

FLOOD HAZARD MAP

GOLAGHAT DISTRICT



Extract from Flood Hazard Atlas for Assam State - A Geospatial Approach prepared by National Remote Sensing Centre, Indian Space Research Organization, Dept. of Space, Govt. of India



Assam State Disaster Management Authority

FLOOD HAZARD MAP 1998 - 2007 GOLAGHAT



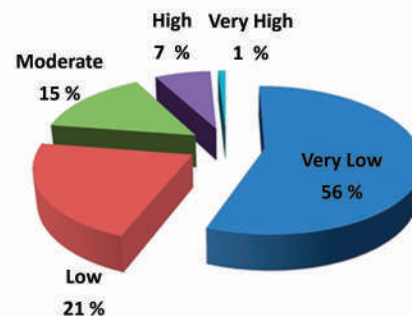
Flood Hazard Statistics

1. Geographical Area: 3502 Sq.Km
2. Total Flood Hazard Area: 1048.14 Sq.Km
3. % Flood Hazard Area: (29.92%)
4. Flood Hazard Area under different Flood Hazard Zone

Hazard Code	Severity	Flood Hazard Area (hectares)
1	Very Low	58482
2	Low	22692
3	Moderate	15431
4	High	7260
5	Very High	949

5. Total No. of Revenue Circles (as per census 2011): 6 nos.
6. Total No. of Villages (as per census 2011): 1132 nos.
7. List of Villages under Very High & High Hazard categories : 80 nos.

Graph showing the percentage of various Flood Hazard categories



1.1 FLOOD AND ITS SEVERITY

Flood is one of the most severe disasters affecting the people across the globe. India is the worst flood-affected country in the world after Bangladesh and accounts for one-fifth of global death count due to floods. Nearly 75 per cent of the total Indian rainfall is concentrated over a short monsoon season of four months (June-September). As a result, the rivers witness a heavy discharge during these months, leading to widespread floods. About 40 million hectares of land in the country is liable to floods according to National Flood Commission, and an average of 18.6 million hectares of land is affected annually. The annual average cropped area affected is approximately 3.7 million hectares. The most flood-prone areas in the country are the Brahmaputra, Ganga and Meghna River basins in the North and North-east India. These rivers carry 60 per cent of the nation's total river flow.

1.2 MANAGING FLOODS

In order to mitigate the impact of floods,

appropriate flood management measures have to be implemented. These measures can be classified into:

1. Structural measures
2. Non-structural measures

Structural Measures: In this approach physical structures are envisaged to prevent the flood waters from reaching potential damage regions. The main structural measures undertaken so far in India are as follows.

1. *Embankments, Floodwalls, Flood levees*
2. *Dams and Reservoirs*
3. *Natural Detention Basin*
4. *Channel Improvement*
5. *Drainage Improvement*
6. *Diversion of flood water*
7. *Catchment area treatment/afforestation*
8. *Anti-erosion works*

Non-Structural Measures: Non-structural measures strive to keep the people away from floodwater. It contemplates use of floodplains judiciously. This technique allows the use of floodplains by reducing the disaster dimension, while retaining its beneficial needs. Following are the main non-structural measures

- 1. Flood forecasting and warning*
- 2. Flood Hazard Zoning*
- 3. Flood Proofing*
- 4. Regulation of reservoirs*
- 5. Flood Insurance*

Flood Hazard Zonation (FHZ), an important non-structural measures facilitates appropriate regulation, and development of floodplains thereby reducing the flood impact. The recurrent flood events at frequent intervals demand the need for identification of flood hazard prone areas for prioritizing appropriate flood control measures. In this context, satellite remote sensing plays an important role in delineating

such flood hazard zones.

2.0 FLOOD PROBLEM IN ASSAM

2.1 ABOUT ASSAM

Assam popularly called as the land of the red river and blue hills is the gateway to the northeastern part of India. It is the eastern most state of the Indian sub-continent, extending from 22°19' to 28°16' North Latitude and 89°42' to 96°30' East Longitude between the foot hills of the Eastern Himalayas and the Patkai and Naga Ranges. Assam is bordered in the North and East by Bhutan and Arunachal Pradesh. Along the south lie Nagaland, Manipur and Mizoram. Meghalaya lies to the South-West, Bengal and Bangladesh to the West. Assam comprises of the Brahmaputra and the Barak river valleys. With an area of 78, 438 square kilometres, Assam also shares international borders with Bhutan and Bangladesh. A land of high rainfall, Assam is endowed with lush greenery and the mighty river Brahmaputra, whose tributaries and oxbow lakes provide the region with a unique hydrogeomorphic and aesthetic environment.



