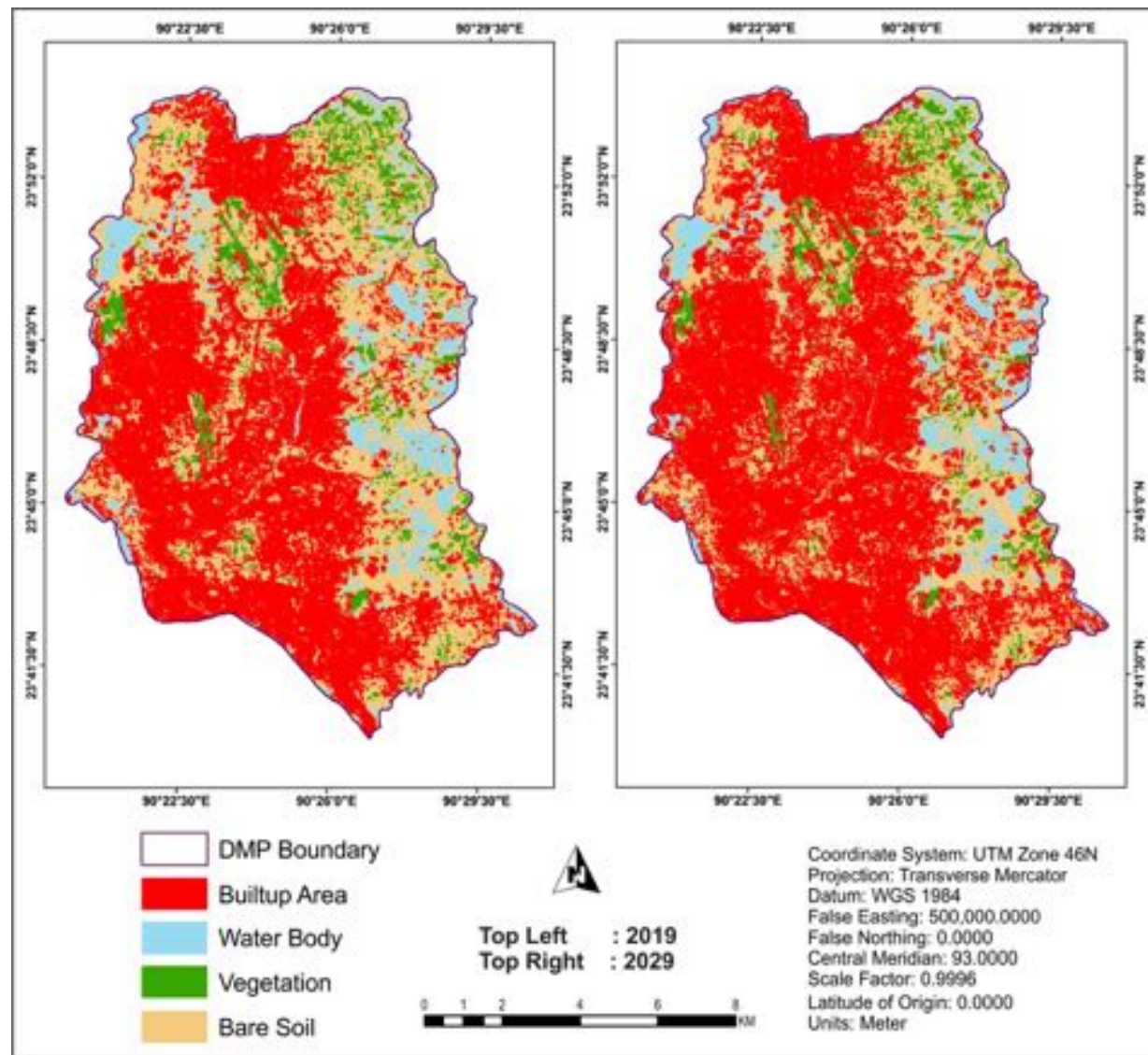


# Artificial Neural Network (MLP)



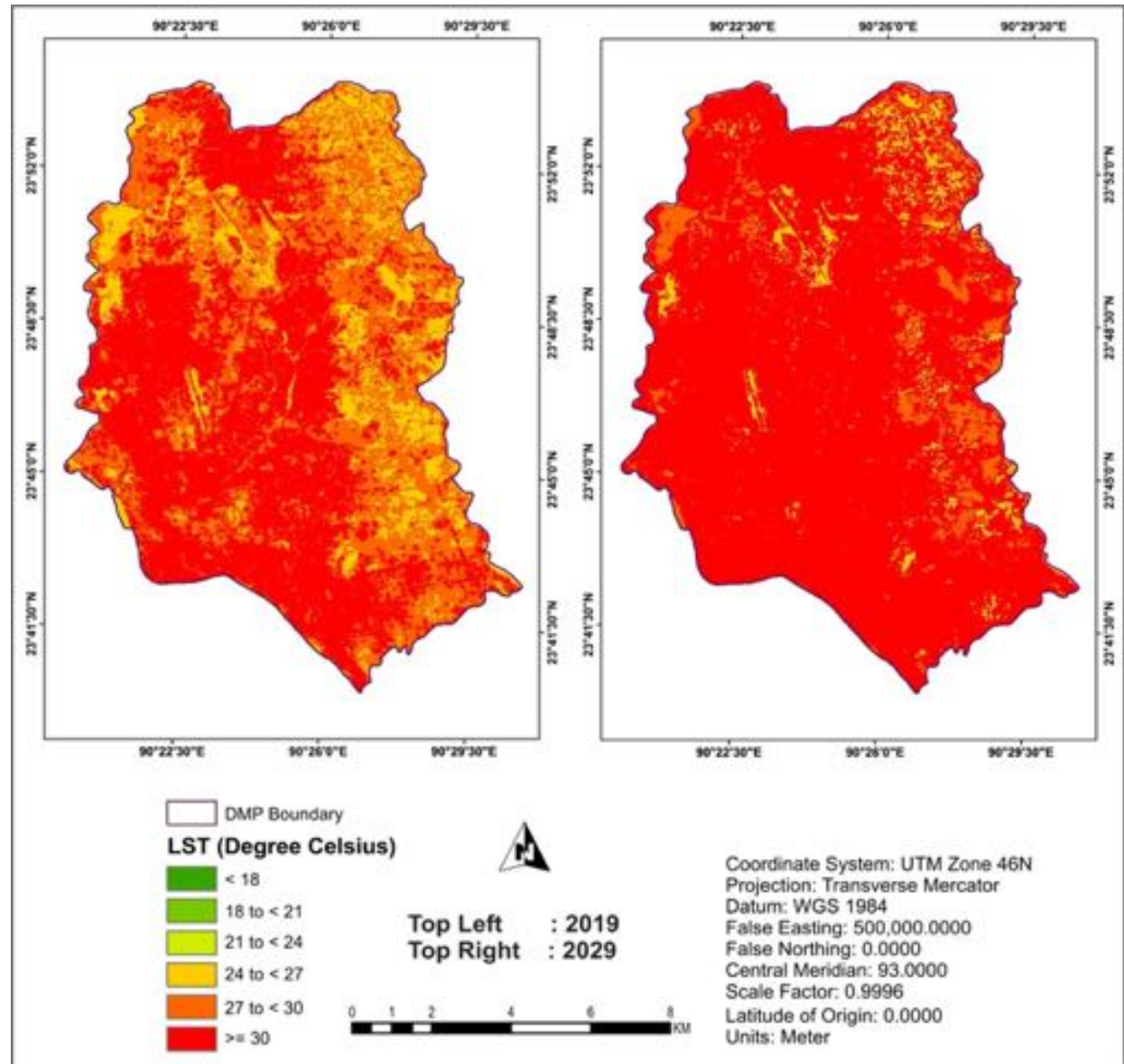
# Simulated Land Cover Dynamics (MLP\_Markov Model)

Approximately **49%** and **57%** of DMP area will be converted into **'Built-up Area'** land cover type in 2019 and 2029, respectively



# Simulating the Future LST Maps (2019 and 2029)

Approximately **56%** and **87%** of DMP area will fall in the **Highest Temperature Zone ( $\geq 30^{\circ}\text{C}$ )** in 2019 and 2029, respectively



