













SECONDARY DATA ANALYSIS REPORT

JUNE 2022

ASSAM FLOODS 2022

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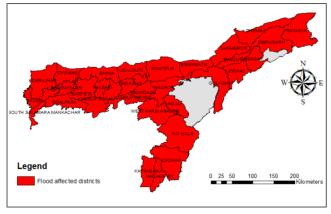
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1. DISASTER OVERVIEW

The flood situation in Assam during the second wave since 14th June 2022 turned critical by 20th June in Assam, and continues to look grim. As on June 17, eight rivers are flowing above high flood level and three rivers are flowing above the danger level (Central Water Commission's bulletin). Additionally, landslides have been reported in Dima-Hasao, Goalpara, Morigaon, Kamrup & Kamrup (M) in the last few days. The flood



MAP 1: FLOOD AFFECTED DISTRICTS IN ASSAM SOURCE: FLOOD REPORT ASDMA

intensity of this kind (this year) has never happened before and due to which the

suffering of the people is also more as they do not have coping mechanisms against it. River Kopili, a major tributary of the Brahmaputra, is flowing in "extreme flood stage" at Kampur in Nagaon district of central Assam. Barpeta is the worst-hit district with 12.76 lakh people marooned. 96 Revenue Circles and 2,930 villages have been impacted by flood incidents, including approximately 1.9 million people, over 100,000 of which are taking shelter in 373 relief camps. 54 people have lost their lives due to flooding and landslides across the state since the monsoon season began on April 6, 2022.

The embankments, roads, bridges, culverts and, many other infrastructures have been damaged in various places. The business establishments are facing huge losses as the water level raised during the night and entered the shops and godowns. The places which are very badly affected were not known as the flood-prone area. The movement of vehicles on NH 15 is closed from the 16th of June, due to overflooding at several places. The embankment of the big rivers like, the Nowanoi, Nanoi, Saktola, and Kulsi, breached at several places. Around 700 families in the area are affected by the flooding and lacking a supply of drinking water and dry rations. Today, there are 1871 relief camps/distribution centres across the affected districts. As the water begins to recede, the immediate impact of flood & post-flood management would be challenging. Most displaced people are living in small, crowded spaces in camps or on makeshift boats, with little food and other supplies. Health and hygiene have been major concerns for children, who are also victims of malnutrition. Issues of maintaining fires in the continuous wet weather and areas for excretion, among others, are cropping up. Even finding clean drinking water has been a big issue, as most of the drinking sources are now covered by the floodwaters. So far, 11,881 people have been safely evacuated by the above forces and agencies. Relief materials were distributed to affected populations who are not taking shelter in relief camps through 232 relief distribution centres and temporarily opened sites.

2. METHODOLOGY

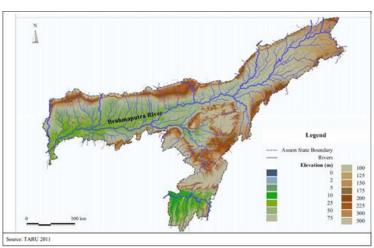
The Secondary data analysis in the aftermath of the floods in Assam, was carried out in June 2022. The Secondary review was a desk study based on information available in the media, Sphere India and Government situation reports, government sources, feedbacks from local organisations working in the state, etc. For more detailed study a preliminary Joint Rapid Needs Assessment (JRNA) will be conducted by Sphere India and its partners in the affected areas of the state.

