

Exploring the Socio-Economic Impact of Flood on the Livelihood of People in Dhemaji District: A Case Study of two villages in Laimekuri Gaon Panchayat under Jonai Co-District

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Abstract—Mitigation of flood risk requires understanding of the topography, climate and vegetation in the area along with effective planning in advance. The district of Dhemaji, in particular, is one of the 312 multi-hazard-prone districts in India (DDMD)⁷. The present study tries to analyse the socio-economic impact of floodwaters from river Brahmaputra on the people of Jonai Co-District. Two villages, namely Telijan (high flood-affected) and No. 1 Pipolguri (medium flood-affected), under Laimekur1GaonPanchayat, were selected for the study. Flood is caused mainly during the monsoon season by the river Brahmaputra. Recurring floods have made a serious impact on the socio-economic condition of the people, mainly on agricultural land, and households. Mental trauma and stress of farmers due to loss of crops is observed along with a shift in occupational structure from farmers to laborers (daily wage) are seen. The papers attempt to do a comparative study on this impact of floods caused by the mighty Brahmaputra and the resilience of the affected people by choosing two flood-affected villages.

Index Terms—River Brahmaputra, Recurring, Impact of flood, Socio-economic

I. INTRODUCTION

India is affected by severe floods on average every third year. Out of the total geographical area of 329 million hectares, more than 40 million hectares are prone to floods (F. Barbhuiya 2015), which is approximately 17 % of the total area. The state of Assam is prone to natural disasters like earthquakes, floods, landslides, and cyclones. Flood usually is caused by a combination of heavy rainfall, causing rivers/oceans to overflow their banks. Floods generally develop over a period of days when there is

too much rainwater to fit in the rivers, and water spreads over the land next to them (A.W. Salik, 2021). Floods have been considered one of the most recurring and frequent disasters in the world. Due to recurrent prevalence, the economic loss and life damage caused by the flood have put more burdens on the economy than any other natural disaster. Floods cause a huge loss of lives and damage to livelihood systems, property, infrastructure, and public utilities. It is a cause for concern that flood-related damages show an increasing trend (National Disaster Authority India, NDMA). Flood is one of the greatest water-related environmental disasters known to humankind (IFI 2007). According to Dr. Murphy (2020), damage to infrastructure also causes a long-term impact. Production in agriculture, manufacturing, and other sectors may suffer due to the direct impact of flooding or to the physical inability of the workforce to attend the workplaces. Economic loss is a result of long-term flood disasters, as floods kill crops quickly (Rahman 2014). Floods exacerbate economic inequality, disproportionately affecting the poor in flood-prone areas while the rich in non-flood-prone regions continue to prosper (Vin, Aki 2024).

Jonai co-district has mainly alluvial soil with a mixture of sand and clay in varying proportions. The soil is deep and well-drained with a varying texture that ranges from coarse loamy to fine loamy. The district has a large expanse of low-lying land with heavy clayish soil and a high percentage of nitrogen, which is conducive to rice cultivation (K Das 2012). The ‘RashtriyaBarhAyog’ has identified 31.05 lakh hectares of flood-prone area in the state, of which the

Water Resource Department, through the implementation of various projects, has protected 16.50 lakh hectares of flood-affected land. Although the achievements of the Water Resources Department (Assam) in terms of infrastructure development can be seen in the following:- Construction of embankment 4465.85 km, Drainage Scheme: 854.19 km, Anti-erosion/ protection works for 746 numbers and Sluice: 86 nos. (major) & 539 (medium & minor). Still there remains many villages which face recurring floods every year.

Flood is an annual phenomenon in the Brahmaputra Valley, affecting a large section of the people every year. In Assam, 42.95 lakh people in 7794 villages of 35 districts were affected in the year 2024 (source ASDMA). A serious impact has been made by the floodwater on the socio-economic condition of the people. Due to this, the economic condition of the agrarian people are immensely affected and a shift of

occupation from the agriculture sector to other sectors is seen, as already mentioned.

