

CHAPTER-2

DATA BASE AND METHODOLOGY OF THE STUDY

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2.1. THE STUDY AREA:

Dhubri, the gateway of Assam, is situated at the western most corner of the state and the district happened to be a meeting place of different racial groups in the past which mixed together and formed a unique cultural heritage and historical background. The growth of mix culture in this region particularly in case of language, art and religion is due to continuous process of assimilation of various races, caste and creed of local people, invaders and migrated people.

The origin of the name Dhubri taken from the mythology of Padma-Purana of Behula-Lakhindar, where Behula used to his dead husband going to the still living Lakhindar. Behula arrived at the bank of Brahmaputra called Netai. She had worked for the havened gods such as Shiv, Parboti and others and washed her cloths on a big stone at the bank of Brahmaputra River called 'Netai Dhubunir Ghaat' (District Report, 2013).

The district of Dhubri was created on 1st July, 1983 dividing once Goalpara district. It is located strategically between Bangladesh and states of West Bengal and Meghalaya. The mighty Brahmaputra divides the district into two parts i.e., Dhubri and Bilasipara Sub-divisions in the north and South Salmara-Mankachar Subdivision in the south bank. In 2015, the South Salamara-Mankachar sub division declared to be a new district.

Dhubri district is bounded by inter-state and international border. In the west, there are West Bengal and Bangladesh, in the east Goalpara and Garo Hills district of Meghalaya, in the north Kokrajhar district and in the south, there are Meghalaya and Bangladesh. The

area of the district is 2,838 Sq. kms. The district has become the most densely populated district in India with a density of 690 persons per Sq. km as per 2011 census (Census, 2011). Its population growth rate over the decade 2001-2011 was 24.4 percent. Dhubri has a sex ratio 952 and literacy rate is 59.3 percent.

Agriculture and forest product are the main occupation of the people of Dhubri district. Main source of income is paddy with surplus production than its requirement. Jute and Mustard seed are two major cash crops. The timber and bamboo of the forest add income to the people. Fish, milk, meat and egg have also found a place in the economy. Though agriculture is the main occupation of the district but land revenue occupies less than excise duty to the Govt exchequer.

Dhubri is one of most flood prone district of Assam. Flood is a recurring feature of the district which causes extensive damage and economic loss almost every year. Every year, the South Salmara-Mankachar Sub-division of the district is found affected mostly by floods, particularly the revenue circle viz. South Salmara, Sukchar and Mankachar. Area under South Salmara Circle has already been washed away by erosion. In the Golakganj circle, Golakganj town and Pub-Kanuri village are affected by Gangadhar flood and erosion. The Bilasipara Sub-division is mostly affected by flash floods of river Gaurang originating from Bhutan.

2.2. LOCATION AND BOUNDARIES:

Dhubri district is situated in the western most corner of Assam, between latitudes 25.28° and 26.01° North and longitudes 89.59° and 90.28° East and 35 meter above mean sea level. The district is almost triangle in shape and bounded by Kokrajhar district in the North, Bongaigaon and Goalpara districts in the East, Meghalaya in the South and West Bengal and Bangladesh in the West.

2.3. PHYSIOGRAPHY:

Representing a part of the lower Brahmaputra Valley the area as a whole is considered as plain and the topographic variation along the east-west direction is not significant. The study area comprises *char* lands formed by the braided river Brahmaputra. One interesting geomorphologic feature of the valley is the presence of a good number of isolated hillocks detached from the Meghalaya Plateau by the degradation work of the river Brahmaputra.

Most of the rivers of the lower Assam have their origin in the Bhutan and they have been flowing in almost north-south direction. A significant physical characteristic of this region is that the river Brahmaputra is highly braided in this region due to its low gradient. As a consequence, there found various riverine islands inside the river bed of the Brahmaputra. It includes all the river islands of the Brahmaputra within the territory of the district. This belt as a whole flooded by the river waters every year and termed as floodplains of new alluvium and silts. This transitory river islands and lowlands in the middle of the Brahmaputra are called *Char lands* or *Chapori* which are formed by the deposition of waste in a certain year. They generally remain above the water level during the winter season but submerged under water during the summer flood season. These char lands are suitable for agriculture only for *rabi* crops during the winter season and the peasants have to discard these lands during the summer season.