# Landslide Work





# Landslides



# Hill Cutting



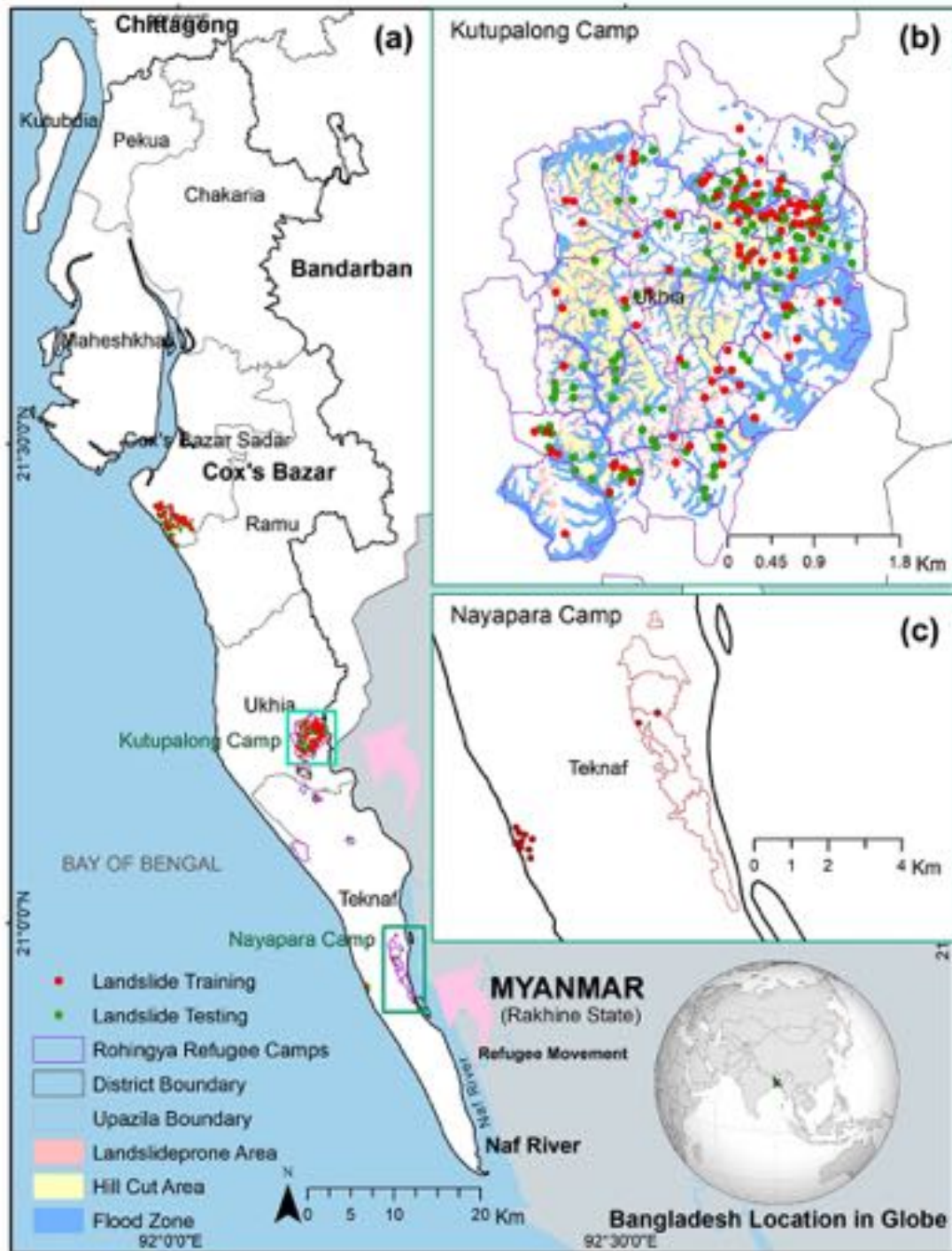
# Indigenous Tribal Communities



# 2017 Rohingya Exodus



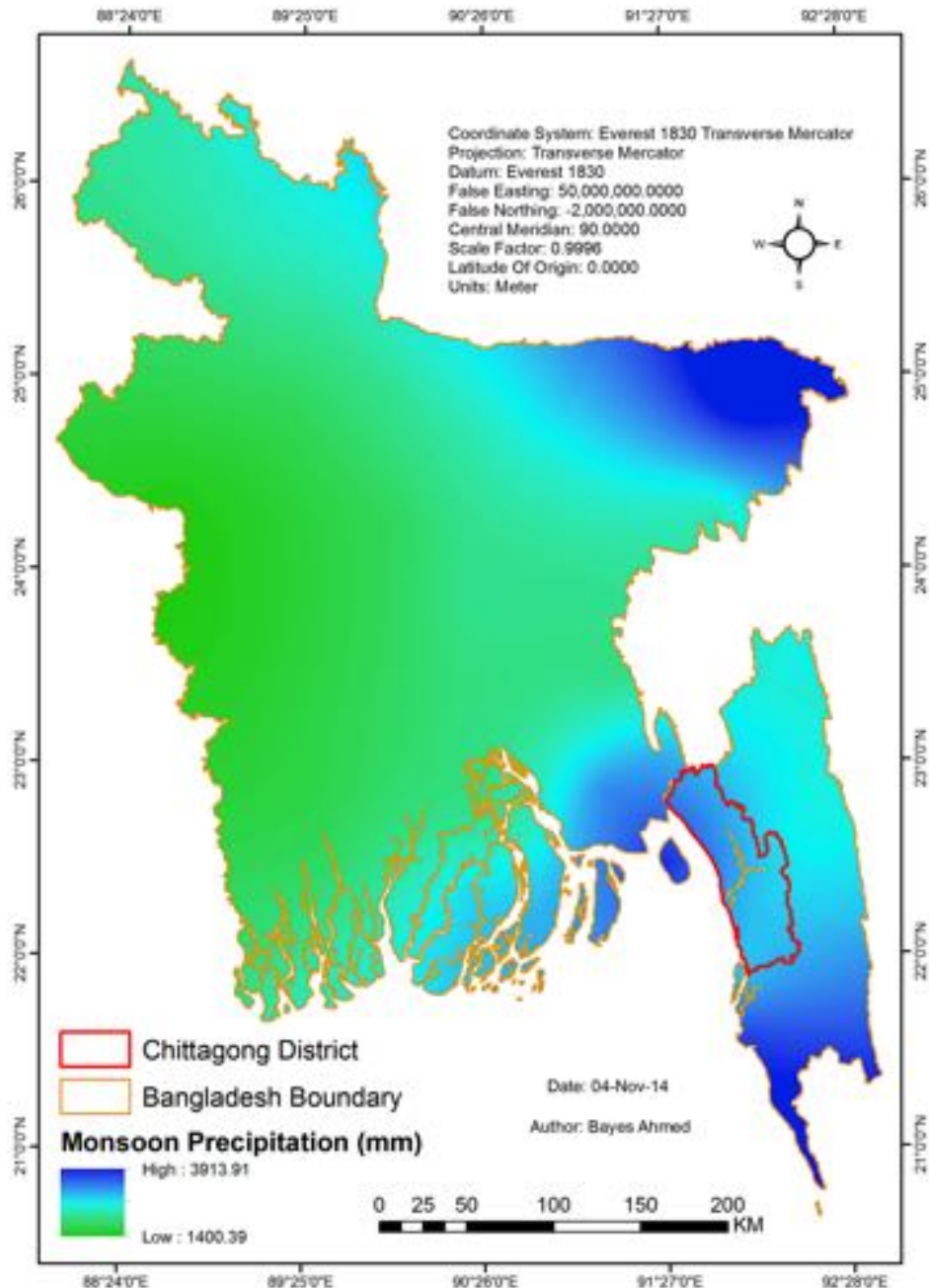
# Study Area



## Landslide Disasters

<b>Date</b>	<b>Location of Landslides</b>	<b>Rainfall Sequence</b>	<b>Consequences</b>
27 July 2015	South Baharchharha area, Cox's Bazar	682 mm rainfall in 6 days	5 fatalities, and 4 houses buried
13 June 2017	All five hill districts	300 mm rainfall in 24 hours	159 killed and 88 injured
25 July 2017	Sadar and Ramu Upazila, Cox's Bazar	677 mm rainfall in 6 days	5 killed and 5 injured
11 June 2018	Ukhia Rohingya camps	459 mm rainfall in 4 days	1 killed and 500 injured
12 June 2018	Maheshkhali Upazila		1 killed
25 July 2018	Miar Ghona, CBM and Dokkhin Mithachori, Ramu Upazila	228 mm rainfall in 24 hours	5 killed