II. STUDY AREA

Jonai is located at $27^{\circ} 49' 48''$ N, $95^{\circ} 13' 12''$ E. The sub-division (now Co-District) is surrounded by the Lali river and Brahmaputra river on the south. The state of Arunachal Pradesh is located on the north, the Sadiya sub-division in the east, and the Simen River on the west. **Give a map.** Thus it is surrounded on two sides by rivers and on one side by the foothills of the Miri and Abor hills. The total geographic area of the Jonai sub-division is 1111.81 sq km, and the total population of the Jonai sub-division stands at 169,898 (Census, 2011). The Mising tribe is the dominant tribe in the region and other tribes are Bodo, Sonowal, Deori, Rabha, who reside here. People from different communities such as Ahoms, Chutias, Brahmans, Biharis, Nepalis, Santhals, etc. also reside in Jonai co-district.

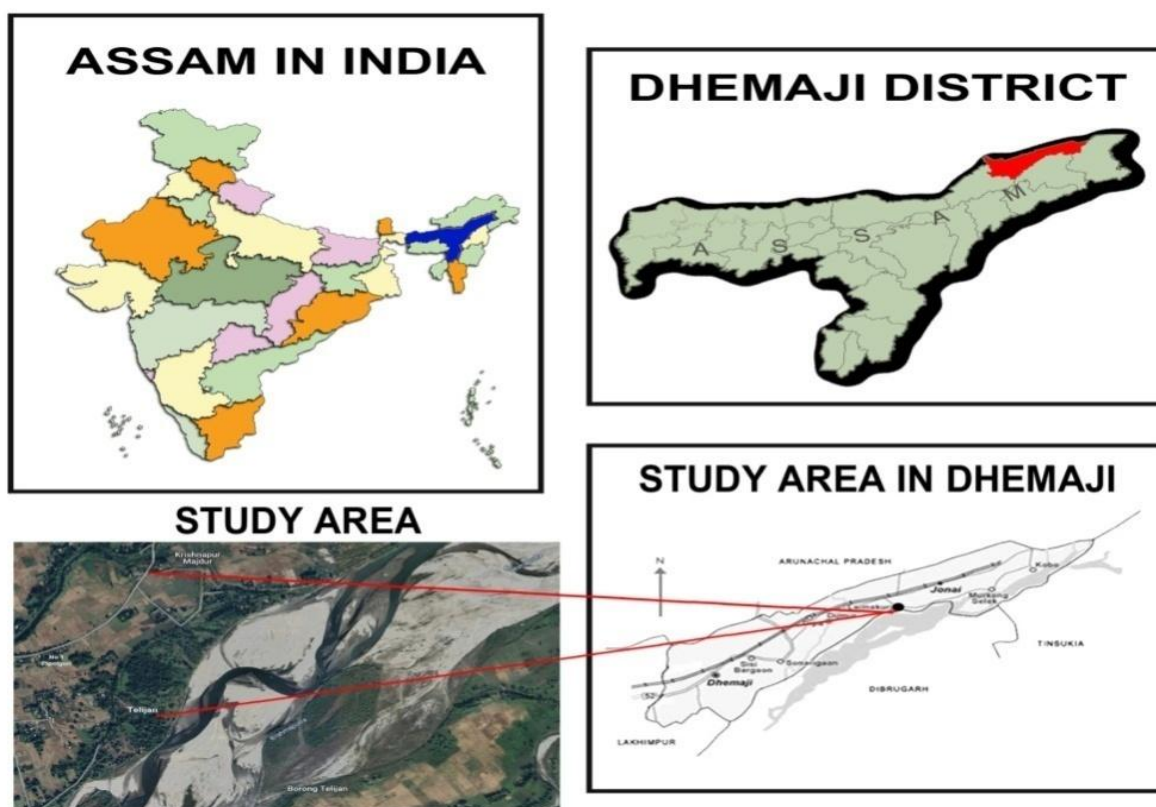


Fig. 1 Map showing the study area

The study is conducted in the two villages, Telijan (high flood-affected) and No.1 Pipolguri (medium flood-affected) of Laimekuri Panchayat under the Jonai MSTD Block (Murkong Selek Tribal Development Block) of Dhemaji District of Assam. Telijan village is located at a distance of 200 meters, and No. 1 Pipolguri is 1.5 kms away from the river Brahmaputra.