2.2 FLOOD PROBLEM

Assam represents highly flood-prone region characterized by severe hazards of floods. Although occurrence of flood has been an age-old phenomenon in the riverine areas of this region, the extent of damage caused by the flood has increased significantly in recent years. With more than 40 percent of its land surface susceptible to flood damage, the total flood-prone area in the Brahmaputra valley is about 3.2 Mha. (Goswami, 2001). The Brahmaputra valley had experienced major floods in 1954, 1962, 1966, 1972, 1974, 1978, 1983, 1986, 1988, 1996, 1998, 2000 and 2004.

3.0 FLOOD HAZARD ZONATION USING SATELLITE REMOTE SENSING

National Remote Sensing Centre (NRSC), Hyderabad under Deptt. of Space in association with Assam State Disaster Management Authority (ASDMA) has prepared the district wise flood hazard maps for Assam State using satellite remote sensing data sets. Satellite data due to their synoptivity and frequent coverage of flood affected areas can be directly used for deriving the flood inundation limits.

About 93 satellite datasets acquired from large number of Indian Remote Sensing satellites and foreign satellite datasets, spanning over 10 years from 1998 to 2007, acquired during different flood magnitudes in Assam have been used to create the flood hazard maps for different districts of Assam. All satellite data sets were analyzed and flood layers were extracted. All the flood layers corresponding to a year are combined as one inundation layer so that this layer represents maximum flooded area in one year. All such combined flood layers for 10 years were integrated into flood hazard layer representing the observed flood inundated areas with different frequencies.

The flood inundation represented in different colours indicates varying frequencies as observed during 1998 to 2007. The road and railway lines are shown to indicate the probable frequency of flooding they are subjected to. The normal river course and water bodies are also shown in the map. Similarly, the layer was also integrated with digital database layers of different districts, these layers include road, rail, village, etc.

The flood hazard zones are categorized into five classes ranging from very low hazard zone to very high hazard zones. Very Low category indicates the areas, which are inundated once or twice during the 10-year period.

Similarly, Low indicates three to four times, Moderate indicates five to six times, High indicates seven to eight times and Very High indicates nine to ten times.

To facilitate better visualization, the following colour coding scheme has been adopted for different hazard zones based on their frequency of inundation. They are: Very Low, Low, Moderate, High and Very High with colour scheme as follows:

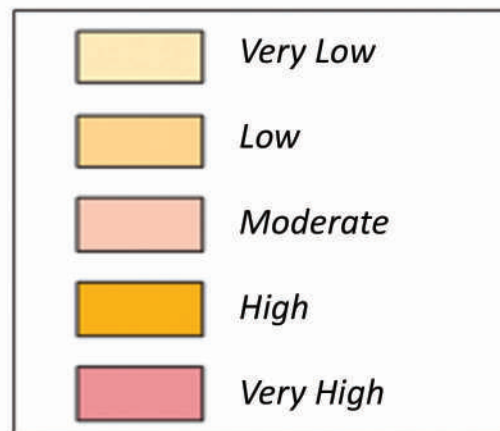


Table: Flood Hazard Classification

Sl.No	Flood Hazard Classification	Number of times / years the area was subjected to flood inundation during 1998-2007
1	Very Low	1-2 times
2	Low	3-4 times
3	Moderate	5-6 times
4	High	7-8 times
5	Very High	9-10 times(almost every year)

4.0 UTILITY OF FLOOD HAZARD MAPS

The Flood Hazard Maps for different districts of Assam will be of immense help to the administrative machinery in identification of flood risk areas and thereby help in the planning of a more effective emergency response. For example, areas that are likely to require evacuation can be identified, and evacuation routes can be planned and clearly signposted so local communities are made aware in advance of an emergency. The identification of flood risk areas will also help in the location of flood shelters for evacuees.

The flood hazard maps can also support planning and development by identifying high risk locations and steering development away from these areas.



