

Sustainable Navigation: A Unique Innovation in Creating Community-based Tourism to Protect River Riches and to Develop Sustainable Livelihoods

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Keywords

- Sustainable navigation
- Community-based tourism,
- River protection
- Standardized livings

Abstract

River, the water resource with its' appealing vistas, amenities for recreation, a mode of transportation, a sense of heritage and thrilling activities, and ties with the environment and the natural realm, has substantial amount of the global tourist market. This paper assesses the possibilities of implementing sustainable navigation strategies in acquaint with community-based tourism. It also intends to evaluate how these approaches protect tributary resources and improve local livelihoods. Within a qualitative research design, an observational approach and semi-structured interviews with key stakeholders from Bangladesh were conducted to figure out the perception regarding sustainable navigation, the development of community-based tourism near river area and also the way it will end in sustaining the standard life quality. Thematic coding with constant comparison was used for data analysis. Sustainability cannot be ensured without sustainable utilization of resources. In chorus, the strategies and changes in developing tourism, the contribution of tourism in improvement and protection of resources, tourist's growth and local's awareness create flow with new possibilities. Key findings indicate unified and acceptable master plan and management strategies would lead sustainable navigation over rivers. It can be used to enhance tourist's experience with river tourism and community-based tourism. Nevertheless, these alternative forms of tourism are the ways of sustainable solutions that can empower locals and protect resources. Though this paper highlights the possibilities and better outcome by combining local people with tourism nearby river area, one route cruise trip and selected study area limit the ability of generalizing the findings. This paper emphasizes the urge for an integrated approach to evolve ecological navigation in devising community-based tourism. The study contributes in addressing common problems that is assurance of sustainable living patterns and river protection via tourism.

Introduction

River, river-basin areas, its community and human beings are allied since civilization period. Though dependency on river is found immensely in developing country because of its prosperity, economic and environmental possibilities (Elliot et al., 2022). Rivers with their vast basins serve the sources of life including water resources, agriculture, transportation, culture, diverse livelihoods, traditions, food etc. Besides, community stands with robust, adaptability and warm hospitality which shows their strong social ties, corporative nature and profound sustainable concerns. These rivers and river area-based resources offer an inviting backdrop enabling an array of tourist pursuits (Susanto et al., 2022). Introducing tourism in these areas appears with huge possibilities while community-based tourism (CBT) is emerged with sustainable development (Ramiz et al., 2022). Thus, sustainable navigation on waterways or river is a unique and sustainable practice to connect with CBT. Being a darling child of nature, Bangladesh has more than 900 rivers currently flowing over her. Each of the river basin area is full of natural resources along with diverse culture, history, ecosystem, customs, beliefs, traditions, lifestyles and one of the unchallenged resources is the water navigation. Water transport ensures easy access with affordability and it creates less environmental impacts than other way of transportation. So, needless to say that huge numbers of communities grew up along the riverside and river basin area. These interconnected ecosystems have fostered the growth of numerous riverside communities, each with its own distinct characteristics. From the vibrant fishing villages from south to the serene riverine settlements of the north, these communities embody the unique spirit of Bangladesh. Their livelihoods, festivals, art forms, and varied way of life are deeply intertwined with the rhythms of the flowing waters. River-basin areas of Bangladesh have huge potentials for community-based tourism, it also can be defined mentioning several aspects. However, concerns for tourism development and resource protection aren't given importance yet (Hossain, 2024).

A significant traction on sustainability in tourism by means of alleviating the hostile effects of mass tourism has gained popularity particularly in rural and less-developed regions (Laxmita et al., 2021). However, sustainable water navigation will be an innovation (Peterlin & Dimovski, 2015) towards protection of river resources and development sustainable livelihoods to create community-based tourism (Ariyani & Fauzi, 2023). As highlighted in the existing literature, sustainable water navigation opens up the ways for local's progress in terms of involvement in sustainable livelihoods, altering income source into traditional