II. OBJECTIVES

The research has outlined the following objectives in order to understand the causes and impact of recurring floods:

- To assess the social impact of floods on the people during the rainy season.
- To assess the economic impact of floods on agriculture and allied activities of Jonai Co-district.

III. METHODOLOGY

A well-designed questionnaire was prepared for the collection of primary data. From each village a total of 30 percent of the total households were surveyed. Stratified random sampling method was adopted, so that representation of households affected in varying degrees is correctly assessed. The instruments for the collection of data include the Flood Damage

Inventory (FDI), Food Assessment Scale (FAS), and Livelihood and Occupation Assessment Inventory (LOAI). The FDI was designed with 9 self-patterned questions with a four-point rating scale of “Absolutely Agree” = (AA – 4 Points), “Agree” = (A – 3 Points), “Disagree” = (DA – 2 Points), and “Strongly Disagree” = (SD – 1 Point). It consists of items that help to understand and gather information regarding the flood impact on the farmland and cause of the flood.

Again, the FAS instrument consists of 4 items with a four-point rating scale of “Absolutely Agree” = (AA – 4 Points), “Agree” = (A – 3 Points), “Disagree” = (DA – 2 Points), and “Strongly Disagree” = (SD – 1 Point). Similarly, the LOAI is a 9-item self-structured instrument styled after a four-point rating scale of “Totally Agree” = (TA – 4 Points), “Agree” = (A – 3 Points), “Sometimes Disagree” = (SD – 2 Points), and “Totally Disagree” = (TD – 1 Point).

The Likert scale is applied as one of the most fundamental and frequently used psychometric tools in educational and social sciences research (A. Joshi, S. Kale, S. Chandel, and D. K. Pal, 2015). Likert scale was used because it is a common method of collecting data and it is easy to draw conclusions and find results from the responses gathered from the study area. Likert scale is handy in rating or assessing people's points of view towards the effects of floods on their social and economic aspects of life.

Findings and comparison of Telijan and No 1 Pipolguri

Table – 1: showing the demography of Telijan and No 1 Pipolguri

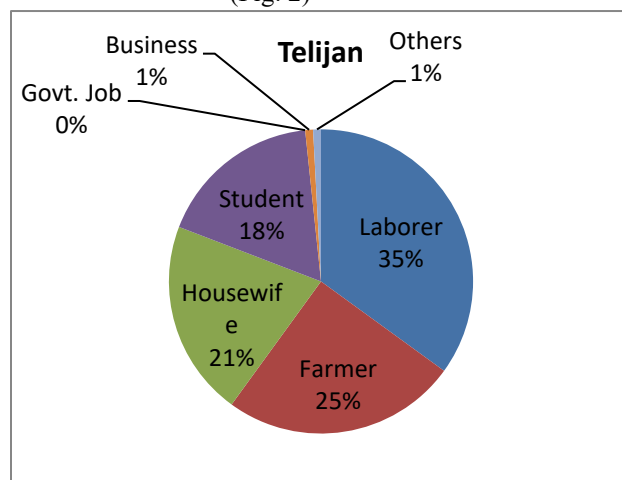
Village -Telijan (Flood Affected)					Village -No 1 Pipolguri (Medium Flood Affected)				
No .	Attributes	Freque ncy		Percenta ge	No .	Attributes	Freque ncy		Percenta ge
1	Age(Years)				1	Age(Years)			
	1-15.	30		24 %		1-15.	33		23.40%
	16-30.	48		38.40 %		16-30.	54		38.30%
	31-45.	24		19.20 %		31-45.	38		26.96%
	45-60.	14		11.20 %		45-60.	9		6.38%
	above 60	9		7.20 %		above 60	7		4.96%
2	Occupatio	Male	Femal		2	Occupatio	Male	Femal	

