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Re-theorizing livelihoods: Impacts of floods and traditional adaptation practices in Majuli, Assam

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Re-shaping the Brahmaputra valley has been happening due to the twin processes of flood and riverbank erosion in last few decades. At the same time flooding and river bank erosions has been a significant part of natural landscapes of the Brahmaputra valley. Majuli too has been perennially affected by the twin process of flood and riverbank erosion which result to the loss of land by the Brahmaputra river and its tributaries and threatened the traditional livelihood systems of the isle which were dependent on the natural resources have undergone significant changes. On account of which the communities who were traditionally dependent on agriculture, pottery making etc. are forced to migrate due to resource depletion. This paper will attempt to uncover these theoretical concerns to look at how the traditional livelihood insecurity and varied livelihood changes are brought by floods and river bank erosion and its impacts on the communities. Also, the paper would gaze into the significant ingenuity shown by the islander through their livelihood strategies and adaptations practices in agriculture and other tertiary sources. By doing this, it will not only contribute towards the field of livelihood scholarships but also sheds light upon the concerns over island sustainability practices in general.

Keywords: Floods, Majuli, Livelihoods approach, Traditional adaptations practices, coping mechanism

Introduction

Disasters has often been considered as 'un-certain' phenomena, un-expected or un-scheduled which causes huge impact to area which are 'under-developed', over-populated or 'un-prepared' and the impact of disasters are often perceived as something out of the usual or normal social fabric. Measures that were planned to avoid disaster are tailored towards facets of natural phenomena which include specific, technocratic measures like engineering structures, planning and hazard awareness campaign. It is the superior technique of disasters or 'paradigm of the extreme' (Hewitt, 1983; Gaillard, 2007). The rapid surge in number of disasters globally between the first and

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second half of the 20th century (Center for Research on Epidemiology of Disasters;, 2008; Corporación OSSO La Red de Estudios Sociales en Prevención de Desastres en América Latina, 2008) depicts the strategic failure of its objective to decrease the frequency of disasters. However, these techniques failed majorly as it did not consider the true causes of disasters that lie in daily operation of the society. Disaster victims are chosen unevenly from the sections of society that are disempowered in daily life (Wisner, B, 1993; Wisner, Blaikie, Cannon, & Davis, 2004; Gaillard, 2007). The victims are marginalized terrestrially because they live in hazardous places, socially as they belong to minority groups, economically because of poverty and politically as their voice is suppressed with people who are politically powerful. Marginalization is the root cause of high vulnerability and low capacity in coping with natural hazards. Disasters often turn back the development clocks by destroying the years of effort and labour and often seen as perpetuating poverty to those who are already disadvantaged in the societies. When these disasters strike, it not only destroys the investments and infrastructure of the regions but also lead to drain of national budgets and international development funds. A large part of resources, which otherwise could be used for development have to be allocated to disaster management and reconstruction work. Floods represented 50% of the disasters in 1990-2001 around the world and Asia faced 35% of all water related disasters during that period (UNESCO office Bangkok & Regional Bureau for Education in Asia & the Pacific, 2006).

Flood in India have been a major disaster in terms of impacts and most hazardous in terms of the loss of life, property and livelihood which leaves thousands of people displaced every year. Flood and river bank erosion has existed in Assam since a very long time however, the impact of disasters has increased exponentially in few decades and this in turn is also affecting the development of the state. The flood prone area of the country as a whole stands at about 10.2 % out of the total area of the country, but flood prone area of Assam is 39.58 % of the area of the state (Rastriya Barh Ayog Report, 1999). It signifies that the flood prone area of Assam is four times more than the national mark of the flood prone area of the country. Flood inundation has a long history in Majuli Island; it has been a feature of the island since 1570. E.A Gait in *A History of Assam* shows that Majuli Island was being subjected to floods of the river on either side in high spate (Gait, 2012). The flood of 1755 was also responsible for the changes of the course of the Brahmaputra. Majuli became one of the largest inhabited riverine island in the world after replacing Marajo Island of Brazil in 2016 (Mitra, 2016). However, over the last few decades the threat from erosion has been particularly aggravated due to flood and river bank erosion as prior to 1950 earthquake¾the original size of island was 1,246 sq km which shrunk to 924.6 square kilometers (Census of India, 2011), however, at present time the total area of the isle as reported is 483 Sq Km (Majuli District Administration, 2019). The efficacy of the river particularly socio-economic aspect has been gradually decreasing due to limited livelihood opportunity. Contemporary government reports and media coverage about Majuli has been as island in crisis and this danger over the existence of the island is imminent and the island is at risk of being completely lost to floods and bank erosion.

The great earthquake of 1950 has compounded the problem of erosion around the island severely as the Brahmaputra has traverses nearly 90kms along the southern side of it from Tekeliphuta to downstream and a vast area of South-east Majuli has been eroded away and many villages under Ahataguri Mouza have been completely eroded. The Brahmaputra Flood Control Committee (BFCC) report, 2012 mentioned that*:* "Prior to the great earthquake of 1950 the erosion was not so acute. The eroding activity became active thereafter and attained seriousness after the flood of 1954" pp.58. Over the years there has been slight change in the disaster incubation characteristic or initiatives of the Governments and post 1950 earthquake, rivers embankment has been created to protect the areas from riverbank erosions. And these have always been portrayed as the sign post of development rather than looking at this a sign for precarity. This can be established by the fact that over last few years a large number of deaths, loss of property etc. in the island and Brahmaputra valley were caused due to breakage or embankment breaches in Assam (Mahanta & Mahanta, 2006). The loss of land, loss of properties and life every year due to floods and riverbank erosions has been parboiling tension between the islanders and the agencies over their inability to take any structural measures to control erosions in the isle. During the course of field work the communities has pointed out that:

> It would be wrong only to blame nature for loss of land or properties or the fury caused in the island every year however, much of the development or flood measures taken by the government which also should be held accountable as they process of development is leading to much of the destruction (this could be understood from the erroneous decision of creating dykes, encroachment of wetlands or beels which were regarded as flood water storage point by different government agencies including the Brahmaputra Board and closing the natural flood ways of rivers like kherkertia suti or Tuni rivers).[1]

If these types of conflicts continue to persist in the community among the different stakeholders and if they maintain their rigid stands, the communities would be greatly affected by this. The loss of land would not only destroy the resource base of the island but this will also cause a serious threat to the rich cultural heritage of the island or the social fabric of the communities. The process would jeopardize the power centre, kinship, wealth and social fabric of family due to untimely demise of family members, postponing the agrarian practices or rituals etc. With the sudden change on the onset of floods and erosion in the community, it has far reaching impact on the community and this in a way affect other aspects or functioning of community and these changes might lead to stress or problems in adaptation among the members from the communities.

Livelihood approach

Livelihood approach offers a unifying approach in understanding the interrelation between the disaster management and planning and this aims to make communities more sustainable from disasters. Livelihood entails the activities required for means of livings which can be social assets (including both material and social resources) and livelihoods that can only be regarded as sustainable when it can aid to reduce the impact of disasters or help to cope from extreme situation, recover from stress and

unprecedented shocks while not undermining the capabilities of natural resources available in the community.