resource-based activities, showcasing culture, traditions and lifestyle. Though Bangladesh has faced some difficulties in protecting river-basin areas, CBT and sustainable navigation signify an inimitable connection of ecological conservation, community empowerment, and economic expansion. Human interruption such as waste disposal in river water, illegal encroachment, massive water transport movement, and natural challenges including flood, river erosion, siltation, water lodging create Bangladesh river areas vulnerable. Also, overexploitation, natural consequences, pollution, massive movement, underdeveloped river ghat (term used in Indian Subcontinent-a broad flight of steps that is placed on riverbank and provides access to the waterways), lack of government policies and security near ghat worsen navigation. Considerations related to non-tourism and tourism movement are playing vital role in balancing normal life and in giving chances to tourism growth. Involving key stakeholders in the planning and implementation of sustainable navigation and CBT initiatives confirms the equal distribution of the benefits of CBT (Laxmita et al., 2021). It ensures river resource protection and safeguarding cultural resources also.

Therefore, the research paper aims to analyze how sustainable navigation helps in creating community-based tourism at river-basin area and its contribution in protecting river resources and developing sustainable livelihoods. Researchers also explored four river bank settlement to find out the resources that would also be utilized in CBT development. Four study areas showed diverse characteristics such as areas near Bhairav bazar, Kishoreganj district represents city life/urban and semi urban life, Chandpur stands with semi-urban and rural community, in addition, Mehendiganj and Jhalokathi have rural embodies. Planning, designing, implantation as well as the support or interference of NGOs, Tourism Planners, Government and Community had been exploring according the requirement of destination present status. To obtain the research objective, three questions were made and given below-

- a) How do sustainable water transportation help in developing CBT in selected areas?
- b) How do CBT and sustainable navigation protect river riches and develop sustainable livelihoods?
- c) What barriers do the key stakeholders face in this development process and what are the possible solution of them?

Literature Review

Sustainable Navigation and Waterway Movement

Navigation is a primitive skill for human beings which ensures safe and efficient movement. It is a course of actions including ferreting destination's route out, planning and following the route to reach the desired destination. To survive and thrive in the environment, navigation related skills, tools and knowledge plays a crucial role whether crossing water bodies, in the air, or the down on ground (Li & Amer, 2013). Maritime navigation, aeronautical navigation, land navigation (Lewis, 1997), pedestrian navigation (Hofmann-Wellenhof et al., 2003), navigation systems for the blind, visually impaired (Real & Araujo, 2019), autonomous navigation (Khan & Ahmmed, 2016) and cognitive navigation (Lukas et al., 2014) are some different facets of navigation. These are used in making decision about where to move, which transport to choose or which path to take to do day to day work and to explore the world. From the word 'explore', tourism captures the whole attention because people discovered the routes, transport or tools or they gathered information/knowledge in order to explore destination. All movement could be for the purpose of exploring new areas or culture, heritage, history, business and leisure activities and so on. Ultimately, navigation skills, tools such as maps, apps, GPS and knowledge guide tourists and enhance their travel experience (Ocampo, 2019). From the very beginning, water-transport is used to travel, in addition, tourist always finds waterways exceedingly attractive. It offers scenic cruises, river excursions, leisure tours, activities like kayaking and boating along with inimitable access to natural landscapes, cultural sites, and urban vistas (Jennings, 2007).

A wide variety of vessels/vehicles serve as water transports having unique purpose depending on waterway and its usage. Boats, ships, barges, canoes and kayaks, houseboats, hovercrafts, submarines are the common types of water transport where boats, ships, canoes and kayaks, submarines are mostly used for leisure and adventure purpose. Water-based transports are the oldest form of transports whereas it is safer, cheaper and environmental-friendly. It has higher storage capacity and is capable to load diversified products also. On the contrary, there are some disadvantages using water transports such as sluggish and time-consuming (Admin, 2022), unsuitable port accessibility, insufficiency in journey frequency, inappropriateness for perishable goods (Czaja & Tutaj, 2024). A detrimental impact of water transports on river ecosystems has been seen over the time. It interrupts natural flow, sedimentation processes, and aquatic species migration. Simultaneously, it drops water and soil quality, agricultural output and erodes the riverbanks (Sabater et al., 2018). Although navigation requires

basic physical infrastructure such as the building of dams, locks, canals and dredging, this human interruption along with boat traffic, the release of oil, ballast water, and chemicals from ships lead to biodiversity degradation and to habitat loss (Selamoglu, 2021). So, the waterway navigation's challenges are to protect the water, its aquatic population, river bank areas and its communities. 'Significant harm' highlights maximization of resources efficiency and lowering negative environmental impacts and it requires sustainable choices in travel practices.

