

COLLEGES AND UNIVERSITIES OFFERING RISK, CRISIS, DISASTER AND DEVELOPMENT-RELATED PROGRAMMES IN THE EASTERN BELT OF INDIA

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July 2024

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Date Published: 13 October 2024

About Avoidable Deaths Network (ADN): ADN is a diverse, dynamic, inclusive, and innovative global-local membership network of experts, practitioners and researchers interested in avoiding human deaths from natural hazards, naturally triggered technological hazards and human-made hazards in low- and middle-income countries. ADN exists to help policymakers, researchers, practitioners and citizens make better decisions to save lives and reduce injuries to achieve sustainable development. ADN's purpose is aligned with the United Nations Sendai Framework for Disaster Risk Reduction's first two global targets and is a member of the Sendai Framework's Voluntary Commitment Platform. On 12 March 2023, ADN launched a global campaign: International Awareness Day for Avoidable Deaths (IAD4AD). More details of the global campaign can be found through this link: <https://iad4ad.avoidable-deaths.net/>

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Acknowledgements

We would like to thank Ms. Riwittambarah Kashyap for managing this project.

We are grateful to the University of Leicester's Institute for Environmental Futures for funding the publication of this report.

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INTRODUCTION

Nibedita S. Ray-Bennett, Alexander Skinner & Madhulika Sahoo

This report took a few years in the making. The project began in 2020 led by Miss. Rwitambhara Kashyap and Avoidable Deaths Network's Project Volunteers. The objectives of this report were to: **i)** identify and map colleges and universities that offer programmes related to risk, crisis, disaster management, development, and avoidable deaths in eight eastern states of India i.e. Meghalaya, Tripura, Nagaland, Assam, Arunachal Pradesh, Sikkim, Orissa and West Bengal; and **ii)** explore the feasibility of developing a network of these colleges and universities for avoidable deaths.

The data was gathered from the All India Survey on Higher Education (AISHE). AISHE is published annually by the Government of India's Ministry of Education. This portal provides a full list of state-level colleges and universities across the country. The list was filtered by state, and from this, all colleges and universities were selected which offered a course or combination of courses related to risk, crisis, disaster management, development and avoidable deaths.

Those colleges or universities which did not have an official website or information related to their courses were then rejected from the study, leaving a selection which matched the objectives of the study and may have the potential to be developed into a network. Unfortunately, the data collected and examined for the state of Assam was subsequently lost due to a theft and, due to time constraints, it has not been possible to repeat the data collection process. As a consequence, Assam is excluded from the final report.

The eastern states of India face multiple risks which can lead to complex disasters. The Ministry of Earth Sciences of India maps the country into four seismic zones, with Zone V as the most seismically active zone. The majority of states covered in this report are categorised as Zone IV or Zone V. The region is also exposed to monsoons and associated risks such as flooding and snakebites. Each chapter sets out in more detail the specific risks faced in that state.

The next phase of this project will be to examine in more detail the feasibility of creating an eastern states network for avoidable deaths so that knowledge, resources and expertise can be shared to mitigate the impact of climate-related disasters and avoidable disaster deaths.

ARUNACHAL PRADESH

Biswajit Paul

Prior to 1972, Arunachal Pradesh, 'land of the rising sun', was known as the North-East Frontier Agency (NEFA). The province was renamed "Arunachal Pradesh" on January 20, 1972, and established as a fully-fledged Union Territory in the same year. Due to its strategic location, the territory drew the Government of India's attention and began the difficult and gradual process of socioeconomic and political development as a unique entity inside the geopolitical framework of the country. It received statehood on February 20th, 1987. (Joshi, 2005; Kumar, 2013). The state of Arunachal Pradesh is located in the extreme northeastern corner of India. It is bordered by Bhutan to the west, China (Tibet) to the north and north-east, Myanmar to the east and south-east and the States of Assam and Nagaland to its south. Situated at the eastern end of the Himalayas, it is here that the Himalayan range changes its east-west orientation to a north-south one (Arunachal Pradesh State Portal, 2018). Much of the southern border follows the foothills bordering the northern fringes of the Brahmaputra valley. Known in Tibet as the Tsangpo, the great river curves around the Himalayas, to enter Arunachal as the Siang. It meets the Lohit, another great river that originates in China, shortly after it moves into the plains; and from this union is born the Brahmaputra, the 'Son of God'. Other big rivers — Kameng, Subansiri and Dibang — flow into the Brahmaputra, carving out distinctive valleys that form the natural divisions that make up the State. From the east flows the Noa-Dihing and several other rivers that originate in the Tirap and Changlang districts of the state. The state has a territory of 83,743 square kilometres, which is about 2.55 percent of India's land area and a third of the area of North-East India. The largest State in North-East India, Arunachal Pradesh's area is slightly more than that of Assam, but it is sparsely populated with only 0.11 percent of India's population and 2.85 percent of the population of North-East India.

Socio-demography of Arunachal Pradesh

Arunachal Pradesh has a total population of 1.38 million, according to the Census of India, 2011. All the States of North-East India, except Mizoram, have larger populations than the state. The population density in Arunachal is 17 people per square kilometre which is significantly lower than the national average of 382 (Census of India, 2011).

In Arunachal Pradesh, there are more than 125 tribes, however only 15 of them have a population of more than 5000 (Census of India, 1991; GoAP, 2005). In terms of percentage share, the most important tribal communities are Nyishi, Adi, Tagin, Wancho, Mona, Aka, and Mini. Due to the tribal nature of the state, there is notable language diversity in Arunachal Pradesh. With the exception of Assamese and Nepali, the state is home to 42 spoken languages, all of which are members of the Tibeto-Chinese language family. The regional languages of Arunachal Pradesh had no written scripts at the beginning of the 20th century, a situation which is maintained to this day for some languages (GoAP, 2005). The state had very low levels of literacy before the 1980s. Arunachal Pradesh had a 25.55 percent literacy rate in 1981, and there was a sizable literacy difference between rural and urban areas, and genders. The literacy figures have been rapidly increasing, from 25.55 percent (1981) to 41.59 percent in 1991 and 54.34 percent in 2001. The first college for undergraduate study in Arunachal Pradesh opened in 1964 at Pasighat and there are now 38 colleges in the state (GoAP, 2005; AISHE, 2020).

The majority of the state's population is economically dependent on agriculture and related activities. Traditional economies and systems are, nevertheless, evolving quickly over time. This includes the production of medical plants and herbs, horticulture, agroforestry, floriculture, organic farming, food processing industries, and eco-tourism (GoAP, 2005).



Natural hazards in Arunachal Pradesh

Arunachal has a “highly precipitous and varied terrain” (Fleming 1995; Rechlin, & Varuni, 2006). Elevations range from 300 metres on the edge of Assam to above 7,000 metres on its northern borders. The land is notable for its isolation. The south-west monsoon makes Arunachal one of the wettest states in the country, with an average annual rainfall of 350 centimetres. The rainy season extends from the pre-monsoon months of March and April, through the wettest months of June and July and continues as late as September and October. The foothills are hot and humid for a large part of the year but higher altitudes are cool, even during spring. As part of earthquake zone V, Arunachal Pradesh is at the highest risk level in India, and is vulnerable to associated hazards such as mud and landslides. Every year as soon as the monsoon arrives, landslides and floods affect properties and lives (GoAP, 2021).

Sample selection

As per the AISHE Report (2019-20), the state of Arunachal Pradesh has one centrally funded university, one deemed university, one institute of national importance, one state-private open university and six state-private universities. The state also has 38 colleges including general degree colleges, teacher training colleges, medical institutes and six polytechnic colleges. Of all the institutions, 13 were selected as appropriate for further investigation. Nine of the 13 institutions receive government funding, while four are funded privately.