	n		e					n		e	
	Laborer	10	5	33.60 %				Laborer	14	2	11.34%
	Farmer	39	18	24 %				Farmer	20	12	22.69%
	Housewife	0	25	20 %				Housewife	0	30	21.27%
	Student	10	11	16.80 %				Student	26	22	34.04%
	Govt. Job	0	0	0				Govt. Job	0	0	0
	Business	1	0	0.80 %				Business	4	1	3.54%
	Others	1	1	0.80 %				Others	3	0	2.12%
3	agricultural field affected by flood (in Bighas)	Number of household						3	agricultural field affected by flood (in Bighas)	Number of household	
	1-5.	12		48 %					1-5.	8	26.66%
	6-10.	6		24 %					6-10.	3	10%
	11-15.	4		16 %					11-15.	2	6.66%
	15-20.	3		12 %					15-20.	1	3.33%
4	Literacy							4	Literacy		
	Male	44		35.2 %					Male	45	31.91 %
	Female	41		32.8 %					Female	42	29.79 %
	Illiteracy								Illiteracy		
	Male	18		14.4 %					Male	22	15.6 %
	Female	22		17.6 %					Female	32	22.7 %

Source: collected by researcher

Demography and Socio-economic condition

(Fig: 2)



(Fig: 3)

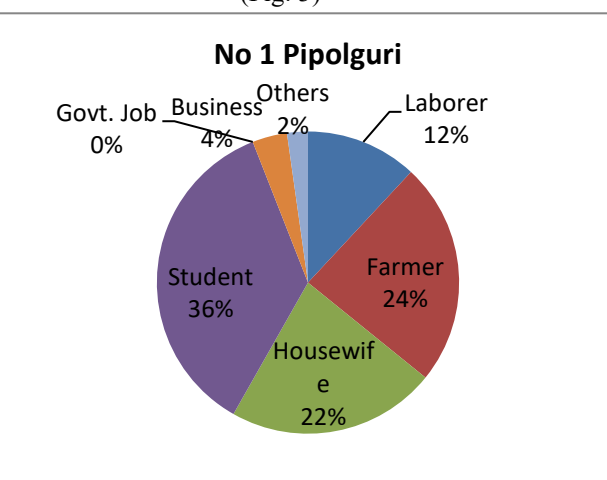


Fig: 1 & 2 Pie diagram showing the Occupation structure of Telijan and No 1 Pipolguri

Source: Collected by researcher

From fig: 2 and Fig: 3, we can see some clear differences between the two surveyed villages. Occupation-wise, it is seen that in Telijan Village, has 33.6 percent (Fig: 1) sampled population engaged as daily wage laborers. The yearly flood damaged their crops and farmland, due to which 84 percent (table: 2) of people face a shortage of food in Telijan village, and so the shift of occupation is seen from agriculture to daily wage laborers or other income sources to cover the household expenses and food.

On the other hand, a different scenario is seen at No. 1 Pipolguri village; people are still continuing their farming activities, though 11.34 percent (Fig: 2) of the sampled population goes for daily wage work. The impact of floodwater from the Brahmaputra River on the agricultural field is also less. The reason is clear, ie the location of Telijan village (200m) to the River Brahmaputra.