Flood in Assam, June, 2012

This will help in minimizing the impacts of Flood in the State of Assam and also encourages sustainable development. In order for this to occur, the consideration of flood hazard maps must be integrated into planning procedures.

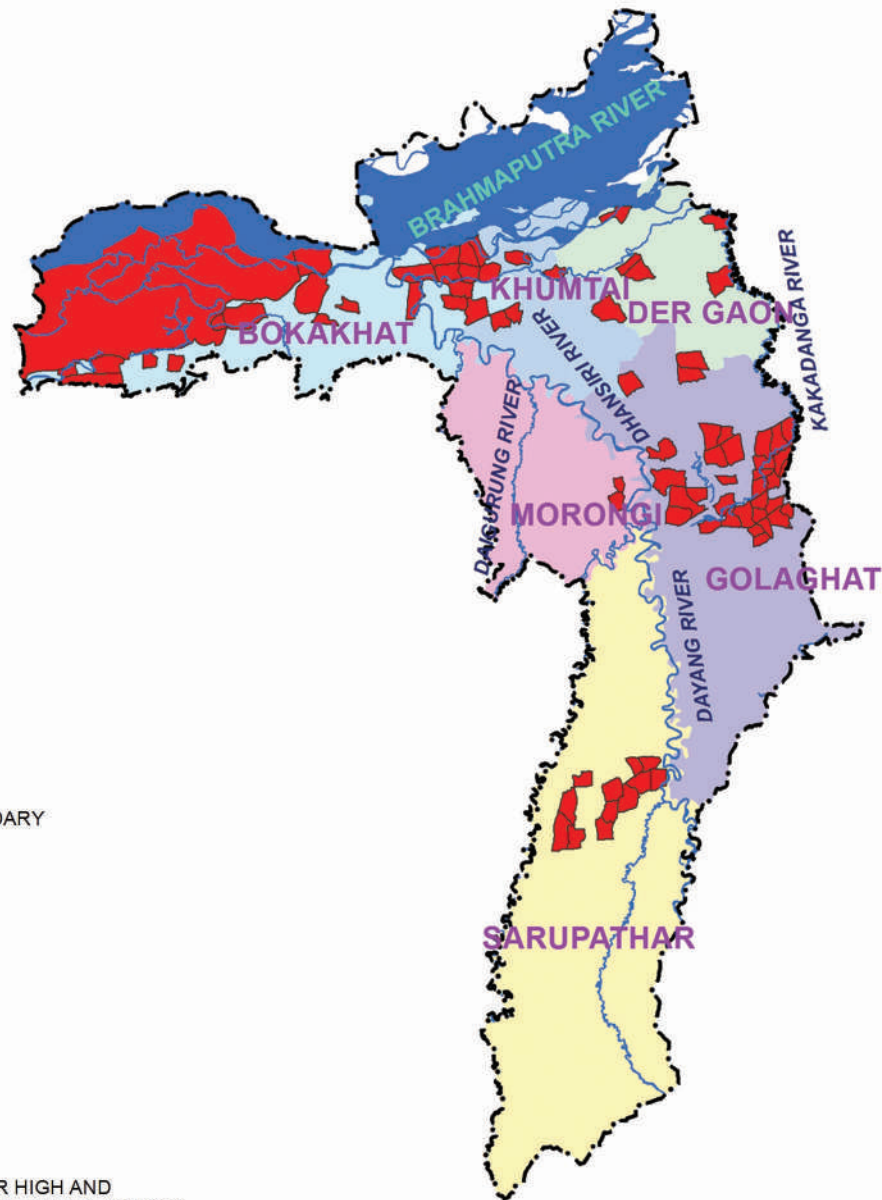
5.0 BENEFITS OF FLOOD HAZARD MAPS

- * Residents will have a better sense of flooding risks and the safety precautions that they need to take.
- * Community planners and local officials will gain a greater understanding of the flood hazards and risks and can therefore improve local planning activities.
- * Builders and developers will have access to more detailed information for making decisions on where to build and how construction can affect local flood hazard areas.
- * Home and business owners will have the ability to make better financial decisions about protecting their properties.