Selected Universities

Examining the 10 universities in the state, five do not have any subject related to disaster management. Thus, these institutions were eliminated at the first phase. The remaining, selected institutions are:

- 1. North Eastern Regional Institute of Science & Technology (Deemed University):** North Eastern Regional Institute of Science and Technology (NERIST), a higher education institution which focuses on science and technology, located in Nirjuli, Itanagar. It was founded in 1984 and is a deemed university that is completely funded and governed by the Ministry of Education of the Government of India. This institution offers BTech and BSc in the Department of Civil Engineering and the Department of Forestry respectively, which includes components on the management of natural hazards and disasters.
- 2. Rajiv Gandhi University, Itanagar (Central University):** The oldest university in Arunachal Pradesh is Rajiv Gandhi University. It is situated near the Rono Hills in Doimukh, 14 kilometres from Itanagar, the state capital. The Department of Geography is responsible for the programme on disaster management. Within the university, eight colleges are shortlisted for inclusion here. Six are government-funded and two are privately funded, and offer relevant programmes including a BA in Geography. The details of these colleges are given in the following section.
- 3. National Institute of Technology (NIT) (Institute of National Importance):** NIT Arunachal Pradesh is located on the state capital Itanagar and is a public technical and research institution. NIT Arunachal Pradesh is one of India's 31 National Institutes of Technology. The Department of Civil Engineering offers relevant courses in BTech and MTech.
- 4. Himalayan University, Itanagar (State Private University):** A non-profit institution, in which the Department of Geography offers MA and PhD studies.
- 5. Arunodaya University (State Private University):** This private institution is located in Naharlagun. The Department of Geography offers MA and PhD studies.

Selected Colleges

Due to a lack of available data, 12 colleges of the 38 total were eliminated during the first phase of research. In the second phase, 18 colleges were eliminated as they do not offer any courses dealing with disaster management. The eight selected colleges offering a relevant BA Geography course are:

1. Indira Gandhi Government College, Tezu
2. Jawaharlal Nehru College, Pasighat
3. Donyi Polo Government College, Kamki
4. Wangcha Rajkumar Government College, Deomali
5. Government College, Bomdila
6. Government College, Yachuli
7. St. Francis De Sales College, Aalo (Private)
8. St. Claret College, Ziro (Private)

Feasibility of developing a network and collaboration with ADN in Arunachal Pradesh

In total, 13 universities and colleges were chosen in Arunachal Pradesh state as relevant for the creation of a network. Rajib Gandhi University (49 kilometres from Lilabari Airport, Assam) and Himalayan University (57 kilometres from Lilabari Airport, Assam) is located in the state capital Itanagar. Nearby Naharlagun has rail connections to Harmuti, and from there the wider Indian rail network.

NIT Arunachal Pradesh's nearest railway station is also Naharlagun, some 38 kilometres distant.

NERIST can be accessed by both rail and road. Buses and taxis are available from Guwahati. The nearest railway station is 18 kilometres away from the institution. From Lalibari Airport, the distance is 67 kilometres. Arunodaya University can also be accessed from the same railway station and airport.

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MEGHALAYA

Rwittambhara Kashyap

On 21 January 1972, Meghalaya was announced as the 21st state of the Union of India (Government of Meghalaya, 2020). It shares an international boundary of 443 km with Bangladesh in the west and south-west while neighbouring the Indian state of Assam in the north and north-east. The state has an area of 22,429 square kilometres (Government of Meghalaya, 2020) and comprises of eleven districts, namely, East Jaintia Hills, West Jaintia Hills, East Garo Hills, North Garo Hills, South Garo Hills, South West Garo Hills, West Garo Hills, East Khasi Hills, South West Khasi Hills, West Khasi Hills and Ri Bhoi. Located in the east of Meghalaya is the state capital and hill city of Shillong.

Socio-demography of Meghalaya

The estimated population of Meghalaya in 2020 was 2,964,007 (Government of Meghalaya, 2020). The state population is largely constituted of different tribal communities. The Garos, the Khasis and the Jaintias are the main tribes besides the tribes such as Bodos, Kochs, and Rabhas. The Khasis, Jaintias and Garos follow a matrilineal system in their societies.

Unlike many Indian states, the sex ratio of women exceeds men, as revealed by the National Family Health Survey (NFHS-4) as 1009, i.e. 1009 females per 1000 males (Shah, 2018).

According to the National Family Health Survey, a person who has completed at least the sixth standard or passed a literacy test is considered literate.

Based on this definition, 84 percent of men aged 15-49 and 83 percent of women aged 15-49 are literate (National Family Health Survey, 2017). However, 19 percent of women in contrast to 22 percent of men have completed 12th

standard or more years of schooling while 16 percent of men and women aged 15-49 never attended school (National Family Health Survey, 2017). According to The Official Web Portal of the Government of Meghalaya, the literacy rate of the state stands at 75.48 percent currently (Government of Meghalaya, 2020).

For the year 2009-2010, poverty data revealed that 17.1 percent of people in the state were poor, against a national average of 29.8 percent (Nayak, 2013).



Meghalaya: The land of multiple hazards

Located at 24°57' and 26°10' north latitudes and 89°46' and 92°53' east longitudes (Meghalaya State Disaster Management Plan, 2016), Meghalaya, as the meaning suggests (the abode of clouds), seldom remains cloud-free. Cherrapunji and Mawsynram are the wettest places on earth (Meghalaya State Disaster Management Plan, 2016).

Meghalaya is prone to recurrent landslides, coal mine collapses, road accidents, flash floods, floods, earthquakes, hailstorms, cyclones, and epidemics (Meghalaya State Disaster Management Plan, 2016).

Meghalaya lies in a seismically active zone and has been marked as a potential site of future catastrophic earthquake latitudes (Meghalaya State Disaster Management Plan, 2016). Concerning the vulnerability of the state to cyclones, it is highly prone to winds and cyclones due to its geographic setting. Since Meghalaya lies to the north-east of Bangladesh, every year 60 percent of the state is affected by cyclones in Bangladesh latitudes (Meghalaya State Disaster Management Plan, 2016). The South Garo Hills, South-West Garo Hills, West Khasi Hills and South-West Khasi Hills districts are near the Bay of Bengal (also called the cyclone basin) due to which large scale damage to lives and property occurs. The wind speeds of these regions can reach up to 50m/s (Meghalaya State Disaster Management Plan, 2016). Moreover, the East Jaintia Hills and West Jaintia Hills districts may experience wind speeds of 55m/s (Meghalaya State Disaster Management Plan, 2016). Even though the hilly terrain of the state does not suffer from floods directly, the plain areas of the adjoining state of Assam are affected due to back-flow of water from the Brahmaputra River (Meghalaya State Disaster Management Plan, 2016).

Landslides are one of the immediate concerns of the state. The state is mostly a hilly terrain, as such it is prone to landslides every year. Generally, landslides happen during heavy rainfall, i.e. from June to October (Meghalaya State Disaster Management Plan, 2016).

Meghalaya is an important exporter of coal and limestone. However, most of the state's coal mining is carried out in unscientific and unsafe manners, such as rat hole mining. Therefore, annually several deaths occur due to mine flooding or collapsing of mine walls (Meghalaya State Disaster Management Plan, 2016).

Sample selection

In Meghalaya, the higher education system comprises of universities, colleges and polytechnics. For the same, 97 colleges, universities and polytechnics were listed. Meghalaya has seven institutions of national importance, four centrally funded government universities, eight privately funded universities and three polytechnics. Moreover, out of the 97 higher educational institutions, seven colleges are funded

by the state government, 63 colleges are privately funded under different grants and 17 are educational institutions with their funding source unidentified.

During the first phase of 97 educational institutions of the state, 45 were eliminated due to the absence of an official website or information regarding the courses offered by them. Amongst the remaining 52, only nine colleges and universities were selected for developing ADN's network in the state. Out of the nine, five of them are universities which comprise of one government-funded and four privately funded, while the remaining four are colleges.

The North Eastern Hills University (NEHU) is the only government-funded university selected for this study. The selected departments within this university are the Environmental Studies Department and the Geography Department. The Environmental Studies Department of NEHU offers MSc Environmental Science and PhD courses while the Geography Department offers MA/MSc Geography, PG diploma in Geo-Informatics, M.Phil. and PhD courses.

Additionally, under NEHU there are 72 colleges i.e. 71 colleges from Meghalaya and one college from Gujarat. However, only four colleges under this university in the state of Meghalaya are selected for this study. The four selected colleges under NEHU are:

- 1. Tura Government College:** This is the only selected government college which is affiliated to NEHU. The Department of Geography which offers a three-year bachelor course is selected.
- 2. St. Edmund's College:** This is a privately funded college and two departments are selected i.e. the Geography Department and Environmental Sciences Department. The geography department offers BA Geology course and the Environmental Sciences Department offers BSc Environmental Science course.
- 3. Shillong College:** This is a privately funded college and the Department of Environmental Science which offers BSc (Environmental Science) course is selected.
- 4. Women's College:** This is a privately-funded college. The selected department is Social Work which offers Bachelor of Social Science (BSW) courses. This college and subsequently, the offered course selected is the Social Work course, which offers a paper in environmental studies and focuses on development (as obtained from the course details available on their website).