3. PRE-DISASTER INFORMATION

3.1. STATE OVERVIEW: ASSAM

3.1.1. LOCATION AND GEOGRAPHY

Assam, situated at the foothills of the eastern Himalayas, is the largest State in northeast India and lies in the middle reach of the river Brahmaputra and Barak. The Brahmaputra basin covers an area of 5,80,000 sq. km out of which 70,634 sq. km falls within Assam. The State accounts for nearly 2.4% of India 's total geographical area. The land has uneven topography, full of hills, plains and rivers. The State is bordering Arunachal Pradesh in the east, West Bengal, Meghalaya,



Map 2: Topographic Features and River Network (Source: Assam SDMP)

Bangladesh in the west, Arunachal Pradesh, Bhutan in the north and Nagaland, Manipur, Mizoram, Meghalaya, Tripura in the south. Its longitude lies at 88.250E to 96.00E and latitude at 24.50N to 28.00N and temperature varies from 60C to 380C. The humidity that is brought into Assam by the southwest monsoons, shower an average annual rainfall of 120 inches or more on the Brahmaputra valley and the surrounding region. The monsoons are Assam's life line; creating a bio-diversity that can compete with the equatorial rain-forests (State profile, Ministry of Health and Family Welfare, 2009). The topography and the warm and humid climate are conducive to plant and vegetation growth. Assam is home to 51 forest and sub-forest types, which covers 35.48% and consists of tropical rainforests, deciduous forests, riverine grasslands, bamboo, orchards and numerous wetland ecosystems (Assam Human Development Report, 2003). The state has 5 national parks, 13 wildlife sanctuaries and 2 bird sanctuaries (Official website, Government of Assam, Last assessed on 20Mar2012).

Parameter Value State Assam Capital Dispur Geographical area 78,438 km² **Co-ordinates** $24 \text{ N}^{\circ} - 28 \text{ N}^{\circ}\text{"} \sim 90 \text{ E}^{\circ} - 96 \text{ E}^{\circ}$ **Population** 3.12.05.576 **Administrative districts** Assam, the gateway to the North East India and is bordering seven states **Borders** viz. Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and West Bengal and two countries viz. Bangladesh & Bhutan. **Average Rainfall** There are 3 major river systems that covers Assam- the Brahmaputra, the **Rivers** Barak and the Manas and several other smaller rivers that are tributaries to these 3 river systems.

TABLE 1: GEOGRAPHICAL PROFILE OF ASSAM

3.1.2. DEMOGRAPHY

As per details from Census 2011, Assam has population of 3.12 Crores of which male and female are 15,939,443 and 15,266,133 respectively. The total population growth in this decade was 17.07 percent while in previous decade it was 18.85 percent. The population of Assam forms 2.58 percent of India in 2011. In 2001, the figure was 2.59 percent.

In 2011, the literacy rate in the state was 72.19%. The male literacy rate was 77.85% and the female literacy rate was 66.27%. In 2001, the census had recorded literacy in Assam at 63.3% with male literacy at 71.3% and female at 54.6%. The urbanisation rate was recorded at 12.9%. Recently as per Assam census data, 87.92% houses are owned while 6.84% were rented. In all, 74.13% couples in Assam lived in single family.

Parameter (Census 2011)	Value
State	Assam
Decadal population growth rate	17.07
Population	31,205,576
Population density	398 (persons per sq. km)
Male population	15,939,443
Female population	15,266,133
Sex ratio	958 (females per 1,000 males)
Literacy rate	72.19%
Literacy Rate (Rural)	69.34 (%)
Literacy Rate (Urban)	88.47 (%)
Life expectancy (years)	66.2 (2014-17)

TABLE 2: STATE DEMOGRAPHY

3.1.3. CLIMATE

Assam experiences the predominant influence of the southwest tropical monsoon which is normally active from April to October with occasional winter showers. The approach of the monsoon is usually marked by strong winds, overcast skies accompanied by occasional thunder showers, hailstorms and at times by cyclones between April and May. Thunderstorms known as Bordoicila are frequent during the afternoons. Heavy downpour starts from June. The annual average rainfall of the state varies between 1600mm and 4300mm from place to place. The average rainfall for the state as a whole is about 2900mm with maximum precipitation during June and July. The average temperature in the state varies from 4°C to 19°C during the winter and 26°C to 37°C during the summer accompanied by high humidity.