# Activities



## Information

**Site ID :** 05

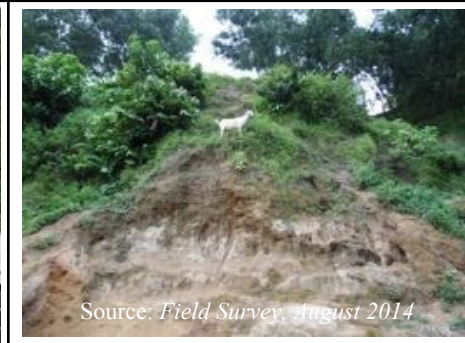
**Site Location:** Tanker Pahar, Moti Jharna  
**Coordinates:** 22°20'54.27"N, 91°48'51.60"E

**Datum:** WGS 1984

**Elevation (m):** 41.18

**Area of Displaced Mass (sqm):** 331.84

**Rainfall:** Unknown



## Slide Mechanism

**Slide Movement:** Slide  
 Active, Reactivated, Suspended  
**Slide Condition:** Advancing

**Slide Style:** Single  
**Water Content:** Moist  
**Material:** Soil/Earth

## Land Cover/Use Type (%):

Dense vegetation is the Primary land cover of Tanker Pahar. Forest/ woodland type is also present in this hill.

## Slide Cause of Movement:

Deforestation is the major issue that caused landslide in this area and intense rainfall acted as a triggering factor for landslide.

## Slide History and Future Risk of Landslide

A landslide at this site occurred in 1982, 1989, 1991, 1994, 1996 and 2013. 10 houses got damaged and 22 people died due to landslide at different periods. Utility facilities were highly damaged in 2013. Economic activities were hampered so does the social life of people. Environment has also had to be severely damaged. Still there are many houses located at the down slope of the hill. At this site has been found to be sandy. The escarpment slope is found to be near vertical. The displaced mass is a part of upper portion. Vertical Slope characteristics can be considered as a triggering factor to future landslide for this hill. Settlements located at the down slope of this hill are at high risk of massive landslide. The risk is high (Field survey, August 2014).

# Land Cover Mapping

(a) 1998



(b) 2001



(c) 2017

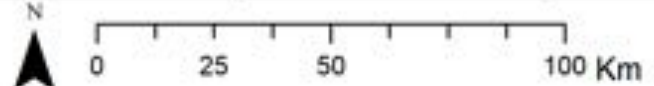
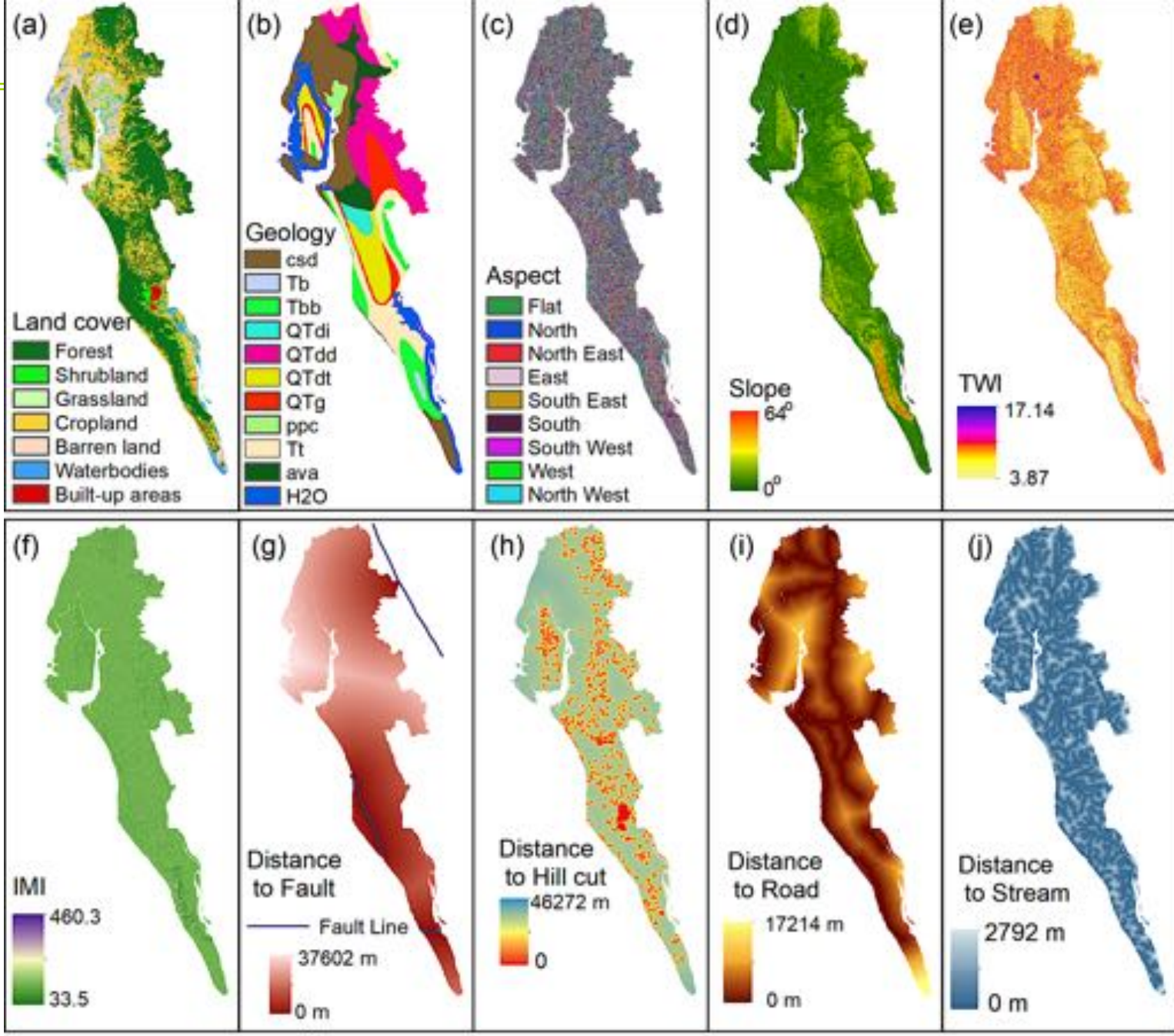