As mentioned earlier, along with NEHU, which is a centrally funded university, four other private universities have been selected for developing the network of colleges and universities in the state of Meghalaya. The four selected universities are:

- 1. Martin Luther Christian University:** The departments selected from this university are the Department of Environment and Traditional Ecosystem and the Department of Public Health. The selected courses under the Department

of Environment and Traditional Ecosystem are the Bachelor of Science in Environmental Science (BSc ES) and the Master of Science in Environment Sciences (MSc ES). Also, under the Department of Public Health, the selected courses are the Master's of Public Health (MPH) and Master of Science in Biostatistics & Epidemiology (MSc BE).

- 2. Mahatma Gandhi University:** The selected department and centre from this university are the Department of Science and Technology and the Research Development Innovation Centre. The selected courses under the Department of Science and Technology are the Diploma in Fire and Safety and the Bachelor of Science in Fire Technology and Industrial Safety Management. Moreover, the selected courses under the Research Development Innovation Centre are the M.Phil. and PhD courses.
- 3. William Carey University:** The selected departments from this university are the Department of Arts, Department of Fire and Safety and Department of Science. The selected courses under the Department of Arts are the MA Geography and PhD in Arts and Humanities courses. Under the Department of Fire and Safety, the BSc in Fire Safety and Hazard Management and Diploma in Fire and Safety and Hazard Management courses are selected. Moreover, under the Department of Science, the MSc Environment Science, MSc Geology and PhD courses are selected.
- 4. University of Science and Technology Meghalaya:** The selected departments from this university are the Department of Earth Science and the Department of Social Work. Under the Department of Earth Science, the selected courses are MA Geography and MSc Environmental Sciences. Moreover, the selected courses under the Department of Social Work are the Bachelor of Social Work (BSW), Master of Social Work (MSW) and PhD courses.

Feasibility of developing a network and collaboration with ADN in Meghalaya

Out of the nine selected colleges and universities, six are located in Shillong, which is the capital and also one of the biggest cities in Meghalaya. The selected universities and colleges located in Shillong are North Eastern Hill University (NEHU), St. Edmund's College, Martin Luther Christian University, William Carey University, Shillong College and Women's College. The city is located at an altitude of 1496m above the sea level and is most conveniently accessed from the neighbouring state of Assam via air transport, buses and taxis. It is well known that Shillong is a busy and safe city with easy accessibility.

However, the Tura Government College is located in Tura i.e. in the West Garo Hills district. The college is 310km from Shillong and takes approximately 6 hours 40 minutes to drive from Shillong. Previously, the situation in Tura was tense and unrest pervaded. However, the scenario has drastically changed in the past few years. Nevertheless, the situation is still unpredictable concerning safety.

The University of Science and Technology Meghalaya and the Mahatma Gandhi University are in the Ri Bhoi districts and are very close to Guwahati, which is one of the largest cities in Assam and North-East. Both these colleges are conveniently accessible from Guwahati and very safe to visit.

The NEHU and the Mahatma Gandhi University are both teaching and research-intensive universities with multiple contributions to both fields. However, for the other colleges and universities, even though each of them is much occupied in the teaching-intensive fields, no information could be obtained regarding their research focuses.

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NAGALAND

Biswajit Paul

The Sixteenth State of the Indian Union, Nagaland was inaugurated on the 1st December, 1963. Nagaland is one of the hill states of northeast India. The total geographical area of the state is 16,579 square kilometres, bounded by Manipur to the south, Assam to the north and west, and Arunachal Pradesh to the northeast. Nagaland also shares its international boundary with Myanmar to the east. There are eleven districts in Nagaland namely, Kohima, Mokokchung, Tuensang, Wokha, Zunheboto, Phek, Mon, Dimapur, Peren, Longleng and Kiphire. There is a large altitude range in the state, varying between 194 metres and 3,841 metres above sea level. Nagaland villages are frequently situated on hilltops and at a higher elevation for security reasons. Mount Saramati is the highest peak in the state having an elevation of 3,841 metres above sea level.

Socio-demography of Nagaland

The 'Nagas', comprising associated ethnic groups sharing similar cultures and traditions, form the majority of the population of Nagaland. Nagaland consists of several tribes and sub-tribes, each with their own distinctive lifestyle, language and culture. The major tribal groups of Nagaland are the Angami, Ao, Chakhesang, Chang, Kachari, Khiamniungan, Konyak, Kuki, Lotha, Phom, Pochury, Rengma, Sangtam, Sema, Yimchungrü, and Zeliang. According to the Census of India 2011, Nagaland has a total population of 19,80,602, of which a majority (71.03%) lives in rural areas. The predominant economic activity of the state is agriculture. Traditionally, 'jhum' or slash-and-burn cultivation has been the main occupation in rural areas. In some areas terrace cultivation is practised in steep hill areas where canal irrigation is possible during the rainy season. In recent years, mechanised farming is increasingly practised in Dimapur and Peren Districts. Nagas predominantly partakes in cottage and small-scale industries, increasingly adopting modern technologies for their livelihood (Directorate of Economics & Statistics, 2014; IBEF, 2010).

Natural hazards in Nagaland

Earthquakes and landslides are the predominant geological hazards in Nagaland. Its tectonic and topographical setting makes Nagaland vulnerable to earthquakes and landslides resulting in high levels of damage. The state is situated in the Delhi Disaster Management Authority's highest seismic risk area, known as Seismic Zone V (on a scale of II to V). Twelve major earthquakes have occurred in the state in the last 100 years (Nagaland State Disaster Management Authority (NSDMA), 2022). The epicentre of the 1950 Great Earthquake, the sixth largest of the 20th century, occurred seven kilometres north of the Nagaland border, in Assam (NSDMA, 2022).

Nagaland consists of steep slopes and high relief. Landslides regularly affect the state, particularly during monsoons, when heavy downpours are experienced. Nagaland is dominated by shale and sandstone, which are vulnerable to weathering, leading to rock falls, debris slides and landslides (NSDMA, 2022).

During the rainy season low-lying areas of the state on the boundary with Assam are affected by floods. The rainy season also brings severe windstorms and hailstorms. In 2016, such storms caused damage to 3,759 houses across the state (NSDMA, 2022).

Fire is the most commonly recorded disaster in Nagaland. During the Indo – Naga conflict, many villages were razed to the ground (NSDMA, 2022).

Sample selection

According to the AISHE (2019-20) report, Nagaland has only one centrally funded public university (Nagaland University), three state-private universities (The Global Open University Nagaland, The Institute of Chartered Financial Analysts of India University, and St. Joseph University) and one institute of national importance, the National Institute of Technology, Nagaland. There are also 62 colleges and recognised institutions along with 16 stand-alone higher education institutions in the state. Out of the 62 colleges and recognised institutes, one is centrally funded by the Indian Government, 14 are state government funded, 4 institutions are run by local bodies, 32 are private institutions and the remaining 11 are private without financial assistance. Nagaland has a total of 83 higher education institutions, out of which, only six offer bachelors, master's, diplomas or research initiatives with a disaster management component (Department of Higher Education, 2020).

During the first phase, of the five universities and institutions of national importance, three were eliminated as they do not offer any courses related to disaster management. Out of the 78 colleges, recognised institutions and stand-alone higher education institutions of the state, 11 were eliminated due to the absence of information regarding the courses offered, and 63 were eliminated for not offering any courses related to disaster management.

Following the eliminations, four colleges and two universities were selected as viable for developing ADN's network in the state. Of the two universities, one is central government-funded, and the other is a state-private university. Out of four colleges, three are state government funded and the other is privately funded.

Nagaland University (NU) is the only centrally funded university in the state. Three departments of the university offer courses on natural hazards and disaster management namely, the Department of Environmental Science, the Department of Geography, and the Department of Geology. All the selected departments offer master's degrees and doctorates in the concerned subjects. There are 52 degree colleges, and 15 technical and professional colleges under Nagaland University, of

which four were selected as viable for developing ADN's network. The four selected colleges under Nagaland University are:

- 1. Fazl Ali College:** This is one of the selected government colleges which is affiliated to Nagaland University. The Department of Geography which offers a three year bachelor course has been selected.
- 2. Zunheboto Government College:** The Geography Department of this college offers a BA Geography course, and the Environmental Sciences Department offers a BSc Environmental Science course.
- 3. Kohima Science College:** This is a government-funded college and the Department of Geography which offers a BSc course has been selected.
- 4. Model Christian College:** This is the only privately funded college of Nagaland which offers BSc degree in Geography.