The concept of sustainable livelihoods approach originated to understand and support livelihoods of rural areas, as people's livelihood are often dependent on number of income earning source through combination of subsistence sources, while on the other hand the urban dwellers mostly rely on cash economy. Since 1990s development studies and developmental policy have undergone through gradual shift developing a more holistic approach towards understanding household social capital assets and activities for living (Scoones, 1998; Ellis, 2000; Carney, 1998). The focus of most of the recent sustainable livelihood approach is a union of five different assets viz. natural, human, social capital, physical and on a set of principle. These five categories of capital or source include: Natural capital (land, water, air and other natural resources, human capital which entails (healthcare, skills and knowledge, indigenous knowledge and healing practices etc.), social capital (family, kinship, social networks, and associations), financial capital (cash, saving, jewellery, household assets and other valuables) and physical capital (housing, infrastructures, work implements, livestock and domestic utensils etc.) (Department For International Development , 1999). During natural disasters the affected communities often use these internal resources as social capital which plays a significant role for mitigating the impacts of hazards, cope or withstand from disasters by using these resources and community bonding, social ties both within and outside the community. Therefore, social capital can be used to a great extent act as an informal insurance and resource of aid for the community to recover and mitigation strategies at the community level. The understanding about the livelihood approach could be better understood by the definition given by (Chambers & Conway, 1991), in which they mentioned that:

> Livelihood comprises of the capabilities, assets (both natural and social of communities) and the activities required for a means of living; A livelihood is something which helps the community to sustain or cope from disasters and also aid in recovering from stresses and shocks. Also in maintaining or enhancing the capabilities and assets, both now and in the future, while not undermining the natural resource base.[2]

This approach describes that how community members obtain these 'assets' and resources what they do with these, or who control these resources in community and lastly in disasters context it is vital as how the communities creates these as their "buffer household assets" for disasters. These assets are not only in the form of the physical aspects (e.g. land, property etc.) but also in social terms (e.g. community based feeling, good relations with neighbors, entrepreneurial skills) and also in terms of financial assets (savings to cope from floods, assets or valuable items, livestock's etc.) which can be used in time of need. In general livelihood can only be sustainable when it can "aid in coping with disasters and recover from stresses and shocks, maintain its capability and assets, and provide sustainable livelihood opportunities for the next generation".[3]

Livelihood approach in general has been centered on adapting asset-based livelihoods "frameworks," however, this field of scholarship has widened by

embracing the political ecological approaches by taking into account the existing power relation between the communities living in the affected area and nature's pertinency in livelihood analysis. Yet this field of scholarship has remained under-theorized and remained inadequately considering the question of materiality and the augmented informal economies in post-colonial state which focused on different forms of livelihoods. Hence, this paper would attempt to address the above theoretical concerns and focus on varied livelihood changes brought by the disasters in the island district of Majuli. It is often seen in vulnerable geographies; community adapts remarkable ingenuity in their livelihood strategies and practices in their everyday life which is relied on their strength and diverse livelihood options. This paper would critically engage with some of these livelihood practices in Majuli.

Majuli's existence as a World Heritage sites

The island is located in the midst reaches of the Brahmaputra river and about 630 km upstream from Bangladesh – Assam border. Also the island is located in the broadest part of the Brahmaputra valley, wherein the river and its tributaries divides it from Jorhat and Lakhimpur districts (Goswami, 2001). The island is encircled by Brahmaputra in the South, Kherkatia Xuti in North-East, Subansiri in the North-West. It lies between 26° 39' 57.6" and 27° 16' 19.2" N and longitudes 93° 34' 12" and 94° 42' 3.6"E. The island forms a significant landmass of alluvial flood plains of the Brahmaputra, which is profusely dominated by profusion of depositional land forms including '*Chars*' and '*Chaporis*'[4] (sandbars, bed-forms etc.) and not to mention vast lengths of wetlands however, these area have been severely impacted due to the flood and rapid erosion. The island is also regarded as "*Cultural hub of Assam*" due to the establishment of largest number of Vaishnavite monasteries as some of them date backs to 15th century by the Bhakti saint Mahapurush Srimanta Sankaradeva.

Water has always been associated with the progress of the society as many worlds' greatest civilization sprung near the banks of the rivers. However, the river which has been boon or life giving for the communities has jeopardized the development, life and social fabric of the communities, especially when Majuli is contesting to be recognized as the UNESCO World Heritage Sites. The government of India proposed Majuli to be included under the "cultural landscapes" category due to culturally reverence and the Satras (Vaishnavite monasteries) being the repository of the vast cultural heritage. However, the island was shortlisted in the "*Tentative List*" of the World Heritage Sites by the WHS committee session in Suzhon, China. However, due to continuous flood and riverbank erosion in the island, it has not only led to loss of life and property but also a serious threat to the rich cultural heritage of the island. Also there has been anomaly in the existence of the island and retaining the World Heritage Sites due to continuous diminishing total land mass of the island post 1950 earthquake. More than one-third of the Satras have been impacted from this and large number of Satras of the island had to be either relocated to the north and south bank of the Brahmaputra due to floods. However, in case of considerably large and financially prosperous Satras like Auniati Satra in the last fifteen years they were able to relocate within the island at least three times but in the case of smaller Satras from Ahataguri or other areas had to relocated out of island or closed as of now only

22 Satras exist out of 65 Satras originally established in the isle (Sarma D. , 2013). Due to relentless erosions, the very existence of the island is under threat. It is facing substantial erosion since the great earthquake of 1950 and the erosions have become acute after 1974. About 1/3 rd of the landmass has been eroded in the past half century and the issue of protection of Majuli Island has been raised at different level during the last couple of years. Its uniqueness due to the cultural and natural heritage makes it a fit case for preserving under the aegis of the UNESCO as a world heritage site.

Methodology

The research study was conducted in Majuli district of Assam, and it was qualitative in nature and narrative research design was followed to study the diverse aspects related to the livelihood changes brought by disasters and use of Indigenous knowledge for Disaster Risk Reduction. The study was located in two blocks of Majuli: Majuli Development Block (Kamalabari) and Ujani Majuli Development Block (Jengraimukh) as the universe for the research, the blocks being perennially affected by floods. The blocks consists of 248 revenue villages out of that 4 villages (Salmora, Jengrai gaon, Moulal Kalita Gaon and Dakhinpat Kumar Gaon) were selected using Purposive Sampling method which was based on the secondary literature which shows higher impact of floods on these villages and due to the proximity to Brahmaputra, lacks of resources to cope from disaster and impacts of floods on livelihoods of the communities due to twin process of floods & riverbanks erosions. For the research explorative interviews with the key informants from the community and the participants included men, women, local scholars and elderly and representative from village councils etc. The data collection was done through key informant's interviews and checklist[5] was used for interview (semi-structure question were used to interview households whose livelihoods were farming, fishing, pottery making etc as it aimed to document communities livelihood patterns, strategies with special reference to ecological and livelihood changes brought by flood and river bank erosion.), focus group discussion was conducted in the four villages in mixed population and individual constituency in which 15 members participated in each FGDs. The categories of respondents selected for the study:

- Elders of the communities, Community members, Members of different groups,
- Community leaders (village head), Block Development officer
- Academician, Members of Community Based Disaster Management Committees/ Task Forces, SHGs etc.

