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APPRECIATION, AWARENESS AND ATTITUDE OF THE NAMASUDRA COMMUNITY TOWARDS FLOOD-HAZARD AND ITS IMPRESSION ON SOCIAL LIVES AND LIVELIHOODS PATTERN IN DAKSHIN DINAJPUR DISTRICT, WEST BENGAL: A PERCEPTION STUDY

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Abstract:

Understanding and improving the public perception and attitude has become an important issue regarding flood hazard and risk management worldwide. Extreme floods have serious social and economic impacts on environment and livelihood pattern of the world community. This paper reports a study of the perceptions, awareness and attitude of the Namasudra community regarding flood-hazard and its impact on their social lives and livelihoods pattern in Dakshin Dinajpur district, West Bengal. The research adopted both quantitative and qualitative techniques using pre-tested households questionnaires, group discussions, perception study and Life History Methods for key informants. A sample of 753 (1.73 %) Namasudra households were interviewed applying Purposive Multi-Stage Stratified Random Sampling method and sample size was validated by using the Fisher formula. Descriptive statistics were used for the analysis of the data. Microsoft Excel v2007, SPSS v17.0, QGIS v2.8 software platform were used for statistical analysis and preparation of map and diagrams. The present study revealed that previous flood experience, proximity to the river, and length of residence were positively related to perception and awareness level. The paper also highlighted that flood hazard has become a serious threat in the eyes of the Namasudra community and severe floods destroyed their livelihood patterns with its tangible and intangible elements.

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1.0 Background and Issues:

Disaster is a serious disruption of the functioning of a community or society causing widespread human, material, economic or environmental losses which go beyond the day-to-day ability of the affected community or society to cope with using its own resources (ISDR, 2002). The frequency of natural disasters has been increasing over the years, resulting in loss of lives, damage to properties and destruction of the environment. The beginning of the research on perception of floods is connected to the names of the geographers White and Burton (after Mc Andrew, 1993).

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The majority of inhabitants living in areas where floods or other disasters are frequent are prone toward an underestimation of danger (Gardner & Stern, 1996). One of the most important critical issues to the world community is protection of life and property from the destructive forces of natural disasters. The Millennium Development Goals (MDGs) states, we must "intensify cooperation to reduce the number and effects of natural and man-made disasters" (UN, 2000). It is necessary to reduce the risk of disaster at national and local level with a strong institutional basis for implementation and build up a culture of safety and resilience at all levels applying knowledge, innovation, perception, awareness and education.

Among the disasters, flood is the most dreadful natural calamity of Eastern India where it becomes an annual phenomenon and one of the worst affected states in this part of India is West Bengal where 55.43 percent of the total geographical area is flood prone. Extreme floods have serious social and economic impacts on environment and livelihood pattern of the world community. In developing countries floods have distinctive long-term effects which can be divided into three categories: (1) consequences for human health including death, physical injury, disease transmission, malnutrition and loss of morale; (2) consequences for agriculture; and (3) impacts on housing and infrastructure (Alexander, 1993). The duration and significance of the impacts depend on the levels of resources available for easy recovery and on the scope of the devastation (Alexander 1993:525).

Households carry experience of negative feelings of flood, according to 'inoculation hypothesis' (Norris & Murrell, 1988; Slovic, 1987). The fear of impending risk makes them careful in confronting and overcoming flood (Chongfu, 2014). Attentiveness is more in the person with risk experience than the one without it (Brilly & Polic, 2005). Weinstein (1989) claim that " three ways by which experience can affect risk perception (1) societal attention, at the time of flood occurrence; (2) victim-directed influence like education and social norms; and, (3) intra-individual response (p. 245)". Floods present a serious threat in the eyes of the inhabitants, and that the perception of threat depends, to a certain degree, on the place of residence (Brilly and Polic, 2005). People's perception and awareness of natural disaster has been discussed more seriously in the recent years globally by various organizations although its rate of implementation depends on regional, cultural, and societal backgrounds.

Flood is most frequent natural disaster that threatens and disrupts the lives of people and occurs suddenly resulting in the onset of loss of life, environmental damage, property loss and psychological impact (Abarquez & Murshed, 2004). The number of people at risk has been growing each year and the majorities are in developing countries with high poverty levels making them more vulnerable to disasters. Each year, there are 50–300 inland floods worldwide, impacting an estimated 520 million people and causing as many as 25 000 deaths (Gore, 2010). Undoubtedly, flood is the most dreadful natural calamity of Eastern India where it becomes an annual phenomenon and one of the worst affected states in this part of India is West Bengal where 55.43 percent of the total geographical area is flood prone.

Flood is a natural hazard which occurs in response to heavy rainfall but in the present day due to extreme human interferences the intensity of flood has increased many times. Among the oldest and known disasters, floods have been threatening humans for ages (Ferreira, 2011). Extreme floods have serious social and economic impacts on environment and livelihood pattern of the world community. Harmful impacts of floods include direct mortality and morbidity and indirect displacement and widespread damage of crops, infrastructure and property (Doocy et. al. 2013; IPCC, 2007). The impact of flood hazard can be categorized into two main divisions- negative impacts and positive impacts. A common approach to differentiate the types of negative societal flood impacts is to distinguish between direct and indirect as well as tangible and intangible flood

impacts (Penning-Rowsell & Fordham, 1994; Smith & Ward, 1998). There is a systematic relationship between flood hazard and physical and psychological health. The majority of physical health effects are present in the weeks and months after flooding, whereas the psychological impacts can last for years (Tapsell & Tunstall, 2008; Isaranuwatchai et al. 2017) and be perceived as grievous not only for the people directly affected by the flood but also for support workers, relatives, and friends (Fewtrell & Kay, 2008; Carroll et al. 2010). All over the world, every year floods take thousands of lives, leave millions homeless loss of properties and infrastructures. (Table 1 & Table 2).