The Global Open University (TGOU) is the only state private university selected as meeting the criteria. The selected departments within this university are the Department of Disaster Management, the Department of Geography, the Department of Earth Science, the Department of Environmental Science, and the Department of Fire Science. The Departments of Disaster Management, Environmental Science and Fire Science offer both bachelors and master's in the concerned subjects, while the Geography and Earth Science Departments only offer master's degrees. The Department of Fire Science also offers diploma and advanced diploma courses.

Feasibility of developing a network and collaboration with ADN in Nagaland

Out of the six selected colleges and universities, three are located in Kohima, which is the capital and also one of the biggest cities in Nagaland. The selected universities and colleges located in Kohima are the Kohima campus of Nagaland University, Kohima Science College, and the Model Christian College. The city is located at an altitude of 1444 metres above sea level and is most conveniently accessed from the neighbouring states via air transport (Dimapur Airport), buses, trains (Kohima Zubza Railway Station) and taxis. The headquarters of Nagaland University and Zunheboto Government College are in Zunheboto district.

The Global Open University is located at Dimapur, 5.4 kilometres south of Dimapur Airport and accessible through bus or taxi from the airport. Lastly, the Fazl Ali College is located in Mokokchung district. Accessibility of this institute is poor as it is located around 150 km from Kohima, the state capital and 197 km away from Dimapur Airport.

Nagaland University is the only university providing both teaching and research with multiple contributions to both fields, whereas The Global Open University focuses on only teaching.

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ODISHA

Mohammed Meharaj Bano

Orissa was established as a province of British India on 1 April 1936, and its inhabitants predominantly speak Oriya. The English name Orissa was changed to Odisha on 4 November 2011 (Maps of India, 2022). The state is located between 17.49'N and 22.34'N latitude and 81.27'E and 87.29'E longitude. It is bounded by the Bay of Bengal to the east, Madhya Pradesh to the west and Andhra Pradesh to the south. On the basis of physiographic characteristics, Odisha is divided into five regions by its state government: the Odisha Coastal Plain, the Middle Mountainous and Highlands Region, the central plateaus, the western rolling uplands and the major flood plains (Government of Odisha, 2022). Bhubaneswar is the capital and largest city of the Indian state of Odisha.

Socio-demography of Odisha

Odisha has a population of around 41 million (Census of India, 2011) of which more than 22 percent are tribal, with their concentration in Mayurbhanj, Keonjhar, Sundargarh and Koraput districts (Government of Odisha, 2022).

The overall sex ratio in Odisha as revealed by the National Family Health Survey (NFHS-4, 2015-16) is 1,036 females per 1,000 males. However, the sex ratio of the under-7 population was 934 females per 1,000 males. Some 27 percent of the population was under the age of 15; only 8 percent was 65 years and above.

Approximately 67 percent of women aged 15-49 and 84 percent of men aged 15-49 are classed as literate (National Family Health Survey, 2015 –16). Twenty-eight percent of women aged 15-49 and 13 percent of men aged 15-49 have never attended school. Only 13 percent of women aged 15-49 in Odisha have completed 12 or more years of schooling, compared with 21 percent of men.

Despite a battery of schemes and welfare programmes, 29.35 percent of the state's population is classified as living in poverty (Rout, 2021).

Odisha: The land of multiple hazards

Odisha extends from 17°49' to 22° 34' North Latitude and from 81° 27' to 87° 29' East Longitude. Due to its sub-tropical location Odisha is vulnerable to various natural disasters such as tropical cyclones, floods, storm surges, lightning, tsunamis and whirlwinds. Growing economic and industrial developments in the region also give rise to potential chemical and industrial disasters (Orissa State Disaster Management Plan, 2019).

Amongst all the natural disasters to which the state is at risk, floods are the most frequent and cause the most annual damage. Almost 80% of the annual rainfall is concentrated over a short monsoon period of three months. The coastal belt

is prone to storm surges throughout the monsoon season, which is usually accompanied with heavy rainfall thus making the estuary region vulnerable to both storm surges and river flooding. A few districts in the western part of Odisha are prone to flash floods. The East Coast of India is one of the six most cyclone-prone areas in the world. A total of 20 percent of severe cyclones that make landfall on the eastern coast of India affect Odisha, with the highest risk times being April to May and September to November. All the coastal districts are vulnerable to cyclones (Orissa State Disaster Management Plan, 2019).

Heat waves are becoming increasingly regular in the state. Climatic changes, decrease in tree cover, depletion of groundwater resources and an increase in daily temperatures especially during the months of May and June, have made the majority of the districts of the state vulnerable to heatwaves (Orissa State Disaster Management Plan, 2019).



Snakebite has been declared as a ‘State Specific Disaster’ by the Government of Odisha. A recorded 1,844 snakebite deaths occurred in the state from 2015-18 (Orissa State Disaster Management Plan, 2019).

Sample selection

According to the AISHE (2021) report, in Odisha, the higher education system comprises of 520 universities and colleges. This includes three Institutions of National Importance, one centrally funded Government University, five privately-funded Universities and seven government-funded Public Universities. In total, from all the institutes in Odisha, 58 colleges were selected for further research, based on the degrees offered.

During the first phase of research, from the 520 educational institutes of the state, 16 universities were found to have sufficient data to remain part of the research and to offer relevant courses. From the 16 universities, 11 are government-funded and five are privately funded universities.

There are 4 universities which have affiliated colleges under them, which are:

- 1. Sambalpur University:** Sambalpur University is located in Burla, Sambalpur district. Popularly known as Jyoti Vihar, it offers courses at undergraduate and postgraduate levels. Under this university, 12 colleges were shortlisted for developing ADN’s network which includes three government colleges,

eight privately funded colleges and one local-body funded college. The Department of Education, Environmental Studies offers a BA in Geography and Environmental Studies.

- 2. Utkal University:** Utkal University is a public university in Bhubaneswar, Khordha district. It is a teaching-cum-affiliating university. Under this university, 19 colleges were shortlisted for developing ADN's network in the state which includes eight government colleges, 10 private funded colleges and one local-body funded college. The Department of Environmental Studies & Disaster Management offers bachelors and master's courses in Geography and Environmental Science.
- 3. Berhampur University:** Berhampur University is a public university in Berhampur. Under this university, nine colleges were shortlisted for developing ADN's network in the state, which comprises two government colleges and seven privately funded colleges. The Department of Arts, Science & Commerce offers bachelors courses in Environmental Science, a Diploma in Disaster Management, and Environmental Studies and Disaster Management.
- 4. Maharaja Sriram Chandra Bhanja Deo University:** Maharaja Sriram Chandra Bhanja Deo University, formerly North Orissa University, is a public university in the regional city of Baripada. Under this university, two colleges were shortlisted for developing ADN's network in the state which includes one government college and one privately funded college offering courses such as PhDs in Environmental Sciences and MBAs in Disaster Management.

Feasibility of developing a network and collaboration with ADN in Orissa

In a total 58 colleges were selected for developing ADN's network in Odisha. Out of the 58 colleges, 19 colleges are selected from Utkal University which is located in Bhubaneswar. Bhubaneswar is the capital and largest city of the Indian state of Odisha. The selected universities and colleges located in Bhubaneswar are Christ College, L. N. Sahu Mahavidyalaya, S. S. D. Mahavidyalaya, NYSASDRI School of Journalism and Social Work, Kujang College, Sarala Mahavidyalaya, N.C. Autonomous College, Vyasa Nagar College, Pattamundai College, S. S. B. College, Thakur Nigamananda Mohavidyalaya, Balugan College, New Star Degree College, Rajdhani College, Regional Institute of Education, Subas Academy of Management and Technology, Model Degree College, A.D. Mahavidyalaya, and SCS (Auto) College.

Bhubaneswar has an average altitude of 45 metres above sea level. The city is well connected with air transport, the train network and roads. Bhubaneswar Railway Station is the main railway of the city and situated in the centre. There are trains to Guwahati, Delhi, Kolkata, Chennai, Hyderabad, Mumbai, and Ahmedabad. There are daily flights from Bhubaneswar to New Delhi, Chennai, Mumbai, Kolkata,

Hyderabad, Bangalore and Visakhapatnam. From the airport, taxi and bus services are available to reach any part of the city. Regular bus services are available for cities including Konark, Puri, Hyderabad, Raipur, Ranchi and Kolkata.