The concept of sustainable navigation is expansive. In tourism, sustainable navigation is a holistic approach that prioritizes the preservation of natural environments, economic viability (McCartney, 1985), cultural richness, and well-being of host communities. It ensures responsible tourism experiences for both visitors and residents. Several aspects including green transport, carbon neutral shipping, effective governance policies, and green energy need to be noted while moving forward with the concept of sustainable navigation. One of the best concepts of sustainable navigation is to use river transportation or inland waterways. "Modern shipping, environmental regulations, and coastal vulnerabilities necessitate more sophisticated coastal water and sediment management (Kirby, 2010, p. 240)". To ensure sustainable navigation on waterway, priority has to be on some basic concepts that includes-

1. Environmental Protection
2. Economic Viability
3. Social Equity
4. Infrastructure Development
5. Technological Advancements

So, it can be said that using alternative fuels, providing evenhanded access to waterway resources, following sustainable and advanced navigation practices, developing smart, resilient and well-maintained infrastructure (ports, locks, navigational aids, improved vessel design) and alternative propulsion systems (electric or hybrid vessels), also promoting simulator training (Karetnikov et al., 2020) will reduce the negative impact of waterways navigation. By integrating these initiatives, water and noise pollution, greenhouse gas emissions, impact of ship-induced waves (Gabel et al., 2017), competition with other transport modes (Pauli, 2010), interruption into waterways dependent lives and livelihoods (Irwan, 2020) would be mitigated which embrace sustainable waterway navigation.

Sustainable River Navigation in Developing Community Based Tourism

A type of tourism, designed with a specific focus on local community empowerment, is Community-Based Tourism (CBT). It offers unique tourism products and meaningful experience to engage community in decision-making and management processes. Tourism offerings can be local accommodation, cultural tours, guided nature walks, local foods and cooking process, teaching farming process, or craft workshops but it would have to represent community identity (Nath, 2025). It also promotes cultural preservation and environmental conservation. Additionally, it nurtures multicultural understanding and respect as well as enables impartial distribution of economic benefits among community members.

The popularity of CBT is snowballing as it grows on small-scale but providing concerns to the community's sensitive areas-social, economic and environmental aspects is underlying principle. One such area of focus is connecting sustainable river navigation. It plays an integral part in supporting community-based tourism and protecting the biological integrity of waterways (Pauli, 2010), particularly in places rife with natural rivers. Nearby riverside area, practicing sustainability will be easier through connecting sustainable water navigation and CBT (Phelan et al., 2020). It is explained above that both explores and appreciates the growth of movement ended with the minimal negative impact and maximum participation of local stakeholders (Nurliza et al., 2018). It serves as vital conduits for those who are transporting visitors. Transportation is the main body of tourism because movement can be ensured by the transport. Sustainable water transport can broaden up the travel purpose with the community touch. It enriches tourists' experience with unique aquatic ecosystem, riverside community's culture and livelihood patterns, local cuisine and lifestyle.

How It Protects River Resources and Develops Sustainable Livelihood

Human intervention jeopardizes the natural ecosystem. Rivers and their deltas are also affected whether it is non-tourism activities or tourism activities. It has been explained above how water transport creates pollution and disrupts river ecosystem and what people should adopt to reduce the negative impacts. But the sustainable practices will result in 'Significant Harm' concept. Here, Key stakeholders play a significant role in connecting sustainable navigation and community-based tourism. Exploring waterways gives tremendous experience to

the tourists, where bringing up their awareness is also become strength in achieving sustainability. Tourism suppliers (tour planners, tour guide, travel agency, Government, Non-Governmental body, local community) must empower themselves by prioritize sustainable practices (Sainz & Samorin, 2021). Water transport system must be eco-friendly, for example, implementing policies of waste management, using alternative fuels, avoiding noise pollution, microplastic pollution in freshwater systems etc. (Su et al., 2017). Training on river tour design and operation, designing sustainable water-transport, crafting authentic experiences, process of sharing cultural heritage and livelihood patterns can enable community social, economic uplifts and sustainable stewardship of river environments (Hsu et al., 2020).