2.4. GEOGRAPHICAL AREA:

The District has total geographical area of 2838 sq. km. equal to 19,06,643 Bigha with population of 19,49,258 as per Census 2011. After creation of BTAD, the present Dhubri district has total geographical area of 2012 Sq. km., which is almost equal to land area of 15,04,177 Bighas (District Report, 2013). The region comprises seven Community Development Blocks, which are considered as micro level spatial units for the purpose of this

research work. Out of total 1100 revenue villages there are 480 villages are under char areas. The rural area covers 2144.1 sq km representing 75.5 per cent and the urban area represents the remaining 24.5 per cent of the total geographical area. Geographically the land of the district can be divided into three categories and they are:

1. **Char (Riverine) areas:** The area along river Brahmaputra and almost the entire South Salmara-Hatsingimari Sub- Division fall in this category. Areas fall under this category is also mostly affected by flood and erosion.
2. **Kaim (Permanent) areas:** Land area located at middle of the district along the NH 31 is known as kaim area. This part is also flood prone area.
3. **High land and Hilly areas:** Area fall under this category located on the Northern part of the district and the area bordering with Meghalaya. Floods is not a problem there.

2.5. ADMINISTRATIVE SET UP:

Dhubri is one of the plains districts of Assam. It falls in the Brahmaputra valley. Dhubri was one of the three sub-divisions of old Goalpara district. It has three sub-divisions namely, Dhubri, Bilasipara and South Salmara-Mankachar. The district has 1,091 villages spread over 3 sub-divisions and 8 Revenue Circles. The districts have an area of 2176.00 Sq km (Rural: 2144.06 Sq km. and Urban: 31.94 Sq km). It is 17th position in terms of area of the total 27 districts in Assam. It has 168 Gaon Panchayat in all (Census; 2011). The numbers of revenue villages in the district are:

Dhubri (Sadar) Sub- Division:

- 1) Dhubri Revenue Circle = 232 Revenue villages.
- 2) Golakganj Revenue Circle = 147 Revenue villages.

3) Agomani Revenue Circle = 83 Revenue villages.

Total = 462 Nos of Revenue villages.

Bilasipara (Civil) Sub- Division:

1) Chapar Revenue Circle = 151 Revenue villages.

2) Bilasipara Revenue Circle = 203 Revenue villages.

3) Bagribari Revenue Circle = 242 Revenue villages.

Total = 596 Nos. of Revenue villages.

South Salmara- Mankachar (Civil) Sub- Division:

1) South Salmara Revenue Circle = 201 Revenue villages.

2) Mankachar Revenue Circle = 115 Revenue villages.

Total = 316 Nos. of Revenue villages.

TABLE 2.1: Demographic Profile of Dhubri.

Total Population: 19,49,258	
Male	9,97,848 Nos. (51.37 %)
Female	9,51,410 Nos. (48.63 %)
Sex Ratio	1000: 952
General Population	12,36,054 Nos. (92.76%)
Schedule Caste	70,395 Nos. (3.61%)
Schedule Tribe	6,332 Nos. (0.32%)
Urban Population	2,03,701 Nos. (12.16%)
Rural Population	17,45,557 Nos. (87.84%)
Density	896 Nos. per Sq. Km.
Percentage of Decadal growth rate (1991-2001)	+24.44
Crude Birth Rate	31%
Crude Death Rate	9%
Maternal Mortality Rate	4/1000
Infant Mortality Rate	78/1000
Literate Person	922,341 Nos. (59.34%)
Male	511,551 Nos. (63.10%)
Female	410,790 Nos. (53.33%)

Source: Census Report, 2011.

2.6. ROAD NETWORK:

The National Highway 31 passes through this district starting from Chapar to Chagolia covering a total distance of 112 kms. The surface transport and water ways connect South Bank Subdivision from Dhubri, the district head quarter through Goalpara by road and ferry services to transport the public as well as the essential commodities by water way. Length of State PWD Road is 125.95 km and rural PWD Roads are 660.478 km.

2.7. RAILWAY COMMUNICATION:

Northeast Frontier Railway line communication runs through the Dhubri Sub-division and Bilasipara subdivision via Parbatjhora Subdivision of Kokrajhar district. There are 5 Nos of Railway Stations viz. Dhubri, Gauripur, Golakganj, Balajan and Moterjhar covering a total length of 59 kms of B.G. line. A portion of New Moinaguri-Jogighopa railway fall in the district is under construction.

2.8. AIR COMMUNICATION:

Rupshi-airport (now under BTAD) was constructed during the last World War-II by the British Govt is about 15 km away from Dhubri town. Some private companies were operating regular flights carrying passengers as well as goods between Calcutta and Dhubri via Coochbehar (West Bengal) after Independence. The Indian Airlines also operated regular air flights between Calcutta and Dhubri. After a long period, at present the Airport is under the National Airport Authority of India and opened for flight.

