

# LIVING WITH WATER:

ADAPTATION PROCESSES, HERITAGE CONSERVATION, AND  
CONFLICTING VALUES.

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## **ABSTRACT**

Several communities across the globe are facing the common threat of land and livelihood loss. Island communities in particular are the most vulnerable of all populations to the effects of global climate change and accelerated sea level rise. Storms, erosion and freshwater availability pose diverse and often fundamental challenges to the livelihoods of island people. This makes adaptation both a necessary and urgent response to a changing climate. However, adaptation is fraught with difficulties and challenges involving societal decision making, attitudes to acceptable risks and structural constraints within the society.<sup>1</sup>

Furthermore, globalization has had uneven effects on island countries and jurisdictions, and a majority of climate change adaptation research and funding is focused on urban areas and industrial sectors with enormous populations. Small coastal and river islands with lesser populations are often left out of these conversations on international funding and policy making. One of the paradoxes of climate change is that the world's poorest and most vulnerable people, who contribute almost nothing to greenhouse gas emissions, end up being most harmed by their effects.<sup>2</sup> Considering the inequity of this situation, this study investigates the local measures taken up by an island community that has dealt with fluctuating water and weather conditions for decades, and the ways in which climate change impacts and 'expert' interventions are affecting societal values. After analyzing and understanding the tools that are within their reach, this thesis aims to evaluate their work in a contemporary context and assess how their tools can be used to the highest benefit.

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<sup>1</sup> W. Neil Adger, Irene Lorenzoni, Karen O'Brien (2009), *Adapting to Climate Change: Thresholds, Values, Governance*, Cambridge University Press, 2009.

<sup>2</sup> Kristof, Nicolas, "Swallowed by the Sea, You doubt climate change? Come to this island – but hurry, before it disappears," *The New York Times*, Jan 19, 2018.

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# **Chapter 1: Introduction**

## **1. Introduction**

“There is a window of opportunity for avoiding the most damaging climate change impacts, but that window is closing: the world has less than a decade to change course. Actions taken – or not taken – in the years ahead will have profound bearing on the future course of human development. The world lacks neither the financial resources nor the technological capabilities to act. What is missing is a sense of urgency, human solidarity and collective interest.” (UNDP 2007)

Heritage sites are constantly changing due to natural and social processes. Climate change research and predictions indicate that the pace will only accelerate in the future, especially in the coastal areas. Living with current weather conditions involves adapted lifestyles that are linked to actions of individuals, societies and governments worldwide. This thesis examines island communities with adapted lifestyles, to better understand how localized strategies of living with water over time can inform planning for the future.

Research suggests that adaptation is necessary – the impacts of climate change are already apparent or in some cases predictable with some certainty as discussed in numerous reports of the Intergovernmental Panel on Climate Change (IPCC). This thesis looks at adaptation as a social process with implications for economic and political stability, and culture, among many other things. It raises issues about societies' ability to adapt with a focus on the decision-making politics and processes underpinning adaptation, with specific focus on traditional knowledge systems and governance.

The second half of this thesis explores the relationship between cultural livelihoods and adaptation, and the role that traditional knowledge plays in enabling adaptation. Finally demonstrating the importance of community-based adaptation in order to promote individual and shared cultural practices.

It has been suggested that adaptation to climate change may be limited by the irreversible loss of places and identities that people value.<sup>3</sup> It is also argued that social and individual characteristics may likewise act as deep-seated barriers to adaptation.<sup>4</sup> These perspectives raise important questions, which this thesis aims to address, about the role that individual and societal values play in adapting to climate change: is adaptation a successful strategy for maintaining what is valued? How do adaptation measures taken by some affect the values of others? In the case of value conflicts, whose value counts?<sup>5</sup> Ultimately, it is important to identify adaptation strategies that acknowledge and address a spectrum of values with governance based on shared practices, ethics, justice and equity considerations.

### **Research Aims and Questions**

This thesis aims to examine how an understanding of impacts on heritage-related livelihoods from rising waters and erosion can help design and operationalize future interventions. Island contexts demonstrate a range of unique vulnerability and resilience characteristics that have become part of their traditional livelihoods that can help explain recent and proposed responses to impacts of coastal erosion and sea level rise. These contexts include sensitivity of coastal fringes to climate change, relatively high degrees of social coherence, closeness to nature and cultural values that are uncommon in urban and industrial contexts.<sup>6</sup>

The research deals with studying climate-human interactions on islands and if possible, identifying the special characteristics of island environments and societies that remain valid in today's globalized world. These characteristics could help make future interventions for vulnerable communities and recommend adaptive strategies that are more effective and sustainable.

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<sup>3</sup>Karen L. O'Brien, "Do values subjectively define the limits to climate change adaptation?" in *Adapting to Climate Change: Thresholds, Values, Governance*, Edited by W. Neil Adger, Irene Lorenzoni, Karen L. O'Brien, Cambridge University Press, 2009.

<sup>4</sup> Ibid.

<sup>5</sup> Ibid.

<sup>6</sup> Patrick Nunn, Roselyn Kumar, "Understanding climate-human interactions in Small Island Developing States (SIDS): Implications for future livelihood sustainability," *USC research bank*, 2018.

Adaptation measures implemented by communities and agencies are often tied to prioritized values.<sup>7</sup> Distinctive values indicate various approaches to adaptation. Traditional worldviews prioritize strategies aligned with group identity – appreciating local knowledge and supporting established livelihoods; modern worldviews give precedence to rational, financial analyses, and postmodern worldviews seek communal well-being, equity and justice, stressing the impact on the poor and future generations.<sup>8</sup> As core elements of culture, values serve as standards and guide action (or inaction), choice and rationalization.<sup>9</sup> This thesis looks at adaptation processes that acknowledge and address these diverse set of values, or identify and discuss value conflicts.

This thesis also aims at exploring roles of historic preservation professionals: The interaction of historic preservation professionals with other disciplines like Planning, Designing, Sociology, Policy making, and dealing with other stakeholders like the community in question. This study is developed based on the impacts of climate change and various adaptation processes on the lives and livelihoods of a vulnerable island community named Majuli, a river island located in north-east India.

The research also aims to study the importance of cultural heritage and intangible identity into wider planning and policy discussions on climate change adaptation for vulnerable communities. There has been a difference between how heritage is defined and how it is protected, and this thesis is about realizing that in communities like Majuli there is not only a tradition of dealing with threats, but also about dealing with fluctuating conditions of weather and water levels. It deals with a history of adaptation, and skills and traditions that have built and evolved in response to harsh weather conditions. In the era of climate change, there has been a static approach when deciding what heritage is, though in reality it is dynamic. This

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<sup>7</sup> Rachel B. Isacoff, “Raised or Razed: The Challenge of Climate Adaptation and Social Equity in Historic Coastal Communities” (Masters diss.), University of Pennsylvania, 2014.

<sup>8</sup> Ibid.

<sup>9</sup> Karen L. O’Brien, “Do values subjectively define the limits to climate change adaptation?” in *Adapting to Climate Change: Thresholds, Values, Governance*, Edited by W. Neil Adger, Irene Lorenzoni, Karen L. O’Brien, Cambridge University Press, 2009.

thesis aims to explore how to reconcile these incompatible concepts of adaptation traditions. The focus of these aims is influenced by the following research questions:

### **What (Background)**

What are the challenges and limits to adaptation processes in the context of culture and livelihoods?

What are the values associated with local adaptation measures?

What is considered as heritage in the context of climate change and climate change adaptation?

### **Why (Challenges and Opportunities)**

Why adaptation?

Why are communities pursuing in-situ adaptation in extreme settings?

Why should traditional and local knowledge, combined with technological and scientific knowledge be incorporated in the decision-making for climate change adaptation?

### **How (Recommendations)**

How can experts from different disciplines like preservation, planning and policy making strategize a solution with vulnerable communities to develop collaborations and new methods for community response and resilience? It is important to note that this thesis is about learning from existing practices, with both sides ('experts' and the community) learning from each other.

How can experiences of some communities inform adaptations of other vulnerable cases?

How would one assess the values within the community that may be in conflict with its longevity?

How do adaptation measures taken by some affect the values of others? And, in the case of value conflicts, whose value counts?

## **Rationale**

As discussed earlier, historic coastal communities and cultural resources have a new set of challenges that are related to climate change and sea level rise. New adaptation tools and models are needed to support communities as they learn to adapt to a “new normal.”<sup>10</sup> Climate change adaptation represents key issues in modern preservation, ranging from incorporating historic places into adaptation planning to understanding intangible heritage, loss of cultural attachment to a place in the face of land loss<sup>11</sup> and impacts of structural adaptation interventions. This thesis addresses these key issues and examines how values relating to people’s knowledge of and sense of place, relate to decision-making in adaptation.

IPCC in its first assessment report stated that by 2050, an estimated 150 million people could be displaced due to climate-induced factors like floods, drought and storms.<sup>12</sup> However migration or retreat may not be ideal considering factors like education, health, sanitation, and cultural roots of the communities. Therefore, there is an urgent need to understand and analyze adaptation strategies in the context of aspirations, aims, priorities and interests in order to form a more sophisticated toolbox for adaptation.

While there are several frameworks for dealing with climate change adaptation, indigenous peoples and traditional knowledge, there is very little research done on the intersection of all three. There are a number of publications that have stressed on the need to have an interdisciplinary approach to climate change adaptation, however, the preservation field has been largely absent in this conversation. The relevance of cultural heritage and notions regarding the idea of permanence in the age of climate change needs to be discussed at length when considering adaptation. The emphasis has generally been on individual resettlement, migration management and humanitarian concerns.<sup>13</sup> But as entire

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<sup>10</sup> “Preservation & Climate Change,” Preservation Leadership Forum, 2015.

<sup>11</sup> Ibid.

<sup>12</sup> IPCC 1990.

<sup>13</sup> “Climate Displacement: Historic Preservation’s Looming Challenge,” US/ICOMOS, 2016.  
<https://www.usicomos.org/climate-displacement-historic-preservations-looming-challenge/>



populations are losing their lands, what becomes of their historic and sacred sites? This question is one of the domains of historic preservation and yet mainstream cultural heritage organizations have been largely absent from climate refugee and adaptation conversations.<sup>14</sup>

Research on climate change adaptation has to be interdisciplinary in nature since it involves deliberate changes and decision-making about resources, values and priorities.<sup>15</sup> It is also important to study adaptation processes that are enacted from – and impacted upon – different prioritized values, because adaptations to climate change may affect what individuals or groups value, particularly in cases where adaptation measures are imposed by others (government institutions or private sectors) and create their own ancillary or secondary impacts.<sup>16</sup> Research on values places a greater focus on the interior dimensions of adaptation, and can provide new insights on the limits to adaptation as a response to climate change.<sup>17</sup> Finally, Adaptation is seen as a social and political process and these dimensions form the backdrop of the analysis presented in the thesis.

This thesis deals with vulnerability to climate change impacts. Hence for the context of this research it is important to establish four key questions – Who is vulnerable? What is vulnerable? How are they vulnerable? and Why are they vulnerable?

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<sup>14</sup> “Climate Displacement: Historic Preservation’s Looming Challenge,” US/ICOMOS, 2016.

<https://www.usicomos.org/climate-displacement-historic-preservations-looming-challenge/>

<sup>15</sup> W. Neil Adger, Irene Lorenzoni, Karen O’Brien (2009), *Adapting to Climate Change: Thresholds, Values, Governance*, Cambridge University Press, 2009.

<sup>16</sup> Ibid.

<sup>17</sup> Ibid.

## Who is vulnerable:

### Island Communities – Coastal and River

Island communities are the most vulnerable of all coastal areas to the effects of global climate change, accelerated sea level rise and coastal erosion. They have lived for generations with considerable and often sudden environmental changes. The traditional knowledge and related practices with which these societies that have adapted to these changes can prove to be of global relevance. Some of the areas in which island communities have developed adaptation-relevant traditional knowledge include natural disaster preparedness, risk reduction, food production systems and weather forecasting. In many of these island contexts, the transfer and application of traditional knowledge is under threat from changes in consumption and migration patterns, and most importantly, from lack of recognition of traditional and place-based knowledge,<sup>18</sup> resulting in loss of land (tangible heritage) and loss of invaluable cultures and traditional livelihoods (intangible heritage).

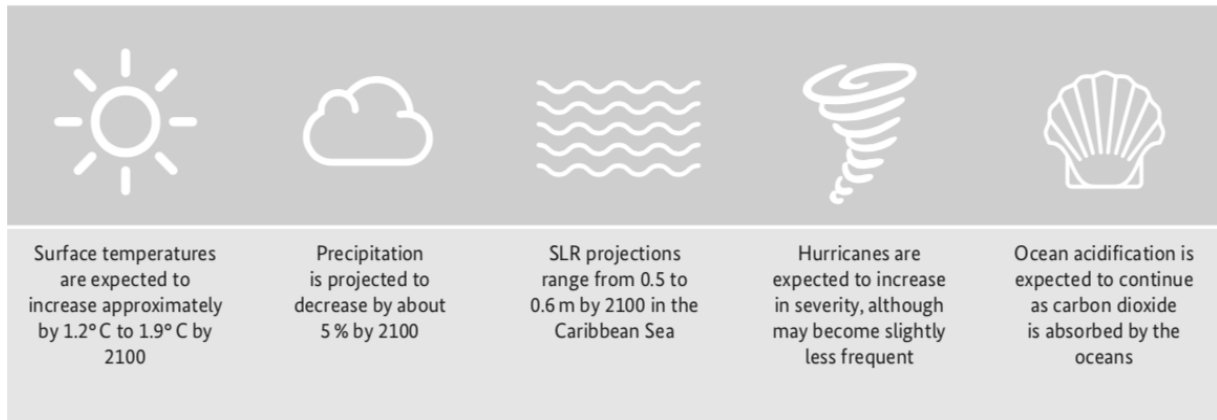


Figure 1: In addition to erosion, projected physical impacts of climate change in the Caribbean. Source: Nurse et al. 2014; IPCC 2014.

For instance, on an average, Small Island Developing States (SIDS) have 26% of their land area 5 meters or even less above sea level. Two thirds of SIDS have less than

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<sup>18</sup> Nakashima, D.J., Galloway McLean, K., Thulstrup, H.D., Ramos Castillo, A. and Rubis, J.T, "Weathering Uncertainty: Traditional Knowledge for Climate Change Assessment and Adaptation." Paris, UNESCO, and Darwin, UNU, 2012.

one quarter of their total land area below this level. Yet, in 33% of SIDS much larger terrestrial areas may be endangered.<sup>19</sup>

<b>The highest and the lowest share of land below 5 m</b>	
<b>Maldives, Tuvalu*</b>	100%
<b>Marshall Islands</b>	99%
<b>Kiribati*</b>	96,70%
<b>Cook Islands</b>	87,90%
<b>Bahamas</b>	72%
<b>Average</b>	26,20%
<b>Haiti*</b>	3,90%
<b>Suriname</b>	3,40%
<b>Timor-Leste*</b>	2,90%
<b>Guyana</b>	2,70%
<b>Papua New Guinea</b>	1,80%
<b>The highest and the lowest share of population below 5m</b>	
<b>Maldives, Tuvalu*</b>	100%
<b>Marshall Islands</b>	99,40%
<b>Kiribati*</b>	95,20%
<b>Suriname</b>	68,20%
<b>Average</b>	29,30%
<b>Mauritius</b>	5,60%
<b>Haiti*</b>	5,40%
<b>Timor-Leste*</b>	4,40%
<b>Dominican Republic</b>	3%
<b>Papua New Guinea</b>	2%

Figure 2: Small Island Developing States Vulnerability Statistics. Source: UN-OHRLLS.

<sup>19</sup> Small Island Developing States Statistics, UN Office of the high representative for the least developed countries, landlocked developing countries and small island developing states (UN-OHRLLS), 2013.

Apart from climate change impacts, the four main vulnerabilities and development needs of SIDS (as recognized by the international community) and their interlinkages are related to<sup>20</sup>:

- Smallness
- Isolation and Fragmentation
- Narrow source and export base
- Exposure to external economic shocks

## **What is vulnerable:**

### **Loss of Land and Livelihoods**

Since 2008, an average of 22.5 million people have been displaced each year by weather and climate-related disasters.<sup>21</sup> Global temperatures and sea levels are expected to rise significantly by the end of the century, placing small island communities in especially precarious conditions.<sup>22</sup>

The consequences of rising sea levels will depend on the magnitude of the rise, but are likely to be significant both in terms of the consequences for human coastal settlements and general living standards – economic and societal impacts, and in terms of environmental costs – physical impacts on natural systems.<sup>23</sup> As sea levels rise, low-lying coastal areas are increasingly being inundated and losing land in the process. While loss and damage from climate change impacts are commonly expressed in monetary terms, non-economic loss and damage, such as loss of livelihood, culture and identity, may actually have the most far-reaching and significant consequences.<sup>24</sup> All the evidence suggests that environmental

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<sup>20</sup> Matthias Bruckner, “Effectively Addressing the vulnerabilities and development needs of small island development states,” UNDP Economic Analysis & Policy Division, 2017.

<sup>21</sup> “Losing your land to climate change,” UN Human Rights office of the high commissioner, OCHR, 2017.

<https://www.ohchr.org/EN/NewsEvents/Pages/LosingLandtoclimatechange.aspx>

<sup>22</sup> Ibid.

<sup>23</sup> International Risk Governance Council, 2010.

<sup>24</sup> Janine Kandel, “Loss and Damage from Climate Change is Already Happening, Says UNU Report,” United Nations University, November 2013.

<https://ourworld.unu.edu/en/loss-and-damage-from-climate-change-is-already-happening-says-unu-report>

vulnerabilities are going to significantly increase in the future, in part due to climate change but also because of other forms of resource and livelihood pressures unless effective and substantial measures are taken to ameliorate them through sound adaptation and other strategies.<sup>25</sup>

### **Heritage – Tangible and Intangible**

Most climate change adaptation research emphasizes the material and objective assets that build the capacity to adapt.<sup>26</sup> Nonmaterial or ‘subjective’ attributes of adaptation such as identity, beliefs and values are more difficult to qualify, and research in this area is less developed.

According to ICOMOS, cultural heritage is an expression of the ways of living developed by a community and passed on from generation to generation, including customs, practices, places, objects, artistic expressions and values, and can be expressed as either intangible or tangible cultural heritage.<sup>27</sup> UNESCO states that “tangible heritage includes buildings and historic places, monuments, artifacts, etc., which are considered worthy of preservation for the future. These include objects significant to the archaeology, architecture, science or technology of a specific culture.”<sup>28</sup> Intangible cultural heritage on the other hand, includes “social practices, knowledge and practices concerning nature and the universe, and traditional craftsmanship”.<sup>29</sup> This thesis looks at heritage as not just an object or place to be preserved for the future generations, but rather something that can be used to address the cultural, social, economic and political needs of the present as well.

This study examines communities that have built and evolved with natural threats and constantly changing weather and water conditions. The cultural heritage in this case are their social practices and local adaptation knowledge that

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<sup>25</sup> International Institute for Sustainable Development (iisd), International Union for Conservation of Nature (IUCN) and Natural Resources and Stockholm Environment Institute, 2003.

<sup>26</sup> Jennifer Fresque-Baxter, Derek Armitage, “Place identity and climate change adaptation: a synthesis and framework for understanding,” *WIREs Clim Change* 2012, pg.251-266.

<sup>27</sup> ICOMOS, 2012.

<sup>28</sup> World Heritage, UNESCO.

<sup>29</sup> UNESCO Convention for the safeguarding of Intangible Cultural Heritage (ICH) 2003, pg.2.

have shaped their way of living; with adaptability and resourcefulness being the hallmarks of the cultures of these communities.

### **Threats to traditional livelihoods and Indigenous Knowledge**

Sea level rise, flooding, coastal inundation, shoreline change, and erosion pose immense threats to coastal communities, their heritage and traditional livelihoods. Moreover, from an anthropological perspective, climate change is ultimately about culture, for in its wake, more and more of the intimate human-environment relations, integral to the world's cultural diversity, lose lands.<sup>30</sup>

Indigenous knowledge is recognized as a critical element in confronting climate change. It was acknowledged in the Fourth Assessment Report (AR4) of IPCC as “an invaluable basis for developing adaptation and natural resource management strategies in response to environmental and other forms of change.”<sup>31</sup> One of the most important international documents on climate change adaptation is the Cancun Adaptation Framework in the Cancun Agreement from the 2010 United Nations Framework Convention on Climate Change (UNFCCC) COP16 in Mexico. The Framework argues that the final approach to climate change adaptation has to be “guided by the best available science and, as appropriate, traditional and indigenous knowledge, with a view to integrating adaptation into relevant social, economic and environmental policies and actions, where appropriate.”<sup>32</sup>

Climate change impact poses direct and immediate threat to the irreplaceable heritage of historic coastal communities. These threats include rapid changes in the environment physically threatening the historic built environment that represents ‘humanity’s cultural legacy’, and also threatening the viability of many traditional practices – indeed, entire cultures – that have evolved in concert

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<sup>30</sup> Susan A. Crate and Mark Nuttall, *Anthropology and Climate Change: From Encounters to Actions*, Walnut Creek CA, Left Coast Press, Inc., 2009.

<sup>31</sup> M.L Perry, “Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,” Cambridge: Cambridge University Press, 2007.

<sup>32</sup> UNFCCC COP16.

with their natural surroundings.<sup>33</sup> Maintaining tangible contact with the past strengthens a community's stability and continuity and provides a basis for future generations to be inspired by their legacy.<sup>34</sup>

Indigenous peoples and marginalized populations are socially and culturally distinct from mainstream society, decisions, policies and actions undertaken by the majority of the world, and at times, even if well intended may prove to be inadequate, ill-adapted, and sometimes even inappropriate.<sup>35</sup> There is therefore a need to understand the specific vulnerabilities, concerns, adaptation capacities and trends, and longer-term aspirations of indigenous peoples and marginalized communities.<sup>36</sup> This thesis draws on traditional and indigenous knowledge combined with scientific technology to help vulnerable communities at large to cope with changes.

## **How are they vulnerable:**

### **Climate Change Impacts**

According to the United Nations Framework Convention on Climate Change (UNFCCC 2011), climate change refers to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability over comparable time periods. The induced changes are wide ranging and significant, and the most notable are ocean warming and acidification which causes rising sea levels, changes

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<sup>33</sup> Anthony Veerkamp, "The Impacts of Climate Change on the Chesapeake Bay," Statement presented at the U.S. House of Representatives committee on Natural Resources' Subcommittee on National Parks, Forests and Public Lands and the Subcommittee on Insular Affairs, Oceans and Wildlife, July 2, 2009.

<https://forum.savingplaces.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=73dee219-9e4b-ffc8-3665-1a59b9359b59>

<sup>34</sup> Rachel B. Isacoff, "Raised or Razed: The Challenge of Climate Adaptation and Social Equity in Historic Coastal Communities" (Masters diss.), University of Pennsylvania, 2014.

<sup>35</sup> Robyn Eversole, John Andrew McNeish and Alberto D Cimadamore, *Indigenous peoples & Poverty: An International Perspective*, the Comparative Research Programme on Poverty (CROP), Zed Books, 2005.