3.1.4. HOUSEHOLDS AND SLUMS

TABLE 3: HOUSEHOLD DATA

Parameter	Values
Population density per km2	398
Urban Population (%)	14.10%
Rural population (%)	85.90%
Total No. of Households	6406471
HH with Drinking Water From treated source	6.50%
HH with Drinking Water From	1.00%

untreated source				
HH with Drinking Water From well	19%			
HH with Drinking Water From tap	10.50%			
HH with Drinking Water Handpump tube well and borewell	59%			
Other Sources	3.00%			
Distribution of HH by availability of Bathing facility/Type of drainage/Kitchen				
Toilet available	65%			
Drainage Facility	874.9KM			
Distribution of HH by Type of Housing Structure				
Kutcha Houses	267076			
Pucca Houses	5695381			
Semi-Pucca Houses	206537			

3.1.5. EDUCATION

TABLE 4: EDUCATION DATA

Parameter (Census 2011)	Value
State	Assam
Total Schools	65203
• Government	46749
Government Aided	4983
 Private Unaided Recognized 	6045
• Others	7426
Total Teachers	370341 (220931 (Male) & 149410 (Female))
Total Students	7582019 (3749480 (Male) & 3832539 (Female))
• Pre-Primary	460270 (238439 (Male) & 221831 (Female))
Higher Secondary	439847 (219502 (Male) & 220345 (Female))
Total Students with Special Needs	3195 (1511 (Male) & 1684 (Female))
Primary Dropout Rate (1-5)	3.3 (4.2 (Male) & 2.3 (Female))
Upper Primary (6-8)	4.6 (6.0 (Male) & 3.2 (Female))
Secondary (9-10)	31.0 (29.7 (Male) & 32.1 (Female))

3.1.6. HEALTH

According to National Family Health Survey V, the health profile of Assam shows that about 32.8% children below the age of 5 years are underweight. Besides, 68.4% children between the age group of 6-59 months are anemic and about 17.6% women have body mass index (BMI) below normal. The infant mortality reduced to 31.9 against the national average of 35. The situation is even worse in Under-Five mortality rate, which stands at 39.1.

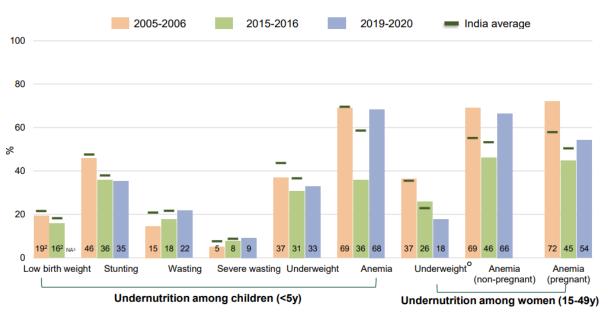


FIGURE 1: TRENDS IN UNDERNUTRITION OUTCOMES

3.1.7. WATER, SANITATION AND HYGIENE (WASH)

Talking about access to drinking water, in Assam out of 6,367,295 households only 10.5% have access to tap water, 18.9% have wells and majority 59.4% use tube wells for drinking water followed by 11.3 % having drinking water accessibility from other sources, (ENVIS Report on Water & Sanitation, 2018).

On treated drinking water the percentage in rural Assam is 5.8%. On untreated water the figure for Assam is only 1%. 4.5% of urban households in Assam have drinking water from covered sources while 13.1% do not have such, (ENVIS Report on Water & Sanitation, 2018).

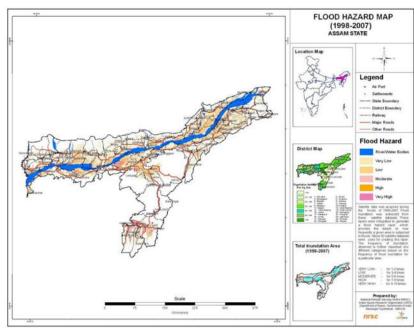
The distance of availability of water from the households is one important matter of concern. 54.8% of households have availability of drinking water inside their premises. There is a fall in households in rural Assam of availability of drinking water near the premises from 41.9% in 2001 to 29.3% this time, (ENVIS Report on Water & Sanitation, 2018). A survey on the Water, Sanitation and Hygiene (WASH) Knowledge, Attitude and Practices (KAP) by Caritas India, 2018 in flood affected Assam, reported that of the existing latrines in the villages, there are no handwashing facilities available nearby, and therefore only 50% of the surveyed population could wash their hands after defecation, (Survey on WASH-KAP, Caritas India, 2018).