In Salmora, a large number of women folks were interviewed whose traditional livelihoods were dependent on pottery making, in order to gain understanding about the impact of flood and river bank erosion on their traditional livelihood practices and income. The interview and focus groups discussion conducted has both male and female participants from Mishing, Kaivarta and Kumar communities in particular. The choice of selecting men were based on the criteria that they were largely engaged in outdoor activities like to pottery trading, transportation, fishing and cattle trading while on the other hand women folk were engaged on pottery making process. There

is very common phrase among the islanders that is "*Kumaronir mukh*" which means the mouth of kumar women, due to their gendered division of labour which includes primarily in various non-economic and economic activities like pottery making, brewing rice-beer, handloom weaving, livestock rearing etc. Hence, through my interaction both binary gender groups provided an in-depth understanding about the nature and extent of livelihood impact and also the gendered dimension of hazardscapes.

Disasters and its impingement on community

Impact of disasters is largely being measured by looking at the number of deaths or injury or by estimating the damage to land, property, livestock etc. Majuli has lost significant amount of landmass due to twin process of flood and riverbank erosion from 1954 to 2012. Around 7.4% out of total of its total landmass has been eroded, with an annual average rate of erosion of 80km^2 and eroded approximately 3,860 km of landmass (Phukan, Goswami, Borah, Nath, & Mahanta, 2012). Over last couple of decades the island has gone through a significant transformation due to flood and river bank erosion, the total landmass of Majuli in the beginning of 20th century was arguably 1,246 sq km which shrunk to 924.6 square kilometers as per (Census of India, 2011) but, there has been anomaly over the actual size of island reported by different scholars and Government of India report as reported by (Sarma & Phukan, 2004) the island was merely left with 421.65 km^2 in 2001 while on the other hand at present time the total area of the isle as reported is 483 Sq. Km as per (Majuli District Administration, 2019) which raised a serious question of data on the isle total landmass. However, the island has been gradually eroded by Brahmaputra and its tributaries due to the process, more than seven dozens villages have been wiped out completely from the island, including a entire Mouza "*Ahataguri*"(Revenue Block) on the western side and also several other villages which has certain cultural or livelihood significance were eroded.

Table 1: Number of families affected by erosion since 2008

Year	No. of affected families affected by Erosions	Areas affected (in Hectares)
2008	185	42.83
2009	52	24.89
2010	329	45.61
2011	132	17.40
2012	321	44.58

(Source: Disaster Management plan for Majuli Sub-division, 2014)

Every year due to the grim nature of floods vast number of families are displaced and forced to relocate to places outside the island and many continue to live as climate refugees within the island, inhabitating in vulnerable geographies like embankment, road etc. particularly people residing near Dakhinpat Kumar Gaon, Kamalabari Ghat, Sumoimari areas. In Assam more than 2500 cadastral villages has been perennially affected by floods including the cultural revered sites of Majuli 'primarily' the Satras

as the island had over 65 Satras (Vaishnavite monasteries) now only 22 Satras are left rest became the victims of the unprecedented deluges in the island (Phukan, Goswami, Borah, Nath, & Mahanta, 2012)[6].

Figure 1: Disaster & Impingement of flood and erosion in Majuli (Field data analysis)

The livelihood crisis in Brahmaputra valley is predominately due to landlessness, livelihood and labour crisis in different sectors, migration, and shift from traditional livelihood to new forms of livelihoods which has gone through a major shift due to erosion from welfare state. In the island predominantly the people livelihoods depends on agriculture, horticulture and livestock framing etc. which is severely impacted due to flood and river bank erosions. Kaivarta[7] and Kumars communities who were traditionally dependent on fishing and potter making have undergone a tremendous shift and the communities have been forced to leave these age old livelihood practices and adopt new types of livelihood which includes working as a daily wager from these community from Dakhinpat Kumar, Sumoimari gaon etc. as majority of them have left these practices. Disaster also leads to huge economic loss as employment patterns are changed and livelihood options are lost. These create economic insecurity for the family and especially for women which deprives them from job and income. Almost 30% of the women reported economic loss due to flood and erosion in the last few years was in the form of loss of land, property and crops. In normal situation wherein women are already at a disadvantage because of the lesser employment opportunities but after the disaster this decreases further.

> I have to struggle a lot for ensuring the survival of my children every year. I couldn't send my children to school because of economic hardship. Now, two of my sons work as agricultural laborers and earn living for the family. I myself raise livestock and poultry so that some additional money can help the family to run smoothly but I usually prefer to sell the poultry before the monsoon starts to survive the flood as they die during flood.[8]

Disasters led to Economic losses which can have long term impact on community post floods as more than one fourth of respondents didn't have any additional source of survival. So they are forced to sell their household assets (utensils or jewellery, livestock, poultry or use their savings) as a social capital to cope from the deluge.

> After the flood of 2012 we didn't have anything to eat. I had to sell some of my personal belongings like silver ornaments and mobile phone to collect some money for buying food. We lost everything in that flood. My husband started working in as a daily wager, my elder son started working as construction laborer in Jorhat and I also took up a job as house help.[9]

Dwindling soil and its materiality

Landholding in Majuli has been skewed and it is very small and less as per the national average landholding, as landholding of the people from the island range from 1 bigha to 10 bigha per family (Nath, 2009). Compared to the national average of landholding which is 1.1 hectares (8.22 bigha)[10], a major factor behind this small landholding is the loss of massive landmass over the years to riverbank erosion and large portion of landmass lost due to erosion has been either agricultural lands or wetlands. Between 1901 and 2001, riverbank erosion has reduced the island from a landmass of 1255 km^2 to about 500 km. A sizeable portion of this lost landmass was agricultural land and wetland that used to be pivotal for agrarian and fishing communities as a large section of community is dependent on it for livelihood.

The loss of land due to flood and erosions has made the community landless and at the same time the Satras being given land as patronage doesn't create much impact compared to the counterparts. Land loss due to riverbank erosions poses great threat not only to existence of infrastructure but also agricultural. Large numbers of people residing in areas like Dakhinpat Kumargaon, Molual Kalita are re-settlers as their lands have been washed away due to riverbank erosion forcing them to resettle in different locations. Due to a recent flood in 2016 at least 19 families have lost their land and erosion has affected 80 families on the island. Since 1954, Brahmaputra and its tributaries have caused large scale erosion in Assam more than 4,270 sq.kms of agricultural land has been washed away and over 50,000 families have become homeless (Kashyap, 2016).