<sup>36</sup> Nakashima, D.J., Galloway McLean, K., Thulstrup, H.D., Ramos Castillo, A. and Rubis, J.T, "Weathering Uncertainty: Traditional Knowledge for Climate Change Assessment and Adaptation." Paris, UNESCO, and Darwin, UNU, 2012.

in ecosystems and biodiversity loss, extreme weather events and the loss of polar ice.<sup>37</sup> These impacts can result in loss of life, destruction of property, loss or degradation of coastal habitats, changes in the range, distribution and productivity of marine species and ecosystem degradation with its corresponding socioeconomic impacts.<sup>38</sup>

As erosion and accelerated sea level rise progress, coastal heritage will be increasingly impacted by this extreme environment. Communities dealing with these varying weather conditions for decades have developed a rich culture in response to their area's particular environmental conditions. Factors like erosion, sea level rise, industrialization and incorrect management systems threaten to destroy not only the physical manifestations of these cultures, but also the cultures themselves. Cultural heritage of communities like these can convey traditional knowledge that builds resilience for change to come and lead to a more sustainable future.<sup>39</sup>

Currently, climate change impacts are predicted to worsen, even under low-emission scenarios, hence, there is an urgent need for additional integrated research and assessment to better understand adaptation.<sup>40</sup> Understanding adaptation trends under various scenarios and contexts would support the planning and implementation of successful action to tackle the global challenges of climate change and sea-level rise in regional, national and local contexts.

## **Why are they vulnerable:**

### **Social Inequity**

When addressing the impacts on heritage due to sea level rise and coastal erosion, indigenous peoples and marginalized populations warrant particular

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<sup>37</sup> UNFCCC 2011.

<sup>38</sup> UN-Oceans at COP23: Ocean and climate: A resilient ocean for future generations, 11th Nov. 2017.

<sup>39</sup> UNESCO WHC, "Climate Change and World Heritage."  
<https://whc.unesco.org/en/climatechange/>

<sup>40</sup> Climate Change: Impacts, Vulnerabilities and adaptation in developing countries, UNFCCC, 2007.



attention. Impacts on their territories and communities are predicted to be both early and severe due to their location in vulnerable environments, including small islands (both coastal and river) and low-lying coastal areas in developing countries.

Today, a majority of climate adaptation research and funding goes to Urban and Industrial sectors with large populations, where sea level impacts will cost billions.<sup>41</sup> However, Indigenous people and Island communities may argue that, despite contributing the least to greenhouse gas emissions, they are the ones most at risk from its consequences due to their dependence upon and close relationship with the environment and its resources.

The second part of IPCC's fourth assessment (AR4) states that the world's poor – already struggling to achieve their basic needs of food, water, and health, will suffer the worst effects of climate change: "Poor communities can be especially vulnerable, in particular those concentrated in high-risk areas. They tend to have more limited adaptive capacities and are more dependent on climate-sensitive resources such as local water and food supplies."<sup>42</sup> Indigenous Peoples make up 4% of the world's population yet account for over 10% of the world's poor.<sup>43</sup>

Despite the impact of climate change on indigenous peoples and their traditional knowledge, international experts and policy makers most often overlook the rights of indigenous peoples as well as the potentially invaluable contributions from indigenous peoples' traditional knowledge, innovations and practices in the global search for climate change solutions.<sup>44</sup> And since adaptation is something that primarily takes place at the local level, it is paramount that indigenous peoples and place-based societies themselves define the risks related to rapid change.<sup>45</sup>

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<sup>41</sup> "Chapter 2: Climate change and inequality nexus", *World Economic and Social Survey*, 2016.

<sup>42</sup> M.L Perry, *Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge: Cambridge University Press, 2007.

<sup>43</sup> Harry Patrinos, "Indigenous Peoples: The Issue of Poverty and the Importance of Good Policy," Education for Global Development, The World Bank Group, 2012.  
<https://blogs.worldbank.org/education/indigenous-peoples-the-issue-of-poverty-and-good-policy>

<sup>44</sup> Christina Nilsson, "Climate Change from an Indigenous Perspective: Key Issues and Challenges," *Indigenous Affairs* 1-2, 2008.

<sup>45</sup> Susan A. Crate and Mark Nuttall, *Anthropology and Climate Change: From Encounters to Actions*, Walnut Creek CA, Left Coast Press, Inc., 2009.

## **Why adaptation?**

According to the IPCC Fourth Assessment Report (AR4) Adaptation can be defined as “Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.”<sup>46</sup> The resilience of social ecological system focuses on “adaptive capacity, transformability, learning and innovation.”<sup>47</sup>

The effects of sea level rise and coastal erosion make it important to understand and analyze communities’ or populations’ capacity to adapt and exercise their resilience in the face of unprecedented change. To indigenous peoples impacts of sea level rise and coastal erosion is not something that comes in isolation; it magnifies already existing problems of poverty, deterritorialization, marginalization and non-inclusion in national and international policy-making process and discourses.<sup>48</sup>

The Fourth Assessment Report (AR4) also pointed out that even under the most stringent mitigation efforts, further impacts of climate change cannot be avoided.<sup>49</sup> This makes adaptation and adaptation research prevalent and imperative. Moreover, the top priority for island communities so far has been to stay in their homelands for as long as they can<sup>50</sup>, not only because the thought of losing their ancestral lands is devastating, but also because retreating to higher grounds becomes difficult due to their low socio-economic capacity. They believe that in addition to aggressively pursuing local adaptation strategies, if the international community can agree on ways to limit greenhouse gas emissions, there is a high

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<sup>46</sup>M.L Perry, *Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge: Cambridge University Press, 2007.

<sup>47</sup> Intergovernmental Panel on Climate Change (IPCC), *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*, New York: Cambridge University Press, 2012.

<sup>48</sup> Susan A. Crate and Mark Nuttall, *Anthropology and Climate Change: From Encounters to Actions*, Walnut Creek CA, Left Coast Press, Inc., 2009.

<sup>49</sup> IPCC AR4.

<sup>50</sup> Kristin Choo, “Washed Away: As Sea Levels Rise, Island Nations Look to the Law to Fend off Extinction,” March 2012.

[http://www.abajournal.com/magazine/article/washed\\_away\\_as\\_sea\\_levels\\_rise\\_island\\_nations\\_look\\_to\\_the\\_law](http://www.abajournal.com/magazine/article/washed_away_as_sea_levels_rise_island_nations_look_to_the_law)

possibility that a majority of coastal and river islands, and their cultures can be preserved.<sup>51</sup>

### **Research Limitations**

Research limitations include access to the site, limited time in the field, cultural biases, inhibitions and language barriers.

The closest major town to Majuli with access to other major cities is Guwahati. Majuli island can only be accessed from Jorhat town via ferry (afternoon service only), and Jorhat is around 306kms from Guwahati. Getting to Majuli included flying into Guwahati, an 8-hour bus ride from Guwahati to Jorhat and finally a 1.5-hour ferry ride from Jorhat to Majuli. The field work comprised of 10 days of data collection through interviews which will be discussed in the next chapter, 'Methodology.'

Being an Indian native, Hindi and English were the medium of communication with the local experts and government officials in the field. The community speaks Assamese (regional) and other tribal languages like Mishing (local). It was essential for this research that the community views were heard, and their values identified, and to achieve this a local interpreter aided with the translation.

Moreover, the village community was not aware about the various issues of climate change. In addition, inhibitions pertaining government authorities made it difficult to get information on community views of government interventions. All of the above factors may have contributed to some inconsistencies in the information that was collected.

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<sup>51</sup> Kristin Choo, "Washed Away: As Sea Levels Rise, Island Nations Look to the Law to Fend off Extinction," March 2012.  
[http://www.abajournal.com/magazine/article/washed\\_away\\_as\\_sea\\_levels\\_rise\\_island\\_nations\\_look\\_to\\_the\\_law](http://www.abajournal.com/magazine/article/washed_away_as_sea_levels_rise_island_nations_look_to_the_law)

## **Chapter 2: Methodology**

## **2. Methodology**

The thesis aims to understand livelihoods that were formed in response to land loss due to erosion and sea level rise, histories of land loss and livelihood changes and the diverse set of values that are associated with adaptation processes. This is developed through the examination of a primary case study.

Research suggests that single case studies can contribute to the in-depth development of propositions regarding the fundamental issues of adaptation,<sup>52</sup> hence, a single case study methodology is applied with qualitative methods, to capture and understand the complex processes of local and governmental ways of adapting.

The research method for the case study includes archival research, field visit, in-depth interviews, key informants interviews, a literature review and secondary data collection. The field visit to the case study site took place in January 2019. The in-depth interviews involve community and household interviews, and the key informants interviews involve local experts and representatives of government authorities and organizations that are one of the key stakeholders.

## **Literature Review**

### **Definitions**

In order to communicate the importance of understanding local climate change adaptation, certain definitions must be explained. Climate change is defined in the United Nations Framework Convention on Climate Change (UNFCCC) as “the change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods. Adaptation is a term used in conversations about the processes of adjusting to climate change and its

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<sup>52</sup> Finan 2009, Pg 181.

impacts.”<sup>53</sup> The United Nations Framework Convention on Climate Change (UNFCCC) defines Adaptation as “one of the two central approaches in the international climate change process. The term refers to adjustments in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates, harms or exploits beneficial opportunities.” The Framework (UNFCCC) states that Resilience on the other hand, refers to “the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity of self-organization, and the capacity to adapt to stress and change.” Judith Rodin in *The Resilience Dividend: Being Strong in a world where things go wrong*, defines resilience as “the ability to bounce back more quickly and effectively.” The terms “Resilience” and “Adaptation” always come up as ways to frame discussions around meeting climate change challenges. Resilience research focuses on the capacity of social-ecological systems to respond to external disturbances, such as those engendered by climate change. (Berkes and Folke,1998).<sup>54</sup> For psychologists, Resilience is a ‘trait’, reflecting a general ability to master challenges, whereas Adaptation is a ‘state’, reflecting how individuals deal with specific stressors. Resilience includes the ability to acquire new capabilities and Adaptation entails preserving existing resources.<sup>55</sup> As the above discussion implies, resilience bears a very close relation to adaptive capacity, and hence some aspects of resilience can be considered to be components of vulnerability (Gallopini, 2006). Folke (2006: 262) considers a vulnerable social-ecological system as one that has “lost resilience. Losing resilience implies loss of adaptability.”

Climate Change threatens to destroy humanity’s cultural legacy. United Nations Educational, Scientific and Cultural Organization (UNESCO 2003) defines Cultural heritage as “the legacy of physical artifacts and intangible attributes of a

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<sup>53</sup> Ben Orlove, “The past, the present and some possible futures of adaptation” in *Adapting the Climate Change: Thresholds, Values, Governance*, Edited by W. Neil Adger, Irene Lorenzoni, Karen L. O'Brien, Cambridge University Press, 2009.

<sup>54</sup> Carl Folke, Fikret Berkes, Johan Colding, *Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience*, Cambridge University Press, 1998.

<sup>55</sup> Gabrielle Wong-Parodi, Baruch Fischhoff, Benjamin Strauss, “Resilience vs. Adaptation: Framing and action,” Volume 10, 2015, pg.1-7.

group or society that are inherited from past generations, maintained in the present and bestowed for the benefit of future generations.” Intangible heritage includes traditions or living expressions inherited from our ancestors and passed on to our descendants, such as oral traditions, performing arts, social practices, rituals, festive events, knowledge and skills and practices concerning nature and the universe or the knowledge and skills to produce traditional crafts, food and medicine heritage and medicine heritage and digital heritage (UNESCO 2003).<sup>56</sup> Indigenous people’s intangible cultural heritage has often been poorly understood or disregarded as “too difficult” to properly acknowledge or recorded in terms of its context, purpose or the persons or places from where it first became known. Indigenous peoples are defined by the United Nations as “inheritors and practitioners of unique cultures and ways of relating to people and the environment. They have retained social, cultural, economic and political characteristics that are distinct from those of the dominant societies in which they live.” Despite the cultural differences, indigenous people from around the world share problems related to climate change and social inequity.

This thesis focuses on local adaptation measures taken by indigenous peoples and marginalized populations facing land and livelihood loss in the age of climate change and accelerated sea level rise.

## **Discussions and Literature on Adaptation**

There have been several international discussions of adaptation, carried out on a global scale, with direct attention to the groups that experience the impacts of climate change most directly.<sup>57</sup> Rachel Isacoff in her thesis, ‘Raised or Razed’ suggests that the definition of adaptation by UNFCCC discussed earlier can be pared down to: reduce vulnerability and enhance resiliency.<sup>58</sup> She looks at three primary

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<sup>56</sup>UNESCO 2003 Working Definitions

<sup>57</sup> Ben Orlove, “The past, the present and some possible futures of adaptation” in *Adapting the Climate Change: Thresholds, Values, Governance*, Edited by W. Neil Adger, Irene Lorenzoni, Karen L. O'Brien, Cambridge University Press, 2009.

<sup>58</sup> Rachel B. Isacoff, “Raised or Razed: The Challenge of Climate Adaptation and Social Equity in Historic Coastal Communities” (Masters diss.), University of Pennsylvania, 2014.

options for adapting to climate change on the coast: protection, accommodation, and retreat, and states that each of these adaptation choices had critical consequences. However, this thesis looks at adaptation as a way to adjust to the changing conditions as a way to stay in place. In several cases of adaptation research, it is assumed that adaptation is about assisting communities to adjust and continue (as best as they could) to live without having to move, and this can be termed as adaptation in situ.

Until recently adaptation to climate change has been seen largely as a global issue, originating from the scientific community such as the Intergovernmental Panel on Climate Change (IPCC) and global policy-making such as the United Nations Framework Convention on Climate Change (UNFCCC). However, governments are now acting at a national level.<sup>59</sup> For instance, in the United States, the National Oceanic and Atmospheric Administration (NOAA) has released *Adapting to Climate Change: A Planning Guide for State Coastal Managers*, which as the name suggests, is a guide for coastal managers to follow as they develop and implement climate change adaptation plans in their respective states. It addresses issues like coastal erosion, storm water management and habitat protection, all of which had been exacerbated by climate change.

Adaptation actions are also being taken at a community level, especially in cases of exceedingly vulnerable communities (indigenous peoples and marginalized populations). However, these actions were not formally recorded until recently. For example, some of the first countries to produce their National Adaptation Plans of Action (NAPAs) were the 48 least developed countries.<sup>60</sup> These were carried out using a combination of existing scientific information on impacts of climate change in the respective contexts and using a participatory approach to develop actions by prioritizing them. Some of the countries have started implementing these actions identified in their NAPAs. For example, the Republic of Maldives where NAPA is

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<sup>59</sup> Saleemul Huq, "Adapting to Climate Change: A Challenge and Opportunity," World Resources Institute.

<https://www.wri.org/our-work/project/world-resources-report/adapting-climate-change-challenge-and-opportunity>

<sup>60</sup> Ibid.



endorsed at the highest level of government and is included in their Third National Environment Action Plan. The Foreword in their NAPA document states that “it was developed with wide stakeholder participations and through extensive consultations at local levels, and thus the priorities in the document have the endorsement of the public.”<sup>61</sup>

In *Adapting to Climate Change: Thresholds, Values and Governance*, Adger, Lorenzoni and O’Brein provide a wide-ranging coverage of adaptation issues from different perspectives: climate science, hydrology, engineering, ecology, economics, human geography, anthropology and political science, and is essential for this thesis since it looks at adaption in general from different lens (disciplines).

Mark Pelling in *Adaptation to Climate Change* provides a framework for evaluating different choices facing humanity and these are structured around resilience (stability), transition (incremental social change and the exercising of existing rights) and transformation (new rights claims and changes in political regimes). Each of these categories are supported by case-studies to demonstrate the diversity of contexts where adaptation is taking place, from organizations to urban governance and the national polity, and provides a detailed insight into the social dimensions to climate change adaptation.

## **Discussions and Literature on Indigenous Peoples and Traditional Knowledge**

The Fourth Assessment Report (AR4) of Intergovernmental Panel on Climate Change (IPCC) noted that “indigenous knowledge is an invaluable basis for developing adaptation and natural resource management strategies in response to climate change.”<sup>62</sup> In the discussions surrounding ‘indigenous, local or traditional knowledge’, it is often referred as the knowledge accumulated across generations guiding human societies and their countless interactions with their immediate environments. Berkes defines such traditional ecological knowledge as “a

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<sup>61</sup> National Adaptation Program of Action, Republic of Maldives, Ministry of Environment, Energy and Water, 2006.

<sup>62</sup> M.L Perry, *Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge: Cambridge University Press, 2007.

cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with another and with their environment.” (Berkes 2012: 7)

A large number of labels co-exist in the literature. Common terms include but are not limited to indigenous knowledge, traditional knowledge, traditional ecological knowledge (TEK), local knowledge, farmer’s knowledge, folk knowledge and indigenous science. Although each term may have somewhat different connotations and reference groups, they often share sufficient meaning to be utilized interchangeably in many contexts (Berkes, 2012; Nakashima and Roue, 2002).<sup>63</sup> To make it simple, this thesis study will refer to it as traditional or local knowledge interchangeably.

Anthropologists have also contributed to the changing outlook of traditional knowledge. In ‘The Savage Mind’, Claude Levi-Strauss (in 1962) implied that indigenous knowledge was the first and foremost an intellectual pursuit, debunking the then prevalent stereotype that traditional was limited to the functional. However, until recently, a very small amount of work was focused on indigenous observations and understandings of climate and climate adaptations. Today, sea level rise, local communities, indigenous peoples and traditional knowledge have become a rapidly expanding area of joint investigation involving social scientists, notable anthropologists, climate scientists and indigenous peoples.<sup>64</sup>

Anthropology and Climate Change: From Encounters to Actions (2009) is a collection of monographs about anthropology and climate change. It expansively talks about “Climate and Culture” to examine opportunities provided by the anthropological research to demonstrate how different cultures understand, value, and interact with weather and climate.

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<sup>63</sup> Nakashima, D.J., Galloway McLean, K., Thulstrup, H.D., Ramos Castillo, A. and Rubis, J.T, “Weathering Uncertainty: Traditional Knowledge for Climate Change Assessment and Adaptation.” Paris, UNESCO, and Darwin, UNU, 2012.

<sup>64</sup> Ibid.

In *Climate-Induced Community Relocations: Creating an adaptive governance framework based in human rights doctrine*, Bronen explores how climate change is creating a humanitarian crisis for over 200 indigenous communities. Even though he argues that traditional responses of hazard prevention and disaster relief are no longer protecting communities, this document is relevant to this thesis since it broadly talks about issues around social injustice and human rights principles that can guide an adaptive governance framework.

### **Primary Case Study**

The approach for the analysis of this research stems from a four-fold examination of the political, social, economic and environmental resources exemplified in a primary case study.

The political analysis examines the regulatory context surrounding the case study with particular attention to issues of broader government-related policies related to heritage, adaptation and protection, and local entities involved in the process. In addition, in Chapter 5, the decision-making process and stakeholders will be discussed.

The social analysis deals with the level and quality of the public and local response to water and weather changes, and their participation in the protection projects, including the issues that emerge in the social realm.

Economic analysis for the case study focuses on the economic impacts of changing weather conditions and impacts of government interventions.

The environmental analysis includes the physical context of the site, and how climate change is aggravating the existing conditions on the site. It also comprises of identifying ecological and biological vulnerability and ways in which these resources are enhanced.

## **Majuli as a representative Case Study**

Majuli Island is one of the largest inhabited river islands located in Assam, India. The island has been shrinking over time due to riverbank erosion and excessive flooding. Like the rest of Northeast India, it has a complex composition of different ethnicities, religions, castes and scheduled tribes. These communities have through decades developed livelihoods, knowledge systems and technologies based on the environmental risks of the river.

Majuli presents itself as a fitting example of the disproportionate impact of climate change on economically marginalized communities. According to the Jorhat district administration (closest town to Majuli), Majuli has a high poverty rate of around 21.47%.<sup>65</sup> The already low income of the island's population is further declining due to climate change impacts<sup>66</sup> and technological adaptation interventions by government authorities. The loss of livelihood due to climate induced events and structural adaptation interventions has resulted in displacement of the traditional settlements in Majuli. A 2012 study by the Centre for Environment, Social and Policy Research (CESPR), in collaboration with the India Network on Ethics and Climate change, noted the widespread loss of livelihood options for thousands of people across Assam due to climate disasters, particularly floods and erosion.<sup>67</sup>

The uniqueness of Majuli lies in its diverse agro-ecology and the combination of tribal and non-tribal cultures. Their tacit knowledge and adaptive water management strategies are systematically marginalized by large-scale, centralized flood and erosion control measures by the government that dissociate local people from their traditional adaptation programs. Majuli's weather and water conditions are well-known to the communities living there. They have 'lived with the floods' for several years and are comfortable with normal flooding that both destroys and replenishes their agricultural fields with fertile alluvium. Their lifestyle highlights

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<sup>65</sup> Trisanki Saikia, "Assam and the economic costs of climate change," The Energy and Resources Institute, November 2018.

<https://www.teriin.org/article/assam-and-economic-costs-climate-change>

<sup>66</sup> Ibid.

<sup>67</sup> Ibid.

that there are different perceptions of water conditions as communities like Majuli have evolved with coping measures and adapted over time. Moreover, they provide a linear history of change and how communities have formed a lifestyle from fluctuating conditions. In today's era of climate change – where there are several coastal and island communities dealing with a severe rise in water levels – water management needs to be diversified and decentralized with an adequate appraisal of indigenous knowledge that can be used towards designing adaptive strategies. As mentioned earlier, given the prospect of global sea level rise, there is an urgent need to develop a more sophisticated toolbox for adaptation. Analyzing Majuli's traditional adaptive strategies, despite its different dynamics and causes, can potentially inform other vulnerable communities that are experiencing similar fluctuating weather and water conditions.

### **Qualitative Interviews and Quantitative Data Collection**

Villages in Majuli were selected based on secondary data-collection and identification of research problems. Key informants interviews and in-depth community interviews were carried out on the field in January 2019 to gather quantitative and qualitative data. Quantitative data was collected from households through questionnaires. The questionnaires were designed based on secondary data and after discussion with a few stakeholders.

Key informants are those who are aware of the science of bank erosion and flooding, or to some extent are the decision makers. These include representatives from the Brahmaputra Board (Ministry of water resources, Central Government of India), representative from the State Government of Assam, members of the Majuli Cultural Landscape Management Authority (MCLMA) and Sattrā Adhikaris (Heads of the Sattrā community).

In-depth Interviews were conducted with the Majuli community – households in villages. A total of 28 in-depth interviews were conducted at the Mishing, Deori and Salmora (Potter's) villages. Among the household members were farmers, teachers, weavers, potters, day laborers and fishers.

## **Chapter 3: Introduction to Majuli, India**

### **3. Introduction to Majuli, India**

This chapter provides an introduction to Majuli and its significance, and characterizes its tangible and intangible heritage. The section looks at the residents of the Majuli community that has developed its traditional livelihood in response to their environment and discusses the conditions that are impacting these heritage-related livelihoods. It also examines the process and politics behind the inclusion of Majuli on the World Heritage tentative list, and explores how different conceptions of heritage and the World Heritage nomination process strongly influence decision-making for protection and adaptation in Majuli.