WHO/UNICEF's Joint Monitoring Programme on sanitation for Millennium Development Goal released its report on India in 2018 which indicated that 59% Indians still does not have access to toilets and they use open defecation. In Assam overall 35.1% households have no toilet. Particularly in events of disasters, 67% of the flood-affected population defecates in the open, due to lack of sanitation facilities and damages to existing sanitation structures in these areas after the flood, (Survey on WASH-KAP, Caritas India, 2018). In rural Assam the picture is as same as in 2001 with 40.4% households with no toilet in 2011 Census. In the urban areas the state has 6.3% households with no toilet. Assam also has overall only 28.5% households have toilets with water closet, 34.7% households have pit latrines and 1.8% households have other types of toilet, (ENVIS Report on Water & Sanitation, 2018).

3.2. HAZARD, RISK ASSESSMENT AND VULNERABILITY MAPPING

3.2.1. FLOOD

The state is frequently affected by the flood hazard i.e., on an average 34% of the land area is affected on decadal basis; followed by erosion, earthquake, landslide, fire and cyclonic storms. The state receive relatively high average annual rainfall (2,425 mm) in India. The soil types the within states are predominantly of sand, clay or loam. Much of the areas being mountainous and does exhibit slope which ranges from 1 to 8%. Due to soil characteristics, climate and topography; this state is



MAP 3: FLOOD HAZARD (1998 - 2007) (SOURCE: ASSAM SDMP)

prone to erosion due to rivers in plains and gully erosion in the hilly areas. On an average 10-25% of the agricultural areas are affected by this phenomenon. Since much of the buildings within the state have roof and wall types of category I and II, these buildings are at high risk to floods, erosion and cyclonic wind storms.

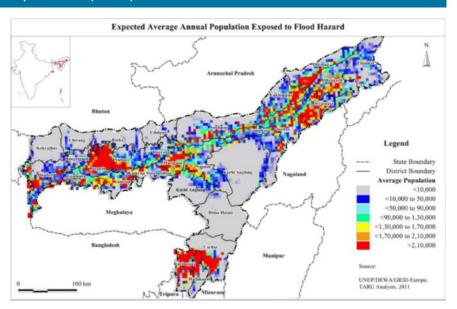
1.2.2 VULNERABILITY TO FLOODS

The Brahmaputra Valley in Assam is one of the most hazard-prone regions of the country, with more than 40% of its land (3.2 million hectares) susceptible to flood damage. This is 9.4% of the country's total flood-prone area. About 7% of land in the state's 17 riverine districts has been lost because of river erosion over the past 50 years. The important cause for frequent occurrence of flood in this region is the extremely dynamic monsoon rainfall regime and the unique physiographic setting. The water yield of the Brahmaputra basin is among the highest in the world. This, together with the limited width of the valley and the abruptly flattened gradient, leads to tremendous drainage congestion and resultant flooding.

According to Flood Hazard Atlas of Assam (ISRO, 2011), approximately 28.31% (22.21 lakh hectares) of land in state of Assam was affected by flood hazard between the period 1998 to 2007. In the above study, the flood prone areas were divided into categories based on frequency which range from very high to very low. Very high indicates nine to ten times inundation during last 10 years. This amounts to nearly 1.64% of total geographical areas of state (5.79% of total flood affected area). High; indicates occurrence of seven to eight floods over the last 10 year. This amounts to approximately 2.86% of total geographical areas of state (10.11% of total flood affected area). The rest of the flood affected zones i.e., moderate, low and very low the percentage area of each flood hazard category accounts to 4.48% (15.83% total flood affected area), 6.27% (22.14% total flood affected area) and 13.06% (46.13% total flood affected area) respectively.