It's not only about the participation of tourism planners and community but also investment in river health protection, visitor education and capacity building measurement. Serving better than before is the main concept in growing tourism at a destination, evolving sustainable river navigation in developing CBT can empower local communities to take ownership of their natural resources (Opperman et al., 2021). Thus, sustainable livelihoods that includes environmental protection, social equity, and economic prosperity can be ensured.

Methodology

Study Area

The researchers had participated a cross-country travel, planned on the longest river route in Bangladesh on 16th September, 2024 which was starting from the north-eastern border of the country, crossing dozens of rivers in the next 6 days and end up at the sea in the south-western part of the country. All tourists experienced the long river route in the reserve tourist launch/houseboat (large boats used for traveling by river). That river tour started from Cholti river/Jalukhali River -originates from the Khasia Jaintia Hills in India and flows southwards to meet the Surma River in Bishwambharpur Upazila and Sunamganj Sadar Upazila of Sunamganj District, Bangladesh. The tourist launch was followed by Surma River-Danu River-Meghna River-Kirtankhola River-Bishkhali River-Gabkhan River-Katcha River-Balaswar River-Bogi Khal-Bhola River-Shupti Khal. The tour ended at Dimer Chor, Sundarban and Bay of Bengal (Fig 1).

Fig. 1: Map of cross-country travel on riverways



Meghna River-Kirtankhola River-Bishkhali River Route had been selected as a case study in this paper. This paper aims at analyzing the possibilities in developing community-based tourism by introducing sustainable navigation on river-waterways and providing protection to river resources and community's development. To stay tuned with the objectives, 4 areas were selected considering River Ghat, community, livelihood patterns, colorful culture and history, natural and man-made attraction. The geographical area nearby Bhairab Bazar Boat Dock, Bhairab, Kishoreganj; Chandpur-Meghna River Bank, Chattogram; Dadpur Ferry Ghat, Mehendiganj; and Jhalokathi Launch Terminal, Jhalokhati, Barishal has human settlement, culture, living patterns, and non-tourism & tourism transport movement, little tourism knowledge along with the potentials for introducing community-based tourism.

Methods and Materials

Qualitative investigation is a powerful methodological foundation that is used for producing deep, and relevant conceptual insights. This research approach also allows to facilitate study, reasoning, and to considerate multifaceted perceptions of what human experience and mean in their context of nature (Pratt et al., 2019; Wilson et al., 2020). Hence, it is a broadly applicable method in tourism research because tourism is “complex, dynamic and subjective phenomenon” (Plakoyiannaki & Stavradi, 2022, p. 2). To build profound concepts on tourism in some particular research settings, qualitative research approach has been applied throughout this investigation. An intrinsic case study was typically undertaken to gain in-depth understanding about the study area and its resources, prospects as well as challenges (Miles, et al., 2020; Creswell, 2013; Putney, 2010).

Data sources and analysis

This research was headed using a combination of primary and secondary data. Primary data had been collected from the personal interviews of the key stakeholders and researcher's field observation. Tourists, skipper, boat operators, tour operators, local people, tourism researchers were playing the role of key stakeholders. About 41 participants (Figure-2) were being asked open-ended questions to share their knowledge and perception using semi-structure questionnaire in order to get in-depth understandings. Selection of the research participants was followed by purposive sampling. Books, eBooks, open-access materials such as published articles, journals, conference papers, newspaper, magazines, repots, government websites, and online magazines were used as secondary data.

Fig. 2: Participant's Information

Segments	Participants type	Quantity
1	Tourists	22
2	Boat authority or managerial team (chefs, service person, skipper, boat mechanic)	07
3	Tour Planner	02
4	Tourism researchers	03
5	Community	07

Online search was mandatory to get the information on related topic to the research title on Bangladesh context as researches or information was hardly found. Researchers apportioned a descriptive code after parting the group segments of transcript manually to do a thematic analysis in this study.