Figure 3: Majuli, Assam, India

#### **Location**

Located in South Asia, Majuli is one of the largest inhabited riverine islands in the world. It is situated in the north eastern state of Assam in India. The river island is situated in the northern part of Jorhat District and is separated from the main land by the Brahmaputra river which is one of the major rivers in Asia flowing

through China, India and Bangladesh. Located in the upper reaches of the river, the island lies within the latitude of 26°45'N - 27°12'N and longitude of 93°39'E - 94°35'E.<sup>68</sup>

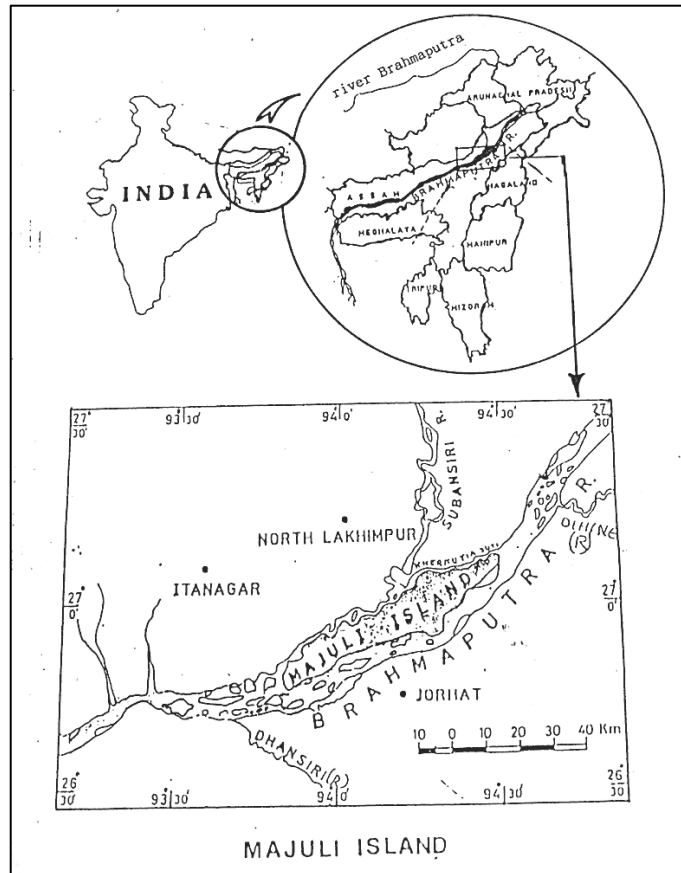


Figure 4: Location of Majuli in Northeast India. Source: Majuli Island: The Cultural Face of Assam, Majuli: The Treasure Trove.

<sup>68</sup> *Majuli Cultural Landscape – At a Glance*, Majuli Cultural Landscape Management Authority, 1<sup>st</sup> Edition, Sep. 2014.



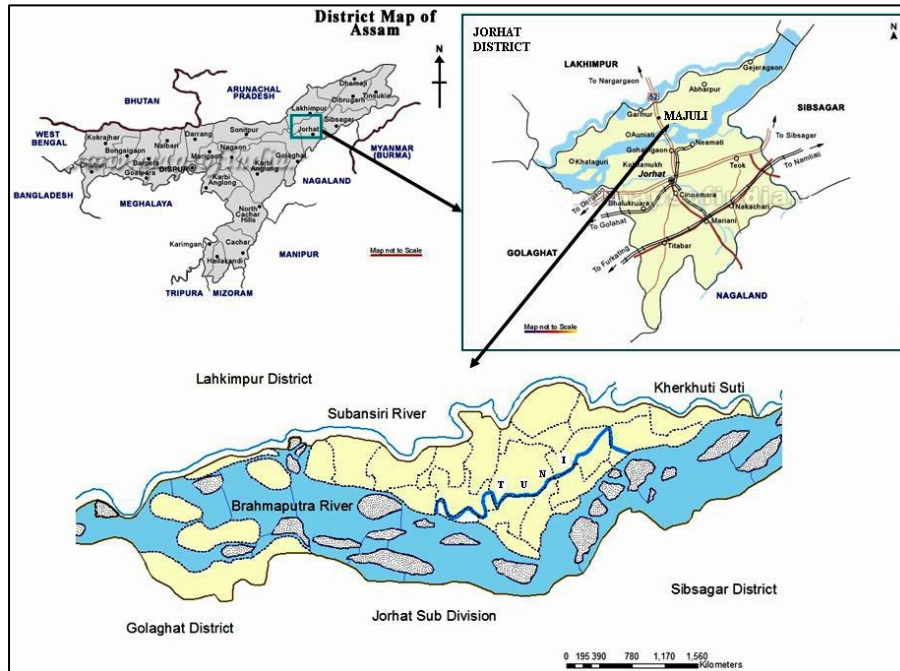


Figure 5: Location of Majuli in Assam. Source: Majuli Island: The Cultural Face of Assam, Majuli: The Treasure Trove.

## **Introduction to the River Island**

Majuli is a river island with a population of 167,304 (2011 census) with a majority of the population belonging to tribal communities like the Mishing, Deori and Sonowal Kacharis. Climate change and glacial ice melt in the Himalayas and Tibet has triggered floods and severe erosion<sup>69</sup> on the island which is causing its landmass to gradually shrink in size. Climate change impacts have been felt on the island with continuous shifts in rainfall pattern as well as changes in the temperature.<sup>70</sup>

Majuli has a landscape of both natural and cultural significance, and over the past several years, the community has developed a lifestyle in response to its constantly changing water and weather conditions. This thesis aims to develop a deep understanding of Majuli’s unique landscape and its community response.

<sup>69</sup> Debojyoti Das, “Changing climate and its impacts on Assam, Northeast India,” *Badung: Journal of the Global South*, June 2016.

<https://bandungjournal.springeropen.com/articles/10.1186/s40728-015-0028-4>

<sup>70</sup> Ibid.

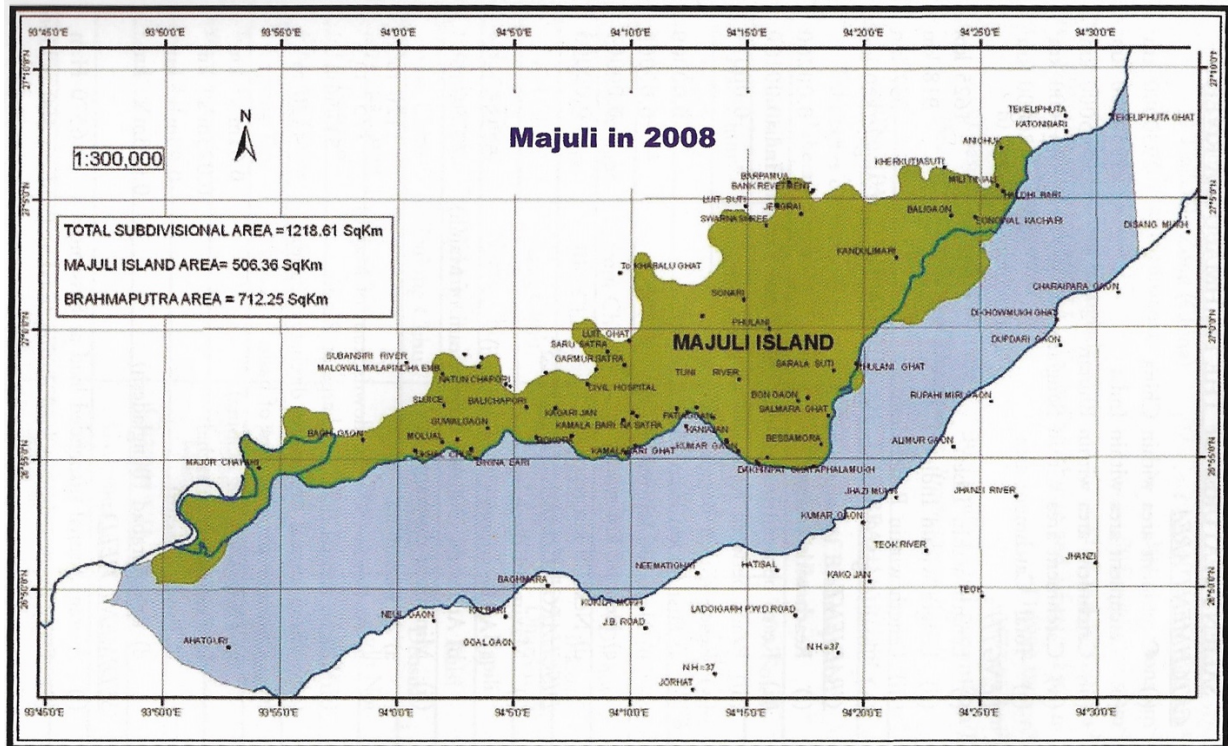


Figure 6: Majuli District Map. Source: The Treasure Trove.

## **Significance**

With its unique geographical location, natural setting and resources, and the way its community is rooted in cultural traditions physically and spirituality, Majuli presents itself as a unique entity with unmatched cultural and natural attributes.<sup>71</sup> In addition, Majuli is one of the river communities that has been living with and adapting to increased changes in weather and water conditions for decades. Adaptation has become a way of living and part of the community's deeply rooted traditions - Houses are built on stilts and moved when required, every household has a boat to commute during flood season, fishing is carried out in the interior parts of the island when it get flooded, soft soil from the banks are used for pottery and mask making, and the island is famous for its folk music and dances that also

<sup>71</sup> Mitul Baruah, "Suffering for land: Environmental Hazards and Popular Struggles in the Brahmaputra Valley (Assam), India," (Masters diss.), Syracuse University, 2016.

celebrate floods and weather-related events. The tangible and intangible resources examined in the next section are largely associated with Majuli's cultural significance.

Additionally, Majuli has been on India's tentative list of World Heritage Sites since 1989 due to its unique natural and cultural properties.<sup>72</sup> The criteria denoting its significance and outstanding universal value (OUV) will be discussed towards the end of this chapter.

### **Historic Resources – Tangible and Intangible**

Majuli shows the continuity of three types of cultural systems – the first indigenous Mishing tribal group, the time period when it was annexed by the Ahom dynasty and recent local adaptation systems. Of these, two generated before the 19<sup>th</sup> century and were based on the traditional understanding of natural and geomorphological constraints of the land.<sup>73</sup> This thesis deals with traditional systems that were a direct product of changing water and weather conditions. For example, the agricultural practices, were based on the annual flooding pattern, climatic variance and soil distribution, the community cultivates different types of crops using sand bars as grazing land, for instance, the glutinous paddy is grown on the higher contours in the center of the island while the monsoon rice is grown in the low-lying areas.<sup>74</sup>

Today, Majuli Island is presented in many national and international discussions as having both tangible and intangible assets – Sattras or Monasteries, folk theater, dance forms, pottery, craft work, mask making, bamboo construction, wattle-and-daub construction and regional music, together with a vibrant traditional knowledge system that has evolved through centuries of human habitation in fluctuating weather conditions.

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<sup>72</sup> "World Heritage Site Status of Majuli Island & MIPADC," Majuli Island Protection and Development Council, Guwahati.

<sup>73</sup> Somi Chatterjee, "Monitoring Challenges in a Living Cultural Landscape: River island of Majuli," *Monitoring Cultural Landscapes in India*, Pg.173-178.

<sup>74</sup> Ibid.

## **Fishing**

After agriculture, fishing has been one of the primary occupations in Majuli for years. The land form, water levels, aquatic plants and seasonal variations determine the fishing seasons. The Mishing tribe and the Deories are the fishing communities that reside near and in the river tracks of the island and live in bamboo constructed houses, raised on stilts. The main sources of fishing are the water bodies found on the island, including the wetlands, marshy lands, ponds and rivulets.

The techniques and tools used for fishing change seasonally. One of which is community fishing where groups of women carry out the activity using hand woven baskets in wetlands. Other methods include fish traps made from bamboo and net that are put along the embankments against water flow. Post monsoon season, when the water levels recede, fish is caught from flowing water channels along the embankments. Additionally, a bamboo bed is prepared along the bank for drying fish before they are taken to markets or homes.

The tools for fishing are further categorized at a local level based on the water level and the types of water bodies where it is carried out.<sup>75</sup> Some of which are:

*Polo*: a conical shaped instrument used for fishing in shallow waters.

*Jakoi*: a triangular instrument made from bamboo, mainly used by women folk to catch smaller fishes in shallow waters.

*Khaloi*: A small device made from bamboo and cane for storage while fishing.

*Dolonga*: A triangular instrument made from bamboo and cane, kept underwater (in the river) to catch fish during winters.

*Chepa/Khoka*: An instrument fixed in narrow water bodies to trap fish.

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<sup>75</sup> *Majuli Cultural Landscape – At a Glance*, Majuli Cultural Landscape Management Authority, 1<sup>st</sup> Edition, Sep. 2014.



Figure 7: Mishing women fishing in a wetland, Majuli.

## Pottery

Pottery is a traditional form of cottage industry in Majuli. Pots are exchanged for paddy, which is one of the staple foods on the island. The potter's community reside in the south-eastern part of Majuli in a village named Salmora. Pots are made from beaten clay and burnt in driftwood-fired kilns while the women artisans shape the pots with their own hands without using a potter's wheel. Archaeologists have said that Majuli's pottery is the "missing link" between civilizations of Mohenjo-Daro and Harappa during which the pottery industry flourished.<sup>76</sup> The raw material (clay) is obtained from the river banks by digging a 10-12 feet deep pit on the bank to collect the soft clay which is called potter's earth or 'kumar mati' from beneath. The clay is then transported back to their homes where it is further mixed with water and left to stand for a day. Women plough the soil dough with their feet and mix it with sand to get the required texture. The final shape is obtained by beating

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<sup>76</sup> Pullock Dutta, "Pottery threat to Majuli riverbanks – Potters urged to shift to terracotta," *The Telegraph*, Feb 26, 2011.

the clay with bare hands or a wooden spoon, and then the product is baked in driftwood-fired kilns. The process for preparing a batch of 50-60 pots takes around four days. After producing the pots, the men from the household transport the pots to near-by villages or towns to sell or exchange for paddy.



Figure 8: Salmora village in Majuli: Woman shaping the clay using bare hands.



Figure 9: Salmora village in Majuli: Outdoor kiln for baking pots.



Figure 10: Salmora village in Majuli: Pots are stored under the floor in the stilt level.

Unfortunately, the digging of pits for soft clay has loosened the soil by the river banks and has aggravated the erosion process. The potter's village, Salmora, has already moved inwards over three times. The building materials from the old houses are salvaged and rebuilt using the recovered and newly purchased materials. The construction type for the potter's community is generally wattle and daub - bamboo canes covered with earth and cow dung.



Figure 11: Kitchen of a potter's house in Salmora village.



Figure 12: Wattle and daub construction with wood panels and tin roof.



In the past two years, the works carried out by the government has prevented the villagers from obtaining the raw material and has severely affected their livelihood. From the in-depth interviews, the community is willing to switch occupations but are concerned that they will not be able to sustain the pottery industry and livelihoods in the coming years.



Figure 13: Woman in Salmora village shaping the potter's earth.

Shubha Hazarika (pictured above), one of women from the potter's community says:

“If pots don't sell, what do we do for a livelihood? We are willing to switch to fishing or farming but we do not have sufficient funds to change occupations and sustain for the time being.”

““If we (Potters) are causing erosion, why and how are other parts of Majuli also being eroded?” – Pushpa Hazarika (Salmora village)

## Weaving

Majuli is also known for its handloom and weaving industry. Almost every house in the community has a loom in the house. *Endi*, silk and cotton fabrics produced in Majuli are sold across the country. The tools used are made from locally available bamboo and timber, and the raw materials for weaving are mainly cotton silk from cocoons and mulberry leaves.<sup>77</sup>

The traditional process of weaving closely follows the annual seasonal changes in Majuli. Depending on the weather conditions, indoor and outdoor breeding for cocoons is taken up. The community produces a variety of silk clothing, one of which is “Paat” silk from the paat worm (*bombyx textor* and *bombyx xroeci*)<sup>78</sup>. The process includes cutting mulberry leaves to feed the paat worm which are generally bred indoors. It then has five breeding stages that are carried out on a bamboo sieve called *chandarai* with a circular pattern for cocoons to breed. The cocoons are boiled in water and the threads, locally known as *necha*, are pulled out, and then washed or bleached with water mixed with burnt *dimaru* scale, which is an alkaline agent.<sup>79</sup> The final product is a fine light-yellow thread which is used to weave different clothing items.

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<sup>77</sup> *Majuli Cultural Landscape – At a Glance*, Majuli Cultural Landscape Management Authority, 1<sup>st</sup> Edition, Sep. 2014.

<sup>78</sup> *Ibid.*

<sup>79</sup> *Ibid.*



Figure 14: The weaving is generally carried out in the stilt level of the house (if the weather permits).



Figure 15: A woman from the *Deori* tribe weaving.

## Sattras

Majuli Island is considered to be a source of the neo-Vaishnavite culture, which first originated in the Sattras of the Island.<sup>80</sup> Sattras are monastic communities with disciples set in land donated to them by the Ahom kings and a certain set of population designated to work for the Sattra community. Income generated from the land is used for cultural, educational and social purposes. It is believed that the Sattras have shaped the socio-cultural life of the island through a symbiotic relationship between the residents of the sattras and the villages.<sup>81</sup> The Sattras can be traced back to the fifteenth century, when Sankaradeva, a revered saint and a social reformer, ushered a religious movement in Assam. He was known to have sought to dissolve the divisive boundaries of caste and creed by bringing people together under one roof.<sup>82</sup>



Figure 16: Entrance to the Kalambari Sattra in Majuli.

<sup>80</sup> "The Disappearing River Island of Majuli: Is There a Glimmer of Hope?" *Terra Green: Volume 11*, Issue 2, May 2018.

<sup>81</sup> International Council on Monuments and Sites (ICOMOS), *Evaluations of Cultural Properties*, UNESCO World Heritage Committee, 2008.

<sup>82</sup> "The Disappearing River Island of Majuli: Is There a Glimmer of Hope?" *Terra Green: Volume 11*, Issue 2, May 2018.

With the passage of time, the distinctive art forms in Majuli have undergone fundamental changes and evolved in response to the environment and with the help of the Sattrra community as well. The monks that reside in the sattras have been proactively participating in the preservation of their artforms.<sup>83</sup> The Sattras as institutions continue to impart spiritual knowledge and propagate art and culture by exercising spiritual control over communities which has over several centuries helped to maintain social order, peace and harmony.<sup>84</sup>

The Sattrra buildings vary in size and complexity and research suggests many have been rebuilt or relocated over the centuries<sup>85</sup> (due to land loss in Majuli). The main large hall, *Namghar*, with a roof supported on two rows of cylindrical columns, sometimes carved and painted, is built in the center of an open space surrounded on all four sides by one story buildings, locally known as *hati*, forming a quadrangle used as dormitories for disciples. Between the *namghar* and the *hatis* are usually large ponds, sometimes fringed with trees of religious significance.<sup>86</sup> The buildings were traditionally constructed of bamboo and thatched roof, but like the traditional homes in Majuli, now are largely replaced by concrete walls and tin sheets.

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<sup>83</sup> "The Disappearing River Island of Majuli: Is There a Glimmer of Hope?" *Terra Green: Volume 11*, Issue 2, May 2018.

<sup>84</sup> International Council on Monuments and Sites (ICOMOS), *Evaluations of Cultural Properties*, UNESCO World Heritage Committee, 2008.

<sup>85</sup> *Ibid.*

<sup>86</sup> *Ibid.*



Figure 17: Interiors of a *Namghar*.

The Sattrra buildings are also storehouses for valuable painted manuscripts, and other types of artefacts in bronze, silver, gold and ivory<sup>87</sup> belonging to the Ahom dynasty. These are now stored inside a separate building and are maintained and preserved by the Sattrra community.



Figure 18: “Museum” containing silver, gold and bronze objects from the Ahom Dynasty at the Dakshinpath Sattrra.

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<sup>87</sup> International Council on Monuments and Sites (ICOMOS), *Evaluations of Cultural Properties*, UNESCO World Heritage Committee, 2008.

One of the most well-known aspects of the Sattra culture is dance and drama, locally known as *bhaona* and *ankiya-nat*, theatrical depictions of good over evil<sup>88</sup> and recollections of flood related events in Majuli. The Sattriya dance has recently been recognized as a national classical dance – for which distinctive masks and costumes are all made locally from the fabric woven on traditional looms.<sup>89</sup>

After examining the nomination process for Majuli’s world heritage status (discussed at end of this chapter), it was observed that the dossier placed special emphasis on the Sattra culture and associated all of Majuli’s cultural significance to the Sattras. Even though this is not the case, it speaks to the social and religious values that are placed on Sattra community.

### **Mask-making**

Among the varied art forms that emerged from the Sattra culture, mask making is one of the most prominent ones. This tradition lives on today, especially in the Samaguri Sattra, a monastery known for being exceptionally skilled at the art.<sup>90</sup> Traditionally, masks were used for dance and theatre. The materials used for making masks are mainly bamboo and cane covered with cloth, plastered with clay and then painted over using rock color. In some cases, wood is also used.

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<sup>88</sup> International Council on Monuments and Sites (ICOMOS), *Evaluations of Cultural Properties*, UNESCO World Heritage Committee, 2008.

<sup>89</sup> Ibid.

<sup>90</sup> “The Disappearing River Island of Majuli: Is There a Glimmer of Hope?” *Terra Green: Volume 11*, Issue 2, May 2018.



Figure 19: Stages of the Mask making process.



Figure 20: Mask carving at the Samahuri Sattrra in Majuli.



Following are the three types of masks that are made in Majuli:<sup>91</sup>

*Mukha*: Face masks.

*Lotokai Mukha*: Also face masks, with movable lips and eyes.

*Bor Mukha*: Life size masks.



Figure 21: *Sattra-adhikar* Hemchandra Goswami of the Samaguri Sattra – One of the key mask-making figures in Majuli.

<sup>91</sup> *Majuli Cultural Landscape – At a Glance*, Majuli Cultural Landscape Management Authority, 1<sup>st</sup> Edition, Sep. 2014.

## Boat-making

The people in Majuli have learned to live with excessive rainfall and floods in the region, with boat-making as one of the most common activities practiced on the island. Every household on the island has a boat to commute with during flood seasons. The material used for constructing boats is wood from *Semalo*, *Uriam*, *Outenga*, *Atrocarpus* and *Hijal* trees which are locally available.<sup>92</sup> Traditionally, a single piece of wood from large tree trunks were used to make boats. However, today boats are made from split timber and traditional hacksaws, blades, chisels and rivets are the tools used for construction.



Figure 22: Boat-making in Majuli. Source: Majuli Cultural Landscape Management Authority

## Festivals

Cultural and religious events in Majuli are an integral part of the life of the people. The festivals celebrate water, new seasons and crop cycles, and hence are in line with seasonal variations, directly impacting the pattern of activities and

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<sup>92</sup> *Majuli Cultural Landscape – At a Glance*, Majuli Cultural Landscape Management Authority, 1<sup>st</sup> Edition, Sep. 2014.

occupations. The Sattras are the major centers of assembly for the celebration of various festivals.