Apart from the geoclimatic setting, high rate of population growth in the form of high birth rate and immigration from border countries has led unplanned settlements. Human activities like deforestation,

accelerated rated change in land use, filling up low lying areas for the construction of buildings, urban development and temporary flood control measures are some changes which do



MAP 4: EXPECTED AVERAGE ANNUAL POPULATION EXPOSED TO FLOODS

SOURCE: STATE DISASTER MANAGEMENT PLAN

contribute to the overall vulnerability of the state to floods (Dhar and Nandaragi, 2003). The reliability and effectiveness of the embankments from the Brahmaputra flooding are generally insufficient because of structural deterioration and ongoing riverbank erosion.

3.2.2. IMPACT OF FLOODING

The state is frequently affected by the flood hazard i.e., on an average 34% of the land area is affected on decadal basis; followed by erosion, earthquake, landslide, fire and cyclonic storms. Flood hazard is of major concern as there is a repetitive loss whereas river bank erosion associated losses and damages are undeclared disasters. River bank erosion event dominate the larger disaster picture and those impacted by the events on a frequent basis suffer more due to phenomenon repeated and with less/marginal or no outside assistance. The state does receive relatively high average annual rainfall (2,425 mm) in India. The

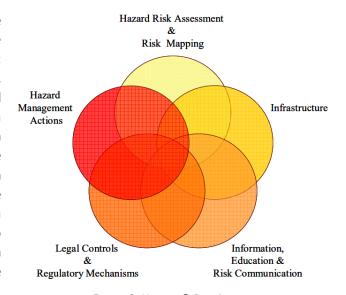


FIGURE 2: HAZARD & RISK ASSESSMENT

soil types within the states are predominantly of sand, clay or loam. Much of the areas being mountainous and does exhibit slope which ranges from 1 to 8%. Due to soil characteristics, climate and topography; this state is prone to erosion due to rivers in plains and gully erosion in the hilly areas. On an average 10-25% of the agricultural areas are affected by this phenomenon. Since much of the buildings within the state have roof and wall types of category I and II, these buildings are at high risk to floods, erosion and cyclonic wind storms.

4. CURRENT DISASTER SCENARIO

4.1. FLOODS IN ASSAM- JUNE 2022

After the first flood wave during mid-May this year, Assam is currently facing the second wave from June 14th 2022 onwards. With rains abating, there was a slight improvement in the overall flood situation in Assam on 22nd June. However, Silchar in south Assam's Barak Valley remained submerged, even 48 hours after an embankment breach. Families continue to be stranded in their waterlogged homes, and the town is facing a massive shortage of food and drinking water. Electricity has also been cut off in several parts of the town.

- The recent heavy swelled many rivers. As on June 22, rivers like Kopili (Dharamtul), Disang (Nanglamuraghat), and Brahmaputra (Dhubri; Goalpara; Tezpur; Neamatighat) are flowing above danger level. Additionally, landslides have been reported in Dima-Hasao, Goalpara, Morigaon, Kamrup & Kamrup (M) in the last few days.
- 112 Revenue Circles and 4941 villages have been impacted by flood incidents, including approximately 5.4 million people, over 2,71,125 of which are taking shelter in 845 relief camps.
- At least 11,292 people and 27,086 animals have been evacuated by agencies engaged in rescue operations, as reported on 22nd June 2022.
- On 23rd June, 7 human lives were lost including 2 children were reported, which has brought the total tally to 107 deaths due to flooding. Additionally, landslides across the state are being reported since the monsoon season began on April 6, 2022 and 17 deaths have been confirmed due to landslides since then.

4.1.1 SECTORAL IMPACTS:

Shelter Sector:

The situation in Assam has become so disastrous that thousands of people have lost their homes and are living in various camps. Most displaced people are living in small, crowded spaces in camps or on makeshift boats, with little food and other supplies. Some of the affected families in Morigaon district are reported to be living in small places along with their animals.