2.9. TOPOGRAPHY:

The unique geo-climatic condition of Dhubri district has made it a unique district compared to other districts of Assam. The mighty Brahmaputra flows through the district separating it into two parts- South Salmara-Mankachar Sub -Division in the South, Dhubri and Bilasipara Sub Division in the North Bank. The tributaries of the river Brahmaputra are Gangadhar, Gadhadar, Gaurang, Tipkai, Champawati in the North and Jinjiram, Jinari and Kaloo in the South bank which causes flood along with massive erosion in the district. Major Beels of the district are Sareswar, Tally, Dheer, Dhakra, Diplai etc. The Brahmaputra flows through a total length of 720 Km in Assam of which 88 Km lies in Dhubri district itself.

2.10. CLIMATE AND RAINFALL:

The climate of the District is damp and humid for its high temperature and heavy rains. The highest rainfall happened in the month of June and July. Generally, the period from June to October is considered as flood season.

TABLE 2.2: Comparative Rainfall in 2010

Month	Year-2010		Year-2011	
	Daily Average Rainfall (in mm)	Monthly Actual Rainfall (in mm)	Daily Average Rainfall (in mm)	Monthly Actual Rainfall (in mm)
January	0.0	0.0	3.4	0.1
February	0.0	0.0	30.8	1
March	72.7	2.3	58.7	2.1
April	426.0	14.2	69.6	2.3
May	548.1	17.7	233.3	7.5
June	553.6	18.5	290.4	9.7
July	223.2	7.2	252.1	8.3
August	178	5.7	409.4	13.2
September	171.3	5.5	-	-
October	31.0	1.0	-	-
November	2.7	0.1	-	-
December	2.4	0.1	-	-

Source: Disaster Management Plan of Dhubri, 2011.

2.11. DATA BASE AND METHODOLOGY:

This study has been conducted in Char Areas of Dhubri district of the state Assam. The area under char area is 998 sq. km and it constitutes 35.7% of the total area of the district. The char areas of the district Dhubri cover the maximum area among the char areas of all the other districts and it is very high in comparison to percentage of total char areas of Assam (i.e., 4.60 percent of the total geographical area of Assam).

The percentage of population in char areas of Dhubri district is 42.14 of the total population of the district as against 9.34 percent in overall char areas of the state to the total population of Assam. Density of population in overall char area is accounted for 690 per sq.km, which are 690.61 in char areas of the district Dhubri.

Number of villages and households in char areas of Dhubri district is highest in comparison to the char areas of other districts of Assam. The total cultivable land in char areas of the district Dhubri is 67,124 hectares, which is highest in comparison to the char areas of other 13 districts, and the total irrigable land in the same is 8,145 hectares. The char areas are located in both the North and South bank of the river Brahmaputra (SES, 2002-03).

2.12 METHODOLOGY:

Both the primary and secondary data have been used in the study. Primary data has been collected on the basis of questionnaires prepared as per requirement.

2.12.1 SAMPLING PROCEDURE:

Primary data used in the study have been collected from the sample survey. Two types of sampling have been used viz., the stratified and the random sampling. Out of 2251 char villages in Assam, there are 480 numbers of char villages are in the Dhubri District. We

divided all the char villages of the district into four strata (or categories). These four strata were as-

1. Char villages near of towns.
2. Char villages far distant from town.
3. Char villages surrounded by river water.
4. Char villages attached with mainland.

In the 2nd step, using multi-stage sampling, 4 (four) villages from each of the four strata listed above, have taken in the sample at random and have constitute a sample of 16 (sixteen) char villages of different categories of the district.

In the 3rd step, from each of the villages 30 (thirty) household have been selected at random. This has constituted a sample of $30 \times 16 = 480$ households.

In the next step, a questionnaire was prepared to collect relevant information on the basis of personal interview method from 480 households of the sample. Primary data collected are related to cross section data on Income, Education, Health, Sanitation, Use of fuel, Occupation, Banking habits and other civic amenities in the present study.

In order to collection of primary data a structured questionnaire has been used. To avoid improper filling of the questionnaire by illiterate and unskilled respondents of char areas, the researcher will use the questionnaire as interview schedule to fill up the questionnaire on the spot as the respondents provide the answers.

The size of sample keeps small due to lack of sufficient manpower, time and money involve in the process of collection of data. As the researcher is an employee and hence other

duties also have to do. Therefore, the size of sample keeps as $30 \times 16 = 480$ households of char areas in the district.

2.12.2 SECONDARY SOURCES:

Secondary data used in the study have been collected from different published and unpublished sources. The main published source of secondary data are the Census of India, Statistical Handbook of Assam, Economic Survey of Assam, Human Development Report, National Family and Health Survey, District Annual Report, Report of different Government department, Books, Journals, Bulletins and so on. Unpublished data includes information collected from Government offices like Revenue Circle, Development Block offices, unpublished research works etc.