Though all of the cultural practices mentioned above stem out of community response to its immediate surroundings, the direct relationship of these traditions and adaptation to water will be discussed in Chapter 5: Water as a way of living.

### **Inclusion on the World Heritage Tentative List**

For over a decade now, the Indian government has been trying to nominate Majuli as a UNESCO World Heritage Site.<sup>93</sup> Since these attempts have been unsuccessful, it has directly impacted the state and local cultural institutions that have been trying to organize Majuli in recent years in order to popularize and gain greater recognition of the unique cultural heritage of the island.<sup>94</sup> This section discusses how the cultural heritage of Majuli is interpreted for the nomination process, and examines the implications of including Majuli on the World Heritage Tentative List.

As of 2019, there are 37 UNESCO World Heritage Sites in India, which include 29 cultural sites, 7 natural sites and 1 mixed site. 42 sites including Majuli are currently on the “Tentative List”.<sup>95</sup> The Tentative List is an inventory of natural and cultural heritage sites, which a country believes meet the World Heritage Committee selection criteria. In order for a site to be nominated to the World Heritage List, it must be included on its country's Tentative List.<sup>96</sup> The List may be updated at any time, but a site must be included on the Tentative List for at least one year to be considered for nomination.<sup>97</sup>

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<sup>93</sup> “The UNESCO World Heritage Committee’s 28th session at Suzhou, China in 2004 shortlisted the island for the World Heritage Site “Tentative List.” *The Hindu*, March 2011.

<sup>94</sup> Mitul Baruah, “Suffering for land: Environmental Hazards and Popular Struggles in the Brahmaputra Valley (Assam), India,” (Masters diss.), Syracuse University, 2016.

<sup>95</sup> UNESCO World Heritage Centre, The States Parties, India.

<sup>96</sup> Ibid.

<sup>97</sup> Ibid.

According to the current framework, it is the Archaeological Survey of India (ASI) headed by its Director General with overall supervision by Secretary (Culture) that spearheads the process in India, including the politically sensitive process of selection from the vast number of cultural and natural sites in India.<sup>98</sup>

The government of India has been making attempts to put Majuli on the World Heritage list since 1998, when the first dossier was prepared by the Majuli Island Protection and Development Council (MIPADC). Three separate dossiers were prepared and submitted in 2004, 2008 and 2012 by the Archaeological Survey of India (ASI) but were subsequently returned citing lack of clarification and other shortcomings.<sup>99</sup> In recent years, Majuli is viewed as the 'largest' river Island, even though research suggests otherwise. Its size and 'unique' sattriya culture are seen as distinguishing factors that are threatened by floods. The first attempt to nominate Majuli based on the aforementioned facts could not present the site in a comprehensive light. The existing data gaps in information and its articulation created confusion leading to questions on outstanding universal value (OUV) criteria, site protection, monitoring and management which remained unanswered comprehensively.<sup>100</sup>

Protection and conservation efforts in Majuli were directed towards objects that were valued and considered significant in the Worlds Heritage nomination dossier. It is important to discuss the various statements and evaluations put forward for the nomination in order to understand what was valued and protected by the government.

The 2008 dossier for the 'River island of Majuli in midstream Brahmaputra River in Assam' contained the following description for Majuli:

"Majuli, an island in the upper reaches of the Brahmaputra River, has been the cultural center of Assam for the past five hundred years and is seen as the cradle of Assamese civilization."

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<sup>98</sup> Archaeological Survey of India

<sup>99</sup> TNN, "Majuli's heritage status a far cry," *The Times of India: City*, May 2017.

<sup>100</sup> Somi Chatterjee, "Monitoring Challenges in a Living Cultural Landscape: River island of Majuli," *Monitoring Cultural Landscapes in India*, Pg.173-178.

In the 16th century Majuli became the heart of a school of Vaishnava worship, founded by the saint Shankardeva. He established Sattras or monasteries around the island in which local art forms such as dance, drama, painting and poetry were used as the medium to propagate Vaishnava religion. Shankardeva and his apostles wrote many songs, dramas and devotional scriptures and this helped the development and formalization of the Assamese language. Majuli became a spiritual-cultural landscape where the scriptures were writ large on the ground and the Sattras fused religious and political systems across whole of society.<sup>101</sup>

According to the dossier, the nominated property was considered by the State Party to be of Outstanding Universal Value (OUV) as a cultural property for the following reasons:<sup>102</sup>

“Majuli is a unique spiritual and cultural landscape and part of the Diaspora of Pan-Vaishnavite spiritual movements.”

“The tangible and intangible heritage of Majuli together with a distinctive traditional knowledge system is an outstanding example of a unique living tradition that has been sustained despite the vagaries of floods and erosion. “

The Criteria under which the inscription for Majuli was proposed were criteria (ii), (iii), (v), and (vi):<sup>103</sup>

*Criterion (ii): exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design.*

The State Party considers that the Island manifests the effect of the Vaishnava movement which in the 15th and early 16th centuries brought whole societies together through the development of Sattras monasteries that diffused cultural and political forces throughout society.

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<sup>101</sup> International Council on Monuments and Sites (ICOMOS), *Evaluations of Cultural Properties*, UNESCO World Heritage Committee, 2008.

<sup>102</sup> Ibid.

<sup>103</sup> Ibid.

*Criterion (iii): bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living, or which has disappeared.*

The State Party considers that the Vaishnava tradition spread widely over India. In Majuli it developed into a more intense form through the very specific dance-dramas that are still practiced on the Island. This cultural tradition was firmly anchored in the Sattras.

*Criterion (v): be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change.*

The State Party considers that the whole way that nature is managed on the island, and the spatial planning of the settlements and fields, appears to be shaped by religious practices.

*Criterion (vi): be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance.*

The State Party considers that the entire religious, cultural and spatial landscape of Majuli reflects the systems and beliefs introduced by Shankardeva in the 16th century. Such beliefs strengthened the Assamese identity.

In the 2008 evaluation of Cultural Properties and statements of Outstanding Universal Value by the International Council on Monuments and Sites (ICOMOS), the criteria provided were not justified at that stage and the Outstanding Universal Value was not conveyed and demonstrated in the nomination dossier.

The values that were put forward in the nomination dossier by the state party significantly relate to the Sattras and their cultural association and the rural landscape between the Sattra community. Moreover, the dossier acknowledges that the physical condition of the Sattras required urgent restoration and in some places

reconstruction.<sup>104</sup> The Sattra community can be seen as an exceptional testimony to the Vaishnava religion that brought disparate peoples together through cultural practices. However, as their influence does not manifest itself across the cultural landscape of Majuli, the ICOMOS evaluation did not consider that this factor applied to the whole island, but only to Sattras as a group or to a selection of Sattras.<sup>105</sup>

In India, heritage has largely been viewed as monumental and preference in determining heritage is given to religious associations over societal associations. As seen in the criteria discussed above, the significance of Majuli in totality has been associated to the Vaishnava tradition, Saint Shankaradeva and the Sattras, and the social and cultural values discussed in the previous chapter are largely absent.

Majuli was nominated for all its cultural distinctiveness which are not limited to the Sattras and its manifestations in terms of buildings, dance, music and social systems, but also to the agricultural management of the landscape, the symbiotic relationship between people and nature and the disposition, style and arrangement of villages, their houses and farmland- which make up the integrated whole.<sup>106</sup> The culture of Majuli is an extension of the coping behavior that shows a deep understanding of operable principles, stresses and limits of a flood-based geomorphologically dynamic system.<sup>107</sup>

Following were the recommendations that were made by the World Heritage Committee when the dossier was sent back in 2006:

- Assemble more information of the Sattras remaining on the island and on the way they have influenced and continue to influence landscape patterns and the overall interaction between people and nature in Majuli and further afield;

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<sup>104</sup> International Council on Monuments and Sites (ICOMOS), *Evaluations of Cultural Properties*, UNESCO World Heritage Committee, 2008.

<sup>105</sup> International Council on Monuments and Sites (ICOMOS), *Evaluations of Cultural Properties*, UNESCO World Heritage Committee, 2008.

<sup>106</sup> Ibid.

<sup>107</sup> Somi Chatterjee, "Monitoring Challenges in a Living Cultural Landscape: River island of Majuli," *Monitoring Cultural Landscapes in India*, Pg.173-178.

- Create an inventory of architecture and spatial patterns in the landscape associated with the Sattras and their movable heritage.
- Put in place legal protection.
- Amplify the Management Plan to take account of the specific nature of Sattra landscapes and buildings, the interrelationship between people and nature, the potential for traditional farming practices to sustain biodiversity, the need to codify traditional knowledge, the conservation and development of traditional architecture, a cultural tourism strategy and approaches to sustainable development;
- Undertake an appraisal of the overall river basin in which Majuli lies, and the potential impact of climate change, in order to ascertain the chances of the island surviving in the medium term;
- Develop and implement a Risk Preparedness Strategy;
- Carefully consider the impact of the proposed bridges on the special characteristics of the Majuli cultural landscape;
- Encourages the State Party to produce an inventory of flora and fauna of the site with particular emphasis on threatened and endangered species that may be protected as result of local management practices.

Another important factor to note is that the Brahmaputra Board which is a government authority that was entrusted with the task for the 'Protection of Majuli Island from floods and erosion' in 2003, began their work in 2004.<sup>108</sup> This coincides with the year the first dossier was presented. Which means the protection plan was only put in places to acquire the World Heritage status since the World Heritage Committee required an amplified management plan and a protection strategy. Furthermore, press reports have suggested that the nomination of Majuli is seen as the catalyst that was needed to prompt action to address the destructive process of

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<sup>108</sup> Samudra Gupta Kashyap, "Rs 233 crore for walls, drainage, screens: How government plans to protect Majuli Island", *The Indian Express*, January 17, 2018.



flooding bank erosion.<sup>109</sup> The International Council on Monuments and Sites (ICOMOS) has also expressed concerns that putting in place approaches to major threats is seen to be contingent on World Heritage inscription. The nomination format for the inscription on the World Heritage list includes a section containing how the requirements for the protection and management will be met, in order to ensure that the Outstanding Universal will be maintained over time. This section requires both details of an overall framework for protection and management, and the identification of specific long-term expectations for the protection of the property.<sup>110</sup> Hence the protection plan for Majuli was a highly political move by the Indian government in order to ensure the nomination of Majuli to the World Heritage List. Unfortunately, the politically-driven protection project was employed to only protect the physical attributes, since like rest of India and as seen in the criteria above, societal values is considered less important and intangible values are not acknowledged altogether. Policy makers, Planners and Engineers involved in these projects present simplistic explanation of flood and its resultant impact on the island habitable space, as a 'techno-managerial' crisis needing policy and physical redemption through 'experts' intervention.<sup>111</sup>

The techno-managerial approach to flood mitigation and erosion is dominated by a discourse produced largely through 'visuals' created by remote sensing imagery that presents a synoptic view of ecological change. However, the phenomena of flooding and bank erosion cannot be understood just through the visual perception. Rather there is a need to engage with examining community perception to flood hazards expressed through memories, oral history, and other tacit knowledge of flood events and management.<sup>112</sup>

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<sup>109</sup> International Council on Monuments and Sites (ICOMOS), *Evaluations of Cultural Properties*, UNESCO World Heritage Committee, 2008.

<sup>110</sup> "Format for the nomination of properties for inscription on the World Heritage List," Annex 5, UNESCO World Heritage Centre.

<sup>111</sup> Debojyoti Das, "Majuli in Peril': Challenging the received wisdom on flood control in Brahmaputra River Basin, Assam (1940-2000)," Springer Science + Business Media Dordrecht, 2014.

<sup>112</sup> Debojyoti Das, "Majuli in Peril': Challenging the received wisdom on flood control in Brahmaputra River Basin, Assam (1940-2000)," Springer Science + Business Media Dordrecht 2014

It is also problematic that the dossiers that were prepared for the nomination had a religious bias towards the Vaishnavite movement and the Sattra community. Hence a majority of protection and conservation efforts by the authorities have been directed towards physically protecting these buildings and preventing the erosion process to control land loss. Had the dossier acknowledged the integrated whole cultural landscape of Majuli, conservation efforts may have been directed to programs on sustaining the vernacular building traditions and other cultural and socially important aspects of Majuli.



Figure 23: Built landscape of Majuli

## **Chapter 4: Majuli - Context**

#### **4. Majuli – Context**

As mentioned in the previous chapters, erosion and flooding have been the crucial elements in shaping Majuli's landform and lifestyle. To better understand the role of these elements in this discourse, there is a need to examine the environmental history of Majuli.

This chapter provides a detailed study of the background and context of the case study environment, including the geographical data, the science behind the shrinkage of the island and a summary on how climate change is affecting Majuli. It also discusses the social, economic and political context, which has played a key role in the decision making and adaptation processes in Majuli which are examined in Chapter Five.

#### **Physical Contextual Data**

##### **Geographical Context**

Majuli is surrounded by a complex geological structure of sedimentary formation and tertiary sandstone in the Upper Brahmaputra Valley. The landscape is characterized in geo-tectonic discourse as vulnerable and particularly susceptible to the tectonic hazards posed by plate movements and the hydraulic ebb and flow of the Brahmaputra river and its tributaries.<sup>113</sup>

The island is bounded by Subansiri River on the North West, The Kherkatia Suti (a spill channel of Brahmaputra river) on the North East and the main Brahmaputra River on the South. The island extends for a length of 80km from east to west and 10-15km along the North South directions with a total area of 506.37 sq.km. as per the most recent Survey of India Map.

Geologically, the landform of the island was formed due to the result of long-term cumulative action of flow, erosion and depositional processes of Brahmaputra River and its tributaries. It is a region of fluvial geomorphology and rises from the

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<sup>113</sup> Archaeological Survey of India, 2005.

Brahmaputra basin and in course of time turned into a flat-level alluvial plain.<sup>114</sup> Several efforts were made to understand Majuli's paleoenvironment in the past. Back in 1662-63, the Mughal Emperor – Aurangzeb conducted a land survey in Assam and its findings suggest that Majuli comprised of 13 small islands between the confluence of Dhansiri and Dihing rivers with Brahmaputra. This was subsequently confirmed by Dr. Wade in a study conducted in 1792-94.<sup>115</sup>

Earlier, Brahmaputra River was known as Lohit and flowed north of Majuli. The rivers Dihing, Disang, Dikhow and Dhansiri were flowing south of Majuli. As a result of major earthquakes on 1691 and 1696, the Dihing river changed its course and joined the upstream course of Brahmaputra (then Lohit). Subsequently, a catastrophic flood along Dibang River devastated the area in 1735. Following this event, the Brahmaputra, Dibang and Dehang rivers abandoned their original course and started flowing south of Majuli, eventually creating the present landform.

### **Formation**

Majuli is part of the alluvial floodplain of the Brahmaputra river and the present landform is the result of geomorphic processes, like fluvial actions of its neighboring rivers that act in tandem with tectonic disturbances on the upper reaches of the rivers.<sup>116</sup> Hydrological studies suggest that the present landform of the island is associated with temporal sequence of transfer and depositional process of sediments of the Brahmaputra river and its tributaries. Material studies indicate that the landform is purely depositional in origin and is susceptible to heavy erosion due to the fluvial action. Tectonic activities in the neighboring areas, particularly upstream, has significant control over the regime of the river, causing changes in the present landform.<sup>117</sup>

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<sup>114</sup> "River Island of Majuli in midstream of Brahmaputra River in Assam," Tentative List Submission, World Heritage Centre, UNESCO.  
<https://whc.unesco.org/en/tentativelists/1870/>

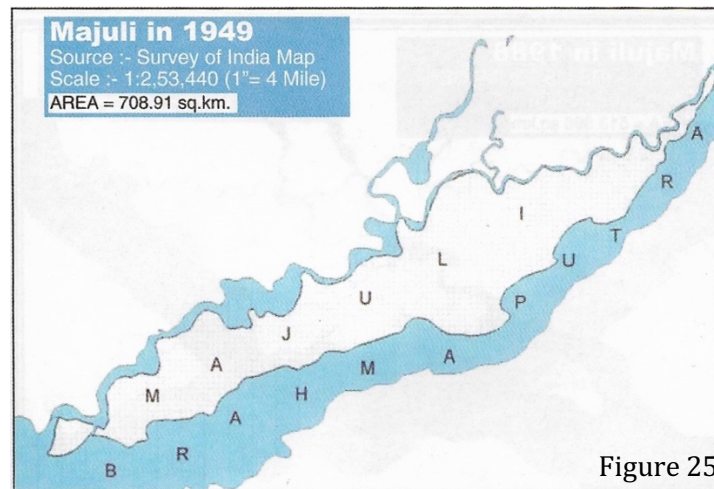
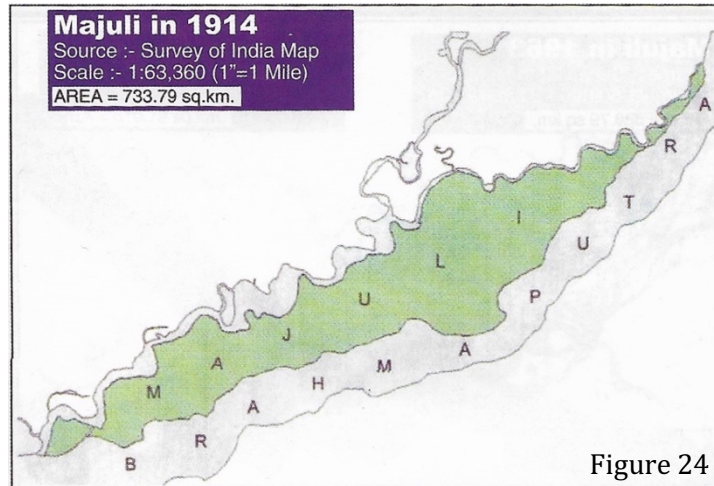
<sup>115</sup> Charu Kamal Hazarika, *The Treasure Trove (A resource book on Majuli, the mid river delta)*, MIPADC, 2010-11.

<sup>116</sup> Ibid.

<sup>117</sup> Charu Kamal Hazarika, *The Treasure Trove (A resource book on Majuli, the mid river delta)*, MIPADC, 2010-11.

## Shrinkage

The size of Majuli Island came down by over 28% in the year 2013. As per the survey carried out by the Assam State Government, the land mass area of the Island has reduced from 733.79 sq. km (as per the Survey of India map of 1914) to about 511.89 sq. km. in the year 2013.<sup>118</sup>



<sup>118</sup> PTI, "Land mass of Majuli Island in Brahmaputra reduced to 522.73 sq. km in 2013: Government," *Financial Express*, August 10, 2017

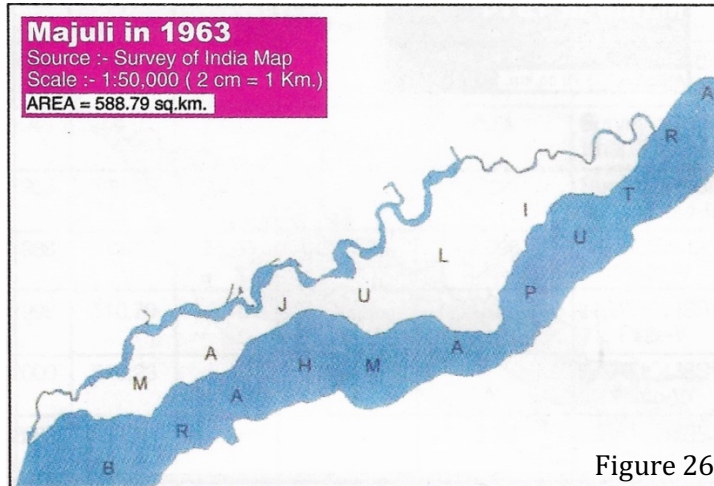


Figure 26

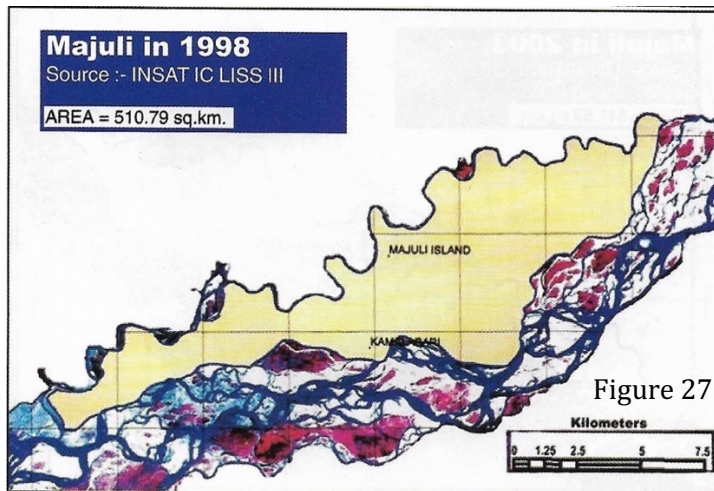


Figure 27

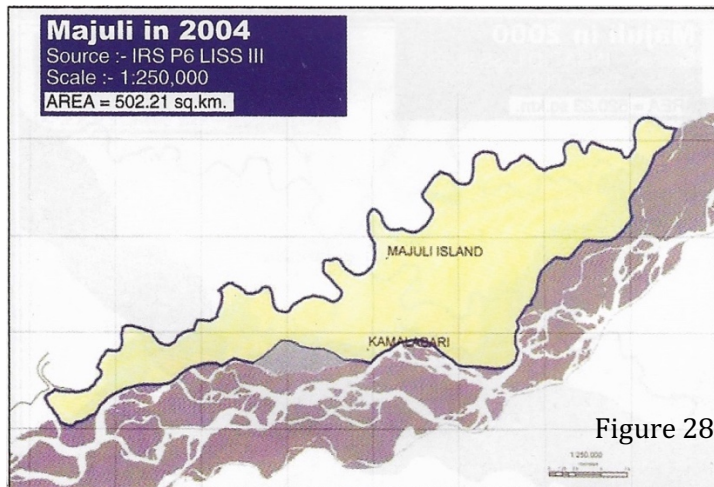


Figure 28

Figures 24-28: Maps indicating the shrinkage of Majuli (1914-2004). Source: Majuli, The Treasure Trove.

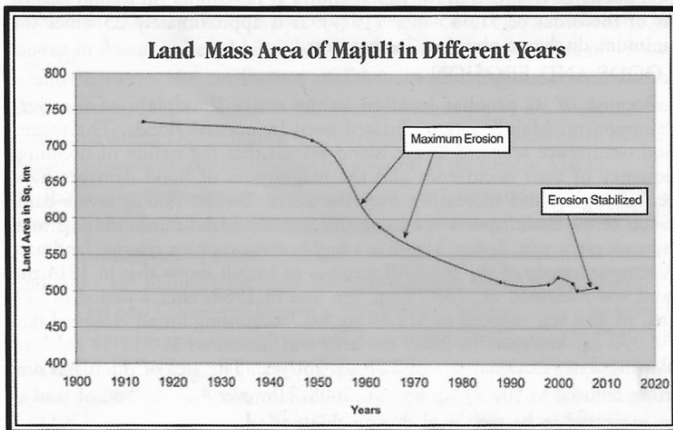
However, other reports suggest that this is a phenomenon that has been caused due to river-bed erosion for more than a century. In 1854, A.J. Mills calculated the area of Majuli to be 1,142 sq. km (Mills 1854). A century later, John Peter calculated the area to be about 960 sq.km.<sup>119</sup> Cumulatively, Majuli has shrunk by almost half its size.