Health and Hygiene Sector:

Health and hygiene have been major concerns for children, who are also victims of malnutrition. Issues of maintaining fires in the continuous wet weather and areas for excretion, among others, are cropping up. Even finding clean drinking water has been a big issue, as most of the drinking sources are now covered by the floodwaters.

Livelihood Sector:

The condition of the farmers has worsened because they have not been able to transport their crops. Drinking water sources are being submersed. Roads are inundated and disconnected everywhere. In addition, the animals that have not been lost in the flooding that sustain the livelihood of families do not have feed, particularly cattle, goats, sheep, and poultry. These animals are also difficult to transport, but their loss is devastating to familial income. The business establishments are facing huge losses as the water level raised due to the floods and entered the shops and godowns.



FIGURE 3: STUDENTS CARRY THEIR LUGGAGE TO SAFER PLACES AFTER HOSTELS AND ACCOMMODATIONS WERE FLOODED DUE TO HEAVY RAIN IN



FIGURE 5: FLOOD BARRICADES PUT UP ON A WATERLOGGED STREET AFTER HEAVY RAINFALL AT KALITA KUCHI IN ASSAM' KAMRUP DISTRICT.

(PICTURE CREDITS: INDIA TODAY)



FIGURE 4: A WOMAN LOOKS TOWARD A DAMAGED BOUNDARY WALL AFTER A LANDSLIDE AT HENGRABARI, IN GUWAHATI, ON JUNE 15. (PTI PHOTOS)



FIGURE 6: A MAN STANDS OUTSIDE HIS HOUSE IN A FLOODED LOCALITY, IN KAMRUP DISTRICT OF ASSAM (PTI PHOTO)



Figure 7: Indian army personnel rescue flood-affected villagers on a boat in Jalimura village, west of Guwahati (Photo: AP)



Figure 8: Nazirpatty locality in the heart of Silchar in Cahcar district. (Picture Courtesy: Partha Seal)



Figure 9: Paramilitary forces aid rescue work in Silchar. (Photo: Cachar district administration)



Figure 10: Villagers use a boat to commute at flood-hit at Raha village, in Nagaon district, Tuesday, June 21, 2022. (Credit: PTI Photo)

4.2. GOVERNMENT RESPONSE

4.2.1. CENTRAL GOVERNMENT

The National Disaster Response Force, the Assam State Disaster Response Fund, fire & emergency services personnel, police forces, and AAPDA Mitra volunteers of the Assam State Disaster Management Authority have been aiding the district administration in efforts to safely evacuate individuals from affected areas of the region.

4.2.2. STATE GOVERNMENT

- Review meeting was conducted by Chief Secretary on 16th June with senior secretaries, officials of Army, NDRF, etc.
- Review meeting with all DCs by Additional Chief Secretary, WRD and Principal Secretary to HCM on 18th June.
- Review meeting by Chief Minister Himanta Biswa Sarma: With the flood situation in Assam remaining critical on 20 June 2022, affecting a population of nearly 43 lakhs in 33 of its 35 districts, CM of Assam has directed air dropping of food and other relief materials in areas where there is heavy inundation, officials said. Sarma gave the direction after a review meeting with his cabinet colleagues and senior district officers during the day.
- Manpower from ASDMA placed at Nalbari, Bajali and Udalguri
- Total advance released to all districts and subdivisions 97.47 crores.
- SDRF deployed in 47 locations with 346 manpower.
- State government has reached out to Indian Institute of Technology, Guwahati to seek its
 expertise in surveying the flood affected areas using drones to assess the condition in the
 villages where road connectivity has been disrupted due to heavy flow of water.
- So far, 11,881 people have been safely evacuated by the above forces and agencies. Relief
 materials were distributed to affected populations who are not taking shelter in relief camps
 through 232 relief distribution centres and temporarily opened sites.