Agricultural field affected by flood

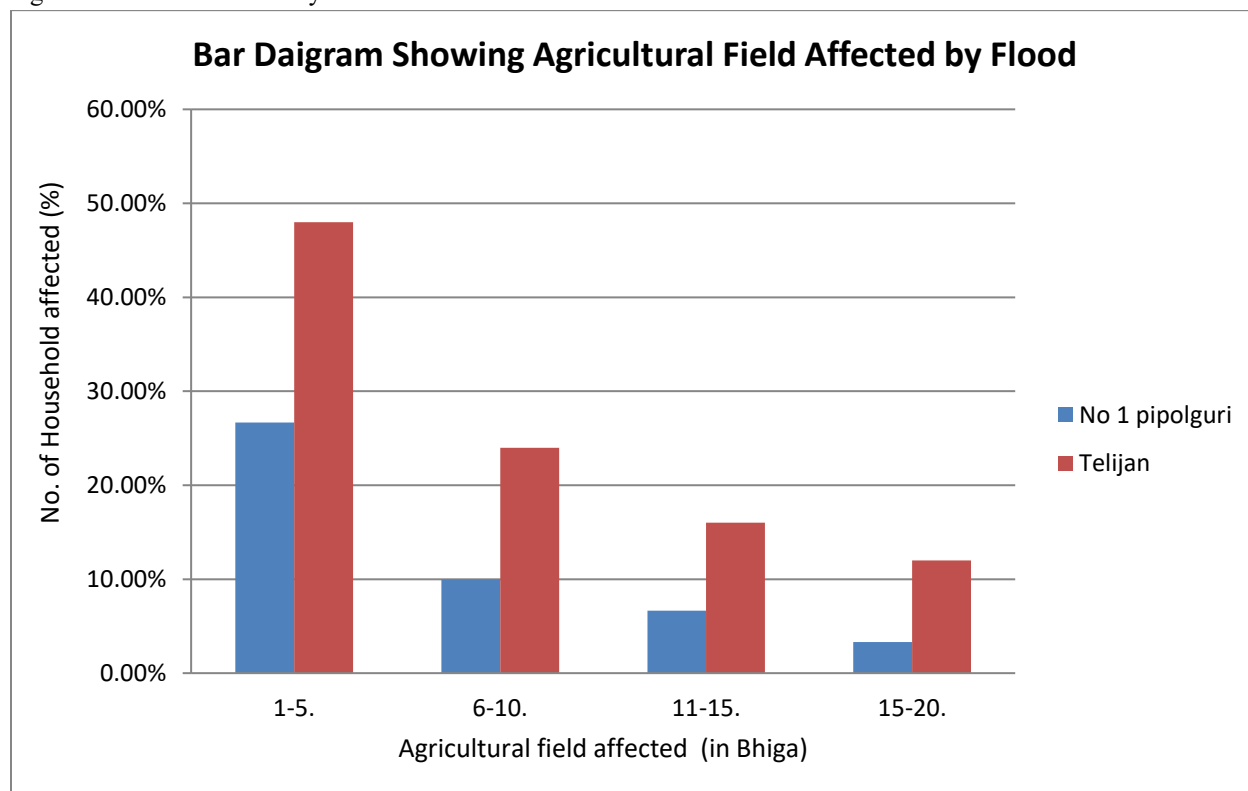


Fig: 4: Showing the Agricultural Field Affected by Flood in Telijan and No 1 Pipolguri.

Source – Data collected by Researcher

From Fig: 4 it is found that the Telijan village, flood affects majority (48%) of the sampled population with 1 to 5 bighas of agricultural field (Table 1). On the other hand only 26.66 percentage of agricultural fields is affected in No 1 Pipolguri village. This indicates that the more distance from the river the less impact at the village as well as the agricultural fields.

Sex ratio

The sex ration of Dhemaaji district is 953 in urban areas and 955 in rural areas. The sex ration of Jonai

subdivision is 920 in town areas and 949 in rural areas. The study area sex ratio is 1010 females per 1000 males. This data indicates that the villages gives equal status to all gender, with deep rooted cultural traditions, rare case of abortion or foeticide is found.

Dependency ratio

As far the collected data from the surveyed population, Telijan village has a dependency ratio of 45.34 and No 1 Pipolguri village has a dependency ratio of 39.60.