6.0 SUGGESTIVE APPLICATION OF FLOOD HAZARD ATLAS BY DISTRICT ADMINISTRATION / DEPARTMENTS

- * Special emphasis should be given by the district administration to these high risk flood affected villages while planning and carrying out developmental activities.
- * District Administration should make available the list of high and very high flood hazard villages to all the departments so that the departments can take adequate measures for mitigating the impact of floods.
- * District administration should publicize that houses in the high risk flood affected areas should be constructed above the high flood level of previous years.
- * District administration should preposition the rescue and relief teams in the high risk flood affected areas to minimize response time for evacuating the people.
- * District administration should instruct the agriculture department to propagate the use of flood tolerant crops in these high risk flood affected villages.
- * District administration should pre-identify the raised platforms and shelter places for sheltering the villagers and livestock for reducing the life and property.
- * In the flood contingency /response plan, the high risk flood affected villages should be accorded priority and a nodal officer be designated during the flood season for monitoring and coordinating the activities of the various departments.
- * District Administration should instruct the Health Department to form mobile medical team and with adequate medicines and preposition these teams in the high risk flood affected areas to prevent the outbreak of epidemics.
- * District Administration should instruct the PHE department to raise the hand pumps above the high flood level in the high risk flood affected areas to avoid contamination of water.
- * District Administration should instruct the Food & Civil Supplies Department for maintaining sufficient stock of the food commodities and store these commodities at appropriate places.

MAP SHOWING VILLAGES UNDER HIGH & VERY HIGH FLOOD ZONES
UNDER DIFFERENT REVENUE CIRCLES, GOLAGHAT



LEND

[---] DISTRICT BOUNDARY

REVENUE CIRCLES

- MORONGI
- BOKAKHAT
- DER GAON
- GOLAGHAT
- KHUMTAI
- MORONGI
- SARUPATHAR
- RIVER/STREAM
- VILLAGES UNDER HIGH AND VERY HIGH FLOOD ZONES (80 NOS)

LIST OF VILLAGES UNDER HIGH AND VERY HIGH HAZARD CATEGORIES UNDER DIFFERENT REVENUE CIRCLES

BOKAKHAT-RC(22 NOS)		
Afala Gaon	Dihingia	Kazironga N.C.
Bamun Gaon	Gorimari	Kuruabahi Gaon
Bilotia	Gugalati	Mohpora
Bohikhowa	Hatikhali T.E.	Nikori
Bortika	Japori Pathar	No.1 Sildubi
Bosagaon	Kaziranga National Park	Rowdoor Pather(a)
Budhbari	Diffolu Pathar	Dhansiri Temera
Dawgaon		

GOLAGHAT- RC(32 NOS)		
Aka Gaon	Kupuhating	Chakial
Athgaon	Mohimelia	Chatia Goan
Bamun gaon	Moutgaon	Chawdang
Bamun Gaon	Na_pamua(a)	Da_Barahi
Barichowa	Purana Melia	Goal Gaon Pt.II
Barua Gaon	Raidangia Gaon	Golaghat Town
Bebejia	Rupkolia	Habi Chukia
Bengenakhowa Grant	Rupkotia	Kacharihat Gaon
Bokolai	SaruKachari	Kherjan
Bosagaon	Sialikhati	Kumar Gaon
Chakar Dhora	Tirual Gaon(a)	

(contd..)

LIST OF VILLAGES UNDER HIGH AND VERY HIGH HAZARD CATEGORIES UNDER DIFFERENT REVENUE CIRCLES

(contd..)

DER GAON-RC (7 NOS)	
Chakial	Missamora Bagisa
Da Dhara Ahom Gaon	Molia Gaon
Domjoria Kachalial	Sital Pather
Ekorani Gaon	

KHUMTAI -RC(5 NOS)	
Barua Gaon	Kanfala
Bon Gaon	Nam Temera
	No.1 Pathori Miri

SARUPATHER -RC(12 NOS)	
Bebejia	Chukia Pathar
Tengabari	Ekorani
Tengrajan No 2	Kachamari
Tengrajan No.1	Nalani Pathar Gaon
Betoni Pathar	Rengmai
Betonijan	Tengaholla No.1

(contd..)

LIST OF VILLAGES UNDER HIGH AND VERY HIGH HAZARD CATEGORIES UNDER DIFFERENT REVENUE CIRCLES**(contd..)**

MORONGI -RC(2 NOS)	
Charia Khat Bagan	Charia Khat Grant

*Flood in Assam, June 2012*