Sambalpur University is located at a distance of 290 kilometres via road from Bhubaneswar, which takes approximately eight hours. There are seven colleges from the Ganjam district of Odisha, which is divided into three sub-divisions: Chhatrapur, Berhampur, and Bhanjanagar. The colleges are Indian Institute of Science Education & Research (IISER), Aska Science College, Chikiti Mahaidyalaya, Ganjam College, Gayatri Institute of Computer and Management Hinjilicut and KSUB College. Ganjam is located at a distance of 168 kilometres by road from Bhubaneswar, which takes approximately four hours.

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SIKKIM

Mohammed Meharaj Bano

On 16 May 1975, Sikkim became the 22nd state of the Indian Union. (*History of Sikkim, 2021*) Sikkim is a state in northeast India, bordered by Bhutan, Tibet and Nepal. It shares its boundary with the sister state of West Bengal. Sikkim is a stairway leading from the western border of the Tibetan plateau down to the plains of West Bengal, with a fall of about 5,215 metres in 240 kilometres. In the west, Sikkim is bounded by the north-south spur of the Great Himalayan Range which includes the world's third highest peak, Khangchendzonga and to its south is Singalila ridge. In the north it is bounded by Dongkia range and includes part of the Tibetan Plateau. In the east it is bounded by the Chola range. Gangtok is a municipality, the capital and the largest town in the state. Today, Gangtok is a centre of Tibetan Buddhist culture and learning, with the presence of several monasteries, religious educational institutions, and a centre for Tibetology.

Socio-demography of Sikkim

The Population of Sikkim was projected at 667,000 in 2019. The present population of Sikkim is composed of different races and ethnic groups, including the Lepchas, the Bhutias, the Nepalese and the Plainsmen, who came and settled in different phases of history. The Nepali community in Sikkim includes three sub-cultural groups: the Kiratis, the Newaris and the Gorkhas.

The sex ratio of women to men as observed in the Census India (2011) is 890 to 1000. The Infant Mortality Rate declined from 32 per 1000 in 2004 to 12 per 1000 in 2017 (Government of Sikkim, 2021). The literacy rate of Sikkim stood at 76.43% among females and 87.30% among males in 2011 (NFHS 5, 2019 - 2020).

Sikkim: The land of multiple hazards

Sikkim is situated between 27° 04' to 28° 07' north latitudes and 88° 01' to 88° 55' east longitudes. It is bounded by Nepal in the west, by the vast stretches of the Tibetan plateau in the north and by Bhutan and Chumbi Valley of Tibet in the east. Darjeeling district of West Bengal stretches along its southern boundary. The State of Sikkim has a total area of 7096 square kilometres. and stretches over 112 kms from north to south and 64 kilometres from east to west. Sikkim is divided into four districts for emergency management purposes: East District, West District, North District and South District (Sikkim State Disaster Management Plan, 2010-11).

Sikkim is prone to earthquakes, landslides, fire hazards, floods and flash floods, avalanches, drought, and storm hazards (Sikkim State Disaster Management Plan, 2010-11). The State of Sikkim is vulnerable to seismic natural disasters, as it falls in India's Seismic Zone IV (of a scale from II-V) and records one of the

highest annual rainfalls in the country. Every year a noticeable number of people are affected by natural disasters among which landslides, floods and riverbank erosion are most frequent.

The state is subjected to torrential monsoon rains, which contribute to rapid runoff on the steep slopes, resulting in landslides and flooding in river bottoms (Sikkim State Disaster Management Plan, 2010-11).

Landslides are a common phenomenon in Sikkim Himalaya and one that causes the most damage to property and connectivity, as well as notable loss of lives (Landslide -Sikkim State Disaster Management Authority (SSDMA)-GOI-UNDP, Government of Sikkim, 2021).

Sikkim is located in the high-risk seismic zone IV of the Indian seismic zoning map. The state contains two main thrust faults, the Main Boundary Thrust (MBT) and Main Central Thrust (MCT). Continuous pushing of the Indo-Australian plate against the Eurasian plate has made most parts of the Himalayan collision zone seismically active including Sikkim. Consequently, there is a high level of seismic vulnerability in the state. According to the Sikkim State Disaster Management Authority (2021), property damage in the state is often disproportionate to the scale of the earthquake. This is attributed to poor design and construction practices (Earthquake - Sikkim State Disaster Management Authority (SSDMA)-GOI-UNDP, Government of Sikkim, 2021).

Sample selection

According to the AISHE (2021) report, Sikkim contains 31 colleges and universities. Sikkim has one institution of national importance, one centrally funded government university and five privately funded universities. Moreover, out of the 31 higher educational institutions, two colleges are funded by the state government and two colleges are privately funded. There are three government funded and one privately funded university under Sikkim University.

During the first phase of research of the 31 educational institutions, 16 were eliminated due to the absence of information regarding the courses offered. The remaining 15 colleges and universities were selected for developing ADN's network in the state. Out of the 15, seven are universities, comprising two government-funded and five privately funded institutions, while the remaining eight are colleges.

Sikkim University is a centrally funded university established in 2007 by an Act of Parliament, and is fully funded by the University Grants Commission, New Delhi. The relevant, selected department within this university is the Environmental Studies Department. The Environmental Studies department of Sikkim University offers B.Ed. - Environmental Education & Geography, and BA (Hons), BSc (Hons) and BCom (Hons) in Environmental Studies.

Additionally, under Sikkim University there are 18 colleges. However, only four such colleges were selected for this study. The four selected colleges under Sikkim University are:

- 1. Loyola College of Education, Namchi:** This is the only selected privately funded college. The Department of Education offers B.Ed. - Environmental Education & Geography.
- 2. Namchi Government College, Kamrang:** This is a government college and the Department of Arts & Commerce offers BA (Hons), BSc (Hons) and BCom (Hons) - Environmental Studies.
- 3. Sikkim Government B.Ed. College, Soreng:** This is a government college and the Department of Education offers B.Ed. - Environmental Education & Social Sciences.
- 4. Sikkim Government College, Gyalshing:** This is a government college and the Department of Honours offers BA (Hons) Environmental Studies.

Feasibility of developing network and collaboration with ADN in Sikkim:

Out of the 15 selected colleges and universities, eight are located in Gangtok, which is the capital and also the biggest city in Sikkim. The selected universities and colleges located in Gangtok are Vinayaka Missions Sikkim University, The Institute of Chartered Financial Analysts of India University, Sikkim Manipal University, Shri Ramasamy Memorial University, Sikkim Government College, Damber Singh College, Sikkim State University and Sikkim Manipal Institute of Technology.

The city is located at an altitude of 1,650 metres above the sea level and is most conveniently accessed from the neighbouring state of West Bengal. Gangtok is accessible via air transport and road. The nearest airport to Gangtok is Pakyong, the only airport in Sikkim, and which has domestic flights and is some 20 kilometres from Gangtok. There is a railway network under construction in Rangpo, some 35 kilometres from Gangtok. Road routes from both the airport and future railway station to Gangtok are through mountainous terrain.

Loyola College of Education and Namchi Government College are both located in Namchi. Namchi is the capital of the South Sikkim district. By air, the nearest domestic airport is Bagdogra in neighbouring West Bengal about 102 kms from Namchi. Cabs, buses and taxis are readily available.

Nar Bahadur Bhandari Degree College is the only university providing both teaching and research, with multiple contributions to both fields. No information about other universities could be obtained.

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TRIPURA

Pangkhi Medhi

Tripura state shares borders with Bangladesh, Mizoram and Assam. The state is surrounded by Bangladesh on its north, south and west. The length of its international border is 856 km (84 percent of its total border) (*Know Tripura, Tripura State Portal*, no date). The state is connected with the rest of India by road. Geographically it has hill ranges, valleys and plains, and its total area is 10,491 square kilometres. Tripura is the third smallest state, and forests cover more than half of its area.

Socio-demography of Tripura

Tripura's population in 2022 is estimated to be 4.24 million, According to Unique Identification Aadhar India, (no date). Tripura has a lush green landscape, and an ethnically and culturally diverse population. The state is home to indigenous tribes, which constitute 31% of the state's population while 69.95% are non-tribal, mostly Bengali. The Tripuri constitute more than half the tribal community. Other prominent tribal groups include the Chakma, Halam, Reang, Garo, Lusai, Marma, Bhils, Santhals, Mundas and Oraons.