Table 1: Recent devastating flood incidents in different parts of the world

Date	Place	Casualties	Estimated economic loss (USD)
May-14	Balkans Flood	Died-37 and displaced-tens of thousands	2.5 Billion
Sep-13	Colorado Flood, USA	Died-8, missing-6	1 Billion
Jun-13	Uttarkhand, India	Died-6500	45 Billion
Jul-10	Indus Basin, Pakistan	Died-2000, affected- 20 million	43 Billion
June -August 2010	Dadeldhura, Nepal	Died-98, missing-8 and 39000 affected	294.4 Million
Jun-07	Bangladesh	Died-500, affected-20 million	1.06 Billion

Sources: Adapted from Tanvir H. Dewan (2015, 37)

Table 2: Damages due to flood hazard (2017) in Dakshin Dinajpur district

Name of District	No. & Name of Blocks Affected	No. & Name of Municipalities affected	Population affected	Damage to crops	Damage to houses		Cattle lost	Human lives lost	Highest No. of Relief Camps	Highest No. of Persons Relief Camps
Dakshin Dinajpur	8 (Balurghat, Kumarganj, Hili, Tapan, Harirampur, Kushmandi, Banshihari, Gangarampur)	1 (Balurghat)	Number	Area in Hec.	Fully	Partly	Nos.	Nos.	Nos.	Nos.
			1025445	59473.79	41123	60599	13	10	359	61905

Source: State IAG members, Government of West Bengal (2017)

As a welfare state, India shall promote and protect the Scheduled Castes and Scheduled Tribes from social injustice and all forms of exploitation (Roy, 2019). The term 'Schedule Caste' itself originates from the Government of India (Scheduled Castes) Order, 1936, which was incorporated in our Constitution via The Constitution (Scheduled Castes) Order, 1950 (Roy et. al, 2019). Article 341, of our Constitution categorized a section of India's population under the category of Schedule Castes. In the state of West Bengal, one of the major Schedule Caste group goes by the name of 'Namasudra' they are the second largest Schedule Caste group, constituting about 17 percent of the total Schedule Caste population of the State (Roy, 2019). Dakshin Dinajpur district in the state of West Bengal, shares an international boundary (more than 252 kms) between India and Bangladesh. Majority member of the Namasudra community in Dakshin Dinajpur district come from Bangladesh since pre-colonial period, although India and Bangladesh have a common historical legacy, a good cultural relations as well as close economic ties.

The satisfaction to fundamental demands of food, cloth, shelter, health, education etc. is limited in these areas and lower stratum of the society specifically the Namasudra Community members are unable to fulfill their basic needs mainly due to their lack of education and socio economic backwardness as they are the peasant and fishing community. Namasudra people in Dakshin Dinajpur district are backward in occupational, educational, social, cultural, religious and political sector comparing to other schedule castes and higher castes. Nevertheless, most of the members of Namasudra community in Dakshin Dinajpur district are faced with a number of environmental challenges and flooding is one of such challenges.

Owing to its geographical location, that is, in a low-lying area, the Namasudra community has a limited capacity to control the hydrological events ensuing Atrai, Punarbhaba and Tangan river. As a result, the members of Namasudra community experience floods in every rainy season. The floods cause displacement of people from their usual dwelling places resulting in varying impacts on infrastructure, crops, health, education, environment as well as damage to property. With this backdrop, the level of perception, awareness of flood hazard and its consequences on lives and livelihood pattern of Namasudra community has been chosen for the present study.

2.0 Objectives of the study:

The following principal objectives has been taken into consideration for the present study-
2.1. To trace out the degree of perception, level of awareness and nature of attitude of the Namasudra community regarding flood hazard within the study area i.e. Dakshin Dinajpur district.
2.2. To assess the impacts of flood on the social life and livelihoods pattern of the of the Namasudra community in district of Dakshin Dinajpur.

2.3. To give some study-based suggestions for the development of livelihood patterns of the Namasudra community at regional and national level.

3.0 Study Area:

Dakshin Dinajpur district is a part of Malda division of West Bengal state, came into existence from 01-04-1992, have been selected for the present study. It is surrounded by the neighboring state of Bangladesh, sharing the international boundary (252 km). Geographically, Dakshin Dinajpur district extends between $25^0$10′55″N to 25^0 35′15″N latitudes and 87^0 48′37″E to 89^0 00′30″E longitude. The district covers a total geographical area of 2,219 sq. Km and it is bounded by Bangladesh on the North, East and South East; Malda district on the South West; and Uttar Dinajpur District on the West. The district bears a total population of 4, 82,754 Scheduled Castes population, among which 9.02% are Namasudra Community according to the census of India, 2011. Dakshin Dinajpur district is a "Non Industry" district and its economy basically depends on agriculture. Administration wise, the district comprises two sub-divisions namely Balurghat and Gangarampur. Besides, it comprises of 1,631 villages, 929 Gram Sansads, 65 Gram Panchayats, 8 blocks, 8 police stations, 3 Municipalities, 7 towns (2 Statutory Towns and 5 Non-statutory Towns) (Fig. 1).