> We used to live in a village which was about 15kms away from Molual Kalita and we had 5bighas of land, poultry and other assets. Everything got washed away during the flood and for 15 days we lived in the relief camps. Finally we moved to this village with no land or house, now we don't have any agricultural land and I had to do share

> cropping for livelihood. All our savings have been used during floods and we have started all over again.[11]

The analysis of data shows that the land distribution in the island has been skewed, as the field data shows that Satras located in the island and the people staying in Satras has own large pool of land, which they received as a patronage at different point of time by the state as well some of these land are given to Satras by the community as well. While on the other hand the community people landholdings has been dwindling over the years and they have less lands compared to the others. In order to understand the question of materiality and soil of the island, we also need to gaze into few other dimensions pertaining to land and the question of location of the island per se. In the island *"da"* or largely low-lying areas located in the island are more suitable for agriculture especially for paddy compared to the areas or people who are located either on the embankments like Dakhinpat Kumar gaon wherein the communities are forced to live near the embankment due to the lack of choice & marginality which makes the community a vulnerable constituency. The people in the island are also forced to relocate to *Chars* and *Chaporis,* but these areas are highly marginalized as the people are perennially affected due to flood and erosions. Every year these families are rehabilitated by giving alternate land in Chaporis which create more marginality among the community and lack of suitable land for agriculture has worsened their conditions.

Dwindling soils and traditional livelihoods

The potter community from Salmora expressed these artistry has been the mainstay of the livelihood and income and the men from the household sail to Sadia, Tezpur, Lakhimpur districts and other neighboring districts to sell the pots on their country made boats. The income generated from it is used a means of sustenance to cope from flood during monsoon. However, they expressed due to the rapid flood and river bank erosion, it has been continuously eroding/washing away the '*Kumar matti*' used by the potters as they face existential crisis of their traditional livelihood which in turn affects the islander source of income.

Figure 2: Traditional Potters of Salmora Majuli

The river which was once a boon to the community has become bane, as the river carrier sand can't be used for the pottery making. Clayey soil which is locally called as "*Kumar-matti*" has glutinous characteristics and this type of clay is required for pottery making. This type of clay is obtained from clay pits from about twenty-five to thirty feet depth near the river banks and the sources for this clay are extremely limited. Largely, this clay can be procured from riverbanks, which is constantly eroding. Over the year the traditional potters are forced to use sand or use inferior quality soil (a type of soil locally called '*Lodha-maati*') this not only gives the pots a low quality finish but also potters get less price for such pots.

Figure 3: Kumar matti or clay gathered by people in Salmora

The potter community from Salmora expressed these artistry has been the mainstay of the livelihood and income both for women and men who are largely engaged in pottery making. The pottery of the place gains its significance from the fact that it is not made on a potter's wheel. The pots are hand beaten and sun dried from the clay is gathered from river banks. The pots find an immediate market within the island as well outside and the income generated from it is used a means of sustenance or to cope from deluge. However, they expressed their definite source of income which is now dwindling due to the rapid flood and river bank erosion. Communities from Dakhinpat Kumar gaon who were traditionally dependent on pottery making, it was their only source of survival for them. But due to rapid flood and erosion they have lost their land and relocated to different areas and they are forced to do odd jobs in order to survive.

> We are Kumars and our traditional livelihood has been pottery making. However, with the recent floods and erosions we have lost their traditional livelihoods and most of the members don't practice their traditional livelihood of pottery making as it is not economically viable for us, as well as the erosions has forced a large section of the community members to migrate for livelihood and those who are in the island they have either do share cropping by taking paddy field on loan. Hence, the traditional livelihood has been lost due to this twin process.[12]

Kumar community from both Dakhinpat Kumar Gaon and Salmora has gone through a major crisis due to river bank erosions per se; the loss of specific types of soil for pottery making has created threat for the traditional livelihood acutely and a large section of community member were forced to leave their traditional livelihood as there has been gradual reduction in the income due to lack of soils over few decades.

Figure 4: Pot sellers from Salmora getting ready sale

And for vulnerable communities like women, the ability to earn money is essential for their survival post disaster yet women's paid and unpaid work is not being understood by the policy makers, relief providers who respond to the survivors. Salmora is one of the worst flood affected area in Majuli where almost 60% of the women folk are earning their livelihood from pottery making, which has been their caste based profession. But in last few years due to the increasing impact of floods and erosion, women's livelihood has suffered severely and families are forced to leave the village and relocate to different areas.

> The intensity of flood and erosion has rapidly increased in the last few years. The Brahmaputra which was a boon for us has now become a threat. The river has started carrying a huge amount of sand along with the flood waters and it has started eroding the land. We no longer get clay to make pottery and this is seriously impacting our livelihood.[13]

Agricultural Production

Disaster leads to huge economic loss as employment patterns are changed and livelihood being lost which creates economic insecurity for the family, and especially for women. Agriculture represents a core part of the Indian economy (around 15% contribution to the GDP) and provides food and livelihood activities to much of the Indian population. Around 40-50% of the land area in the Brahmaputra valley is under cultivation and Majuli, ranks higher as majority of the island's population

source of income is through agriculture. Thus, when (Hobsbawm, 1994) announced the "death of peasantry", the case of Brahmaputra valley continued to strengthen the relevance of agriculture (Akram-Lodhi & Kay, 2010a; Akram-Lodhi, A. H; Kay, C, 2010b). Over a century ago, (Kautsky, 1988 [1899]) illustrated us about "the agrarian question". He shared that the agrarian question should not be concerned with the fate of the peasants rather, should focus on the transformations of agriculture under the capitalist mode of production. However, many Marxist scholars have pointed out that capital has enormous control over the peasantry which in return turns them into "disguised proleriats" (Bernstein, 1982) or "wage labor equivalents" (Banaji, 1977). Overall, the agrarian questions are relevant in understanding rural changes and transformation of peasantry in the neoliberalized world in which we live in. The most important question depicting agrarian crisis in Brahmaputra valley is that of a land. As compared to other places where the land becomes infertile, the land in Brahmaputra valley is fading altogether due to erosion every year therefore; it becomes vital to give a new meaning to the land. (Li, 2014) In her article, what is Land proclaims that land is a "Strange Object" which "stays in place" and cannot be removed and (Li, 2014) argues that the "location" of land moulds people's rights over land in various ways. Her acknowledgement of land in the Brahmaputra valley fails where instead of staying in one place, as here the land is continuously diminishing at a rapid rate. The peasants in the valley are struggling hard to protect their land from disappearance. The question of land, its importance in an agrarian question needs a well-organized approach in such geographies.

The economy of Majuli is predominantly agrarian with more than 75% of its population earning their livelihood from agriculture. It not only takes care of the food requirements but also gives employment to a large section of people which is also the mainstay of the economy. However, the percentage of people engaged in agriculture and allied activities have been declining year after year due to the diminishing productivity of lands because of recurrent floods.