2.13 DATA PROCESSING:

To fulfil the first objective of the study, information collected from various secondary sources and analysed. In order to understand the extent of displacement due to flood and erosion data collected from secondary sources are grouped at National, State and District basis.

In order to fulfil the second objective data collected relating to income, occupation, and education etc of the household of the selected char villages of the district which are recurrently affected by flood and erosion every year. Data and information so collected is compared to the District and State level data available at secondary sources.

For the third objective the various literatures, reports, researches and analysis is sufficient. To fulfil the fourth objective analysis of all the information collected from primary and secondary sources have been analysed.

2.13.1 STATISTICAL ANALYSIS:

The statistical methods like Averages and Percentages have been used to measure the attributes like Income, Education, Migration, Assets and Property, Housing conditions etc. So that data collected on different attributes are expressed in Average and Percentage. In this analysis the percentage value was used for all the groups and was taken to draw the comparable results.

The two-way **ANOVA** technique is used in order to measure the sample variation on the attribute like education, occupation, size of land holding of the households. The ANOVA is a statistical technique that used to check if the means of two or more groups are significantly different from each other. It checks the impacts of one or more factors by comparing the means of different samples.

In the two ways ANOVA, data are classified according to two different criteria. The procedure for analysis of variance is somewhat different from the one way that the one way dealing with problems of one-way classification. In a two-way classification the ANOVA table takes the following form:

ANOVA: Two way				
Source of variation	Sum of Squares	Degrees of freedom	Mean Sum of Squares	Ratio of F
Between Samples	SSC	(c-1)	MSC= SSC/(c-1)	MSC/MSE MSR/MSE
Between Rows	SSR	(r-1)	MSR= SSR/(r-1)	
Residual or Error	SSE	(c-1) (r-1)	MSE= SSE/(r-1) (c-1)	
Total	SST	n-1		

SSC= Sum of squares between columns.

SSR= Sum of squares between rows.

SSE= Sum square due to error.

SST= Total sum of squares of variations

Chi Square Test is also used to measure the change in occupation due to erosion. The chi square describes the magnitude of the discrepancy between the observed and expected values. It is defined as-

$$X^2 = \sum \frac{(O-E)^2}{E}$$

Where, O refers observed and E refers expected frequencies. Expected frequencies are obtained using the formula $E = \frac{(\text{Row Total})(\text{Column Total})}{N}$

In some cases, we measured the **Karl Pearson's Correlation Coefficient** among variables. The correlation coefficient helps us to know the types and degrees of relationship among the variables. The formula used to find out the correlation coefficient (r) is-

$$r_{xy} = \frac{\sum xy}{\sqrt{\sum x^2} \cdot \sqrt{\sum y^2}}$$

Where, $x = (X - \bar{X})$ and $y = (Y - \bar{Y})$

2.13.2 Quantification of Socio-Economic Variables:

In order to quantification of socio-economic attribute we have used the *Kuppuswamy's Socio Economic Scale* in this study. In this method the socio-economic status of a household is identified based on their Income, Education and Occupation. Different

score point has been offered for different levels of attributes. The model of the scale is given as follows:

TABLE 2.3: Revised scale of socio-economic status (2012)

A) Education		Score
1	Profession or Honours	7
2	Graduate or Post Graduate	6
3	Intermediate or Post High School Diploma	5
4	High School Certificate	4
5	Middle School Certificate	3
6	Primary School Certificate	2
7	Illiterate	1

B) Occupation		Score
1	Profession	10
2	Semi Profession	6
3	Farmer, Shop-owner, Clerical	5
4	Skilled Worker	4
5	Semi-Skilled Worker	3
6	Unskilled Worker	2
7	Unemployed	1

c)	Monthly Income (in Rs.)	Score	Modified for 1998 (in Rs.)	Modified for 2012 (in Rs.)
1	≥ 2000	12	≥ 13500	≥ 32050
2	1000-1999	10	6750-13499	16020-32049
3	750- 999	6	5050 - 6749	12020-16019
4	500- 749	4	3375 - 5049	8010-12019
5	300-499	3	2025 - 3374	4810-8009
6	101-299	2	676 - 2024	1601-4809
7	≤ 100	1	≤ 675	≤ 1600

Total Score	Socio economic Status
25-29	Upper (I)
16-25	Upper Middle (II)
11-15	Middle/ Lower Middle (III)
6-10	Lower/ Upper lower (IV)
≤5	Lower (V)

This method has been helping us in categorisation of household in different groups like Lower, Middle or Upper class. In order to identify the number of households living below the poverty line we depend upon the BPL ration card issued by the Government.