4.0 Materials and Methods:

4.1 Sapling Unit and Techniques:
The present paper is a community based cross sectional study conducted during May to November, 2019 in the different CD blocks of rural Dakshin Dinajpur district. The district had a population of 43565 Namasudra peoples out of which 22669 were male and 20896 were female as per the report of Census of India, 2011. The researcher had selected all those villages in all the

community development blocks of Dakshin Dinajpur district on the basis of concentration of Scheduled Caste population (more than 75 per cent) as per the report of census of India, 2011. The sample designed for the present study is Purposive Multi- Stage Stratified Random Sampling**.** In the first stage, the district Dakshin Dinajpur has been chosen purposively from the 23 districts of West Bengal state, India. The main factors for selection of purposive sampling were: firstly- Dakshin Dinajpur district shares more than 252 km Indo-Bangladesh international border and a close economic tie as well as socio-cultural history and secondly- the researcher is well versed with the conditions of the district as he is the resident of district Dakshin Dinajpur. In the second stage, the revenue villages were selected on the basis of concentration of Scheduled Caste households of every blocks and wards. In the last stage, after identification of the household villages on the criteria of accessibility and availability of transport facilities, the required information for the study had been collected by administering an interview schedule to head of the household. In this study, the sampling units were the households of Namasudra Community and sample size of the study was 753 (1.73 %) aged between 15- 65. The details of sampling procedure and sample survey areas are shown in Table 3 and Fig. 2 respectively. The survey was conducted by home to home visit and from each household, information has been collected from head of household and married female. The sufficiency of the collected sample size was validated by using the Fisher formula:

$$\mathbf{n} = \frac{Z^2 PqD}{d^2}$$ (Standard Deviation Mugenda & Mugenda, 1999)

Equation 1

Where,

n = the sample size

Z = the standard normal deviate (1.96), which corresponds to 95% confidence interval

P = persons living in Dakshin Dinajpur district at risk of flooding

q = total population in Dakshin Dinajpur district – residents at risk of flooding

d = the degree of accuracy = 0.05

D = heterogeneous population.

Table 3: Selection of sampled households from Namasudra community in Dakshin Dinajpur district

Sl. No	Name of the C.D. Block /Municipality / District	Total number of sample village/ward from each Block/Municipality	Number of selected household from each village /ward	Total sample size of Namasudra households
1	Kushmandi	11	10	110
2	Gangarampur	11	10	110
3	Kumarganj	8	10	80
4	Hili	8	6	48
5	Balurghat	14	9	126
6	Tapan	9	10	90
7	Banshihari	9	10	90
8	Harirampur	9	11	99
Dakshin Dinajpur district		87	80	753 (1.73 %)

Source: Prepared by the author, 2019

4.2 Collection of Data:

Standard structured questionnaires were prepared based on the objectives of the research, which include the questions related to the degree of perception, level of awareness and attitude of Namasudra people regarding flood hazard. Then the questionnaires were adopted to collect the data at the study area. This paper is based on Primary data which have been collected from the field with the help of standard questionnaire applying interview techniques and perception study.

Observation method, informal discussion with other family members and neighbours and information are gathered from social activists.

The present study also encompasses Life History Method which allows the researcher to explore a person's micro-historical (individual) experiences within a macro-historical (history of the time) framework and challenges to understand current attitude and behaviors of an individual.

4.3 Statistical Methods:
Descriptive statistics like simple percentage, mean were used for the analysis of the data. To study the perception and awareness level of Namasudra community regarding flood-hazard the following Statistics were used in our present study:

$$\text{Standard Deviation (S.D)} = \sqrt{\frac{\sum \mathbf{X^2}}{\mathbf{N}} - \left(\frac{\sum \mathbf{X^2}}{\mathbf{N}}\right)}$$

Equation 2

$$\text{Coefficient of Variation (CV)} = \frac{\boldsymbol{\sigma}}{\mu}$$

Equation 3

Where,
σ = Standard deviation and
μ = Mean.

4.4 Software used:
Data entry and statistical analysis were performed using the Microsoft Excel v2007 (Microsoft Corporation) and Statistical Package for Social Science (SPSS) IBM windows version 17.0 software. Maps are prepared in QGIS v2.8 software platform.

5.0 Result and Discussion:

5.1 Appreciation of flood:
The nature of the perception study is qualitative. While describing the appreciation of Namasudra community regarding various hazards like flood, drought, earthquake etc. it takes place an important role in decision making process of their everyday livelihood. Level of understanding is a prominent factor for the better livelihood pattern, i.e. better degree of perception saves life and property from damage to a considerable extent. The area which is vulnerable to floods can be assessed with the help of degree of perception. There are several methods for the assessment of tangible and intangible attributes- some selected methods have been applied for our present study. From the reported responses of the Namasudra community regarding severe flood (1987) occurrence year, it is observed that the literate population have better perception than the illiterate male and female population and also the male literate population aged above 40 years have exact perception of flood occurrence year than male literate population aged below 40 years (Table 4).