Agriculture and pottery being one of the primary occupations, the constant land loss has left several farmers and potters landless and are forced to live on the embankments in makeshift houses.

**THE AREA OF MAJULI AS PER SURVEY OF INDIA MAP**

Year	Area of Majuli in sq-km.	Area eroded in sq-km.	Area reclaimed as fill in sq-km.	Average loss of area per year in sq-km.	Source
1914	733.79				Survey of India map* Plate-I
1949	708.91	24.88		0.71	Survey of India map* Plate-II
1963	588.79	120.12		8.58	Survey of India map *Plate-III
1988	513.89	74.90		2.996	IRS LISS III* Plate-IV
1998	510.79	3.10		0.31	INSATIC LISS III Plate-V
2000	520.23		9.44		INSATIC LISS III Plate-VI
2003	511.89	8.34		2.78	INSATIC LISS III Plate-VII
2004	502.21	9.68		9.68	IRS P6 LISS III Plate-VIII
2008	506.37		4.16		IRS P6 LISS IV Plate-IX

\*Courtesy, Dr. R. Sarma, Engeo Consultancy, Lamb Road, Guwahati-01.



\*The Brahmaputra board (government body) claims that their R.C.C porcupine projects which started in 2004 helped “reclaim” land back as indicated on the maps.

Figure 29: Area comparison of Majuli over time. Source: Maps by Survey of India, The Treasure Trove.

<sup>119</sup> Sahay Avijit, “Majuli and the Tragedy of Hazard Identification,” *Economic and Political Weekly*, Mumbai August 5, 2017.



## Floods and Erosion

The island has been subjected to annual flooding for several years now. In an earlier report by E.A. Gait called 'History of Assam', the island had been subjected to catastrophic floods in the years 1570, 1642 and 1735. In the recent past, the island has experienced disastrous floods in the years 1931, 1935, 1948, 1949, 1951, 1962, 1966, 1969, 1970, 1977, 1987, 1988, 1998<sup>120</sup>, 2001, 2005, 2008, 2012, 2016.<sup>121</sup>



Figure 30: Majuli during the 2016 floods. Source: Janambhumi News Desk.

Due to its peculiar location on an active floodplain of Brahmaputra river, Majuli experiences inundation even during normal floods. 2011 reports suggest that the nature of flooding, its frequency and magnitude has been changing and increasing over the years.<sup>122</sup> In 1950, a powerful earthquake struck the Brahmaputra valley in Assam, de-stabilizing the channel of the river. Since then, the river has continuously been shifting course.<sup>123</sup> This has aggravated not only the

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<sup>120</sup> Charu Kamal Hazarika, *The Treasure Trove (A resource book on Majuli, the mid river delta)*, MIPADC, 2010-11.

<sup>121</sup> Interviews with Mishing community

<sup>122</sup> Charu Kamal Hazarika, *The Treasure Trove (A resource book on Majuli, the mid river delta)*, MIPADC, 2010-11.

<sup>123</sup> Sahay Avijit, "Majuli and the Tragedy of Hazard Identification," *Economic and Political Weekly*, Mumbai August 5, 2017.

flooding but also the bank erosion along the river. Studies show that the erosion rate in Majuli from 1914 to 1988 was around 2.996 sq.km/year, and from 1988 to 2008 it was 2.78 sq.km/year.<sup>124</sup>



Figure 31: Land eroded at Salmora Village in Majuli.

The 1950 earthquake can also be seen as a watershed event for state policy in flood mitigation and protection of the areas that lie in the Brahmaputra valley. It also coincided with the era of building 'big dams' and a Multi-Purpose River Valley Project.<sup>125</sup>

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<sup>124</sup> Charu Kamal Hazarika, *The Treasure Trove (A resource book on Majuli, the mid river delta)*, MIPADC, 2010-11.

<sup>125</sup> Debojyoti Das, "Majuli in Peril': Challenging the received wisdom on flood control in Brahmaputra River Basin, Assam (1940-2000)," Springer Science + Business Media Dordrecht, 2014.

## **Climate Change Impacts on Majuli**

Climate change is gaining importance as scientific and socio-economic studies have brought forth substantial evidences.<sup>126</sup> As discussed in Chapter One, climate change is more likely to have more adverse effects in the developing countries and island communities due to high dependency on climate sensitive livelihoods. Policies to protect climate-dependent livelihoods are crucial for enhancing adaptive capacities of these communities.

The Intergovernmental Panel on Climate Change (IPCC) projects that the Himalayan Highlands will experience some of the highest increases of global warming. The flow of rivers such as Brahmaputra River is already changing volume and intensity and will directly affect the millions of people from India and Bangladesh that depend on the river as a direct source of livelihood.<sup>127</sup>

Majuli, like other parts of South Asia, is experiencing vast climate change impacts. Brahmaputra is a Himalayan glacial river, making the river and all its geographies susceptible to climate change impacts. Factors like the melting of the Himalayan glaciers and the ever-changing rainfall pattern in South Asia has already started to severely affect downstream places like Bangladesh. Climate change also poses the risk of new forms on environmental hazards and vulnerability in the Brahmaputra valley. In Majuli, the changes which are both climate-induced and connected to development related activities are affecting the water conditions.<sup>128</sup>

In addition, climate change is also taking a toll on the health and well-being of Majuli residents as there is a serious problem of water related vector borne diseases. The vulnerability of the population to climate change and existing physical conditions is high as the adaptation capacity of the village is being compromised in light of uncertain flooding that disturbs their crop cycle and annual calendar.<sup>129</sup>

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<sup>126</sup> IPCC 2014, UNFCCC 2007.

<sup>127</sup> IPCC 2007, pg 478-493.

<sup>128</sup> Goswami 2008. Pg 41.

<sup>129</sup> Debojyoti Das, "Changing climate and its impacts on Assam, Northeast India," *Badung: Journal of the Global South*, June 2016.

<https://bandungjournal.springeropen.com/articles/10.1186/s40728-015-0028-4>

## **Social and Economic Context**

Majuli Island houses 243 large and small villages, many of which still have houses constructed of bamboo and mud with thatch roofs.<sup>130</sup> In recent times concrete and tin roofs are also used in several village houses. Majuli is predominantly an agrarian society with around two-thirds of the population engaged in traditional agricultural practices based on a wide variety of local crops.<sup>131</sup>

The Majuli community is a repository of local knowledge of the eco-system of the island which has influenced the way agriculture, fishing and building traditions are carried out according to annual cycles, based on very localized knowledge and in accordance with nature. Spiritual and cultural practices also follow this pattern being integrated into economic working activities.<sup>132</sup>

Majuli, like other parts of Northeast India, has a complex composition of different ethnicities, religions, castes and scheduled tribes. The largest ethnic group is the Mishing tribe which have developed livelihoods, knowledge systems and technology in response to the environmental risks associated with the river.<sup>133</sup> Approximately 21.47% of the island's population is below the poverty line (less than \$2/per day).<sup>134</sup>

### **Agriculture**

Agriculture is considered to be the backbone of Majuli's economy. About 90% of the total population depend on agriculture for their livelihood.<sup>135</sup> They are highly dependent on the soil, rainfall and flood cycle of the region. The population of Majuli

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<sup>130</sup> International Council on Monuments and Sites (ICOMOS), *Evaluations of Cultural Properties*, UNESCO World Heritage Committee, 2008.

<sup>131</sup> Ibid.

<sup>132</sup> Ibid.

<sup>133</sup> Fredrik Carl Felding, "The Risks of Climate Change Adaptation: How policies of adaptation, lower the adaptive capacity of indigenous communities," (Bachelors diss.) Lund University Department of Political Science, Development Studies, 2013.

<sup>134</sup> District Administration, Jorhat

<sup>135</sup> Bikas Das, "An overview of the economic condition of Majuli, the largest inhabited river island of the world," *International Journal of Interdisciplinary and Multidisciplinary Studies (IJIMS)*, Vol 4, 2017, Pg. 91-96.

has always lived with floods, using it as an asset among others to bringing irrigation and nutrition to the fields. A majority of the cultivated goods are food grains, including rice, wheat, potato, oil seed (mustard, sunflower, sesame), pulses (black gram, green gram, pea, lentil, frenchbean), garlic, onion, chili, banana, sugarcane and several kinds of vegetables. Approximately 41% of the total area of the island is used for farming. Below is a map showing the agricultural land use in Majuli.

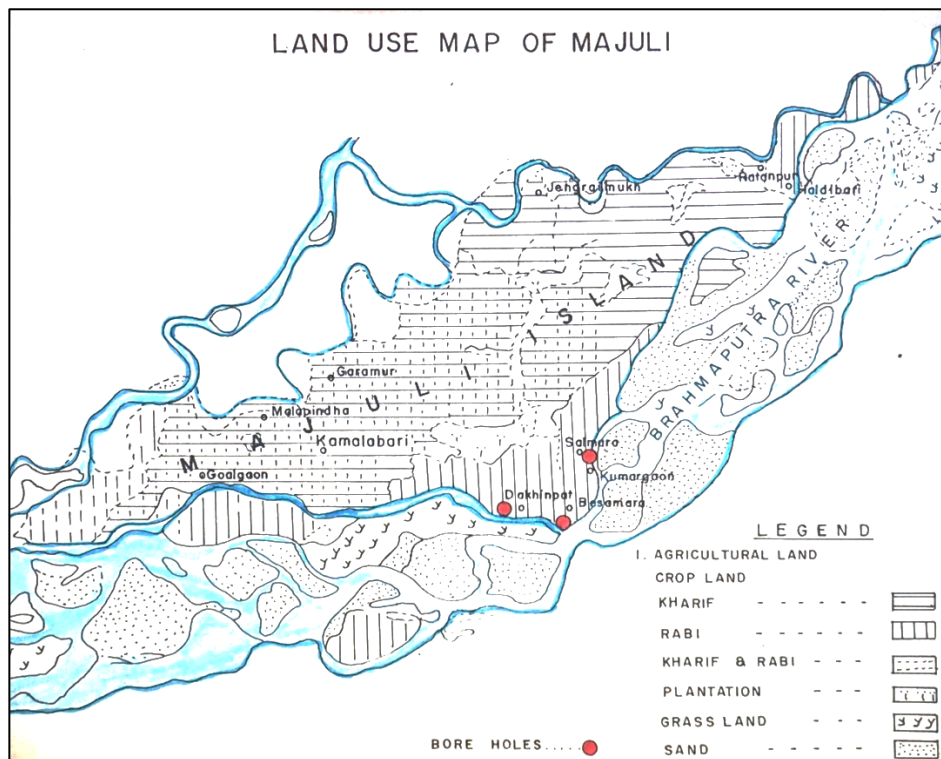


Figure 32: Land use of map of Majuli. Source: Brahmaputra Board

## **Political Context**

Majuli was a part of the Jorhat sub-division at the time of Independence in 1947. In 1979, however, Majuli was declared as an independent sub-division, and in September 2016, the Assam Government declared Majuli as the newest district in Assam. Currently, Majuli has its own elected representatives, and is represented at the Assam Legislative Assembly by a member of the tribal communities through affirmative action. Being an independent district now, the people of Majuli have better access to government agencies and programs.

When it comes to environmental governance, and river governance in particular, the role of the Indian State government is highly reflected, and is founded upon, the global narrative of “progress.”<sup>136</sup> In the Indian context, the legacy of expansion of infrastructures (dams, embankments etc.) to bring the river systems under control goes back to the colonial period, a project that the postcolonial state has fervently continued.<sup>137</sup>

There is abundant research globally on the disastrous socio-ecological implications of large hydraulic structures such as embankments, dams and land spurs.<sup>138</sup> Despite that, the Central Government of India continues to provide hydraulic infrastructure as a solution to river-related problems like erosion and flooding. There is an unprecedented push for hydropower dams in the Brahmaputra valley, and in Majuli, the Ministry of Water Resources (part of the Central Government of India) have been proposing expansions of embankments all along the northern bank of the island.<sup>139</sup> The next chapter discusses interventions by the government authorities for the protection of Majuli from floods and erosion.

With the BJP (Bhartiya Janata Party)-ruled government coming to power in 2014, the controversial embankment projects have resurfaced in the policy arena. Known for its obsession with grand projects, the current government is steadily

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<sup>136</sup> Mitul Baruah, “Suffering for land: Environmental Hazards and Popular Struggles in the Brahmaputra Valley (Assam), India,” (Masters diss.), Syracuse University, 2016.

<sup>137</sup> Ibid.

<sup>138</sup> Ibid.

<sup>139</sup> Ibid.

moving forward with these projects.<sup>140</sup> (Discussed in detail in Chapter 5). Moreover, in a region where livelihoods are predominantly agrarian, large-scale erosion of landmass have huge socio-economic implications - People have had to relocate several times and lost livelihood and food sources. To counter these issues, Brahmaputra Board, a statutory body under the Ministry of Water Resources was assigned to protect Majuli. However, these issues have not yet found a place as a disaster in the National Policy on Disaster Management, 2009.<sup>141</sup> This policy continues to address only catastrophic events (like earthquakes and cyclones), missing 'slow disasters' like river bank erosion entirely.<sup>142</sup>

Another major concern is the Indian Government's plan to build several dams in the state of Arunachal Pradesh for the purpose of harnessing hydro-electric power. This concern was expressed by 70% of the household interviewees during the field visit. These dams located in the upstream part of the Brahmaputra river will directly impact the course and configuration of the river, potentially producing more uncertainties and risk for the valley portion in the downstream areas, and given the seismic sensitivity of the Eastern Himalayan region, these dams can lead to catastrophes of unimaginable scale in the entire region.<sup>143</sup>

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<sup>140</sup> Mitul Baruah, "Suffering for land: Environmental Hazards and Popular Struggles in the Brahmaputra Valley (Assam), India," (Masters diss.), Syracuse University, 2016.

<sup>141</sup> Government of India 2009

<sup>142</sup> Mitul Baruah, "Suffering for land: Environmental Hazards and Popular Struggles in the Brahmaputra Valley (Assam), India," (Masters diss.), Syracuse University, 2016.

<sup>143</sup> Ibid.

Following are the government agencies and resources in Majuli:

<b>Government Agency</b>	<b>Resources</b>	<b>Function</b>
Brahmaputra Board	Local office and headquarters in Majuli	Majuli Protection Plan
Majuli Cultural Landscape Management Authority (MCLMA)	Local office in Majuli	Preservation of Majuli's cultural landscape
The Water Resources Department	Divisional office in Majuli	Water services
The Ministry of Water Resources and the Welfare of Plain Tribes and Backward Classes, Assam	Office in Guwahati	Welfare services for scheduled tribes and castes
The Fishery Department	Office in Garamur, Majuli	Water services, Seed bank program, Fish and pig culture
The Char-Anchal Development Agency	Office in Garamur, Majuli	Tourism development
The Circle Office	Office in Kalambari, Majuli	Administration
The SDO (Civil) Office	Office in Garamur, Majuli	Administration
The Assam State Assembly Library	Guwahati, Assam	
Gram Panchayat representatives of Salmora, Dakhinpat, and Rawnapar panchayats	Majuli	Village representatives from major villages in Majuli

Figure 33: List of government agencies, resources and their functions in Majuli.



Nongovernmental Agencies (Activists/social organizations):

<b>Nongovernmental Agency</b>	<b>Resources</b>	<b>Function</b>
MIPADC: Majuli Protection and Development Council	Local units in Majuli and Guwahati	Majuli protection, aided with the World Heritage dossier preparation
AJYP: Assam Yuva Parishad	local units in Majuli	Demands to introduce comprehensive self-government system in Assam
TMPK: Takam Mishing Poring Kebang	local units in Majuli	Student's organization focused on socio-economic and political issues of the Mishing Tribe.
KMSS: Krishak Mukti Sangram Samiti	local units in Majuli	Local organization focused on issues of Public distribution systems, land rights, and governmental and corporate corruption.

Figure 34: List of non-government agencies, resources and their functions in Majuli.

## **Chapter 5: Water as a way of living**

## 5. Water as a way of living

This chapter deals with the relationship of the Majuli community with water – how water has formed a way of life, traditions and livelihoods. It then moves on to examine the adaptation processes, both local and governmental, and discusses how each of these measures has affected the society. A majority of this data is gathered from field interviews, and the remaining from secondary data collection. The importance of community participation and place-based knowledge in the decision-making for climate change adaptation is considered towards the end of this chapter.

In Majuli, water is seen as both a threat and as an object of celebration. The people here have lived with floods by adjusting their agro-ecology to the normal flood cycle. The occurrence of floods and bank erosion are not unique to the island, since it sits in a ‘genetic floodplain’ and both of these fluvial phenomena (flood and bank erosion) are part of normal geomorphic processes in a riverine landscape of braided river systems.<sup>144</sup> Some of the recent studies (and from the field in-depth community interviews) suggest that the Majuli community do not necessarily see flood as a perennial problem. Through years of co-evolution with the flood plains, these communities have evolved a lifestyle that interweaves everyday activities with farming and allied activities. They have a dialectical relationship with their environment, for instance, the locals have classified the wetlands on the island into the following categories and based on their form and uses:<sup>145</sup>

- Small Ponds (“Pukhuris”) – Used for washing and homestead fishery.
- Depression in the fields (“Hola”) – These are natural depressions in the fields, smaller than wetlands and are shared by the local communities for feeding and washing cattle, and sometimes fishing. Various economically important local grasses and crops are also found here.

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<sup>144</sup> Debojyoti Das, “Majuli in Peril’: Challenging the received wisdom on flood control in Brahmaputra River Basin, Assam (1940-2000),” Springer Science + Business Media Dordrecht, 2014.

<sup>145</sup> *Majuli Cultural Landscape – At a Glance*, Majuli Cultural Landscape Management Authority, 1<sup>st</sup> Edition, Sep. 2014.

- Water body running parallel to the road (“Khai”) – Found alongside the road as a shallow ravine. These are purposefully formed by digging out earth and used for vegetable yards on hanging bamboo palisades and as boundaries for households.
- Water body near road caused by seasonal flood (“Dubi” or “Duba”) – Created by floods, this feature becomes identifiable only post flood events when water recedes, leaving channels with a deep sheet of leftover water remains. These get charged with more water in the subsequent flood season and becomes a constant source of fish from the river.
- Shallow marshy land with savanna type of grass (“Pitoni” or “Doloni”) – These are marshy lands found in the interior parts of the island. They are fed by streams or small channels and are major breeding grounds for migratory and local birds.
- Large wetlands (“Beel”) – These are waterbodies connected by small streams or depressions and are generally directly connected to larger streams which flow on to the Brahmaputra river. Due to its large size, it is shared by all its surrounding villages for fish, aquatic plant and to water paddy and rabi crops.
- Other water features include small streams that seasonally dry up (“Jan”), perennial streams (“Suti”) and Rivers (“Nadi” or “Non”)

This demonstrates how the local population have become accustomed to the water features and conditions in the area and developed a considerable amount of understanding of their resilience to water related risks. One could make the argument that these are manifestations of a certain kind of heritage - their relationship with water. Majuli people also memorialize the past flood events through songs and couplets that are sung on occasions to remember the dead. These events are part of daily life and are enacted in theatres and during drama and dance

festivals that are organized by the Sattras.<sup>146</sup> The Brahmaputra river lives in their rituals and religions, nourishes their soil and sustains them away from the ever-developing Assamese mainland.

### **Local adaptation measures**

For the traditional communities in Majuli, who drew subsistence from land, flood is a natural and regular occurrence. It is not perceived as anything apart from normal river behaviors and not considered a disaster. The Mishing community for example, migrated into Assam, following the course of the Brahmaputra river.<sup>147</sup> Being well aware of the region's rivers, geographical and geological conditions, these communities generated a shared metaphysical conditioning that manifested in a mutually complementary way of life and resource sharing. Common intention (of harnessing resources) and cooperation is known to generate a shared experience and is a basis for cultural resilience.<sup>148</sup> Over time, its internalization evolves as an existential pattern and is defined by social conditioning, its system of communication and a locus of control.<sup>149</sup> As existence is context bound, shared knowledge is continued through practice and is seldom vocalized, thus lessening the cognitive load and imparting traditional knowledge with a sense of flexibility whose principles may be adapted to contextual parameters.<sup>150</sup> The logic and continuity of such place-based knowledge systems depend on participatory mechanisms, shared governance system and monitoring.

In Majuli's case, the cultural perception of water and weather-related challenges is its natural resilience. This is important in terms of the cultural context of Majuli, which makes up its heritage. The local population of Majuli have

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<sup>146</sup> Debojyoti Das, *'Majuli in Peril': Challenging the received wisdom on flood control in Brahmaputra River Basin, Assam (1940-2000)*, Springer Science + Business Media Dordrecht, 2014.

<sup>147</sup> Somi Chatterjee, *Monitoring Challenges in a Living Cultural Landscape: River island of Majuli*, Monitoring Cultural Landscapes in India, Pg.173-178.

<sup>148</sup> *Chapter 5: Building Local Capacity and Accelerating Progress: Resilience from the Bottom Up*, Disaster Resilience: A National Imperative, NAP 2012.

<sup>149</sup> Somi Chatterjee, *Monitoring Challenges in a Living Cultural Landscape: River island of Majuli*, Monitoring Cultural Landscapes in India, Pg.173-178.

<sup>150</sup> Ibid.

developed simple flood and water management strategies. These include careful use of cyclic flooding and memories of past flood events to establish their own cycle of annual activities like agriculture, fishing, animal husbandry, craft work<sup>151</sup> and even festivals and celebrations. Some of the local adaptation measures practiced in the region are resilient agriculture systems, building construction, and long-term food production and storage.

### **Agriculture, Cattle and Fishing**

The Majuli community is comfortable with “normal” flooding that both destroys and replenishes their agricultural fields with fertile alluvium. The annual crop cycle on the island is a unique system that embodies traditional knowledge and determines the interaction of the inhabitants with their environment for a successful harvest.<sup>152</sup>

The riparian flat, on which fodder is traditionally grown, renders enough fodder to last through lean seasons, lasting from December until February. During peak monsoons, when the islets and the low-lying areas are submerged, cattle is taken to the mainland. Similarly, the migration and breeding patterns of local freshwater fish have led to a societal prohibition against fishing in September and October and the island communities’ sharing of the wetlands as a common resource by clear demarcation of its products.<sup>153</sup>

### **Building Construction**

One of the adaptation processes practiced by the Majuli community is living in stilt houses locally known as “chaang ghars.” These are traditional dwellings built on stilts and are constructed using locally available materials like bamboo and thatch. Some of these houses are located close to the swamps and ponds locally

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<sup>151</sup> Debojyoti Das, *‘Majuli in Peril’: Challenging the received wisdom on flood control in Brahmaputra River Basin, Assam (1940-2000)*, Springer Science + Business Media Dordrecht, 2014.

<sup>152</sup> Ibid.

<sup>153</sup> Ibid.

known as “beels”, and this method of adaptation has been integrated in the design of the houses built in most Mishing Tribe villages.



Figure 35: House raised on bamboo stilts also known as “chaang ghars.”