Flood impact assessment

Table 2: Showing the FLOOD DAMAGE INVENTORY (FDI).

Statement	N= number of household surveyed	N=25	TELIJAN (a high flood affected village)					No 1 Pipolguri (a medium flood affected village)				
FLOOD DAMAGE INVENTORY			AA (%)	A (%)	DA (%)	SD (%)	TOTAL (%)	AA (%)	A (%)	DA (%)	SD (%)	TOTAL (%)
Difficulties face to maintain food after flood in their farmland.			52	28	12	8	100	20	26.66	36.67	16.67	100
Villagers received low production after flood in their farmland.			60	20	16	4	100	43.33	40	12	6.67	100
Early harvest happens to protect the crops from flood.			36	48	8	8	100	36.67	43.33	13.33	6.67	100
Flood water affects the agricultural fields.			48	40	12	0	100	50	26.67	16.66	6.67	100
Soil erosion decrease soil fertility.			44	32	16	8	100	46.67	30	13.33	10	100
Sand casting or silt deposition in the agricultural field affects production of paddy.			64	20	8	8	100	40	46.67	10	3.33	100
Alternative crops are practice to cope with the flood water.			36	52	12	0	100	26.67	53.33	13.33	6.67	100
Flood happens due to heavy rainfall			80	20	0	0	100	60	30	10	0	100
Flood occurs due to heavy rainfall at Arunachal Pradesh			40	48	8	4	100	30	43.33	20	6.67	100

Source: Data collected by researcher

Absolutely Agree" = (AA – 4 Points), "Agree" = (A – 3 Points), "Disagree" = (DA – 2 Points), and "Strongly Disagree" = (SD – 1 Point)

In Table 2, Flood Damage Inventory (FDI), as far as response from the surveyed households of the two

villages, the responses to the questions in both the villages were almost valued in a similar range, in different issues. They face difficulties in maintaining food after the flood in their farmland, and other supplies to the flood-affected village.

Table 3: Showing the Food Assessment Scale (FAS).

Statement	N= number of household surveyed	TELIJAN (a flood affected villages)					No 1 Pipolguri (a medium flood affected villages)				
Food Assessment Scale	N=25	AA (%)	A (%)	DA (%)	SD (%)	TOTAL (%)	AA (%)	A (%)	DA (%)	SD (%)	TOTAL (%)
Difficulties face to maintain food.		32	36	20	12	100	36.67	33.33	23.33	6.67	100
Is there any shortage of food after flood		48	36	8	8	100	16.66	20	36.67	26.67	100
Has they face any days of starvation during flood or after flood		24	28	28	20	100	13.33	16.67	40	30	100
Do flood in agricultural field create insecurity to your staple food.		44	32	16	8	100	40	26.67	20	13.33	100

Source: Data collected by researcher

Absolutely Agree” = (AA – 4 Points), “Agree” = (A – 3 Points), “Disagree” = (DA – 2 Points), and “Strongly Disagree” = (SD – 1 Point).

The Food Assessment Scale (FAS) (Table 3) portrays respondents of both villages agreeing on the problems, such as difficulties in maintaining food, with a value of 68 percent and 70 percent, respectively. The assessment further shows that at Telijan village, 52 percent agree and 48 percent

disagree on the following to days of starvation during or after the flood which for No. 1 Pipolguri villagers, is only 30 percent respondents. It clearly indicates that the economic stability and capability to manage food is better at a medium flood-affected village than at a flood-affected village. Also they are better able to cope with the recurring floods as damage to their village is less in comparison to Telijan village.