Table 4: Severe flood (1987) perception of Namasudra community

Perception of Severe Flood (1987)				
Age-group	Reported Perception of Occurrence Year			
	Male		Female	
	Literate	Illiterate	Literate	Illiterate
Below 40 Years	1985-1988	1983-1989	1985-1989	1980-1992
Above 40 Years	Exact Year	1986-2988	1987-1988	1986-1988

Source: Prepared by the author, 2019

Table 5: Summary of traditional knowledge of Namasudra community regarding early warning flood indicators (multiple answer response)

Traditional Knowledge	Indicators	No of respondents	Per cent (%)
Behaviour of humans, plants and animals	Old people's bones aching	41	5.44
	Large number of cow egrets sited	204	27.09
	Loud persistent croaking of frogs	86	11.42
	Domestic animals making loud distraught noises	114	15.13
	Movement of ants to higher ground	213	28.28
	No knowledge	95	12.61
Knowledge of weather pattern	Heavy rains in the area for long periods of time	533	70.78
	Strong wind blowing	65	8.63
	Temperature higher than usual	39	5.17
	Lighting and thunder on the river	19	2.52
	No knowledge	97	12.88
Knowledge on nature of river	Rising of the river	498	66.14
	Noise level of river increases	211	28.02
	No knowledge	44	5.84

Source: Prepared by the author, 2019

Traditional knowledge of Namasudra community regarding early warning flood i.e. flood forecasting have been shown in Table 5. In our study, more than 70 per cent respondents were aware of local way of knowing whether it would flood or not. To predict the flood risk, members of Namasudra community use their traditional knowledge and local strategies which are considered as a trust source of information to this community. Results of the study further highlight an important difference between level of awareness of traditional knowledge and level of flood experiences. The people who settled their habited near the riverside have more traditional knowledge than the others. It is also observed from our present study, that majority of the young member of the Namasudra community did not have a good command of traditional flood knowledge. This could be attributed to their no being old enough or inexperience of flood hazard. Young generations said that this traditional flood knowledge was outdated and there were more modern methods and scientific knowledge of predicting floods.

5.2. Flood Probability:

When asked about the probability of flood occurrence in the coming season, most of the respondents replied in affirmative (88.71percent). Out of total 753 Namasudra respondents only 3.59 per cent said that there was high flood probability, 6.24 per cent replied that there was no chance of flood while 11.29 per cent did not reply (Table 6 & Fig. 3). This high degree of perception is mainly due to high flood frequency. Mean, standard deviation and coefficient of variation of the perception and awareness of Namasudra community regarding flood hazard are shown in table 05. The mean score of probability of flood (150.60) is lower than the flood occurrence period (251). Coefficient of correlation (CV) value is higher in case of probability of flood (CV=1.20) rather than the awareness of flood occurrence period (CV=0.53). Therefore, it is vivid from the above discussion that there is a significant association between perception of flood and awareness of flood occurrence.

Table 6: Perception and awareness of the Namasudra community regarding flood-hazard in Dakshin Dinajpur district

Probability of Flood					
Perception Response	Number of Respondents	Per cent (%)	Mean	SD*	CoV**
High Flood Probability	27	3.59	150.60	181.43	1.20
Moderate Flood Probability	126	16.73			
Low Flood Probability	468	65.15			
No Flood Probability	47	6.24			
Do not Know	85	11.29			

Awareness of Flood Occurrence Period					
Period	No. of Respondents				
July-August(Early)	243	32.27	251	134.18	0.53
August-September(Normal)	389	51.66			
September-October(Late)	121	16.07			
SD* = Standard Deviation, CoV** = Coefficient of Variation					

Source: Prepared by the author, 2019

5.3 Awareness of Flood Period:

The occurrence of flood is a combination of physical as well as manmade factors. In our study area i.e. Dakshin Dinajpur district the most common causes of floods are climate related, most notably rainfall. During the monsoonal period heavy rainfall are observed but sometimes it takes place in the pre-monsoon and post monsoonal period which also caused floods. The people of the Namasudra community in the district of Dakshin Dinajpur have a very clear perception of this phenomenon as majority of them have buildup the habitat near the marshy lands and nearer to the river banks such as Attrai, Punarvaba Tangon river etc. Out of 753 Namasudra respondents 389 respondents (51.66 per cent) said that the normal flood occurs in the month of August and September. Besides the normal flood period, 32.27 per cent and 16.07 per cent respondents reported too early and too let flood respectively (Table 6). Sometimes it takes place in the period of kharif and sometimes at harvesting period. The occurrence of early and let floods is less but people of Namasudra community are quite aware of them.