However, recent development pressures, the concept of a “pakka ghar” (permanent house) and improved access to air-conditioning technologies has resulted in concrete being used as a construction material. A lot of traditional homes have been altered, with concrete being used as stilts and columns (structural use) to support the houses. In some cases, if the families are well-off, the main dwelling unit is completely reconstructed in concrete, while the kitchen, which is a separate unit, remains in the traditional bamboo form. They believe that bamboo construction for kitchen units lets the room breathe while cooking, especially since they use traditional Indian stoves known as “chulhas” which produce large amounts of smoke. Moreover, concrete is preferred over bamboo since it allows for privacy. All the newer toilet units for households are built in concrete.

In addition, every household in Majuli has at least one boat stored under the house, in the stilt level. Majuli residents are prepared for flood water until the stilt level and use boats to commute from one place to another.



Figure 36: Traditional Mishing house with concrete stilts and structural members, Thatch roof is also replaced by tin roof.





Figure 37: Interiors of a typical kitchen unit in Majuli with a “chulha” in the center.

### **Long-term food production and storage**

Apart from cultivating flood resistant crops and building construction that lets the community live with water, the Majuli community produces and stores bulk food in anticipation of floods. They have processions of carrying pumpkins from the fields to their homes and is an event of celebration to welcome the monsoon season. The food is stored in the attic area of the kitchen between the roof and ceiling and can be used for months till the water subsides.

## **Government works and interventions**

The Government of India set up an autonomous body called Brahmaputra Board under the Brahmaputra Board Act 1980 under the Ministry of Irrigation (now renamed Ministry of Water Resources).<sup>154</sup> Some of the main tasks entrusted on the Brahmaputra Board are the planning and integrated implementation measures for controlling floods and bank erosion along Brahmaputra valley. The Board mainly carries out surveys and investigations and prepares the master plan for controlling floods and bank erosion.<sup>155</sup>

The master plan developed under the scheme “Protection of Majuli Island” by the Brahmaputra Board includes three primary measures to manage floods, erosion, drainage congestion and water logging. These include construction of Reinforced Cement Concrete (R.C.C) porcupines, Land Spurs and Bank revetment. The proposal was conducted in three phases (as detailed below) and was estimated to be around \$14 million.<sup>156</sup>

### **Phase I –**

- Construction of nose of the existing land spurs.
- Permeable screens in the form of R.C.C porcupines (1390 no.)
- Improvement of road with embankment (50kms)
- Construction of new embankment (18kms)
- Bank revetment work (1.5m)

### **Phase II –**

- Permeable spurs to be constructed in specific locations in the above reaches (21 no.)

### **Phase III –**

- Land spurs (10 no.) along with bank revetment.

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<sup>154</sup> Government of India, Brahmaputra Board Ministry of Water Resources, River Development and Ganga rejuvenation.

<sup>155</sup> Ibid.

<sup>156</sup> Master Plan of Majuli (Under part 3), Report Volume, Brahmaputra Board, Ministry of Water resources, Government of India, March, 2000.

Following works have so far been executed/are under execution by Brahmaputra Board:

Description	Estimated Cost (INR in crore)	Actual Expenditure (INR in crore)	Remarks
Immediate Measures (Year 2004-2005)	6.22	6.09	Completed
Phase- I (Years 2005-2011)	56.07	52.63	Completed
Emergent Measures (Year 2008)	4.99	4.75	Completed
Phase-II & Phase-III (March 2016)	115.99	115.53 (up-to March, 2016)	92.19 per cent of physical progress has been achieved. Targeted to be completed within 2016
<b>Total</b>	<b>183.27</b>	<b>179.0</b>	

Figure 38: Description of government works. Source: Brahmaputra Board.

### R.C.C Porcupines

These are permeable prismatic structures composed of six members, each made of reinforced cement concrete (R.C.C) and joined using nuts and bolts. They act as dampers and are considered to be a cost-effective bank protection measure.<sup>157</sup>



Figures 39-40: R.C.C Porcupines constructed by the Brahmaputra Board.

<sup>157</sup> Deepika Jauhari, "Rescuing the Flood-ravaged River Island of Majuli, Assam," Pg 49-55.

The R.C.C members are casted in-situ, and generally, six members are used to construct one porcupine. The sizes of each member are 3m x 0.1m x 0.1m or 2. X 0.1m x 0.1m.<sup>158</sup> They are designed for a partial obstruction of about 15-20% to the flow of water. The porcupines are constructed for training the river along the desired course, reducing the intensity of the flow at the point of river impact and providing protections to the bank by damping the velocity flow along the bank.<sup>159</sup>

### **Land Spurs**

The proposal by the Brahmaputra Board includes construction of stone spurs encased in wires jutting out towards the river. The purpose of these are to curtail the force in which the river hits the island and eventually diverting its flow to some extent. They comprise of locally available boulders arranged perpendicular to the river with sloping faces on either side held together by steel wires.



Figures 41-42: Land spurs constructed by the Brahmaputra Board.

However, some of the Land spurs were designed without keeping in mind the detrimental impacts they have on the areas the river is diverted to. The construction of stone spurs in the southern mainland side of Majuli diverted the flow of the Brahmaputra river to the lower parts and accelerated the devastation in those areas.

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<sup>158</sup> Ashok Kharya, Piyush Kumar, "RCC Porcupines an effective river bank protection measure – a case study of protection of Majuli Island," India Water Week 2012, New Delhi, April 10, 2014.

<sup>159</sup> Deepika Jauhari, "Rescuing the Flood-ravaged River Island of Majuli, Assam," Pg 49-55.

## Bank Revetment

Bank revetment is carried out in the vulnerable reaches at about 11 locations by using sand or earth filled geo-bags (Geotextile sand containers or bags designed for coastal, river and slope protection) that are laid out along the banks to prevent erosion.



Figures 43-44: Bank Revetment construction by Brahmaputra Board.

The Brahmaputra Board has also identified a “wholesome approach” and an “ideal river management plan” to preserve the island in its present form. This includes the following<sup>160</sup> –

- Sloping of banks 1:5:1 to 2:1 (in places where bank revetment is proposed);
- Bank revetment on vulnerable areas;
- Afforestation 1/5<sup>th</sup> width of the floodplain between river banks and the flood dyke with species like willow, eucalyptus, *dalbergia sisoo* and other local varieties;
- Undergrowth of *vitex nigundo*, *arundo donex*, *ipomea carnea*, other live hedges and local species for stabilizing and binding the soil;
- Scientific land management practices and cultivation of economic species like citronella, vegetables, other rabi crops and pisciculture in the floodplain between afforested belt and the dyke. Unproductive land can be used for playground and recreation;

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<sup>160</sup> Report on the Erosion problems of Majuli Island, Brahmaputra Board, Ministry of water resources, December 1997.

- Shifting of human habitations/homesteads to protected zones behind embankments;
- Armoring of land spurs at nose and shanks with apron and filter (where bank revetment is carried out);
- Protection of dyke and land spurs with *Benata*, *Napier* and *Kans* grasses; and
- Construction of bridges on spill channels for the Brahmaputra tributaries for all weather movement.

The funding for the construction projects in the master plan is from the Ministry of Development of North Eastern Region (MoDONER) which is a branch of Central Government of India and a part of it was borne by the Brahmaputra Board.

### **Protection Policies**

As research on the rivers in India suggests, the main approach of government authorities to assist populations in adaptation to flood and erosion, has been structural and technological measures of control, such as embankments.<sup>161</sup> The Assam Embankment and Drainage Act from 1953 (Assam Act 1, 1954) followed by the validation act of 1960 (Assam Act No XXVI 1960), specifies how embankments were one of the first large scale approached in Assam to control the impacts of Brahmaputra river.<sup>162</sup>

Today, the main strategy of the Assam Government and the Asian Development Bank (ADB) is to employ structural approaches to protect Majuli. Even though the Asian Development Bank (ADB) in their technical assistance report to the Assam government, questioned the usefulness of embankments pointing to the importance of non-structural measures such as increasing stakeholder participation, the Assamese government, unfortunately, continues to use structural approaches to maintain the existing framework.<sup>163</sup>

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<sup>161</sup> Das and Bhuyan 2012, pg. 50.

<sup>162</sup> Fredrik Carl Felding, "The Risks of Climate Change Adaptation: How policies of adaptation, lower the adaptive capacity of indigenous communities," (Bachelors diss.) Lund University Department of Political Science, Development Studies, 2013.

<sup>163</sup> Ibid.

The Brahmaputra Board under the Central Government of India is working with the Assam Government for managing risks related to the Brahmaputra River. The work according to the report produced by the Brahmaputra Board consists of a complete reliance on structural measures through implementing technologies of spurs, dykes, embankments and boulders, and, there is no mention of the knowledge and technologies of local populations.<sup>164</sup> Instead the report specifies how the Master Plan was conceived outside Majuli by “experts” building models of the island at the North Eastern Hydraulic & Allied Research Institute (Brahmaputra Board 2012, pg. 13-14) to measure impacts to different interventions.

The Assam Act No. VII of 2006 or the Majuli Cultural Landscape Region Act, a heritage-driven policy document for the protection of Majuli’s cultural landscape and heritage was ratified by the Assam State Government. It talks about preserving the island but not much ‘preservation’ is seen there apart from cosmetic changes like constructing guest houses funded by the Archaeological Survey of India (ASI) and building tourist accommodations.<sup>165</sup> This was an Act established “to integrate development and heritage for protection of heritage resources of Majuli Cultural Landscape Region, through education, awareness, understanding of cultural significance and ensuring a sustainable and positive development trend.”

Following are the provisions in the act:

- (a) Delineation of boundaries of Majuli Cultural Landscape Region;
- (b) Conservation and sustainable development of the resources within the Cultural Landscape Region;
- (c) Preservation and progression of cultural values, ethos and identification of the Cultural Landscape Region;
- (d) Preventing uncontrolled land-use and disintegrated developmental measures of any type;

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<sup>164</sup> Fredrik Carl Felding, “The Risks of Climate Change Adaptation: How policies of adaptation, lower the adaptive capacity of indigenous communities,” (Bachelors diss.) Lund University Department of Political Science, Development Studies, 2013.

<sup>165</sup> Sangeeta Barooah Pisharoty, “The sorrow of Majuli,” *The Hindu*, December 24, 2011.

- (e) Preventing commercial exploitation, incorporation of non-indigenous techniques into sustaining traditional life-style and institution;
- (f) Encouraging heritage and environment sensitive tourism and tourists; controlled tourist influx to the island including type of products/daily needs of tourists, limited to basic necessities only;
- (g) Supporting proliferation of locally based (economic) initiatives, controlling external initiatives in the core area for economic activities except for the case of provision of technical expertise and keeping with the tradition of the place;
- (h) Preventing loss of values and authenticity of the Cultural Landscape with unthoughtful and disconcerted projects or programs by various implementing agencies;
- (i) Continuous development of a hydrological, disaster management, risk preparedness model for flood and erosion for preventing recurrent loss of properties and landmass due to both factors;
- (j) Sustainable development of buffer areas with growth centers, bio-economic activities, market center of national status which can provide for adequate livelihood options for people both in and outside of the core area.

The act also makes provisions for the establishment of the authority, Majuli Cultural Landscape Management Authority (MCLMA), and recognizes the indigenous residents, government organizations, people's organizations and private individuals/institutions who can contribute to the development in resource management of Majuli as the primary stakeholders.

The powers and functions of the Majuli Cultural Landscape Management Authority (MCLMA) include powers to protect the cultural resources, monitor developmental activities, prepare and modify guidelines for socio-economic, socio-cultural activities and risk preparedness for the entire Majuli cultural Landscape Region (Assam Act No. VII, 2006). It also includes securing and coordinating execution of town and country planning schemes, economic and social development schemes, flood protection and erosion protection schemes, tribal welfare schemes



and the preservation of authenticity and values of Sattras and Sattras Region and villages. The act requires the authority to take further measures for development and monitoring relating to land use decisions, agriculture, irrigation, drinking water, vernacular housing, roads and tracks, wetlands and fisheries, sattras, traditional settlements, forests and groves, livestock cooperative as per people's requirement, vocational training marketing of local products, improvement of education through school and colleges, eco-sensitive tourism, resettlement and rehabilitation in all of the region.<sup>166</sup>

Despite making provisions for protecting indigenous communities and addressing authenticity and values ascribed to the island by the local residents, the Act has not been incorporated by the Brahmaputra Board – which is currently responsible for the decision making for Majuli's overall risk and resilience capacity. The Act urges the authorities to prepare and enforce a management plan that incorporates indigenous communities and traditional knowledge. However, the protection plans and schemes that are seen today continue to focus on experts and their engineered strategies of command and control.

### **Key Findings from Stakeholder Interviews**

The overall discussion presents four key findings, 1. Majuli has experienced harsh weather conditions for decades, and the residents have developed ways to live with these. 2. The Government is trying to address these conditions by employing flood and erosion control measures to stop excessive water from flowing inside the island. 3. There has been no dialogue or information sharing between the government authority and the Majuli community. 4. The Government of India has failed to acknowledge Majuli's intangible cultural heritage (traditional livelihoods of people) and hence, have proposed hard flood and erosion control measures that are politically and not socially driven.

The field interviews helped understand the differences between community-based perspectives and values, government policies, differences in shared cultural

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<sup>166</sup> Assam Act No. VII, 2006

practices and the secondary research data. To gain a deeper understanding of community values and perspectives, villages in Majuli were selected for data-collection through in-depth interviews and key informant interviews. This section discusses key themes and findings that emerged from these interviews.

### **Key Informants Interviews**

The data collected from key informants interviews suggest that the decision-maker and implementation authority is the Brahmaputra Board. The results indicate that most of the participants did not associate the changing weather conditions to climate change, but they believe that the increased flood and erosion problems in Majuli are due to the intensified river flow that can be controlled by technological interventions such as bank revetment, land spurs and porcupines.

“We are empowering the community by giving them work.”

“The community does not know what they want.”

-Brahmaputra Board representative

Even though the Brahmaputra Board employed local residents, mostly the mishing tribe members, for labor work to carry out their projects, the laborers are not informed about what is being done.

“We get daily wages for the labor work. That is all I know.”

-Laborer employed by the Brahmaputra Board

“I don’t know what projects the Brahmaputra Board is carrying out. Why are they here? The construction of stacking rocks above makes the river intensity higher on this side.” He is referring to the land spurs that diverted water to the southern parts of the island.

Salmora (Potters) village resident

57% of the participants supposed that there was “partial” community participation in the decision-making process, however, there was no indication of

participation whatsoever. When discussing the Majuli Protection plan, the socio-cultural and traditional values were not talked about, and the emphasis was on physically intervening and “successfully stopping” land loss through structural interventions by the government authorities.

### **In-Depth Community Interviews**

The results of the household interviews indicate that agriculture is the main occupation of the people. All families own their houses (none of the houses are rented). Only 50% of the household interview participants believe that climate change is affecting Majuli, even though a majority (70%) had experienced extreme weather conditions that range from floods, drought, increase in temperature, unpredictable rainfall, increase in diseases and decline in food resources. One of the major concerns among the villagers was the presence of higher levels of arsenic in drinking water which has resulted in several cases of arsenic poisoning. From the survey it was understood that there has never been a consultation, workshop or school lessons on changes in weather conditions and adaptation techniques. The local adaptation strategies carried out are passed down through generations. When asked about the Majuli protection plan being carried out by the Brahmaputra Board, only 45% of the household interviewees were aware of it. As mentioned earlier, despite the fact that the Brahmaputra Board employed local residents to carry out labor work for their projects, there hasn't been any kind of information sharing or awareness about what is being done. Only 40% of the participants believe that the government authorities are helping them overcome changing weather conditions in Majuli.

There has not been adequate and qualified participation of the indigenous community. Moreover, data from the interviews suggest there is an absence of systematic assessment of socio-economic vulnerability within high risk regions. Planning and implementation measures by the governing authorities have formed a new layer instead of being integrated into existing strategies within different sectors such as agriculture. Information sharing, constituency consultation, independent monitoring and evaluation systems are some of the basic approaches that must be

guaranteed in the process of adaptation planning and implementation,<sup>167</sup> however, this has been largely absent in the case of Majuli.

Following are a few excerpts from the in-depth community interviews to gain a deeper insight into community experiences, priorities and opinions:

“The year before last was terrible, my house was destroyed.”

- Weaver

“I would rather die in my birthplace, Majuli than move elsewhere.”

- Farmer and bamboo construction worker

“We celebrate the floods every year. It is bad for us when there are no floods. No floods mean no crops and no fish...No food.”

- Farmer and weaver

“I would rather build in Concrete, because it is more permanent in nature”

- Farmer and laborer

### **Decision makers and Stakeholders**

The key stakeholders identified in the Assam Act No. VII of 2006 or the Majuli Cultural Landscape Region Act are the indigenous residents, government organizations, people’s organizations and private individuals/institutions who have stake in natural resources, possess their own organizational structure and decision-making process, with or without formal status and can contribute to development in resource management in the area (Assam Act No. VII, 2006). The Assam State Government and the Central Government of India are the decision-makers. The

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<sup>167</sup> Adriana Ramos, *Adaptation, Governance and Civil Society*, World Resources Institute. <https://www.wri.org/our-work/project/world-resources-report/adaptation-governance-and-civil-society>

Brahmaputra Board is the statutory body under the Central Government of India that is responsible for decisions regarding flood and erosion control and the overall protection of Majuli. As discussed in the earlier section, despite the provisions made for local knowledge being incorporated in the planning and decision-making process, this has not been enforced in the case of Majuli.

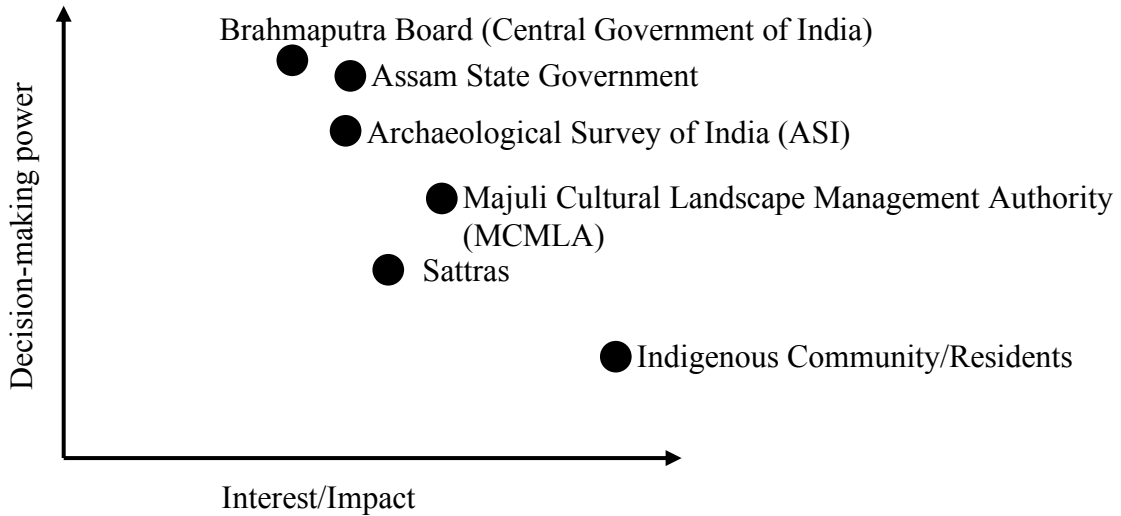


Figure 45: Stakeholder matrix showing the degree of impact/interest and decision-making powers of key stakeholders

Stakeholder	Functions/Powers
Brahmaputra Board	Decision maker – Government Authority under the central government of India responsible for the Protection Plan for Majuli.
Assam State Government	Decision maker – State Government Authority.
Archaeological Survey of India (ASI)	The Archaeological Survey of India (ASI) is an Indian governmental agency attached to the Ministry of Culture that is responsible for archaeological research and the conservation and

	preservation of cultural monuments in the country. ASI worked on Majuli's World Heritage nomination dossier and process.
Majuli Cultural Landscape Management Authority (MCLMA)	The Authority established in 2006 under the Assam Act VII for the preservation of Majuli's cultural landscape.
Sattras	Monasteries for religious practices. Sattrra leaders known as <i>Sattrra-adhikaris</i> often times are consulted by the government authorities and vice versa.
Community	The indigenous community and the residents of Majuli do not have a say in the decision-making process for the protection of Majuli.

Figure 46: Stakeholder diagram with their functions or powers.

Regrettably, the cause and consequence of bank erosion and floods in Majuli continues to be examined only by hydraulic experts, agricultural scientists and civil engineers who test their hypotheses based on quantitative analyses of flood plates and georeferencing. As mentioned earlier, these studies are reinforced by visual images produced through Geographical Information System and Remote Sensing maps that visually transmit what are purported to be a flood hazard.<sup>168</sup>

This has resulted in loss of innovation and opportunities where technology, local and place-based knowledge together could have provided new solutions for strengthening adaptive capacities of vulnerable places like Majuli.

<sup>168</sup> Debojyoti Das, "Majuli in Peril': Challenging the received wisdom on flood control in Brahmaputra River Basin, Assam (1940-2000)," Springer Science + Business Media Dordrecht, 2014.

## Evaluation

There is a growing consensus among researchers and planners in general to incorporate local communities in disaster risk management and climate change adaptation planning, yet its actualization largely remains a dream.<sup>169</sup> This is seen in the case of Majuli's protection plan where local methods are not incorporated in the overall planning process by the responsible authorities. The solutions employed by the decision-makers such as embankments and spurs have been analyzed as a technology developed outside of Majuli without the participation nor the consideration of local stakeholders. Despite the efforts put into preventing land loss by managing floods and erosion, the Majuli community continues to become more vulnerable due to the loss of indigenous knowledge base, livelihoods and the social organization which has evolved around living with varying water and weather conditions.

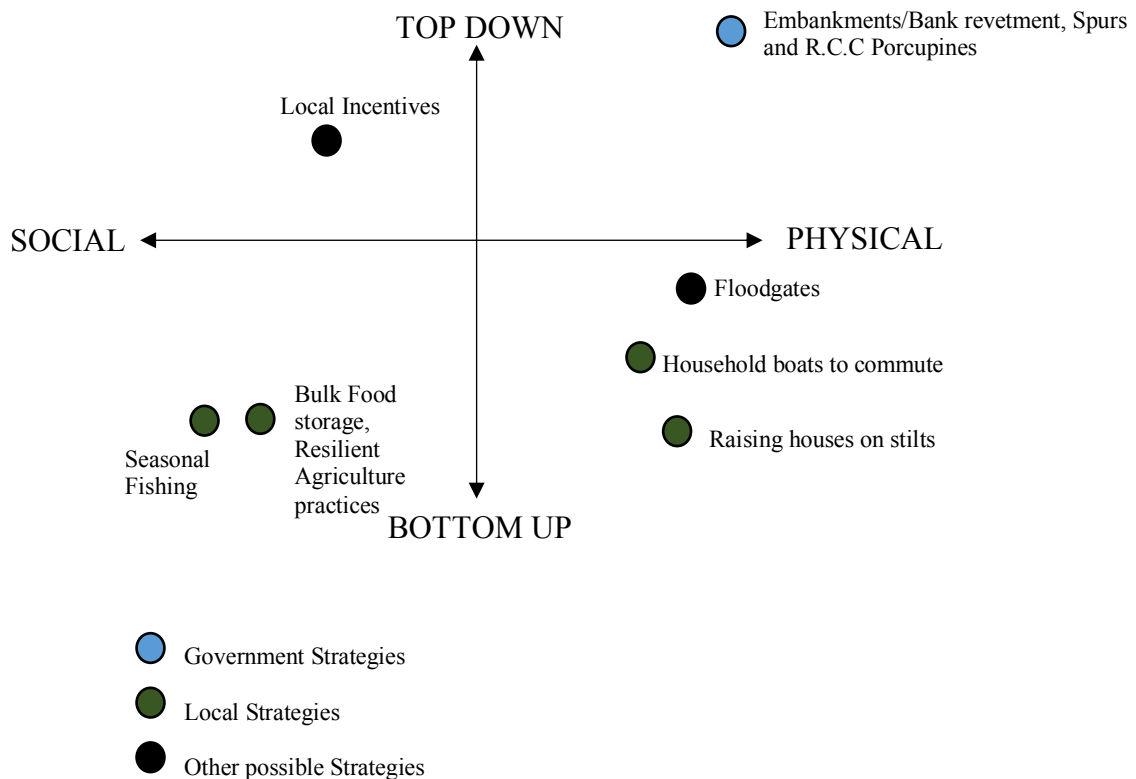


Figure 47: Evaluation of various adaptation strategies.