> Agriculture is no longer profitable. Earlier we used to grow both Ahu and Boro[1] rice but due to recurring floods our crops keep getting damaged. We sometime had to take land on loan for farming or shared cropping, but due to flood either our crops are damaged or we had to wait until water recedes which in turn delays the planting season by months this in turn impacts our income negatively.[15]

Even the movie Village Rockstar depicts the grim reality of Assam's vulnerable geographies and family loss incurred due to floods. The conversation between daughter (Dhunu: the lead protagonist) and the mother from the movie in the later half manifest the vulnerability of this side of world post floods. When Dhunu asks her mother a compelling question on – 'Why they go back to do farming every year when the recurring flood destroys the crop annually, to which her mother replies with a sad but determined voice in Assamese 'Karmoe dharmo' which translates 'work is our religion' she further adds to that because 'we are farmers and this is all we know" (Das & Das, 2017). Thus, the same similarity could be observed in Majuli and other parts of Assam as this has been the plight of farmers as well. Wherein their yield is destroyed every

year to flood but still the communities goes back and does farming year after year.

> We used to cultivate our own land and grow crops on our own but post 1992 floods we lost everything including our agricultural land and livestock. Our house was washed away and we moved to this village without any source of livelihood. We had to borrow land on loan for farming but that also didn't reduce our plight as the flood would impact our crops here as well. After which my elder son had to migrate to nearby town Jorhat for livelihood and my younger son started working as daily wage and works sometime under The Mahatma Gandhi National Rural Employment Guarantee programme (MGNREGA).[16]

The fertile soil has always been the abode to variety of bio resources and dependence on the same for livelihood generation has been the sole reason for a self-sustainable livelihood system in the island. But since time immemorial Majuli has been undergoing severe degradation due to the chronic flood problems and this has been affecting the self-sustainable systems severely. Also one of the key points that emerged from the discussion was that, the geographical isolation is one of the major drawbacks of Chaporis landscapes which in turn make the dwellers difficult to access market. These small islets have commuting issues with mainland Majuli by road and waterways as they reside in the middle of the river. Hence, the lack or poor transportation infrastructure makes the Chaporis farmers difficult to sell their agricultural outputs in market. For instance, Bhakat Chaporis are known for their expertise in agriculture, mostly in sugarcane, mustard and a wide variety of vegetables. But due to inaccessibility to market, they are bound to sell their produce at scant rates. Occasionally, their crops decay in the field or at home storage because of fewer buyers.

Traditional livelihoods (livestock loss) and shifts

Floods in the island also cause economic loss due to the drowning of the livestock which brings untold miseries to the people. Livestock is one of the prominent sources of income for rural population and a woman plays a dominant role in that as these resources are managed by them. However, the flood has severely impacted these form of livelihoods, as per the last year report at least 15 lakhs animals were affected by floods and as per Assam State Disasters Management Authority (ASDMA) to floods total number of big animals including (cows, buffaloes, goats etc.) affected due to floods was 14 lakhs 86,846 in Assam (Nag, 2019)[17]. The communities loses major chunk of income due to death of cattle's, poultry and pigs etc. this in turn creates certain form of economic insecurities among people. Loss of any form of livestock has long-lasting effects on agriculture and on the incomes of the landless laborers, who largely rely on livestock for their livelihoods. A large number of respondents from and Jengrai Mukh Gaon and Dakhinpat kumar gaon expressed that their livelihood is dependents on selling cow milk, meats of goats, pig etc. in the market which has severely impacted. Post floods, gathering fodder becomes a big problem for the people and the communities are forced to sell their cattles and and poultry at a low price. This has also been reported by (Bhanutej, Jathar, Panicker,

Tiwari, & Uprety, 2002) that during the drought in Shidanpura village in Karnataka, the scarcity of fodder compelled people to sell their cows for only Rs. 200 (Approx. USD 4)

> I have to struggle a lot for ensuring the survival of my children every year. I cannot send my children to school because of economic hardship. Now, two of my sons work as agricultural laborers and earn money for the family. I myself raise livestock and poultry so that some additional money can be earned to help the family run smoothly. But over the year we sell our livestock and poultry to survive from floods before the monsoon starts as they die, drowned or washed away sometime during flood.[18]

A Mishing woman from Jengrai gaon expressed that most families did not have a stable source of income nor did they own any immovable property like a piece of land which was the most disturbing or troubling aspect of this entire process of change for them. The insecurity of survival and instability in income are the basic causes of worry for the families. Flooding often causes loss of livestock and poultry in order to avoid such a loss women often sell them prior to floods which helps them in dealing with the economic insecurities post flood or in some cases women had to take loans to buy seeds and livestock for their survival post floods.

> Surviving the flood becomes a problem in the island as we don't have agriculture land. My children earn a meager amount as daily-wage laborers. We are not able meet our basic needs and so we had to sell our poultry and livestock at a low price in order to survive (Original statement in Assamese, "amar kheti matti nai, jenetene lora sualibure enei hajira kori, taake khaisu aru.[19]

Fishing as a source of sustenance for community

The twin processes of flood and river bank erosion lead into a high cost among communities as they had to relocate from one location to another, as the displacement leaves the community not only fend for new piece of land but they also need to identify a new source of livelihood. In Majuli, the livelihood crisis exists due to the unprecedented erosion leading to depletion of wetlands which is vital sources for fishing communities. In case of Dakhinpat Kumar Gaon and Sumoimari predominantly being Kaivarta village, whose traditional livelihood is fishing but the twin process of flood and river bank erosion along with the technocratic process involving the creation of infrastructure to control the disasters, have lead into gradual depletion of water bodies including wetlands which have posed serious threats to local livelihood like fishing over few decades.

The analysis of data shows that one of the predominant livelihood practices that are affected is fishing, and it is not economically viable anymore. Fishery has been traditional livelihood for tribal as well as other communities and Majuli economy in particular. The island being surrounded by Brahmaputra and its tributaries, the main source of fishing was through wetlands hundreds of beels (owned by communities or the state), ponds, streams and channels. With the development and creation of embankments, check-bunds, and spurs have created the natural obstruction of the

river courses, thereby severing as the hindrance for the connections between the wetlands and rivers. As these wetlands are deprived due to lack of freshwater, many of these wetlands have completely dried over the years, and they are filled with stagnant water which has become inhabitable for growth of fishes.

In the Kaivarta villages whose traditional livelihood household majorly relies on fishing, only 30% of the fishermen practice other forms of livelihood like agriculture, livestock rearing, contractual jobs, carpentry, service etc. which has been impacted the most. The family expressed that even when weather was bad the fishermen community expressed they had to go out for fishing in order to sustain the daily needs of their family. He added the capacity to buy food items like rice, food staple for fishing community dependents on fish catch and savings from earlier day. The fishermen expressed daily whatever fish we catch out of that we use only 10% - 15% for our own consumption rest is sold in the market. The fisherman folks added that due to the hydraulic structure like formation of embankment, spurs just restricted the movement of water and due to wetlands being transformed into homestead has led to gradual reduction of fishes which in turn has impacted their livelihood severely. The data shows that only 78% of the fishermen had their own boat which they use for fishing, on the other hand rest of the community take the boats on rent either they had to pay Rs.350 or one fourth of catch to the owner of the boats, which they think put toll on their income as well. The families from Sumoimari and Dakhinpat Kumar Gaon have been fishing as livelihood has undergone significant changes due to lack of fishes and people are opting for animal husbandry and rearing, goat, cows etc. As explained by fishermen, Diganta Das (now a goat rearer):