(d) 2018

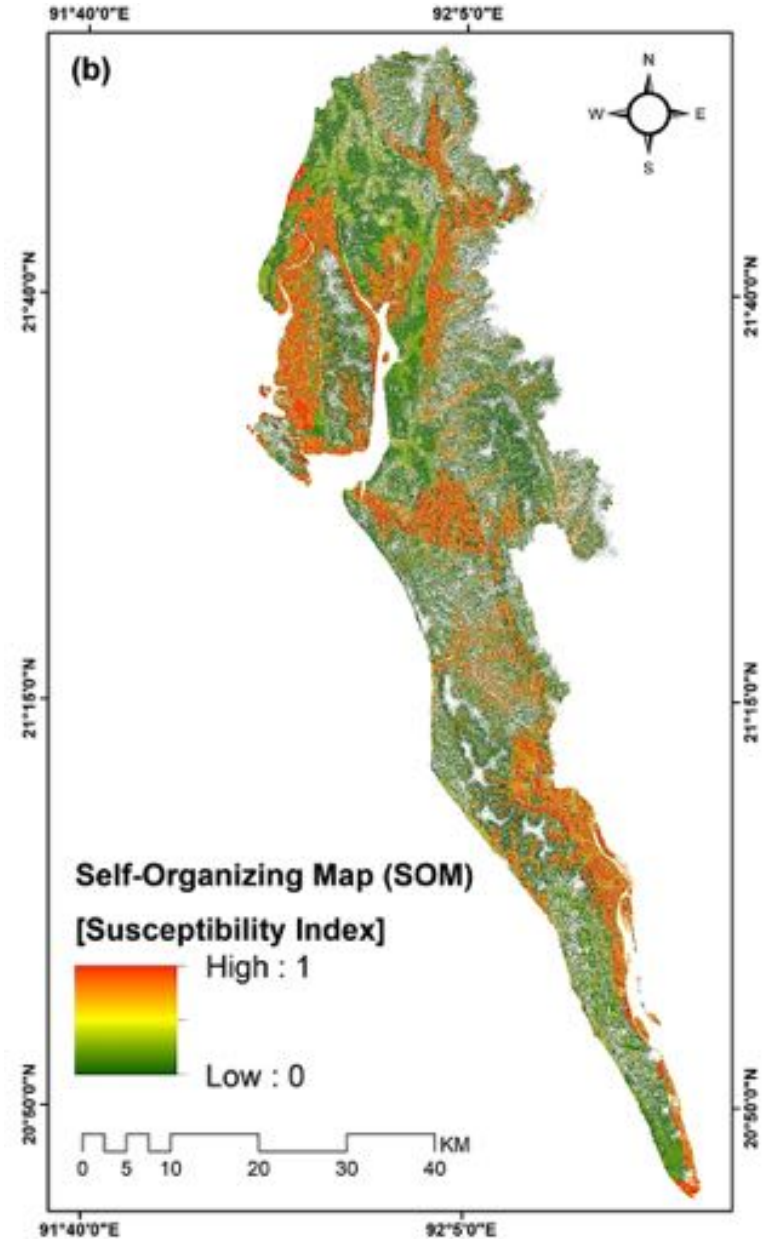
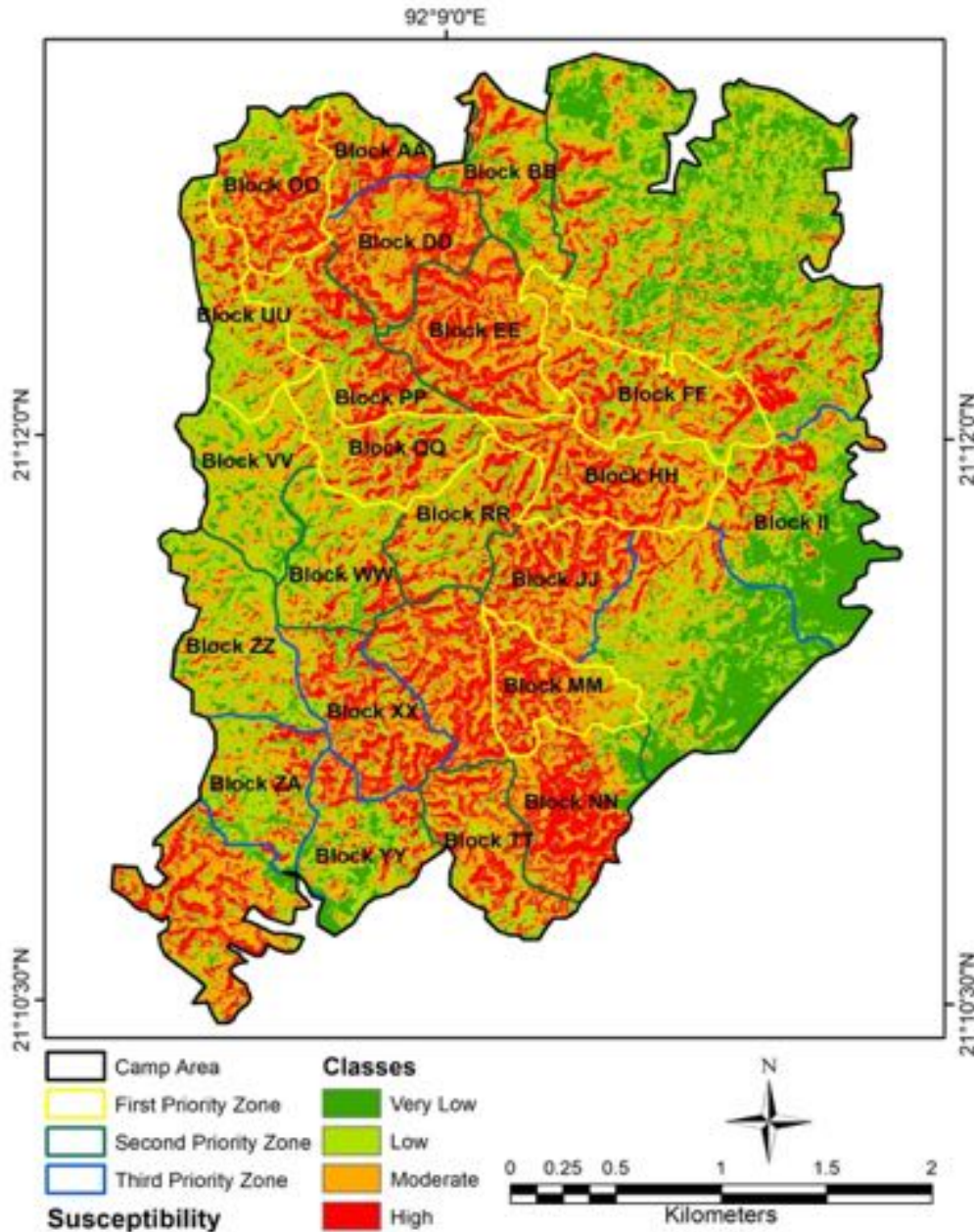