The Sex Ratio is 960 (in 2001 it was 948); compared to an average of 943 across India. The literacy rate, as per the 2011 Census was 87.22% (against 73.19% in 2001). The male-female literacy gap reduced to 7 percent by 2011, which was the highest reduction in the country during the 2001-2011 decade, thus fetching the State Decadal Literacy Award (*Know Tripura | Tripura State Portal*, no date).

Tripura: The land of multiple hazards

Tripura is prone to various natural and human induced disasters. The State is situated in the highest seismic risk area of the country, earthquake Zone V (*Home page, Tripura Disaster Management Authority*, no date). The state is further prone to the hazards including floods or flash floods, epidemics, fires, cyclones, hailstorms, and lightning (*Disaster Management, Revenue Department*, no date).

During 2011 and 2012, the state witnessed four tremors measuring above 4 on the Richter Scale where the epicentres were in the state. The most recent was 4.2 on the Richter Scale on 25th November, 2012 located in West Tripura District (*Disaster Management, Revenue Department*, no date).

In 2008 floods in North Tripura took the lives of people and livestock. Crops, fish seeds and food grains were badly affected (*History of Disaster in Tripura, Tripura Disaster Management Authority*, no date). During 2012 two tornadoes affected the Bishalgarh and Boxanagar areas. They affected houses, crops, livelihoods

and injured many. The tornado hit Bishalgarh on 1st May, 2012 damaged about 1000 houses and injured 45 people (*Disaster Management, Revenue Department, no date*).

Sample Selection:

In Tripura, the Education system comprises of universities, general degree colleges, technical colleges, professional colleges, and other colleges.

There are 62 institutions of higher learning in the state which are registered under All India Survey on Higher Education (AISHE). Out of those, 34 government institutions including one State University are under the control of the Higher Education Department. There is one private engineering college (Techno India), two General Degree Colleges run by Holy Cross and Bhartiya Vidya Bhawan and four private B.Ed. Colleges run by Bhavans, Holy Cross and ICFAI University (*About Us, Directorate of Higher Education, no date*).

There are 4 universities, out of which two are State Public Universities, one is a Central University and the last is an Institute of national importance. All four universities were selected for this study:

- 1. National Institute of Technology, Agartala:** offers bachelor's course in Chemistry and Engineering, with components relating to disaster risk management.
- 2. Tripura University, Agartala:** offers an MSc and PhD in Geography and Disaster Management.
- 3. Institute of Chartered Financial Analysts (ICFAI), Tripura:** offers relevant course as part of its Environmental Engineering programme.
- 4. Maharaja Bir Bikram University, Agartala:** offers an MA in Environmental Administration and Disaster Management.

There are 17 colleges both sitting under these universities and running as independent institutions which offer relevant courses meeting the selection criteria.

Feasibility of developing network and collaboration with ADN in Tripura

The primary airport in the state is the Maharaja Bir Bikram Airport, at Agartala, the state capital and the home of the majority of the selected institutions for this study. Multiple daily flights are available to Kolkata, and daily flights to Delhi.

The state can be accessed by rail from the east, as far as Kumarghat, some 130 kilometres or three and a half hours to Agartala. The state is well connected by road, with taxis and buses readily available.

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WEST BENGAL

Srashta Chowdhury

The state of West Bengal extends between 21° 38' to 27° 10' north latitudes and 85° 50' to 89° 50' east longitudes. The state stretches from the outer Himalayas in the north down to the Bay of Bengal in South. It has common international boundaries with the countries of Nepal, Bangladesh and Bhutan. The state shares boundaries with the state of Sikkim in the north, Assam in the northeast and to the west with Bihar and Jharkhand. Its capital is Kolkata (former Indian capital and currently the third largest urban agglomeration) on the banks of the Ganges, known as River Hugli locally. There are eight distinct landscapes prevalent in West Bengal: (a) the Darjeeling Himalayan Hill region; (b) the Terai region; (c) the North Bengal Plains; (d) the Rarh region; (e) the Coastal region; (f) the Mangrove area; (g) the Western plateau and highlands; and (h) the Ganges delta. West Bengal stands third in the country in terms of mineral production with coal constituting the majority. More importantly, West Bengal is crossed by numerous rivers and streams, both snow-fed and rain-fed (Ganga River Basin Management Plan, 2013).

Socio-demography of West Bengal

The population of West Bengal is 91.3 million (Census of India, 2011). The state population is largely constituted of different tribal communities. West Bengal has been experiencing an increasing share of the urban population over time. As per the Census 2011, about 31.89 percent of the population in the state lives in urban areas. Especially the last decade has witnessed a sharp increase of 3.9 percent in urban population. In 2011, West Bengal reached a population density of 1029 persons per square kilometre compared to the national average of 382 persons per square kilometre. As per Census 2011 data, West Bengal is the second most densely populated state in the country after Bihar. As per the Census of 2011, the statewide male literacy rate is 82.67 percent while the female literacy rate is only 71.16 percent. However, according to the NFHS – 5, only 32.9 percent of women have attended 10 or more years of schooling compared to the 34.7 percent of men. Only 25.5 percent of women have ever used the internet, to the 46.7 percent of men who have had such access.

Natural hazards in West Bengal

The State of West Bengal is vulnerable to natural disasters including flood, cyclone, hail and lightning storms, drought, landslide, erosion and earthquakes because of its geo-morphological, climatic and seismic conditions. Floods and cyclones occur almost every year in different parts of the state and inflict huge loss of life and property. These natural disasters strike at the very root of the economic growth of the state. The Government of West Bengal (GoWB) recognises the need to have a Disaster Management Policy with a proactive, comprehensive, and sustained

approach to disaster management to reduce the detrimental effects of disasters on the socio-economic development of the state. GoWB believes that Disaster Management requires a holistic approach which is inclusive of all the activities before, during and after disaster.

It is noted that about 68 percent of the total population of the state resides in 10 river-bank districts. The urban population is also concentrated in the river-bank districts accounting for about 85 percent of the total state urban population. Further, among the 10 river-bank districts around 56 percent of the urban population of the state resides in the four districts of North Paraganas (20%), Kolkata (15.40%), Burdwan (10.6%) and Howrah (10.5%). The river-bank districts also have greater share (60.32%) of the rural population, as compared to the non-riverbank districts

The flood risks of the state are of a different nature according to the different regions. The rivers Teesta, Torsa, Jaldhaka, Raidak-I, and Raidak-II flowing through the districts of Jalpaiguri and Cooch Behar originate in the neighbouring country of Bhutan and the state of Sikkim and flow down to Bangladesh, where they meet the Brahmaputra. The rivers of the districts of Uttar Dinajpur and Dakshin Dinajpur originating at Bangladesh pass through these districts and then join the Ganga-Padma downstream of Farakka in Bangladesh. Both the places of origin and the outflow of most of these rivers are in Bangladesh. The district of Malda through which the river Ganga flows receives its flood water from about 11 states and can be quickly filled by the run-off generated in these vast areas. Ultimately the river flows down the Farakka Barrage to Bangladesh. Another portion of the Malda district receives floodwaters of the Mahananda, which again originates in the hills of the neighbouring country of Nepal and has some catchment area in the neighbouring state of Bihar and then passes through the district to join the Ganga-Padma downstream of Farakka Barrage in Bangladesh. Major contributing factors to floods in the North Bengal regions are the run-off because of heavy local rainfall, discharge of upper basin areas and outflow conditions in the neighbouring countries. The Mahananda and most of the rivers of Uttar and Dakshin Dinajpur districts get blocked when the Ganga upstream and downstream of Farakka Barrage is high thereby not allowing drainage of flood discharge during that period.

West Bengal has two Cyclone seasons – pre-monsoon and post-monsoon, during April-May and Nov-Dec. Pre-monsoon cyclones, cause widespread hailstorms and are traditionally known as Kalbaishaki. Paschim Medinipur, Purba Medinipur, South 24 Parganas, North 24 Parganas, Howrah, Hooghly, part of Nadia, Burdwan and Bankura are located in very high damage risk zone ($V=50\text{m/s}$) with respect to cyclones; whereas a major part of Nadia, Burdwan, Bankura, Murshidabad, Malda, Uttar and Dakshin Dinajpur, Jalpaiguri, Cooch Behar, Darjeeling, part of Purulia are in a high damage risk zone ($V=47\text{m/s}$). A major portion of Purulia falls under a moderate damage risk zone ($V=29\text{m/s}$) with respect to cyclones.