<sup>169</sup> Pearce, 2003.

## **Community Participation and Place-Based Knowledge**

There are two specific areas that are extremely relevant in the discussion of climate change adaptation. The first consists of risk reduction at the local level, using a place-based and bottom-up approaches that aims to help those likely to be affected. The second involves the linkages of risk reduction to livelihoods, involving natural resource management, watershed management, income generating activities and poverty reduction.<sup>170</sup>

Systematic attempts to evaluate factors ensuring effective public participation, defined by Arnstein (1969) as the phenomenon in which people who “have at stake” in an issue but no power to influence it are given the legal opportunity to be active participants in the decision-making process. This is not seen in the management and planning system in Majuli. According to Arnstien, communities can be involved in decision-making in a number of ways. At the lowest level, the community may be targeted with the relevant information or just information sharing about what is being done. At the higher levels, their views may be solicited through consultation exercises, focus groups discussions, or questionnaire surveys.<sup>171</sup> Additionally they may also be included in the decision-making process.<sup>172</sup>

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<sup>170</sup> Maarten van Aalst, Ian Burton, Terry Cannon, “Community Level Adaptation to Climate Change: The Potential Role of Participatory Community Risk Assessment,” *Global Environmental Change*, February 2008.

<sup>171</sup> Subhajyoti Samaddar, Martin Oteng-Ababio, Frederick Danyour, Mujeeb Adams, “Evaluating Effective Public Participation in Disaster Management and Climate Change Adaptation: Insights from Northern Ghana Through a User-Based Approach,” *Risk, Hazards & Crisis in Public Policy*, March 2015.

<sup>172</sup> Arnstein, 1969.



The Intergovernmental Panel on Climate Change (IPCC) supports with “robust evidence” that the “integration of local knowledge with additional scientific and technical knowledge can improve disaster risk reduction and climate change adaptation.”<sup>173</sup> Scientific knowledge is commonly understood as knowledge generated systematically from formalized, explicit processes and principles, such as scientifically acknowledged methods and theories.<sup>174</sup> Local or place-based knowledge, in turn, often refers to a broad set of knowledge situated in specific locales that reflects expertise and understanding of local phenomena.<sup>175</sup> Bringing together and making use of local and scientific knowledge can help understand how existing adaptation strategies may be in conflict with other locally significant social goals and preferences.

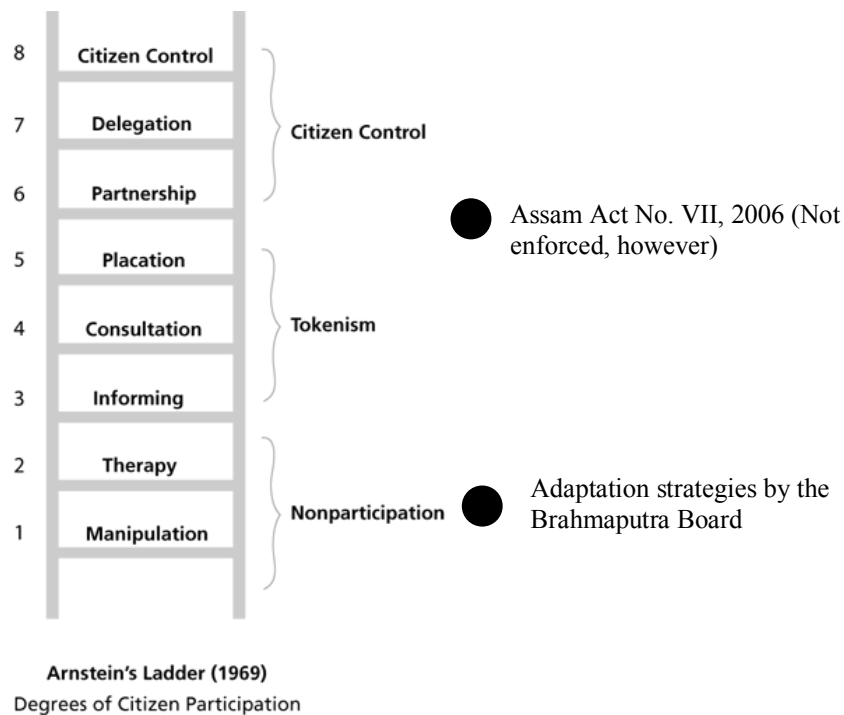


Figure 48: Evaluation of protection policies and strategies based on Arnstein’s Ladder of Participation.

<sup>173</sup> IPCC 2012, 15.

<sup>174</sup> Sebastian Dujardin, Julie Hermesse, Nicolas Dendoncker, “Making space for experiential knowledge in climate change adaptation?” Insights from municipal planning officers in Bohol, Phillipines,” Jamba, March 27 2018.

<sup>175</sup> Raymond, 2010.

## **Tensions between shared cultural practices**

In this discussion it is crucial to examine different values that are ascribed to the cultural resources in Majuli, and review value conflicts or tensions between the community and the government. Values have long played a central role in defining and directing conservation of heritage; Values, wherever it resides, produces a flow of benefits.<sup>176</sup> In Majuli, the decision makers value the built fabric which has necessitated structural interventions to protect it. On the other hand, the community values the process and traditions of living with water (discussed earlier in this chapter) which has not be acknowledged in the wider framework. The dynamics among values and benefits are complex and tend toward conflict,<sup>177</sup> and due to these conflicting values, the protection projects have failed to benefit the community. The decisions implemented for the protection of Majuli have in fact reversed the effectiveness and values of locally adapted traditions.

The failure to recognize that human systems are embedded within the values that are ascribed to the residing place can have profound socio-economic consequences, loss of livelihood being one of them. Part of the challenge for successful adaptation is the incongruence between aspirations, aims, priorities and interests.<sup>178</sup> Beyond the physical preservation aspects, benefits to the cultural heritage bearers or the local community can provide social justification to protection and preservation efforts. The following questions need to be addressed while discussing benefits – What are these benefits? Who should distribute them and how? Among whom should they be distributed? and to address these, it is essential to explore the intersection between values and social justice. In cases of value conflicts, equal participation and equal benefits should be considered. Justice, equity and well-being are goals within debates about socio-economic development.

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<sup>176</sup> Erica Avrami and Randall Mason, "Mapping the Issue of Values." In *Values in Heritage Management*, Edited by E. Avrami, R. Mason, S. Macdonald, D. Myers, Los Angeles, J. Paul Getty Trust, forthcoming in 2019.

<sup>177</sup> Ibid.

<sup>178</sup> W. Neil Adger, Irene Lorenzoni, Karen O'Brien (2009), *Adapting to Climate Change: Thresholds, Values, Governance*, Cambridge University Press, 2009.

Although these may be driven by concerns other than environmental, these can at times be complementary and related to climate change adaptation.<sup>179</sup>

Research suggests that a majority of adaptation will occur spontaneously through adjustments to markets and individual behavior.<sup>180</sup> But markets are in effect, constructs of laws, regulations and collective will of the agents and regulators involved.<sup>181</sup> Governments, as an expression of collective will, influence everything and should aim to 1. Protect vulnerable populations by reducing their vulnerability and exposure to risk (natural, social and economic); 2. Provide information for planning and stimulating sound adaptation strategies; and 3. Protect important public goods (like nature conservation) as well as provide public goods such as human security and protection.<sup>182</sup>

### **Drawbacks and Outcomes**

Dunu Roy (2005), an eminent Indian social activist, writes that the tribulations of people affected by rivers in spate have always had to bow to the technological and political exigencies of profit and power. Goswami and Das (2003) have argued that the flood problem in the Brahmaputra basin has been exacerbated by the fragmentation of the river system through the construction of embankments, dykes, spurs and porcupines along the southern bank of Brahmaputra and its tributaries.<sup>183</sup> The river no longer remains a 'natural' drainage system and as a consequence, the water control interventions along the river no longer allow for

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<sup>179</sup> Eriksen and O'Brien, 2007; Wilbanks, 2007.

<sup>180</sup> Hanemann, 2000.

<sup>181</sup> Adger, Lorenzoni and Karen O'Brien, "Adaptation Now," in *Adapting to Climate Change: Thresholds, Values and Governance*, Edited by W. Neil Adger, Irene Lorenzoni, Karen L. O'Brien, Cambridge University Press, 2009.

<sup>182</sup> Adger, Lorenzoni and Karen O'Brien, "Adaptation Now," in *Adapting to Climate Change: Thresholds, Values and Governance*, Edited by W. Neil Adger, Irene Lorenzoni, Karen L. O'Brien, Cambridge University Press, 2009.

<sup>183</sup> Ibid.

traditional measures to be taken in particular regions of the basin- including Majuli.<sup>184</sup>

After analyzing the findings from field interviews, there is a missing link between administrators and the Majuli public. This further realizes the urgent need to establish and strengthen local governance coordination forums to ensure and promote mechanisms for efficient dissemination of information. Bridging the gap between community and administration could largely provide the establishing of strategies to reduce disaster risks and management approaches.<sup>185</sup> Adaptation strategies can benefit from a combination of traditional knowledge with innovative approaches to address evolving challenges. Priority should be given to building resilience of livelihoods, protecting people and assets from climate hazards such as droughts, floods and cyclones, and engaging and building capacity of local institutions to support people in adapting.<sup>186</sup>

In conclusion, the Majuli community has had a long-term experience with high environmental impacts and long term external and internal engagements to address these impacts – a situation seen in several areas of the world. Future decisions and research on climate change adaptation needs to consider the existing dichotomy between the local and government efforts to tackle environmental impacts.

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<sup>184</sup> Debojyoti Das, “Majuli in Peril’: Challenging the received wisdom on flood control in Brahmaputra River Basin, Assam (1940-2000),” Springer Science + Business Media Dordrecht, 2014.

<sup>185</sup> Homolata Borah, “Why Majuli island required attention,” Times of India Blogs, December 7, 2016.  
<https://timesofindia.indiatimes.com/blogs/social-strings/why-majuli-island-requires-attention/>

<sup>186</sup> Adriana Ramos, “Adaptation, Governance and Civil Society,” World Resources Institute.  
<https://www.wri.org/our-work/project/world-resources-report/adaptation-governance-and-civil-society>

## **Chapter 6: Recommendations and Conclusions**

## **6. Recommendations and Conclusions**

The case study findings and supporting literature provide a deep insight into the complex process of climate change adaptation and its implications on traditional communities and livelihoods. Historic preservation planners and citizen advocates must participate with local residents, multidisciplinary planning groups, and all levels of government to propose and implement sound adaptation strategies.<sup>187</sup> The historic community's perspective is essential in the adaptation planning process to extend the longevity of historic cultural resources, traditional knowledge systems and maintaining an area's quality of life.

This chapter provides application of the findings discussed in the previous chapter and proposes recommendations supporting the protection of Majuli's heritage in adaptation processes. This is categorized into community level recommendations, general policy recommendations and recommendations for the government authority in charge. It will also look at transferrable lessons and recommendations for the preservation community in general for dealing with climate change adaptation.

In order to discuss successful adaptation recommendations and solutions, it is important to revisit the research questions (on recommendations) that were posed at the beginning of this thesis (in Chapter 1, Research aims and questions section):

- How can experiences of some communities inform adaptations of other vulnerable cases?

Borne out of long-term experience and experimentation, communities like Majuli have adapted to environmental change through techniques and approaches using knowledge transmitted both orally and in practice from one generation to another. This process has enabled them to develop and enhance a wide range of coping strategies which can potentially form the basis for other coastal communities today in dealing with climate change impacts.

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<sup>187</sup> Ann D. Horowitz, "The Effects of Sea Level Rise on Historic Districts and the need for Adaptation," (Masters diss.), Goucher College, 2013.

- How would one assess the values within the community that may be in conflict with its longevity? (Majuli e.g: Potter’s community)  
New policy and intervention approaches should be made by identifying areas of traditional and place-based knowledge systems that can be integrated with other forms of knowledge and understanding so that new adaptation solutions could be sustainably enhanced.
- How do adaptation measures taken by some affect the values of others? And, in the case of value conflicts, whose value counts?  
Like in Majuli’s case, indigenous peoples’ implicit knowledge and adaptive water management strategies have been systematically marginalized by large-scale, centralized flood and erosion control measures that dissociate local people from traditional livelihoods and programs. It is important to identify values that the heritage bearers and (local and place-based) knowledge bearers ascribe to a place, and finally capitalize on these set of values so that the community (residents) can benefit from the decisions made.

### **Application of the Findings: Recommendations for Majuli**

The findings raise issues that are beyond information sharing, community participation and traditional knowledge in adaptation processes. The exchange of traditional knowledge involves cultural values, multiple legal jurisdictions, risks to cultural sustainability and survival, and rights to self-governance.<sup>188</sup> Moreover, the goals and processes of adaptation cannot be separated from the nature, status and legitimacy of knowledge claims about the future.<sup>189</sup> The recommendations presented in this section will examine ways to harmonize Majuli’s tangible and intangible cultural heritage of adapting and modern adaptation solutions. It will

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<sup>188</sup> Terry Williams, Preston Hardison, “Culture, law, risk and governance: contexts of traditional knowledge in climate change adaptation,” *Climate Change and Indigenous Peoples in the United States: Impacts, Experiences, and Action*, 2013.

<sup>189</sup> W. Neil Adger, Suraje Dessai, Marisa Goulden, Mike Hulme, Irene Lorenzoni, Donald R. Nelson, Lars Otto Naess, Johanna Wolf, Anita Wreford, “Are there social limits to adaptation to climate change?” *Climate Change*, 2009.

look at incorporating soft approaches and process-oriented strategies within the larger plan that are aimed at developing innovative information systems, social structures and the necessary governance that will support the adaptation process in Majuli.

### **Community Level**

The Majuli residents and community plays a major role when discussing ways to promote new systems of valuing tangible and intangible cultural heritage in Majuli. Following are recommendations or guidelines for the community to advocate for the presence of their cultural heritage in the decision-making process by the government authorities for the protection of Majuli and in discussions relating to the cultural heritage of Majuli. For instance, the World Heritage nomination process where they have been largely absent, and the emphasis has only been on the Sattra community.

- **Awareness:**

An informed community contributes local knowledge and values to the adaptation visioning process.<sup>190</sup> Climate change knowledge was largely absent in the community during the in-depth household interviews. This is important because climate change can affect future decisions about adaptation, even at a local level. This will also help promote collaboration where science and technology combined with traditional adaptation techniques can be used for new adaptation solutions, where existing traditional and technological resources could be used to their highest benefit. The village representatives, locally known as “Gaav Muras” who directly communicate with government authorities should form a medium of communication between the community and the government in order to initiate information sharing and community participation.

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<sup>190</sup> Ann D. Horowitz, "The Effects of Sea Level Rise on Historic Districts and the need for Adaptation," (Masters diss.), Goucher College, 2013.



In order to promote economic development of arts and crafts like bamboo construction and tools, weaving, mask-making and pottery, the recognition of and support for the realization of the potential of their own culture and traditional values is critical. The Majuli community instinctively make the most of their traditional knowledge and other creative sources to meet livelihood objectives, but today, vulnerability of these livelihoods is a constant reality. Hence awareness of survival strategies and livelihood resistance through their own skills, customs, values and experiences is essential to strengthen effective adaptive strategies in livelihood vulnerabilities.

It is also important to incorporate the aforementioned awareness considerations in school and college curriculums and workshops for adults.

- **Potters Community:**

In order to secure a livelihood for the potter's community, finding an alternative source of clay or earth is essential. Switching to Terracotta could be an option where earth obtained from the interiors of the island (central parts) could be used as raw material. Clay could also be sourced from other parts like Jorhat, if provisions are made by the government or if the pottery industry in Majuli is formalized.

- **Community (Tribal) representatives** in the government (already existing) must demand participation or information sharing when it comes to adaptation, protection or management plans for Majuli. Like the village representatives or "Gaav Muras," tribal government representatives could also be a medium of communication between the government and tribal communities.

Following is a table indicating how the existing set of tools and resources in Majuli could be used by the community to meet the recommendations discussed in this section:

Tools	Recommendation
Cultural Heritage of various arts and crafts practiced on the island.	Seizing opportunities to generate income from their cultural knowledge both in and outside Majuli as well.
Willingness to adapt to new conditions, traditional knowledge systems of Pottery and if possible, government or MCMLA assistance.	Potters community: Finding an alternative source of clay or earth to secure a livelihood. Switching to Terracotta could be an option where earth obtained from the interiors of the island (central parts) could be used as raw material. Clay could also be sourced from other parts like Jorhat (across the river) - if provisions are made by the government or if the pottery industry in Majuli is formalized.
Reserved seats for Scheduled Tribes in the State Government (Affirmative Action) and enforcement of the Assam Act VII (2006).	Community and Tribal representatives within the government must demand for the presence of their intangible cultural heritage in the broader framework.

Figure 49: Existing tools that could be used to meet recommendations.

### General Policy Recommendations

- **Community Involvement and Social Development:** Participation of local communities and stakeholders must be encouraged.

The government authorities should involve the residents of Majuli in the planning and protection of Majuli and formulate participatory decision-making processes for adaptation.

- **Sustaining Economic and Cultural Values:** Using a rights-based approach to promote sustainable development within vulnerable communities in Majuli as part of a broader Municipal plan. This will include acknowledging the intangible cultural heritage of Majuli and making policy provisions for the same.
  
- **Enforcement and Monitoring:** The Assam Act No. VII of 2006 discussed in the section about protection policies, lays out provisions for the preservation of cultural heritage and protection of indigenous communities in Majuli, and for the preparation of a management plan. The Majuli Cultural Landscape Management Authority (MCLMA) is an authority established under this act to carry out the set provisions. However, this has not been enforced or monitored by any authorities. The Assam Act VII gives MCLMA powers to make cultural heritage-related decisions for Majuli. These must be enforced, and MCLMA should be part of the decision-making process and implementation of the protection plan for Majuli.

In order to monitor and evaluate the implementation of the policies and guidelines, it is important to develop monitoring and evaluation instruments to guide cultural service and delivery. These mechanisms include:

- Extensive reassessment of the management plan every two years.
- Comparative evaluations of properties belonging to the same type of cultural property or areas with successful adaptation strategies.
- Periodic reporting and surveys.
- Assessment of the effectiveness of each action to achieve objectives from the Assam Act No. VII.

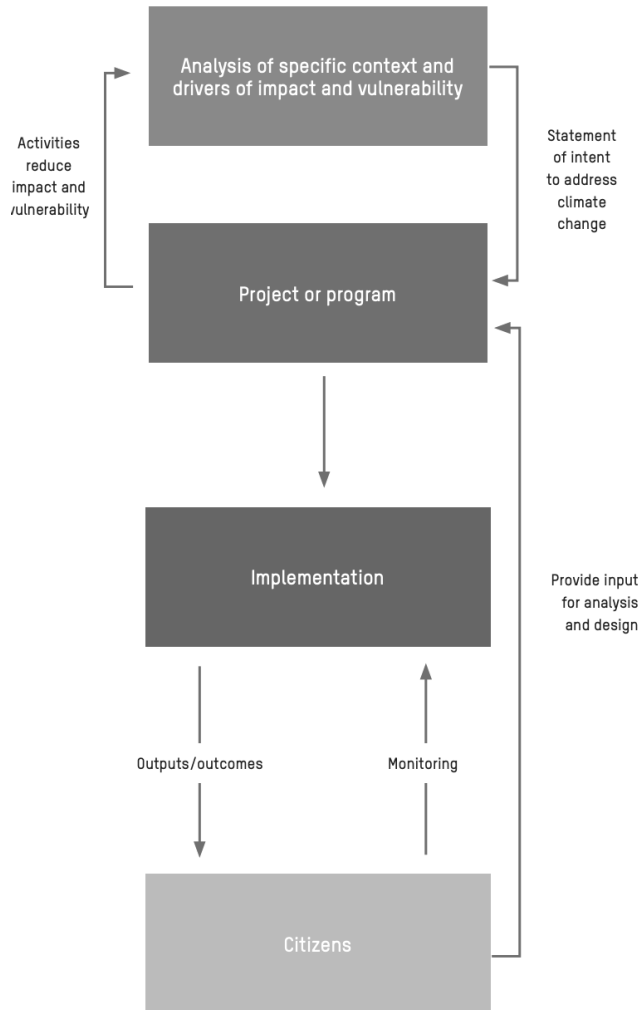


Figure 50: Components of Adaptation Project Design. Source: World Resource Institute.

- **Urban Development Guidelines and Controls:** The following should be considered while preparing development guidelines in the management plan for the built fabric of Majuli.
  - Regulations to avoid environmentally hazardous development in natural areas and sensitive zones, especially water bodies that are essential for the community’s survival.
  - Regulations on infrastructure to ensure effective traffic, water, waste and energy management.

- Guidelines and controls to ensure architectural (bamboo, wattle and daub construction) harmony wherever possible. It is important to note that with the increase in population and new infrastructures like separate toilet units for individual households, controlling new development (such as brick and cement toilet units, one-story concrete units) may be in conflict with the social benefits recognized by the community itself.
- Guidelines to ensure equity and development rights.
- Special regulations on high value areas of environmental and social significance (such as wetlands and farmlands) and also for its immediate surrounding areas.
- Securing funds for the maintenance of public infrastructure and livelihoods.
- Incentives for the promotion of art, craft, culture, language and food.
- Regulations for regulating pollution levels due to increasing tourism activity.
- Regulations to ensure protection of natural elements such as trees, birds, marine species and plant species that are essential to the traditional adaptation process.

**Recommendations for the government authority in charge (Currently, Brahmaputra Board**

Data gathered from field-interviews suggests that the projects carried out by the Brahmaputra Board under the Majuli Protection Plan include hard infrastructure which were technocratic and top-down in nature. Following are the guidelines that need to be considered by the Brahmaputra Board in order to promote adaptation interventions that accommodate a diverse set of values and benefit the society.