# Factor Maps

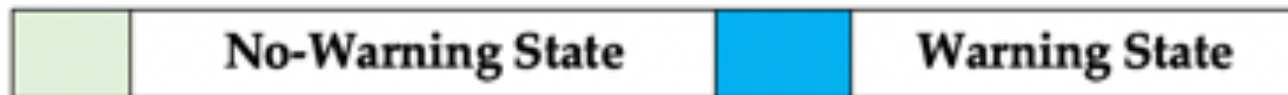


# Landslide Susceptibility Mapping (LSM)



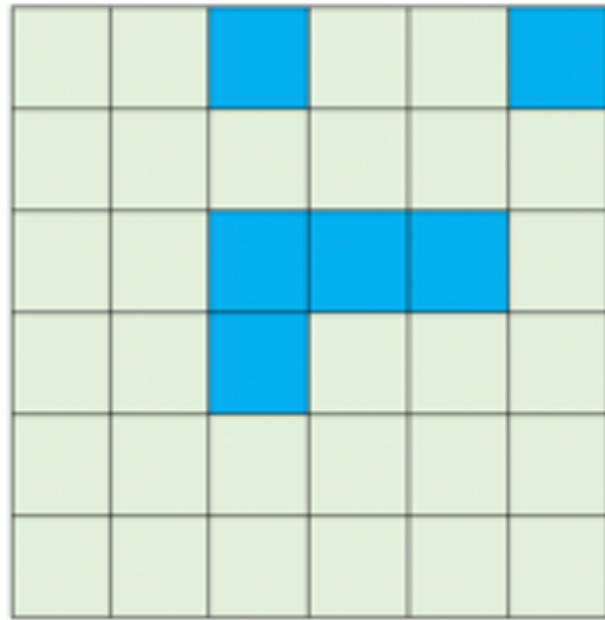
# Early Warning System

Landslide Hazard Matrix	Zone 2 (Low LSM)	Zone 3 (Medium LSM)	Zone 4 (High LSM)
R1 (Low Rainfall)	No-Warning State	No-Warning State	Warning State
R2 (Medium Rainfall)	No-Warning State	Warning State	Warning State
R3 (High Rainfall)	Warning State	Warning State	Warning State

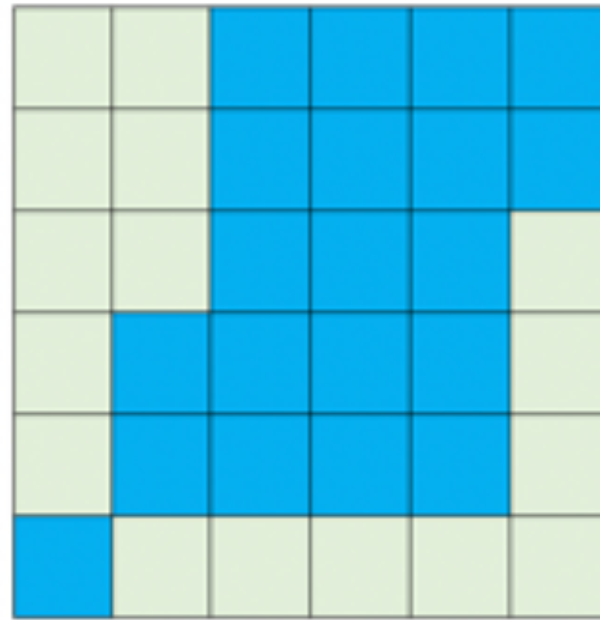


A hazard class (no warning vs. warning state) is assigned based on the assumption that **the higher the susceptibility, the lower the rainfall.**