4.3. HUMANITARIAN RESPONSE

- IAG Assam initiated Unified Response Strategy for effective coordination of NGO responses in flood affected areas of the state. The State IAG is planning for an Emergency Meeting of its members to assess the situation and for coordinated response.
- SEEDS India has distributed 40 Relief Kits (food, WASH, NFIs etc.) and is currently constructing 20 Transitional Shelters in Cachar District.
- Caritas India has started the relief distribution in Hojai, Cachar and Karbi Anglong with WASH,
 Food and Shelter kits.
- Emergency Relief Assistance was organised by North East Diocesan Social Service Society, Guwahati (NEDSSS) in collaboration with Jirsong Asong, Diphu supported by Manos Unidas, with the aim of providing Dry Ration supply to 2000 families from of most affected districts of Assam. A meeting with village leaders and institutions in Satgaon Parish was also organised for

the same. School students volunteered in the packing of kits at Langting, Relief camp in Langting railway line area.

- Digitized needs assessment being done in collaboration with the government disaster management authorities.
- Immediate relief kits to at least 3000 families targeting women headed households, marginal and landless farmers, and families with persons with disabilities in affected districts based on unmet needs
- Drone-based damage and loss assessment of the affected areas.
- In addition, the North-East Affected Area Development Society (NEADS), an organisation based in Assam and supported by Humanitarian Aid International (HAI), has received £60,000 in funding from Start Network and is responding to this crisis, taking the lead on providing humanitarian aid to displaced and affected groups.
- HAI is also collaborating with Monday.com to deploy tools to digitally collect data on the
 emerging needs on-ground to prepare real-time dashboards of needs and response for all
 stakeholders. An Emergency Command Centre (EOC) is being piloted in Jorhat, Assam in
 collaboration with government disaster management authorities to coordinate digitised data
 collection for the current flood need assessment.

5. SECTOR WISE NEEDS ANALYSIS

Unprecedented rainfall and flooding have left behind a trail of destruction in Assam and other states, as well as parts of neighbouring Bangladesh - submerging villages, destroying crops, and wrecking homes. In the affected areas food and nutrition security is of high concern followed by shelter needs, livelihood restoration and access to health services, particularly in slum areas and informal settlements.

WATER, SANITATION AND HYGIENE

- Drinking water sources are being submerged. Finding clean drinking water has been a big issue, as most of the drinking sources are now covered by the floodwaters.
- Due to unhygienic water many livestock and humans are affected with illness.
- The floodwater also damaged many of the household toilets partially and completely.

LIVELIHOOD

- The animals that have not been lost in the flooding that sustain the livelihood of families do not have feed, particularly cattle, goats, sheep, and poultry.
- These animals are also difficult to transport, but their loss is devastating to familial income.
- Crops have been completely destroyed on nearly 99,026-hectare area.
- Acute shortage of fodder is causing death of cattle which survived the rising waters of the river.

EDUCATION

- Study material of children are damaged by the flood across various district.
- Many schools are reported to be inundated by flood water and hence, structural assessment and condition of the buildings must be checked before reopening of school.
- All connecting roads, bridge, culvert, school building, Anganwadi centre are damaged, most of the roads are closed including NH 15.

HEALTH

- Disruption in health services is due to infrastructural damage, damage to medical equipment, shortage of medicine and inaccessibility to hospitals/health centres etc.
- All connecting roads, bridge, culvert, hospitals are damaged, most of the roads are closed including NH 15.
- People are having shortage of Hygiene kit and are most urgently needed in the rural as well as in the urban areas.
- No medical facility many children are suffering from fever.

FOOD AND NUTRITION SECURITY

- People are having shortage of dry ration, baby food, candle and matches are most urgently needed in the rural as well as in the urban areas.
- The floods have affected the functioning of markets as well.

SHELTER

- The situation has become so disastrous that thousands of people have lost their homes and are living in various camps.
- Most displaced people are living in small, crowded spaces in camps or on makeshift boats, with little food and other supplies.
- At least 11,292 people and 27,086 animals have been evacuated by agencies engaged in rescue operations on 22nd June. Affected communities rush to high ground, hoping for safety.

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