5.4 Type and Degree of Loss:

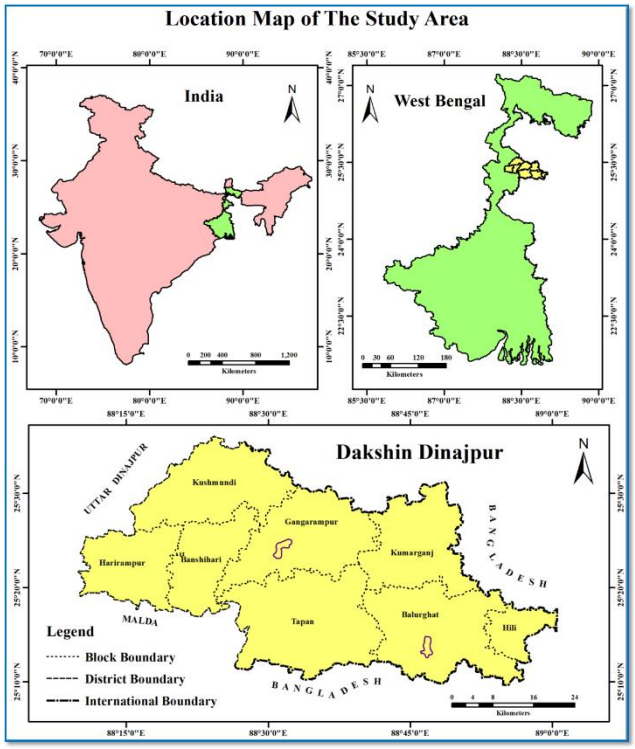
The members of Namasudra community have a good memory and personal losses about the dangerous flood which occured in the years 1987 and 2017.The type and degree of losses of severe floods and normal floods are shown in the table no 7. From table no 7, it is observed that there is no loss of life in normal floods but some damage is caused in case of property. Although the rate of intensity of severe floods in 1987 and 2017 is quite different but there is a huge amount of damage both in property and life. Only immovable properties like houses (96.4 per cent) and crops (99.1 per cent) were damaged during the 1987 floods and 1.1 per cent human, 19.6 per cent goods was lost at all (Fig. 6). On the other hand, 0.7 per cent human beings, 84.3 per cent houses and 95.3 percent crops were lost during the 2017 severe flood. In the memory of the local folk, 1987 and 2017 flood was the most devastating, when more than 95 per cent crops and >84 per cent houses collapsed. To test the accuracy of memory, approximate occurrence year was asked from the each Namasudra respondents and the result showed that the aggregate perception of the Namasudra people is of very high degree. It is also observed that the young educated male Namasudra respondents have better perception about the severe floods comparing to female and uneducated Namasudra respondents.

Table 7: Types and Degree of Losses in Severe Flood (1987 & 2017) and Normal Flood

Type of Losses	Degree of Loss (Percent)		
	Severe Flood (1987)	Severe Flood (2017)	Normal Flood
Loss of Life			
Human	1.1	0.7	Nil
Livestock	5.8	4.6	Nil
Goods	19.6	16.2	Nil
Loss of Property			
Houses	96.4	84.3	6-16
Crops	99.1	95.3	25-55

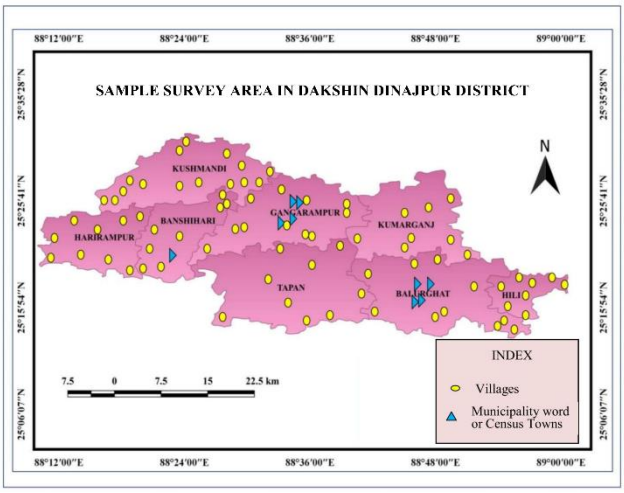
Source: Prepared by the author, 2019

Fig. 1: Location map of the study area



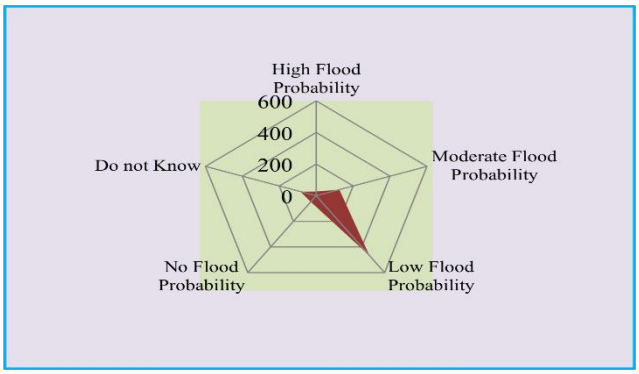
Source: Prepared by the author, 2019

Fig. 2: Sample survey villages and municipality words in Dakshin Dinajpur district