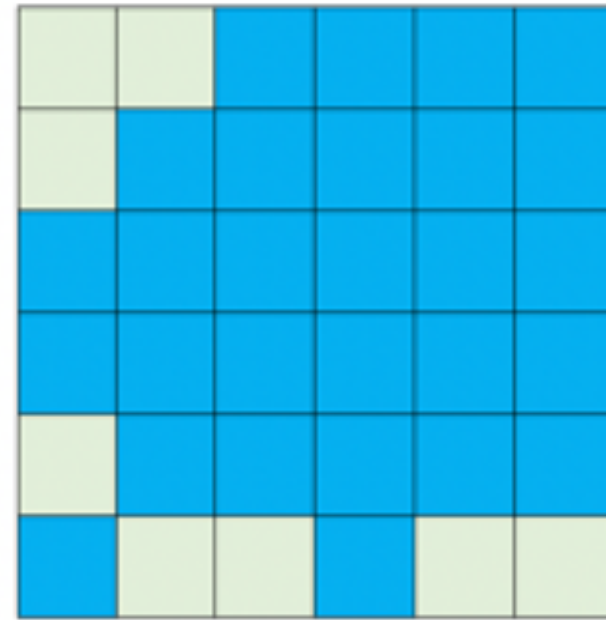
# Early Warning System



**(a) Scenario 1: Low Rainfall (R1)**  
[Zone 4] = 6 cells affected



**(b) Scenario 2: Medium Rainfall (R2)**  
[Zones 4+3] = 20 cells affected



**(c) Scenario 3: High Rainfall (R3)**  
[Zones 4+3+2] = 28 cells affected

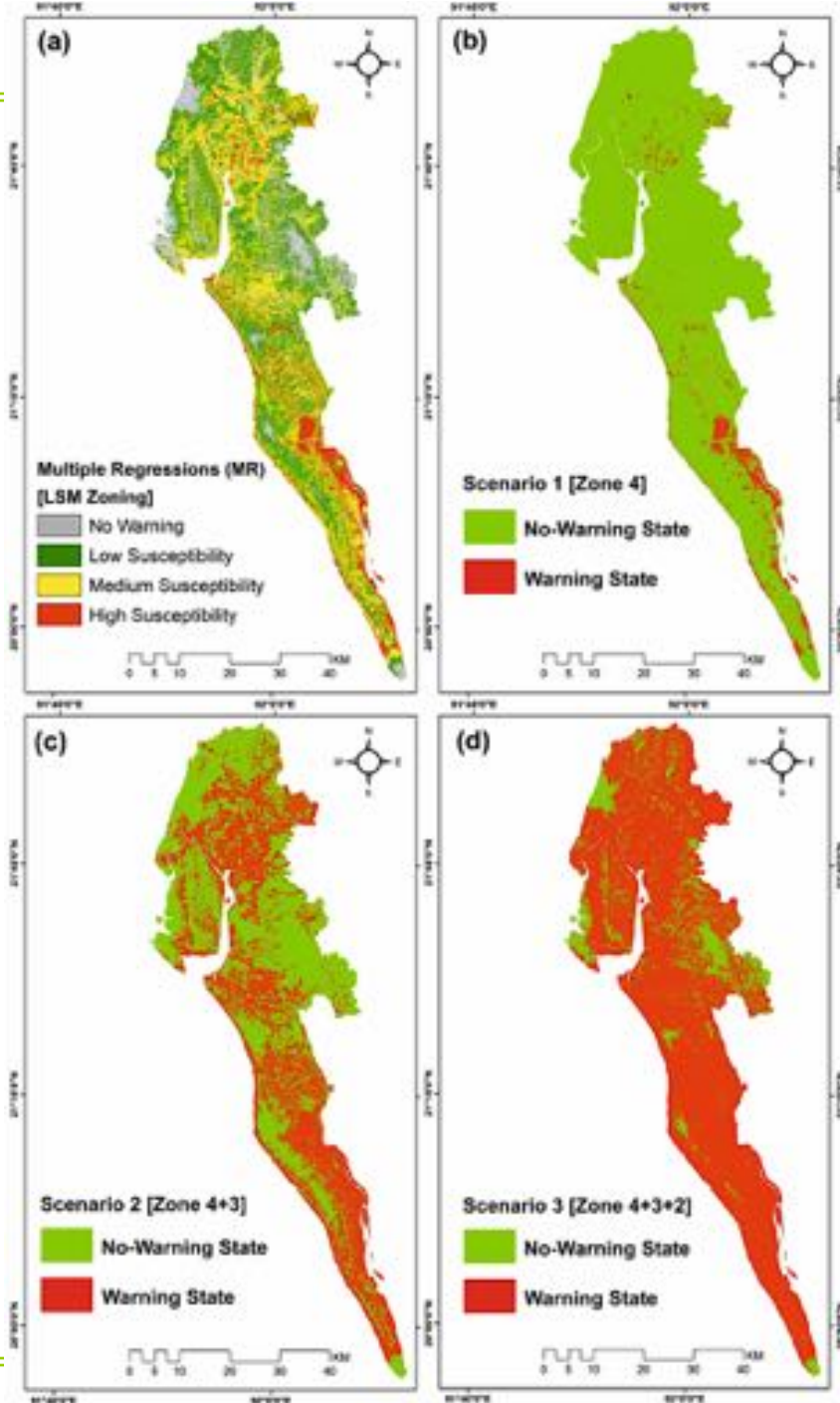


# Early Warning System

0	35	210	151	142	226
41	67	180	129	111	167
98	105	255	249	250	87
66	170	222	180	200	99
38	119	178	159	199	80
186	20	17	77	45	20

# Early Warning System

URL: [www.landslidebd.com](http://www.landslidebd.com)



Rainfall Amount (mm)
<b>[Consecutive 5 Days Cumulative]</b>
Low Rainfall (R1) = 95 – 220
Medium Rainfall (R2) = 221 – 345
High Rainfall (R3) > 345
No Warning