Western sections of the northern districts of Jalpaiguri and Kooch Bihar lie in Earthquake Zone V. The remaining parts of these two districts, along with the districts of Darjeeling, Uttar Dinajpur, Dakshin Dinajpur, Maldah, 24 North Parganas and 24 South Parganas lie in Zone IV. The rest of the state along with the city of Kolkata, lies in Zone III.

Sample selection

The 19 districts of West Bengal (2011 Census) have been selected for the study. According to AISHE (2019-20) report, West Bengal has 1398 colleges, 45 Universities and 456 Stand Alone Institutes, which comprise 3.50%, 4.53% and 4.25% share respectively of the Higher Educational Institutes of India. The highest number of 179 colleges is in the district of Kolkata and lowest in Koch Bihar, 22 colleges. 5.56% of the universities are located in rural areas whereas 64.44% are located in urban areas. In the case of the colleges, 61.02% are rurally located and 38.98% are in the urban area. There are 13 colleges per lakh population, with an average enrolment of 1170 students per college. Gross Enrolment Ratio (GER) in Higher education in West Bengal is 19.3, GER for male population is 20.0% and for females, it is 18.7%.

A total of 143 colleges and 25 universities have been selected for developing ADN's network in West Bengal. Out of these 25 universities, one is central government-funded, 13 are state public universities, three are state private funded, one is private deemed university, four are of Institute of National Importance and the remaining three are private universities. Out of 143 colleges, 52 are state government funded, 41 are privately funded, 30 colleges run by the local bodies, three are private un-aided, and 17 sit under universities.

The Higher Educational Institutes that have been excluded from ADN network building have been so on the basis of the geographic location, availability of infrastructure and faculty, proper institute website and subjects taught.



Private Universities

1. **Amity University:** In this university the Institute of Social Science, Institute of Environmental Science and Institute of Renewable and Alternative Energy offers BSc, MSc and PG Diploma courses in Geography, Environmental Science and Solar Energy respectively.
2. **JIS University:** The departments that include the study of natural hazards and disaster management as a part of their curriculum in this institute are the Department of Earth Sciences and Department of Remote Sensing and GIS. The institute offers a three year BSc in Geology, two years MSc in Geology, MSc in Remote Sensing and GIS and PhD courses.
3. **St. Xavier's University, Kolkata:** The institute provides two years master's degrees in social work, in the Department of Social Work.

State Public Universities

1. **West Bengal State University:** In this university the Department of Geography and Department of Agriculture and Rural Development have been selected. These two departments offer MSc and PhD courses of study.
2. **Diamond Harbour Women's University:** In this institute the Department of Geography offers MSc and PhD (multidisciplinary) courses.
3. **Bankura University:** The institute provides a two year master degree in Social Work in the selected School of Social Sciences.
4. **Jadavpur University:** Six departments from this institute have been selected for network building. The Department of Geography provides BSc, MSc and PhD in Geography. The Department of International Relation offers BA, MA and M.Phil courses. The School of Environmental Studies offers an M.Tech in Environmental Biotechnology, an Advanced Diploma in Industrial Safety and Environmental Management and a PhD The School of Oceanographic Studies offers only PhDs (multidisciplinary). The School of Water Resource Engineering offers an ME in Water Resources and Hydraulic Engineering and the School of Energy Studies offers M.Tech in Energy Science in Technology and PhD courses.
5. **Coochbehar Panchanan Barma University:** In this institute the Department of Geography offers MA and PhD courses.
6. **North Bengal University:** Three departments have been selected to build the network, the Department of Geography and Applied Geography offer MA/MSc, M.Phil and PhD courses. The department is under the UGC SAP DRS II (Disaster Management in sub – Himalayan region). The Centre for Himalayan Studies offers MA in Strategic Area Studies, M.Phil and PhD courses. The department of Lifelong Learning and Extension offers MA in Rural Development.

7. **Raiganj University:** In this institute the Department of Geography offers MA, MSc, M.Phil and PhD courses.
8. **Aliah University, Kolkata:** In this institute the Department of Geography offers BA/BSc and MA/MSc courses.
9. **Calcutta University:** The two selected departments Geography and Environmental Science offers MSc in the respective subjects.
10. **Presidency University:** In this institute the Department of Geography offers BSc, MSc, and PhD courses.
11. **Kalyani University:** The selected department of Geography offers MA/MSc, and PhD courses. The Department of Environmental Science, which has also been selected, offers MSc, M.Phil and PhD courses.
12. **Rabindra Bharati University:** The selected departments are that of Geography and Department of Adult and Continuing Learning, offers an MA in Geography and Master's in Social Work respectively.
13. **Vidya Sagar University:** The selected Department of Geography and Environmental Science offers MSc and PhD courses.

State Private University

1. **Adamas University:** School of Applied and Basic Sciences of this institute offers BSc and MSc in Geography, integrated MSc in Geography and Geo-Informatics and a P.G. Diploma in Geo-Informatics and Geo-Statistics.
2. **Seacom Skills University:** The School of Sciences has been selected which offers, a BSc, MSc and PhD in Geography.
3. **Techno India University, West Bengal:** The departments selected from this institute are Department of Applied Geology, Department of Environmental Science and Department of Earth Science. All the departments offer MScs in the respective subjects.

Private Deemed University

1. **Ramakrishna Mission Vivekananda Educational and Research Institute:** The department selected is School of Environment and Disaster Management which offers an MSc and PhD in Environment and Disaster Management.

Central University

1. **Visva Bharti** is the only centrally funded university in the state. Two departments in this university offer courses on natural hazards and disaster management, the Department of Environmental Science (Shiksha Bhaban) and Institute of Humanities and Social Science (Vidya Bhaban). Department of Environmental Science offer master's degrees and doctoral degrees in

the concerned subjects, while the Department of Geography in Institute of Humanities and Social Science offers BA, MA, M.Phil and PhD.

Institute of National Importance

- 1. Indian Institute of Technology, Kharagpur:** The Centre for Oceans, Rivers, Atmosphere and Land Sciences and the Centre for Rural Development and Innovative Sustainable Technology have been selected. The selected courses that are provided by the two departments are B. Tech, M.Tech, MSc, MS and PhD.
- 2. Indian Institute of Science Education and Research, Kolkata:** The Department of Earth Sciences has been selected which offers BS and MS programmes.
- 3. National Institute of Technology, Durgapur:** The institute offers an M.Tech programme in the Department of Earth and Environmental Science and the Department of Humanities and Social Sciences.
- 4. Indian Institute of Management:** Centre for Development and Environment Policy has been selected from the institute.

Selected colleges

The colleges that have been mentioned in this section, listed by district, teach Disaster Management as a part of the Geography curriculum offering BAs/BScs in the subject. Some colleges offer MAs/MScs along with the aforesaid bachelors. The names of the different colleges have been mentioned according to the districts and type of fund. The degrees offered by the colleges have also been mentioned beside each name.

1. Koch Bihar

Private Aided: Coochbehar College (BA), Dinhata College (BA), Sitalkuchi College (BSc), Tufanganj Mahavidyalaya (BA)

State Government: ABN Seal College (BA)

University: University BT & Evening College

2. Kalimpong (district was newly formed in 2017)

State Government: Cluny College for Women (BA), Kalimpong college (BA/BSc)

3. Darjeeling

Local Body: Kurseong College (BA), Southfield College (BA)

Private Aided: Siliguri Mahila Mahavidyalaya (BA), St. Joseph College (BA), Surya Sen Mahavidyalaya (BA)

Private Un – Aided: Ghoom Jorebunglow Degree College (BA)

State Government: Darjeeling Government College (BA)

University: Siliguri College (BA, MA/MSc)

4. Jalpaiguri

Private Aided: P.D. Women's College (BA)

Private Un – Aided: North Bengal St. Xavier's College (BA)

State Government: Ananda Chandra College (BA), Dhupguri Girls College (BA)

5. Uttar Dinajpur

State Government: Dr. Meghnad Saha College (BA)

6. Dakshin Dinajpur

Local Body: Balurghat Mahila Mahavidyalaya (BA)

State Government: Balurghat College (BA)

7. Malda

Local Body: Gazole Mahavidyalaya(BA), Malda College (BA), South Malda College (BA)