- Incorporating soft-measures within the protection plan. Using diverse options, including both hard and soft measures can

maximize adaptation strategies. Below are examples of some soft-measures that can be incorporated:

<b>Sector</b>	<b>Adaptation options</b>
<b>AGRICULTURE</b>	Developing crop insurance
	Irrigation facilities like water storage and transport
	Development of resistant crops
	Forestry with shorter rotation time
<b>VULNERABLE ZONES NEAR RIVER BANKS</b>	Enhanced drainage systems
	Regulate land use by designating disaster hazard zones
	Improve flood insurance programs
	Warning and evacuation schemes
<b>HEALTH AND HOUSING</b>	Improvements in public health
	Improved building standards – eg: separate toilet units for every household
	Loss reduction (leakage control etc.)
	Clean drinking water supply
<b>WATER RESOURCES</b>	Drinking water storage provisions
	Provide flood and drought related information
	Use integrated analysis of water quality characteristics of water supplies, and select suitable water purification processes based on that analysis
<b>FOOD MANAGEMENT</b>	Introduce mutual aid systems
	Optimization of the use of food resources

Figure 51: Soft adaptation measures within various sectors.

- Information sharing, public participation  
To ensure adequate and qualified participation of the community, governments should provide support not only for the appointed representatives to take part in the formal process, but to also guarantee support for consultations, information sharing and systematic assessment of socio-economic vulnerability within communities.

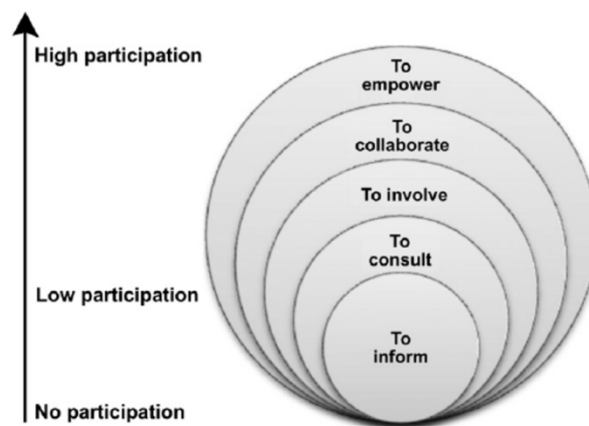


Figure 52: Levels of Participation in the decision-making process. International Association for Public Participation, 2007.

- Socially driven project precedents  
The Brahmaputra Board must look at socially driven project-precedents where measures are implemented based on existing local initiatives. For example, the Tuvalu Coastal Adaptation Project by the United Nations Development Programme (UNDP) and the Government of Tuvalu where the three key outcomes of the project were 1. Strengthening institutions, human resources, awareness and knowledge for resilient coastal management; 2. Vulnerability of key coastal infrastructure including homes, schools, hospitals and other assets reduces against damage; and 3.

A sustainable financing mechanism established for long-term adaptation efforts.<sup>191</sup>

- Fund allocation and Finance

The government should use five key principles when considering the accountability and effectiveness of adaptation finance.<sup>192</sup>

These could be applied at different levels of government- from national to local, and can form the starting point for dialogue on the effectiveness of adaptation finance.<sup>193</sup>

1. **Transparency:** When stakeholders (government, private sector, civil society, and affected communities) are able to gather information about the use of funding and the activities being carried out.
2. **Ownership:** When stakeholders at the national, regional and local level decide what actions are taken.
3. **Responsiveness:** When resources meet the needs of the most vulnerable people and communities.
4. **Participation:** When processes allow stakeholders to provide informed, timely, and meaningful input to influence decisions that affect them.
5. **Equity:** When actions help to prevent and rectify social inequalities.

It is important to note that in adaptation planning, though communities are recognized to have unique cultures, various agencies, too, have a set of ideologies. Regulating adaptation is complicated by problems of control and influence.<sup>194</sup>

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<sup>191</sup> Adaptation UNDP.

<sup>192</sup> Terpstra, 2013.

<sup>193</sup> Annaka Peterson Carvalho, Pieter Terpstra, Oxfam, World Resource Institute.

<sup>194</sup> Rachel B. Isacoff, "Raised or Razed: The Challenge of Climate Adaptation and Social Equity in Historic Coastal Communities" (Masters diss.), University of Pennsylvania, 2014.



Following are recommendations on ways to promote new systems of valuing tangible and intangible cultural systems, in ways that it can contribute directly towards socio-economic development:<sup>195</sup>

- Providing new opportunities for poor communities to grow out of poverty by generating incomes from their own cultural knowledge and production;
- Catalyzing local-level development through the diverse social, cultural, economic, and physical resources that communities have to work with;
- Strengthening social capital – in particular, to provide a basis on which marginalized groups can pursue activities that enhance their self-respect and efficacy and to strengthen respect for diversity and social inclusion so that such groups can have a share in the benefits of economic development; and
- Diversifying strategies of human development and capacity building for knowledge-based dynamic societies – for example, through support for local publishing, library services, and museum services, especially those serving marginalized communities.

### **Transferable Lessons**

This thesis lays out justifications, challenges and the complex socio-economic impacts of climate change adaptation. As the international community moves forward in its efforts to take an integrated approach to address current and future impacts of climate change, and work collectively towards increasing adaptive capacities and reduce vulnerabilities, consideration should be given to the following:

- A politically driven, technocratic top-down adaptation process can create unanticipated economic and social stresses.
- Adaptations incorporating local knowledge can address the unique needs and characteristics of a community, including the protection of livelihoods and locally valued historic resources.

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<sup>195</sup> World Bank Group.

- In cases like Majuli, there is an urgent need to examine the potential of intangible cultural heritage as both elements and tools for socio-economic development.
- With respect to technical measures, authorities may wish to pay closer attention to the traditional technologies and skills that have allowed island communities to cope successfully with climate variability in the past. However, as it is uncertain whether the traditional technologies and skills are sufficient to reduce the adverse consequence of climate change, these may need to be combined with modern knowledge and technologies, where appropriate.<sup>196</sup>

Moving forward, priorities that drive efforts to deal with climate change adaptation measures should include the following:

- Greater knowledge and information sharing between stakeholders and decision-makers.
- More communication and transparency at all government levels (local, regional and national)
- The development of tools with the help of existing resources to aid local communities to protect what they value, and adapt in the process.
- Ensure both procedural justice (empowering communities to overcome a lack of social capital and institutional barriers to involvement in decision-making) and distributive justice (distribution of benefits, resources and opportunity) in the adaptation process.

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<sup>196</sup> IPCC 2007.

## **Further Research and Recommendations**

The protection of historic communities vulnerable to climate change requires additional areas of study and research. This calls for a greater emphasis on traditional and place-based approaches to vulnerability reduction and a closer collaboration between disciplines, agencies and sectors to scale up these activities and integrate them into modern interventions and emerging policy frameworks. It is argued that the discussion of this type of approach is essential among all stakeholders when discussing climate change adaptation. Additional research on this topic must incorporate the voice of local communities in the understanding of who is at risk and possible solutions, as well as sharing findings with the affected community and policy makers.

## **Recommendations to the Preservation community**

Adaptation decisions become more diverse and contradictory as one moves from small-scales and single agents to larger-scales and multiple agents.<sup>197</sup> In addition to adaptation planning, local preservation planners must participate in public education efforts. In historic preservation, a sense of belonging drives the inhabitants of a place to continue promoting, conserving and managing their heritage.<sup>198</sup> The intangible and tangible values of a place, as well as the variation in vulnerability of areas by region and locale, necessitate distinctive interventions for adaptation.<sup>199</sup> Preservation professionals must use their knowledge and expertise in adaptation planning in a number of ways, including:

- Help translate the needs of vulnerable communities into adaptation action.

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<sup>197</sup> W. Neil Adger, Suraje Dessai, Marisa Goulden, Mike Hulme, Irene Lorenzoni, Donald R. Nelson, Lars Otto Naess, Johanna Wolf, Anita Wreford, "Are there social limits to adaptation to climate change?" *Climate Change*, 2009.

<sup>198</sup> Fairclough, Graham, "Cultural Landscape, Sustainability, and Living with Change?" Paper presented at the US/ICOMOS 4th International Symposium. *Managing Change: sustainable approaches to the conservation of the built environment*. Philadelphia, Pennsylvania. April 5-8, 2001.

<sup>199</sup> Rachel B. Isacoff, "Raised or Razed: The Challenge of Climate Adaptation and Social Equity in Historic Coastal Communities" (Masters diss.), University of Pennsylvania, 2014.

- Supporting government agencies, including those with oversight functions, to carry out their mandate.
- Cultivate strategies that respect the “cultural legitimacy” of the community.
- Concede alterations that impact current notions of integrity in favor of prolonging the existence of historic communities in their original place.<sup>200</sup>

The point of emphasis on heritage and culture is that, these are compatible with a majority of individuals, and are ready incentives for participation and implementation of climate change adaptation strategies that are established with a proper cultural frame of reference.<sup>201</sup> Historic Preservation professions should help identify these cultural traditions that contain norms and institutions supporting adaptation, and norms and institutions that pose serious problems for these adaptation measures. Without carefully planned collaborations which take into account cultural heritage bearers, it is unlikely that adaptation interventions will benefit the level of legitimacy necessary to ensure the efficacy of these interventions.<sup>202</sup>

While other professions tend to make decisions “on the basis of their separation from the public – the more abstract and elevated the position the better,” historic preservation professionals are uniquely positioned to garner community consensus.<sup>203</sup> Through experience of working directly with locals, preservation professionals understand values that are ascribed to objects, places and traditions. Values and valuing processes are paramount to understanding the importance and fate of cultural heritage as it relates to 1. The societies and social groups that

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<sup>200</sup> Rachel B. Isacoff, “Raised or Razed: The Challenge of Climate Adaptation and Social Equity in Historic Coastal Communities” (Masters diss.), University of Pennsylvania, 2014.

<sup>201</sup> Thoko Kaime ed., *International Climate Change Law and Policy: Cultural Legitimacy is Adaptation and Mitigation*, Routledge, 2014.

<sup>202</sup> Thoko Kaime ed., *International Climate Change Law and Policy: Cultural Legitimacy is Adaptation and Mitigation*, Routledge, 2014.

<sup>203</sup> Rachel B. Isacoff, “Raised or Razed: The Challenge of Climate Adaptation and Social Equity in Historic Coastal Communities” (Masters diss.), University of Pennsylvania, 2014.

construct it and find meaning in it; and 2. The nature of heritage conservation as an activity that must draw on many disciplines and bodies of knowledge.<sup>204</sup>

Ultimately For heritage preservation “to be successful, it must directly concern itself with issues of social justice” and “work toward the creation of livable communities for all.”<sup>205</sup>

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<sup>204</sup> Erica Avrami, Randall Mason, Marta de la Torre ed., *Values and Heritage Conservation*, Research report, The Getty Conservation Institute, Los Angeles, 2000.

<sup>205</sup> Barthel-Bouchier, Diane, *Cultural Heritage and the Challenge of Sustainability*, Walnut Creek, CA: Left Coast Press, Inc. 2013.

## **Conclusion**

This thesis demonstrates that adaptation interventions and choices can have critical consequences. The current methods of valuing loss do not include cultural and symbolic values, leading to an undervaluation in comparison with more easily valued and tangible assets.<sup>206</sup> This study looks at heritage as an object, place or tradition that is fluid and dynamic rather than monumental and static, that evolves with the changing environment and values over time.

Though adaptation decisions involve trade-offs “regarding economic efficiency, environmental effectiveness, equity political legitimacy,” being sensitive to the pluralistic and often conflicting public policy values through preservation planning will lead to wide-ranging adaptation solutions incorporating culture as a key factor in sustainability of historic coastal communities.<sup>207</sup> One should see adaptation as part of a wider process to enhance well-being of the society by supporting the development of cultures comprising just local responses to climate change impacts through policy and practice. Moreover, this thesis emphasizes that the local adaptation measures developed by one community can be useful and further developed in other vulnerable communities. This requires dialogue and collaboration, not only between national governments, but also between heritage organizations and institutions.

Technologies and practices have been developed in different parts of the world, to facilitate climate change adaptation. Considering the current and future impacts of climate change, adaptation needs to be understood and operated as a social process, where communities gain access to various skills, resources and information so that they can continuously shape their lives and livelihoods as the environment changes around them.<sup>208</sup> Instead of ‘expert’ interventions, the approach should build over existing adaptive capacities and offer opportunities for

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<sup>206</sup> W. Neil Adger, Suraje Dessai, Marisa Goulden, Mike Hulme, Irene Lorenzoni, Donald R. Nelson, Lars Otto Naess, Johanna Wolf, Anita Wreford, “Are there social limits to adaptation to climate change?” *Climate Change*, 2009.

<sup>207</sup> Rachel B. Isacoff, “Raised or Razed: The Challenge of Climate Adaptation and Social Equity in Historic Coastal Communities” (Masters diss.), University of Pennsylvania, 2014.

<sup>208</sup> Ensor, 2009.

local communities to play an informed role in decision making about technologies and strategies that are most appropriate for their needs. Diversity has become key for climate change adaptation – there must be diversity in decision-making systems, local institutions, and cultural and social values. Rather than centralized mechanisms and top-down interventions, responsive and equitable processes of decision-making should be encouraged. Adaptation measures can only be effective if introduced with an adequate awareness of cultural and societal values and issues. Through collaborative, community-based effort, historic coastal communities can create a successful reconciliation of multiple values for long-term societal adaptations.<sup>209</sup> The future success for climate change adaptation, therefore, might not depend on emphasizing local or managerial efforts, but in demonstrating how participatory and deliberative the decision-making systems and interventions can reveal the importance of social vulnerability for a wider range of possible adaptation options.

The issues discussed in this thesis presents challenges in the decision-making for climate change adaptation at local, institutional and political levels and argues for ways to promote new systems incorporating both tangible and intangible cultural heritage in adaptation processes.

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<sup>209</sup> IPCC, 2014.

# **Appendices**



## **Appendix A**

### **Majuli In-depth Interviews**

Date:

Place:

Family size:

Personal introduction:

- Brief description of the research objectives and questions.
- Brief description of objectives of the interview.
- Declaration of the voluntary and confidential nature of the interview and seek consent.

Personal Information:

1. What is your name?
2. What is your age?
3. Gender

Basic Information:

1. How long have you lived in Majuli?
2. What is your current place of residence?
3. How far is it located from the river?
4. What is your education level?
5. What is your main employment?
6. When did you move to your current house?
7. What is your house made up of?
  - (a) Bamboo
  - (b) Concrete
  - (c) Wattle and Daub
  - (d) Bamboo + Concrete

8. Has the construction material always been the same?
9. If not, when was it renovated?

Climate change awareness and Information:

1. Do you believe climate change is affecting Majuli?
  - (a) Yes
  - (b) No
  - (c) To some extent
  - (d) Don't know
  
2. Have you felt extreme weather conditions in Majuli?
  - (a) Yes
  - (b) No
  - (c) To some extent
  
3. Where any of the following the felt impacts?
  - (a) Floods
  - (b) Soil Erosion
  - (c) Drought
  - (d) Increase in temperatures
  - (e) Unpredictable rainfall
  - (f) Increase in diseases and health problems
  - (g) Decline in food resources
  - (h) Conflict
  
4. Have these impacts affected your business?
  - (a) Yes
  - (b) No
  
5. If yes, How?

Information on Adaptation:

1. What are you doing to adapt/overcome the weather conditions?
  - (a) Raised house on stilts
  - (b) Produced and stored bulk food and drinking water
  - (c) Planted flood resistant crops
  - (d) Planted trees
  - (e) Others
  
2. Others?
  
3. Have you ever attended a consultation, workshop or had school lessons on changes in weather conditions and adaptation?
  - (a) Yes
  - (b) No
  
4. How do you get information about weather conditions and warning systems?
  - (a) Television
  - (b) Newspaper
  - (c) Observed changes in the sky
  - (d) Radio
  - (e) Word of mouth
  
5. What did you do during an extreme weather event?
  - (a) Stayed put
  - (b) Went to another safe location (raised platforms constructed by government authorities or private institutions)?
  
6. Has an extreme weather condition damaged your home?
  - (a) Yes
  - (b) No

7. Where did the funds for repair come from?
  - (a) Self
  - (b) Government assistance

Information on Government works:

1. Are you aware of a Majuli protection plan?
  - (a) Yes
  - (b) No
  - (c) Vaguely heard of it
  
2. Have you heard of Brahmaputra Board?
  - (a) Yes
  - (b) No
  - (c) Vaguely heard of it
  
3. Do you think government authorities are aiding with adaptation solutions/in tackling weather conditions in Majuli?
  - (a) Agree
  - (b) Disagree
  - (c) Only to some extent

Is there any additional information that you would like to share with me?

Note: The medium of communication for the interviews was Hindi if the participant was fluent in the language. An interpreter was required for participants that spoke regional or tribal languages (like Assamese and Mishing)

## **Appendix B**

### **Majuli Key Informants Interviews**

Date:

Place:

Organization:

Personal introduction:

- Brief description of the research objectives and questions.
- Brief description of objectives of the interview.
- Declaration of the voluntary and confidential nature of the interview and seek consent.

Personal Information:

1. What is your name?
2. What is your age?
3. Gender

Basic Information:

1. How long have you lived in Majuli?
2. What is your current place of residence?
3. How far is it located from the river?
4. What is your education level?
5. What is your main employment?
6. When did you move to your current house?
7. What is your house made up of?
  - (a) Bamboo
  - (b) Concrete
  - (c) Wattle and Daub
  - (d) Bamboo + Concrete

8. Has the construction material always been the same?
9. What kind of organization do you work for?
  - (a) Government
  - (b) Non-government
  - (c) Other
10. Other?
11. What role do you play in the organization?

Climate change information:

1. Do you believe that climate change is affecting Majuli?
  - (a) Yes
  - (b) No
  - (c) Don't know
2. Have you felt extreme weather impacts in Majuli?
  - (a) Yes
  - (b) No

Adaptation information:

1. What out of the following have been done to adapt in Majuli?
  - (a) Raised houses on stilts
  - (b) Planted flood resistant crops
  - (c) Built new structures as safe locations during heavy rains or floods
  - (d) Constant supply of food and food distribution
  - (e) Others
2. Others?
3. What is being done for long term adaptation in Majuli?
  - (a) Practiced new sustainable methods of farming

- (b) Reinforced existed houses
- (c) Afforestation
- (d) Flood barriers
- (e) Others

4. Others?

Decision-making information:

1. Who are the key stakeholders and decision makers for Majuli?
2. Is there a Climate change adaptation plan in place?
3. What was the process that lead to determine how, what and when plans for climate change adaptation should start?
4. At what point did the local government initiate discussions, concerns and plans for the protection of Majuli?
5. What do you know about the Majuli protection plan?
6. Have these projects been effective? How? If not, why?
7. Do you think the above measures are sufficient to control floods and erosion in Majuli?
8. What are the challenges faced in implementing the above projects?
9. Has there been any involvement of NGOs or other such organizations in the management of Majuli?

Information on participation:

1. Was there any community participation during the decisions made for the protection of Majuli?
  - (a) Yes
  - (b) No
  - (c) Partial
2. How is your organization reaching out to the local public?

3. Do you think the local population and local leaders (“gaav muras”) play an adequate role in the management and protection of Majuli?

Is there any additional information that you would like to share with me?

Note: The medium of communication for the interviews was English or Hindi if the participant was fluent in either. An interpreter was required for participants that spoke regional or tribal languages (like Assamese and Mishing)



## **Appendix C**

### **Detail Breakdown of Interviewees**

1. In-depth community interviews: 28

Salmora village interviews: 11

Mishing village interviews: 10

Deori village interviews: 7

Male: 17

Female: 11

Fishers: 6

Potters: 6

Weavers: 7

Others: 9

1 focus group in the Mishing village was conducted, 35% participants were female.

Note: Since some of the interviews were conducted in homes of the participants, more than one member participated in these surveys.

2. Key informants interviews: 17

Brahmaputra Board officials: 6

Majuli Island Protection and Development Council (MIPADC) members: 2

Sattra-adhikars (Heads of the Sattra community): 4

Contractors: 2

Other Government Officials: 2

Political Leaders: 1


## Appendix D

### Assam Act No. VII of 2006 or the Majuli Cultural Landscape Region Act

2006 61

পঞ্জীভুক্ত নম্বৰ - ৭৬৮/৯৭

Registered No. 768/97

**অসম**  **ৰাজপত্ৰ**  
সংসদীয় অসম

**THE ASSAM GAZETTE**  
অসাধাৰণ  
**EXTRAORDINARY**  
প্ৰাপ্ত কৰ্তৃত্বৰ দ্বাৰা প্ৰকাশিত  
**PUBLISHED BY AUTHORITY**

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নং 167 দিশপুৰ, শুক্ৰবাৰ, 28 জুলাই, 2006, 6 শাওণ, 1928 (শক)  
No. 167 Dispur, Friday, 28th July, 2006, 6th Sravana, 1928 (S.E.)

**GOVERNMENT OF ASSAM**  
**ORDERS BY THE GOVERNOR**  
**LEGISLATIVE DEPARTMENT :: LEGISLATIVE BRANCH**  
**NOTIFICATION**  
The 27th July, 2006

**No.LGL.143/2004/19.--** The following Act of the Assam Legislative Assembly which received the assent of the Governor is hereby published for general information.

**ASSAM ACT NO. VII OF 2006.**  
(Received the assent of the Governor on 25th July, 2006)  
**THE MAJULI CULTURAL LANDSCAPE REGION ACT, 2006.**  
**AN**  
**ACT**

to integrate development and heritage for protection of heritage resources of MAJULI CULTURAL LANDSCAPE REGION, through education, awareness, understanding of cultural significance and ensuring a sustainable and positive development trend.

**Preamble** Whereas it is expedient to provide for,-

- (a) Delineation of boundaries of MAJULI CULTURAL LANDSCAPE REGION ;
- (b) Conservation and sustainable development of the resources within the Cultural Landscape Region ;
- (c) Preservation and progression of cultural values, ethos and identify of the Cultural Landscape Region;
- (d) Preventing uncontrolled land use and disintegrated developmental measures of any type as understood so far as development ;
- (e) Preventing commercial exploitation, incorporation of non-indigenous techniques into sustaining traditional life-style and institution ;

- (f) Encouraging heritage and environment sensitive tourism and tourists; controlled tourist influx to the island including type of products/daily needs of tourists, limited to basic necessities only;
- (g) Support proliferation of locally based (economic) initiatives, control external initiatives in the core area for economic activities except for the case of provision of technical expertise and keeping with one tradition of the place;
- (h) Preventing loss of values and authenticity of the Cultural Landscape with unthoughtful and disconcerted projects or programmes by various implementing agencies;
- (i) Continuous development of a hydrological, disaster management, risk preparedness model for flood and erosion for preventing recurrent loss of properties and landmass due to both factors;
- (j) Sustainable Development of buffer area with growth centres, bio-economic activities, market centre of national status which can provide for adequate livelihood options for both people of core area and outside, as well;

It is hereby enacted in the Fifty-seventh Year of the Republic of India, as follows:-

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Figure 22: Majuli Cultural Landscape Management Authority (MCMLA)

Figure 30: Janambhumi News Desk

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