Table 4: showing Livelihood and Occupation Assessment inventory (LOAI)

Statement	N= number of household surveyed	TELIJAN (a flood affected villages)					No 1 Pipolguri (a medium flood affected villages)				
Livelihood and Occupation Assessment Inventory	N=25	AA (%)	A(%)	SD (%)	TD (%)	TO TA L (%)	AA (%)	A(%)	SD(%)	TD(%)	TOTAL (%)
Any financial situation comes to the family after flood.		60	20	16	4	100	36.67	33.33	20	10	100
Have people shifted their occupation from farmer to other.		48	36	8	8	100	43.33	30	20	6.67	100
Daily wages works or labor is better than cultivation.		64	20	8	8	100	46.67	26.66	20	6.67	100
Any compensation obtained from government for flood damage to farmlands.		32	36	20	12	100	23.33	26.67	30	20	100
Any loans, borrowing or debt of the family.		44	36	12	8	100	40	26.67	20	13.33	100
Has the recurring flood in farmland has made any trauma or stress.		32	36	20	12	100	26.67	23.33	30	20	100
Any drinking water problem in the village due to flood		40	48	8	4	100	30	26.67	36.67	6.66	100
Flood has affected the schooling of the students		40	48	8	4	100	26.67	23.33	33.33	16.67	100
Health issues arise due to flood		24	28	28	20	100	30	33.33	26.67	10	100

Source: Data collected by researcher

Absolutely Agree” = (AA – 4 Points), “Agree” = (A – 3 Points), “Disagree” = (DA – 2 Points), and “Strongly Disagree” = (SD – 1 Point).

Table 4 represents the Livelihood and Occupation Assessment Inventory (LOAI) of the surveyed villages. The respondents of both villages have almost similar responses in many of the inventories. Financial assistance is received more in Telijan (60%), the heavier flood affected village in comparison to No.1 Pipolguri. However, in both the villages, shift of occupation is clearly marked (46% in average). Nearly 43.33 percent agree that drinking

water becomes a problem in the village during floods. These indicators clearly show how recurring floods have affected their life. They also believe that daily wages are better than any other agricultural work; this is a reflection on how they have suffered and fought for so many years with floodwater. Each year the agricultural fields with standing crops get damaged by floodwater, and they get half of what they had sown to harvest. Therefore, the people of the villages choose to change their livelihoods instead of farming. During floods, the people have stress, as they are constantly worried how long the flood

waters will stay and in what condition they will find their crops and other property. Moreover, children face closure of schools as these buildings are mostly used as temporary shelters. They also face health issues, due to inaccessibility to nearest health facility and lack medicine or visit by a Doctor in case of emergency.

IV. CONCLUSION AND SUGGESTIONS

Floods are a natural recurring phenomenon in Dhemaji District. In the Laimekuri Panchayat, several other villages are affected by the floodwaters of the river Brahmaputra. The study reveals that the flood-prone village of Telijan is facing severe problems like scarcity of food, submergence of crops by flood water, etc during rainy season. The dropout of students from school is always a serious concern in the flood-affected village. Though the literacy rate of the villages is average, the number of students going to higher levels of education is very meager, leading to unemployment. Ultimately, in the coming years, the students are forced to work in the agricultural fields or as daily laborers to survive.

V. SUGGESTIONS

1. The villagers should adopt a flood resilient cropping strategy, with different crops for different seasons. They can practice more the cultivation of Rabi crops, Boro rice, and Zaid crops (Zaid crops are fast growing and short term crops such as watermelons, pumpkins and various green leafy vegetables etc.)
2. The villagers have to encourage their students to go for higher studies, and awareness cum career counselling for the parents and students should be done by the government and NGOs.
3. Scientific methods must be used to mitigate flood problems. The age-old dykes should be updated using the latest technology and proper study. As recommended by Rastriya barh Ayog to built 5000 kilometers embankment in Assam in the decades of 1950s and 1960s around 132 kilometers were built in Dhemaji District. The most of the dykes have expired and lack the strength to hold the water pressure of Brahmaputra and its tributaries during flood period.

4. Road connectivity needs to improve to all weather roads, as the study area's roads were in a pathetic condition.
5. The Flood and River Erosion Management Agency of Assam (FREMAA) under the Water Resource Department should proactively work in the flood-prone areas.

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