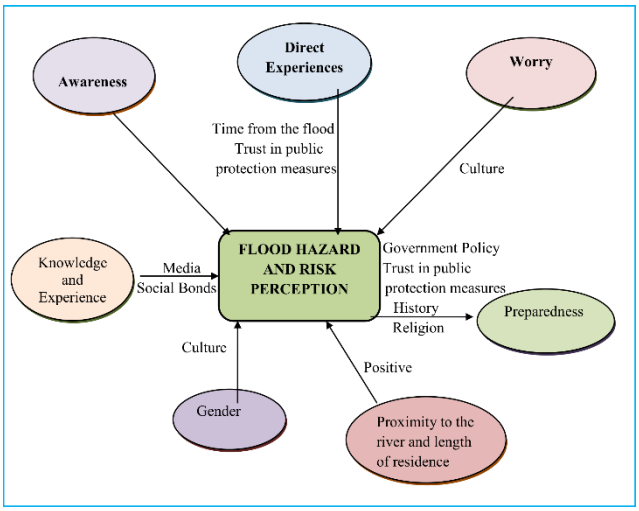
Source: Prepared by the author, 2019

Fig. 3: Probability of Flood



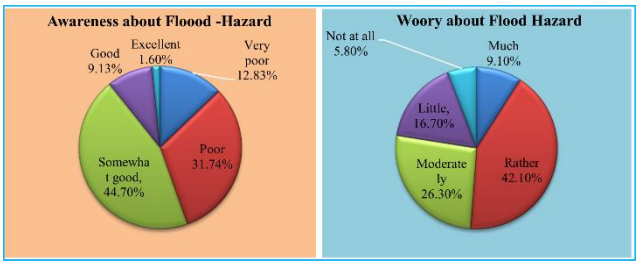
Source: Prepared by the author, 2019

Fig. 4: Appreciation, Awareness, Attitude and Knowledge of Namasudra community towards Flood-Hazard and Risk Perception



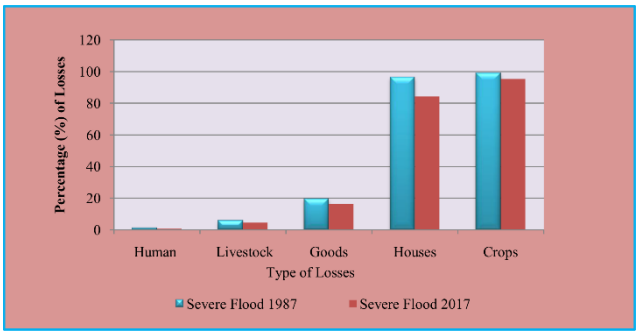
Source: Prepared by the author, 2019

Fig. 5: Result on awareness and worry of Namasudra community about flood hazard



Source: Prepared by the author, 2019

Fig. 6: Types and Degree of Losses in Severe Flood (1987 and 2017)



Source: Prepared by the author, 2019

Fig. 7: A) Namasudra women using Banana-tree trunk raft for lightening (photo taken by A. Roy on 18/08/2017)

B) Perception of flood-hazard, a *kattcha* house which is 4.72 feet above from ground level. (Photo collected by authors on 16/01/2020)

C & D) Collection of drinking water from tube well during flood period &Children's of Namasudra community are travelling during flood period for collecting food provided by Youbo Sanga Club. (photo by A. Roy on 19/08/2017

E) Severe flood destroyed a tin shade house in Karkha village beside Tangon River (photo taken by A. Roy on 22/08/2017)

F) Households take their livestock to safer place(s)

5.5 Reaction of Normal Flood:

Peoples of Namasudra community express their views regarding normal flood. In Dakshin Dinajpur district, Namasudra people move away voluntarily (Table 8) and for that they have their own boats. They remove their livestock (cattle 61.53 per cent, goods 24.1 per cent) and some members of their family (mainly olds, females and children's), before they are completely surrounded by flood water. Some Namasudra people shift their own place during flood period when they find that their total crop is overflowed. Very few members of the Namasudra community (13.3 per cent) remain in their houses to fight against the flood to save their houses. When asked why they evacuate their houses during flood period, their respondents are generally highlights two factors: firstly, the chance of collapse of their *Kuchcha* houses and secondly, lack of folder of their cattle.

Table 8: Reaction of Namasudra community to Normal Flood

Item	Removal (%)		No Removal (%)
	Before Flood	During Flood	
Men	31.25	55.45	13.3
Cattle	61.53	29.24	9.23
Goods	24.1	60.5	15.4