> Once an avid fisherman he was forced to switch towards animal rearing or goat trading which according to him is comparatively an unprofitable business as the cost of buying goats and other animals are comparatively higher than fishing. Also this is strenuous and risky which involves travelling to far-flung villages without certainty of fixed income in return which also doesn't fetch much profit. He mentioned that the lack of support from the governmental institution or loans for buying livestock's also makes it difficult to practice these new forms of livelihoods to survive.[20]

Changing livelihood of community

Since the natural resources are already diminishing it is important that rural communities should adopt method of livelihood diversification rather than giving a narrow focus on natural resources and agriculture in rural livelihoods (Bebbington, 1999). Li (2011) found a similar observation where the rural populations focused on new forms of livelihoods and labor regimes instead of sticking to their '*locally oriented production on small family farms*'. I agree with the author contestation that rural livelihoods should not be paramounted as natural resources centric but through the finding of my research also reflects that there has been exponential growth of '*educated unemployed*' as mentioned by Li (2011) and absence of alternative resources in Brahmaputra valley compels the rural livelihoods to depend on natural resources. The constant degradation of these resources has therefore, paralyzed the livelihood systems.

Timber-sawing has also evolved as one of the tertiary occupation in the island and is becoming a key source of livelihood primarily among Mishing community, as timber sawing has been one of their main sources of livelihood, which earlier belonged to the migrant laborers from U.P and Bihar.

Figure 5: Timer-Sawing in Moulal Kalita Gaon

However, over the years the traditional livelihood of people has been dwindling and new form of livelihoods like growing masonry, plumbing, etc. has come up, while some of the traditional livelihood practices have dwindled and disappeared. Looking at the (Sanyal & Routray, 2016) work on social capital which reminded us, about these new forms of livelihoods which he regarded as '*sub-economy*', that becomes a mainstay of the community and he argues that these livelihood would become the permanent part of the capitalist economy. However, they also argue that (Sanyal & Routray, 2016) 'need economy' is a result of primitive accumulation which may again need to be further enhanced by integrating political ecology concerns in it. For instance, in Majuli, while the loss of resources and traditional livelihoods is largely due to the human-induced disasters and the projects on disaster-control, rooted in the specific functioning of a capitalist state, they also have to do with the bio-physicality of Majuli, as discussed earlier with relations to land and water, for example.

These livelihood change are not only restricted to Moulal Kalita or Dakhinpat village alone; but also this applies to Majuli at large, and many parts of the Brahmaputra Valley, too. In Majuli, over the past few decades, a number of new livelihood practices, as daily wager, construction labourer etc. has grown compared to the traditional livelihood like timber-sawing (*kath-phola*), carpentry etc.

The lost art of Mask Making due to Erosions

Mask making has been carved a niche art in Majuli for itself by being a repository of Assamese art and culture and especially in terms of preserving the culture and practices of communities. Majuli boasts many of these monastic centers or Satras, preserving and practicing music, dance and art. One of the famous mask making practitioners in the island is Hem Chandra Goswami, who is also Sattriya (member) of Samaguri Satra. He is national and international acclaimed mask maker and has helped to

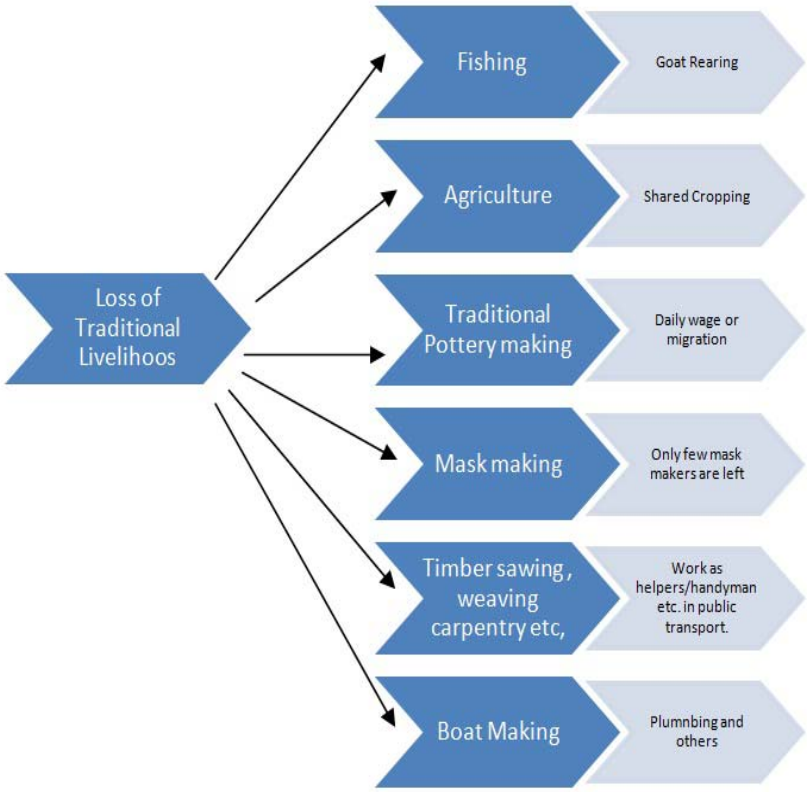

Figure 6: Changing nature of Traditional Livelihoods due to disasters

enhance the performance and dramatic effect of these characters, which would not be possible by facial expressions alone.

Figure 7: Mask makers from Samaguri Satra

However, due to the dual process of floods and riverbank erosion, it has been bane for the mask makers and continuously degrading the age old practices and art form. He narrates,

> Over the years the climate change floods and erosions in the island has become very rampant and this has created threat for the existence of the mask making practices, he explains that the Brahmaputra which used to get the clay suitable for mask making now carries only lodha-matti or sand which can't be used for mask making, and even if I use that the quality of mask comes out to be bad also giving the shape to the mask become problematic. He feels that if at this rate Brahmaputra carries the sand these ages' old practices might be lost in few decades.[21]

The resource depletion is accompanied by the migration of the locals which is gradually pushing the island deeper into solitude with the constant threat of extinction. Communities who were traditionally dependent on mask making, agriculture, pottery making, boat making and other such occupations are forced to migrate to other states and districts of Assam in search of better livelihood options.

Adaptation practices and its viabilities

Coping mechanism to disasters refers to the way the available resources are used to achieve various beneficial ends during hazards and disasters (United Nations Development Programme, 2004). Traditional knowledge systems or Indigenous knowledge system have always been powerful tool for the communities, and it has always helped local people, in protecting and conserving their natural resources, restoring their livelihoods and lives from disasters. The communities from Majuili have developed multiple strategies to live with floods which the island witness perennially. These indigenous knowledge/adaptation strategies and practices are largely vested to relocate, evacuate their homes temporarily, change cropping patterns (like growing crops like Sali and Bau) etc. has become the sources of subsistent for the communities post flood and these supplement their income from migrating household members and some of these are discussed in figure 8.