# Kashmir – India

**18 Soldiers  
were killed in  
flash  
flooding in  
July 2015**



# PRA Activities







## Indigenous mountain people's risk perception to environmental hazards in border conflict areas

Bayes Ahmed<sup>a,b,\*</sup>, Peter Sammonds<sup>a,b,c</sup>, Naomi M. Saville<sup>d</sup>, Virginie Le Masson<sup>e</sup>, Kavita Suri<sup>f</sup>, Ghulam M. Bhat<sup>g</sup>, Naveen Hakhoo<sup>g</sup>, Tsering Jolden<sup>h</sup>, Gulzar Hussain<sup>i</sup>, Kuenga Wangmo<sup>j</sup>, Bindra Thusu<sup>c</sup>

<sup>a</sup> Institute for Risk and Disaster Reduction, University College London (UCL), UK

<sup>b</sup> UCL Humanitarian Institute, University College London (UCL), UK

<sup>c</sup> Department of Earth Sciences, University College London (UCL), UK

<sup>d</sup> Institute for Global Health, University College London (UCL), UK

<sup>e</sup> Overseas Development Institute (ODI), London, UK

<sup>f</sup> Department of Lifelong Learning, University of Jammu, India

<sup>g</sup> Institute of Energy Research and Training, University of Jammu, India

<sup>h</sup> Department of Sociology, University of Jammu, India

<sup>i</sup> Department of Geology, University of Jammu, India

<sup>j</sup> Centre for Archaeology and Historical Studies, Royal University of Bhutan, Bhutan

### ARTICLE INFO

#### Keywords:

Participatory rural appraisal  
Hindu Kush Himalaya  
War  
Landslides  
Line of control  
India

### ABSTRACT

This study aims to understand community risk perception to environmental hazards in a border conflict zone context in high-mountain areas. Participatory rural appraisal (PRA) tools were applied by the social science team. The results were validated with a hazard map prepared by a separate team comprised of geologists. Turtuk, the northernmost village in Ladakh, India located near the line of control with Pakistan was undertaken as a case study. Turtuk represents a high mountain indigenous rural community which has experienced several catastrophic disasters (flash flooding and landslides in 2010, 2014, and 2015) and territorial armed conflicts (wars in 1971 and 1999 with Pakistan) in recent times. The villagers were able to identify various environmental hazards and associated risk zones through participatory timeline diagram, and hazard and dream mapping exercises. The PRA maps matched the geological hazard map of Turtuk, demonstrating that community people

# EEFIT Mission in Ecuador



## THE MUISNE, ECUADOR EARTHQUAKE OF 16 APRIL 2016

A FIELD REPORT BY EEFIT



# Notable Works



# Drought – Naogaon



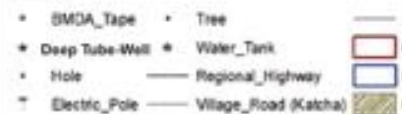
# Drought – Naogaon



(a)



Legend



(b)



Legend



# Indigenous people's responses to drought in northwest Bangladesh

Bayes Ahmed <sup>a</sup>, Ilan Kelman <sup>a, b, c</sup> , Md. Kamruzzaman <sup>d</sup>, Hossain Mohiuddin <sup>d, e</sup>, Md. Mostafizur Rahman <sup>d</sup>, Anutosh Das <sup>d</sup>, Maureen Fordham <sup>a</sup>, Mohammad Shamsudduha <sup>a</sup>

[Show more](#)

<https://doi.org/10.1016/j.envdev.2018.11.004>

[Get rights and content](#)

## Abstract

Bangladesh is highly disaster-prone, with drought being a major hazard which significantly impacts water, food, health, livelihoods, and migration. In seeking to reduce drought vulnerabilities and impacts while improving responses, existing literature pays limited attention to community-level views and actions. This paper aims to contribute to filling in this gap by examining how an indigenous group, the Santal in Bangladesh's northwest, responds to drought through local strategies related to water, food, and migration which in turn impact health and livelihoods. A combination of quantitative data through a [household survey](#) and qualitative data through [participatory rural appraisal](#) is used. The results suggest that the Santal

# Future Research Collaboration

- Global Challenges Research Fund (GCRF) - UK Research and Innovation (UKRI)

<https://www.ukri.org/research/global-challenges-research-fund/>



- Horizon 20-20; Erasmus+

LONDON'S GLOBAL UNIVERSITY



4–5 July 2019

## International Conference on the **Rohingya Crisis** in Comparative Perspective



**“A HOME IS WHERE I HAD  
SLEPT CLOSE TO MY  
MOTHER” – ROHINGYA**

We aim to understand the root causes of Rohingya crisis in Myanmar, the drivers of Rohingya influx into Bangladesh, Rohingya diaspora and their adaptation strategies in host countries, and the overall implications for security and peace in the region. We are also keen to compare the Rohingya crisis with other examples of serious crimes against humanity, genocide and war crimes that occurred globally.

VENUE: G11 & G17, UCL INSTITUTE OF ADVANCED STUDIES  
(IAS), SOUTH WING, GOWER STREET, UNIVERSITY COLLEGE  
LONDON (UCL), LONDON WC1E 6BT. UK

**Please submit your Abstract before 30 April 2019**

Organised by: UCL Centre for Collective Violence, Holocaust and Genocide Studies (CCV) &  
UCL Institute for Risk and Disaster Reduction; Contact Person: Dr Bayes Ahmed; Email: [bayes.ahmed@ucl.ac.uk](mailto:bayes.ahmed@ucl.ac.uk)

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# Thank you for your time & attention!

Email: [bayes.ahmed@ucl.ac.uk](mailto:bayes.ahmed@ucl.ac.uk)

## Question?