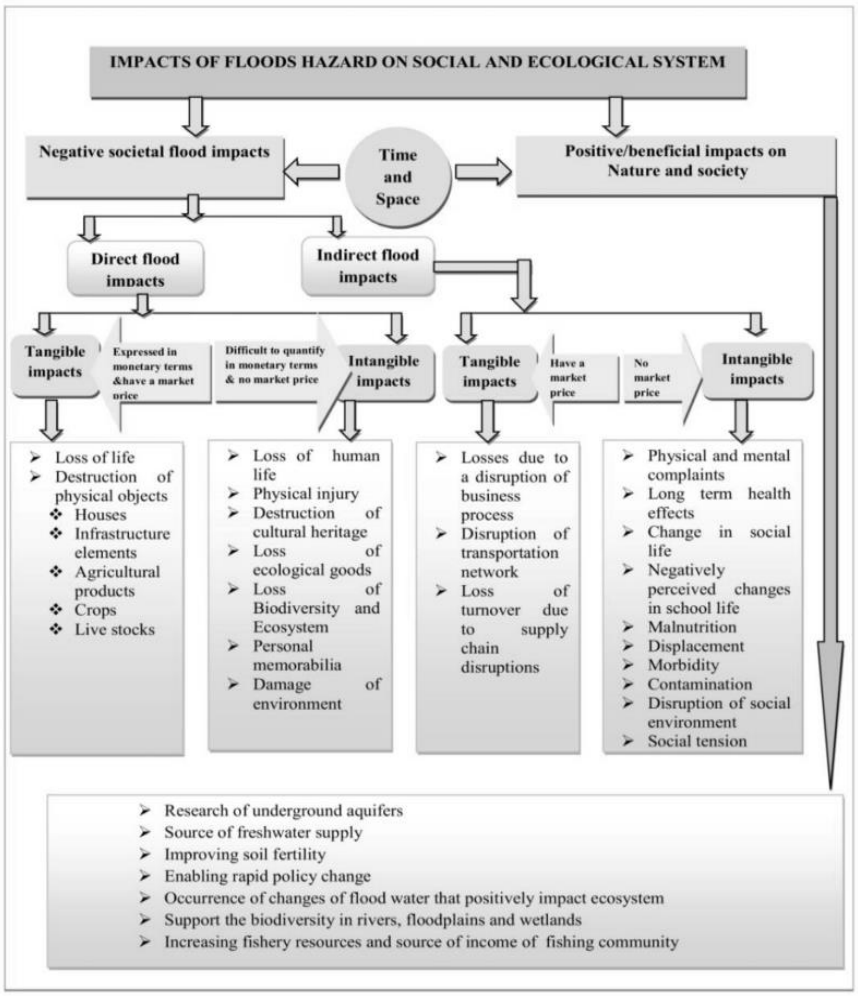
Source: Prepared by the author, 2019

6.0 Impact of Flood-Hazard on Social Lives and Livelihoods Pattern of Namasudra Community:

Floods are considered as the most devastating natural hazard worldwide which causes severe socio- economic, cultural and human losses. Floods can have a variety of human-related tangible and intangible impacts on the world community that span across space and time. The impact offlood hazard can be categorized into two main divisions- negative impacts and positive impacts. A common approach to differentiate the types of negative societal flood impacts is to distinguish between direct and indirect as well as tangible and intangible flood impacts (Penning-Rowsell & Fordham, 1994; Smith & Ward, 1998). Direct impact refers those impacts which are closely associated with physical contact and on the other hand indirect impacts are those that occur outside of the flood event in both space and time. Both direct and indirect flood impacts are further categorized with regard to tangible and intangible impacts. The topology of flood hazard impact on social lives and livelihood pattern of Namasudra community and environment have been shown in Fig. 8.

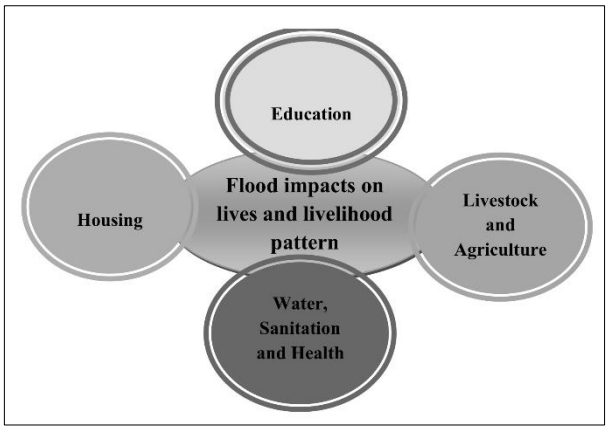
To deal with the social life and livelihoods pattern of the Namasudra community in the Dakshin Dinajpur district, it is necessary to perceive the history of the last few decades. Socio-economic development of a region or a group of people not only depends on availability of physical resources but also on human resources. It is well established fact that economic development and social development go together but this is not exactly so in case of Namasudra community in Dakshin Dinajpur district. The people of Namasudra community are able to adjust their economic activities by any means in a short extent but not as much their social activities. Social characteristics of the Namasudra community in the study area have undergone many changes from the pre-colonial period to the recent times. Social life and livelihood pattern of a region or a community not only include the religion, language, caste and tribal culture, but also the educational character, house type and health sector of the particular area or community to understand the impact of the customs and practices of those inhabitants of the area on their societal life (Fig. 9). From this point of view, our next discussion will be centered upon the educational, health characteristics and housing conditions of the area under review.

Fig. 8: Topology of flood hazard impacts and examples



Source: Prepared by the author, 2019

Fig. 9: Impact of flood hazard on lives and livelihood pattern



Source: Prepared by the author, 2019

6.1 Education:

Education is the principal factor for socio economic prosperity, development, and welfare. Educational qualification plays an important role in social development; i.e., a higher level of education provides better opportunities for engagement in social dimension through which a society socializes all members and it helps for nations building. The perception of flood hazard and its impact on social lives specifically on education have been shown in Table 9.