State Government: Malda Women's College (BA)

8. Murshidabad

Local Body: Dukhulal Nibaran Chandra College (BSc), Jangipur College (BSc), Krishnanath College (BSc)

Private Aided: Jalangi Mahavidyalaya (BSc), Kandi Raj College (BSc), Subhash Chandra Bose Cenetenary College (BA)

State Government: Berhampore College (BA/BSc), Berhampore Girl's College (BSc)

University: Sewnarayan Rameswar Fatepuria College (BA/BSc)

9. Bankura

Local Body: Bankura Sammilani College (BA), Chhatna Chandidas Mahavidyalaya (BA/BSc), Sonamukhi College (BA)

State Government: Bankura Christian College(BSc), Ramananda College (BSc)

University: Barjora College (BSc), Patrasayer Mahavidyalaya (BA)

10. Birbhum

Local Body: Rampurhat College (BA), Turku Hansda-Lapsa Hemram Mahavidyalaya (BA)

State Government: Hiralal Bhakat College (BA), Krishna Chandra College (BA)

University: Sambhunath College (BA)

11. Puruliya

Local Body: Achhruram Memorial College (BA)

Private Aided: Nistarini College (BA), Panchokot Mahavidyalaya (BA)

University: Balarampur College (BA)

12. Purba Bardhaman

Local Body: Burdwan Raj College (BA/BSc), Gushkara Mahavidyalaya (BA/BSc)

Private Aided: St Xavier's College, Burdwan (BA) , Mankar College (BA),
Triveni Debi Bhalotia College (BSc, MSc)

Private Un – Aided: St. Xaviers College, Asansol (BA)

State Government: Dr. Bhupendra Nath Dutta Smriti Mahavidyalaya (BA/BSc),
Kandra Radha Kanta Kundu Mahavidyalaya (BA), M.U.C. Women's College
(BA/BSc), Shyamsundar College (BA/BSc), Asansol Girls' College (BSc), Kulti
College (BA), Michael Madhusudan Memorial College (BSc)

University: Katwa College (BA)

13. Nadia

Local Body: Nabadwip Vidyasagar College (BSc)

State Government: Krishnagar Govt. College (BA), Srikrishna College (BSc)

University: Dwijendralal College (BA)

14. Howrah

Local Body: Shibpur Dinobundhoo Institution (BSc)

Private Aided: Azad Hind Fouz Smriti Mahavidyalaya (BA), Prabhu
Jagatbandhu College (BSc, MSc)

State Government: Bijoy Krishna Girls' College (BSc)

15. East Medinipur

Private Aided: Mahishadal Raj College (BSc), Prabhat Kumar College (BSc)

State Government: Haldia Government College (BSc, MSc), Khejuri College
(BSc), Panskura Banamali College (BA/BSc and MSc), Shahid Matangani
Hazra Govt. College for Women (BSc)

University: Swarnamoyee Jogendranath Mahavidyalaya (BSc), Tamralipta
Mahavidyalaya (BA)

16. West Medinipur

Local Body: Midnapore College (BSc)

Private Aided: Bhattar College (BA/BSc), Midnapore City College (BSc, MA/
MSc)

State Government: Belda College (BSc), Govt. General Degree
College, Narayangarh (BSc), Hijli College (BSc), Nayagram Pandit Raghunath
Murmu Government College (BSc), Santal Bidroha Sardha Satabarsiki
Mahavidyalaya (BSc)

17. Hooghly

Local Body: Tarakeswar Degree College (BA)

Private Aided: Serampore Girls' College (BSc), Serampore College (BA/BSc),
Bidhan Chandra College (BA/BSc), Khalisani Mahavidyalaya (BA)

State Government: Chandernagore College (BSc), Hooghly Women's College
(BA/BSc)

18. Kolkata

Local Body: Vidyasagar College for Women (BSc), Women's Christian College (BA)

Private Aided: Asutosh College (BSc, MSc), Gokhale Memorial Girls College (BA/BSc), Heramba Chandra College (South City College) (BSc), Jogamaya Devi College (BSc), Loreto College (BSc), Maheshtala College (BA), Rani Birla Girls' College (BSc), Sammilani Mahavidyalaya (BA), Shri Shikshayatan College (BA/BSc), South Calcutta Girls' College (BSc), Victoria Institution (BSc), Vidyasagar College (BSc), Women's College (BSc)

State Government: Govt. Girls General Degree College (BSc), Lady Brabourne College (BSc), Rammohan College (BSc), Sarsuna College (BSc), Sister Nibedita Government General Degree College for Girls (BA/BSc)

University: Deshbandhu College for Girls' (BA/BSc), Vivekananda College for Women (BA)

19. North 24 Parganas

Local Body: Acharya Prafulla Chandra College (BSc), DumDum Motijheel Rabindra Mahavidyalaya (BSc), Kalinagar Mahavidyalaya (BSc), Naba Barrackpore Prafulla Chandra College (BSc), Rishi Bankim Chandra College for Women (BSc)

Private Aided: Barrackpore Rastraguru Surendranath College (BSc), Mrinalini Datta Mahavidyapith (BSc)

State Government: Barasat Government College (BSc), Bhairab Ganguly College (BSc), Bidhannagar College (BSc), DumDum Motijheel College (BSc), East Calcutta Girls College (BSc), Prasanta Chandra Mahalanobish Mahavidyalaya (BSc), Sarojini Naidu College For Women (BSc), Sree Chaitanya College Habra (BSc), Taki Government College (BSc)

University: Basirhat College (BSc)

20. South 24 Parganas

Local Body: Sagar Mahavidyalaya (BSc), Sonarpur Mahavidyalaya (BSc)

State Government: Baruipur College (BSc), Fakir Chand College (BSc)

University: Bhangar Mahavidyalaya (BSc), Kultali Dr. B. R. Ambedkar College (BSc), Raidighi College (BSc)

Feasibility of developing a network and collaboration with ADN in West Bengal

The districts of West Bengal have a well-developed communication system, by road and rail. The district of Darjeeling sees huge influx of students from the northern districts: Jalpaiguri, Kochbihar, Uttar Dinajpur, Dakshin Dinajpur and Malda. The district has one of the oldest universities, i.e. University of North Bengal (est. 1962), where the Department of Geography and Applied Geography is under the UGC SAP DRS II (Disaster Management in sub – Himalayan region). Other than this the university has a Centre for Himalayan Studies that focuses on studying the problems and prospects of the eastern and northeastern Himalayan region. Other than this

university the other districts in the northern portion of Bengal have newly built universities which have been selected: Coochbehar Panchanan Barma University (Kochbihar), Raiganj University (Uttar Dinajpur) and Gourbanga University (Malda). Six districts do not have any central universities, private universities or institutes of national importance. Other than the universities, 27 colleges have been selected from the northern portion of West Bengal in both urban and rural locations, with proper connectivity via roadways and railway. Only Siliguri College (Darjeeling district) offers a master's programme in Geography and is located in the city centre.

The other selected universities are located in and around Kolkata, the capital of West Bengal. Due to high connectivity via local modes of transportation, be it roadways, railways, metro or waterway, the institutes that are located in and around Kolkata Metropolitan Area (KMA) are easily accessible. Similarly, all the Private Universities that have been selected for the study are located in the KMA. Calcutta University, Presidency University, Jadavpur University, West Bengal State University, Aliah University, Rabindra Bharati University, Adamas University, Techno India University, Ramakrishna Mission Vivekananda Educational and Research Institute, Indian Institute of Science Education & Research (IISER), Indian Institute of Management (IIM, Joka), are all located in and around the KMA.

Viswa Bharati which is the only central university in the state is located in Bolpur, Birbhum district and is 163.5 km away from Kolkata.

The Indian Institute of Technology, Kharagpur (IIT) is located in West Medinipur, 130 km away from the capital of West Bengal.

The other universities, such as Vidyasagar University (East Medinipur), Bankura University (Bankura), Kalyani University (Nadia) are the only State Public Universities in the respective districts.

Diamond Harbour Women's University is the only university in the state exclusively for women and is located in South 24 Parganas, 42.4 km away from Kolkata.

The colleges that are selected are located across multiple districts and are affiliated to the state public university present in each district. The Private Universities, the Institute of National Importance, the State Private Universities, the Presidency University, the Aliah University, the Diamond Harbour Women's University, and the Rabindra Bharati University do not have any affiliated colleges but are teaching and research intensive universities.

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