Sustainability, daily life and disasters

Sustainability as a concept infers to meet basic needs on an average basis and during the hazards; vulnerability of people depends on the nature, force and diversity of livelihoods. Therefore, giving a thought to life is crucial in understanding livelihoods sustainability as well as vulnerability in confronting natural hazards. The inability to cope from natural disasters and perenniality of disasters shows the lack of preparedness in day to day life and the principle cause of disasters lie within the hazards independent constraints which makes or victimizes a certain group of people more vulnerable than other rather than as an 'extraordinary' dimension of disasters. In other words, disasters reflects the development failure in integrating it in development plans and when a disaster strikes attributing that as a responsibility to nature is nothing but restoring nature as a scapegoats for such events.

Local knowledge systems have been found to contribute to sustainability in

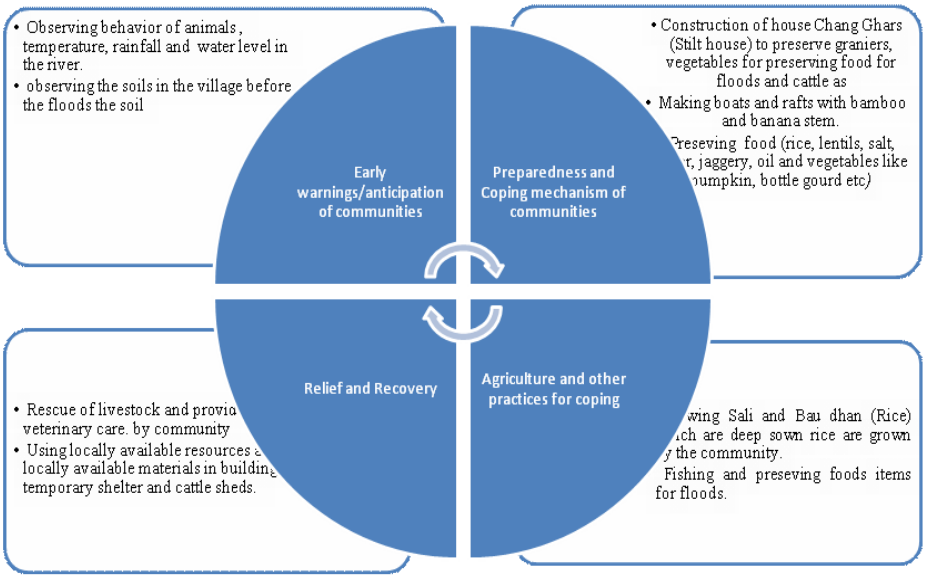

Figure 8: Indigenous knowledge and practices of community from flood in Majuli[22]

diverse fields such as biodiversity conservation and maintenance of ecosystems services, sustainable water management and agriculture practices etc. These local knowledge systems have also been found useful for ecosystem restoration and often have ingredients of adaptive management (Pandey, n.d.). Knowledge and skills broaden the range of activities which in turn lessens dependence on fishing in bad weather. Social capital plays vital role in giving alternative support. The savings of fishermen and potters communities not only helps to buy food during undersupply but also helps to maintain fishing boats and construct impenetrable homes also they acquire the additional cash by lending valuable belongings. Therefore, vulnerability of people cannot be segregated from livelihoods sustainability. Similarly, livelihood sustainability is tied to people's vulnerability and natural hazards.

Coping mechanism from flood

In most of these vulnerable geographies we have seen communities adopting number of measures to cope from disasters, especially families belonging from Salmora and Dakhinpat Kumar gaon, Jengrai gaon mentioned that they had to reduce their daily expense and focus mostly on essentials like food, medicine and other non-essential items are overlooked by the community. In order to do so a lot of families either pawn or sells their belongingness like jewellery, cell phones, utensils and even some time boats as well. In these geographies women play a key role during the time of disasters they are mostly engaged in alternative livelihoods method like handloom, handicrafts, poultry etc. or taking loans from friends and families to withstand the impact of disasters.

However, the islanders have shown a significant ingenuity in their livelihood strategies and adaptations practices in agriculture and other tertiary sources. The

agriculture practice of the local commune has transverse in Majuli over the years and started growing Sali paddy in high line areas and deep water rice in low line areas like Bau dhaan[23] (Rice). The deep water rice is not affected by flood waters and can be harvested after the floods recede. But these agriculture practices are impacted due to the continuous soil erosion and sand deposition in their fields.

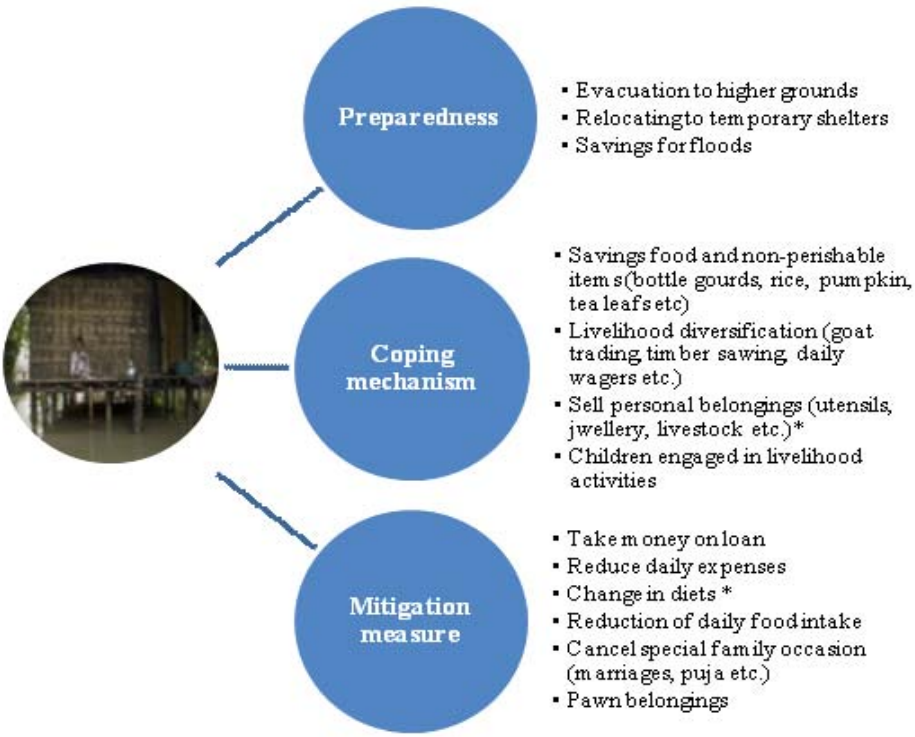

Figure 9: Coping Mechanism in different stages of Disaster Management[24]

The knowledge base practices to cope from floods like storage of food grains, housing structure, prediction of rain using early warning system etc. which they observed through some signals from nature before any major event is about to happen which assists them to prepare from disaster and reduce its impacts and the communities have mastered these over the years. They are living in consonance with nature and their traditional wisdom helps them to detect and identify the possible hazards or disasters. The analysis of data shows that coping mechanism developed by communities were based on their folklore or stories which are passed from one generation to another that were useful in understanding nature and the causes of disasters.