Table 9: Impact of flood hazard on educational facilities and flood perception of Namasudra community

Category	Variables	Frequency	Per cent (%)
School damage	Yes	642	85.26
	No	111	14.74
Children disruption to go to school	Yes	706	93.76
	No	47	6.24
Reason for disruption	Road Impassable	439	58.30
	Bridge Culvert Washed away or submerged	127	16.87
	School submerged or surrounded by water	187	24.83

Source: Prepared by the author, 2019

The educational scenario of the Namasudra community is not good as compared to other communities and higher caste; this is mainly due to low economic status. Among the total respondents of Namasudra community, it is found that only 30.24 per cent population are educated, female education is very low, i.e., only 7.6 per cent of the total female population are literate. The higher educational scenario is only 2.5 per cent. The main factor behind the backwardness of Namasudra community in educational sector is their low economic status. The people of Namasudra community are not in position to send their children to school after every effective flood, because their economy is disturbed badly. At least one member of every Namasudra households is dropped out and some of the families have no education at all. The joint family size, which is a common feature of Namasudra households, is a negative factor of education, because of need of even children for fishing and agricultural work. A large number of member bellow 18 years old are went to Mumbai, Bangalore and Delhi for earning money for their old parents which temporary helps for their families. Out of total (753 in number) Namasudra respondents 86.25 per cent said that the severe flood damage the school and 93.76 respondents told that their children are not able to go to school for flood hazard.

6.2 Housing Conditions:

The housing environment has been acknowledged as one of the main settings that affects human health. Roof materials and structure of the houses of the Namasudra community is very poor, therefore the extent of damage of floods is more visible and prominent. During the rainy season straw roofs exhibited water leakage and mud walls that soak water were reported to collapse easily.Among the seven hundred fifty three (753) sampled households of the Namasudra community, 64.8% indicated that their houses collapsed due to excessive impacts of floods while the rest had their houses intact. The Namasudra members specifically who build their habited proximity to the marshy land area dare not construct *pucca* houses due to flood losses. In our study, it is found that , only 9.5 per cent houses are *pucca* and rest are *kuchcha* (76.5%) and thatched (14 %).The distance between two houses is very small which giving rise to congestion. Majority of the Namasudra households do not adequate open space. Therefore, during the rainy season they keep their cattle in their living quarters. Number of person per room is very high (2.85 persons /room).

6.3 Health:

Health is a complex, multidimensional concept that is usually measured in terms of the absence of physical pain, physical disability, or an acute morbid condition that is likely to cause death. As per the definition of World Health Organization (World Health Organization [WHO], 1946) health is 'a state of complete physical, emotional and social wellbeing and not merely the absence of disease or infirmity'. Out of total Namasudra respondents of Dakshin Dinajpur district, the general health condition is very good among 17.26 per cent, good 30.18 per cent, satisfactory among 37.38 per cent and poor among 15.18 per cent respondents. Every flood is followed by a number of diseases

and huge number of people died of the fatal disease. Malaria was the most commonly flood-related disease and it was reported to be more prevalent during and immediately after the flood season. During and after each flood a large number of persons suffer from colds, coughs, fevers etc., apart from that malaria, diarrhea, snake bite, small pox, and cataract are mentionable. Females and children member of the Namasudra community are more prone to diseases including those caused by flood.

6.4 Use of modern facilities:
The peoples of Namasudra community have very few modern facilities like radios, television, freeze, Gas cylinder, pressure cocker etc. Out of total 753 sample Namasudra households, there are only 43 televisions, 08 freezes and 29 gas cylinders, 31 motor vicles although majority households have a bye cycle. The rate of modernization of Namasudra community is very low mainly due to their socio-economic backwardness and disruption of life and economy on account of floods.

7.0 Suggestions and Conclusion:

It is evident from the above discussion that the members of Namasudra community in Dakshin Dinajpur district have a high degree of perception and positive attitude towards flood-hazards and risks. There should be a well-planned policy to coerce communities especially in rural areas to construct dwelling using durable materials and away from the flood prone areas. Central and State government should embark the communities and regional authorities in making them conscious of the flood hazard in view of the climate mutability. Early flood warning system should be developed in community level for a long term period.

The people of Namasudra community who are residing in the rural areas under study are more prone to suffer from colds, coughs and fevers than the urban Namasudra residents in the before and after flood period. Therefore, greater medical facility is suggested for the period of flood. Community awareness on the flood hazard itself should be developed. A public education campaign should be developed by the government. There are inner linkage between impact of flood and various aspects of society. From this point of view, multi-sectoral approach to flood hazard mitigation should be promoted.

The social conditions of Namasudra community in Dakshin Dinajpur district is not as good as their economic condition. The main factors behind this that they have searched out a number of alternatives for their economic losses, such as keeping more livestock and orientation towards services. Low educational status, poor housing condition, weak health and few modern facilities-these social conditions are not equally distributed among them. Majority Namasudra members do not construct *pucca* houses due to the danger of flood-hazard losses.

Devastating floods cause losses to their economic as well as socio-cultural resources. Therefore, few members of the Namasudra community are curious about the flood insurance scheme, especially for crops and houses. From this point of view, if the central and state government comes forward with this scheme, there is a great prospect of wide acceptance. Free education at least in flood year must be provided for the students of flood prone area for educational development of Namasudra community and for higher education they should get some financial help from the government. Financial and technical help should be provided by the government for their socio-economic development.

Therefore, it may be concluded that the above measures are taken into consideration and implemented properly, the Namasudra community should be developed their social livelihood

status. But, unfortunately, when the flood is over, the government and people both show apathy and negligence. As a result, during a moderately severe flood, both people and the government again have to start rescue work at considerable expense, inconvenience and even loss.

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