> We have our own flood predictions techniques and we observe sets of early warning sign which help us to predict the intensity of flood. Like the soil sediments coming downstream from which we get an idea of how heavy the rains would be. If soil sediments are flowing in the river before the onset of monsoon, it signals that flood will come and the rain would be heavy leading to floods.[25]

There are certain indigenous practices which are used by the people in order to reduce the impacts of disasters in the island are discussed below.

> Another warning system that works is observing the rain pattern. If during the beginning of the rainy season, it rains heavily for first week or more than 10 days continuously, it predicts heavy flooding and during such times we evacuate to higher grounds. She also mentioned that Women are important source in keeping this practice alive as they pass on these indigenous knowledge systems orally to their children and other members which helps them to prepare from disasters.[26]

Figure 10: Traditional Chang Ghar in Jengrai Gaon

The data analysis shows the people residing near the river bank had to adapt changes in the dietary practices by integrating pumpkin, bottle gourd and whatever they families had saved before the onset of floods. Also some of the communities residents added that they also need to restore on further rationing strategies to cope from the floods and even some mentioned that they had skipped atleast one meal daily during flood due to lack of food supply.

> We had to change our dietary plan during the floods time as due to lack of resources either we rely on food that are saved before by us (pumpkin, bottle gourd, potatoes etc.) or the relief material. They also mentioned that most of the families during had to reduce the intake of fish, poultry etc. and eat potatoes, lentils, rice etc. which are easily accessible.[27]

The traditional livelihood systems of the isle which were dependent on the natural resources have undergone significant changes due to floods and riverbank erosions. However, the societal response developed based on the community practices or ingenuity had negative impacts, like impoverishment. It was evident that though the residents have developed these coping mechanisms for ûooding however, at the same time it didn't seem to achieve much due to perennial ûooding, people lost their income and assets which they could only partially recover from flood. Therefore, this makes

it hard for the community to make structural adjustments that would allow adaptation in the longer term.

The way forward

It is important to acknowledge that disaster shouldn't be just confined to the discourse of disaster management per se but it is a larger development issue for protecting development gains and making it sustainable. It is also important to ensure that for disaster management efforts, national and state agencies must consult the affected communities, particularly with women and other vulnerable groups. There has been a breakdown of traditional livelihoods in Majuli, primarily due to disaster-induced natural resources crisis which are largely human induced. Therefore, it needs to be deeply examined of as the floods and erosion not only has social impacts on the community but also it is creating livelihood crises in the community which in turn has been major issue for sustenance of traditional livelihoods which has collapsed over the years. Hence, it is vital that local communities should participate in evaluation of disasters needs and the ways of sustaining the natural disasters based on their indigenous knowledge and practices. In this process Community Based Disaster Risk Reduction practices empowers the communities with self-developed strategies which are socially and cultural accepted by communities to cope from the natural disasters. The use of this wisdom or Indigenous knowledge during the times of floods and climate change requires an urgent reckoning. The disaster risk reduction plans for the communities requires assimilation of indigenous knowledge which are made for the locale and these practices have evolved over the period of time inculcating as per the needs of the community and ecology.

It is also observed that local population tends to diversify their livelihoods in order to cope with the socio-ecological crisis which Simon Batterbury describes as '*productive bricolage*' especially in the context of islands and their specific geographies to cope from flood. However, the viabilities of these livelihood practices are questionable as these tertiary livelihood opportunities might not be useful to cope from the floods which are perennial in the island.

Notes

[1] The excerpt is from the FGDs conducted in Salmora.

[2] Chambers, R. and Conway, G. (1991) *Sustainable Rural Livelihoods: Practical Concepts for the 21st Century*. Discussion paper No. 296. Brighton: Institute for Development Studies, p 7.

[3] Chambers, R. and Conway, G. (1991) *Sustainable Rural Livelihoods: Practical Concepts for the 21st Century*. Discussion paper No. 296. Brighton: Institute for Development Studies, p 7.

[4] Chars and Chapori' these two names were coined based on the topography of the Assam. The Raised land surrounded by water is locally called 'Char'. When 'Chars' get perpetuality then they are locally called 'Chapori'. In other words, after changing of the course of river if the 'chars' are connected with or linked to the original soil then the 'chars' are identified with 'Chapori'.

[5] Some of the key points of the checklist were: types of disasters and hazards affect in

the area, impact of disaster on traditional livelihoods (Block level, GP level and community level), indigenous knowledge and practices to cope from disasters, role of institutions in disaster risk management, and strengths of the community etc.

6 Saha. S., (2018) Deluges eroding the heart of Assam's culture. Published in Media India Group on 1st November 2018. Retrieved from https://mediaindia.eu/society/deluges-eroding-the-heart-of-assams-culture/

[7] Kaivarta communities the marginalised schedule caste communities whose traditional livelihood is fishing.

[8] The excerpts are from the interview conducted in Jengrai gaon.

[9] The excerpts are from the interview conducted in Dakhinpat Kumar gaon.

[10] The Hindu Business Line (2018) Average farm landholding size shrinks to 1.1. ha. The information is retrieved from https://www.thehindubusinessline.com/economy/agri-business/average-farm-landholding-size-shrinks-to-11-ha/article24719240.ece#:~:text=The%20average%20landholding%20size%20of,and%20Rural%20Development%20(Nabard).

[11] The excerpts are from FGDs conducted in Molual Kalita gaon and the views are expressed by 40 year old homemaker.

[12] The excerpt from interview conducted with community member from Dakhinpat Kumar Gaon.

[13] The excerpts are from interview conducted in Salmora.

[14] This variety of rice is sown in March/April with the effect of pre-monsoon showers and harvested during June/July. While on the other hand boro is a locally name variety which is grown during between November/December to May/June.

[15] The excerpt from FGDs conducted in Jengrai gaon and Salmora.

[16] 60 year old residents who was displaced from Ahotguri Mouza (block).

[17] Nag. J. (2019) Assam Flood: Death toll rises to 48, nearly 15 lakh animals affected as situation worsens. The information is retrieved from https://mumbaimirror.indiatimes.com/news/india/assam-floods-death-toll-rises-to-48-nearly-15-lakh-animals-affected-as-situation-worsens/articleshow/70296255.cms

[18] The excerpts from interviews and views were expressed by 47 year old landless farmers.

[19] The excerpts from interviews and views were expressed by 60 years old woman respondent.

[20] The excerpts are from interviews conducted with the fishermen folks from Salmora and Dakhinpat kumar gaon.

[21] The excerpts are from interview conducted with prominent mask maker Hem Chandra Goswami from Samuguri Satra

[22] The above figure was designed based on analysis of field data collected in Majuli.

[23] Ahu and Bau Dhaan is variety of rice popular in Assam and North Eastern region.

[24] The above figure was designed based on analysis of field data collected in Majuli.

[25] The Excerpts are from interview conducted with the village leader from Jengrai gaon

[26] The Excerpts are from interview conducted in Kamlabari Ghat and views are

expressed by village elder from Mishing village.

[27] The excerpts are from interview conducted in Salmora and Dakhinpat kumar gaon.

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