Findings and Discussion

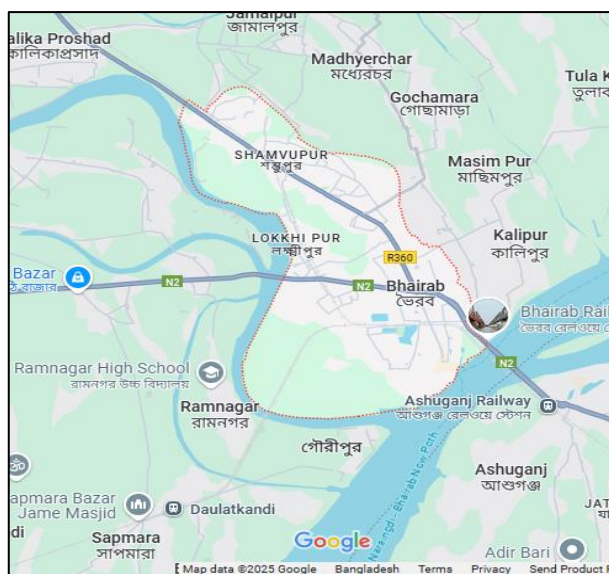
The researchers pored over four areas of Bangladesh which are located near river areas and have potentials to develop community-based tourism. A comprehensive

analysis of the research literature and information from the governmental reports and websites of Bangladesh assisted in building the structure of findings and discussion. Through a six days long tour over waterways in Bangladesh, researchers found those four areas which are nearby river basin and also full of culture, local attractions. Each area represents specific physiographic, hydrological, geological features, and unique environmental aspects along with attractive resources which promote CBT. This part of the paper has discussed about tourism resources of selected area, potentials and challenges of developing CBT through sustainable navigation, the way to mitigate challenges and how CBT contributes in protecting river riches and in developing sustainable livelihoods.

Characteristics of Selected River Basin Areas ***Bhairab Bazar, Kishoreganj District, Dhaka***

Bhairab Bazar (administrative headquarter and urban center of Bhairab Upazila) is about 139.32 sq km, located in between 21°11' and 24°02' north latitudes and in between 90°54' and 91°02' east longitudes (Fig 3). The wet season is hot, oppressive, and mostly cloudy and the dry season is warm and mostly clear over there.

Fig. 3: Map of Bhairab Bazar, Kishoreganj District, Dhaka



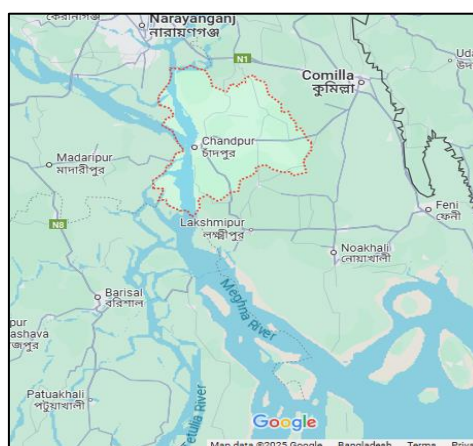
The usual year-round temperature swings between 54°F and 92°F and is rarely below 50°F or above 97°F (Bhairab Bazar Climate, Weather by Month, Average Temperature (Bangladesh) - Weather Spark, n.d.). It is situated beside the rivers of Meghna and Brahmaputra and mostly known for its port and fishes. Being three-dimensional communication, advanced industrialization and a well-known business center, this tow The usual year-round temperature swings between 54°F and 92°F and is rarely below 50°F or above 97°F (Bhairab Bazar Climate, Weather

by Month, Average Temperature (Bangladesh - Weather Spark, n.d.). It is situated beside the rivers of Meghna and Brahmaputra and mostly known for its port and fishes. Being three-dimensional communication, advanced industrialization and a well-known business center, this town is the largest in Kishoreganj District and 32nd largest town in Bangladesh.

Chandpur, Chattogram

Chandpur district is about 1,740.6 sq km which is from 23°29 to 23°04 north latitudes and 90°6 to 90°09 east longitude. This naturally vivacious district of Chittagong division is located in the basin of the Padma and Meghna rivers in the country's southeastern part (Fig 4). It plays as a hub for agricultural activities, river transport, and trade and is also rich with cultural heritage and natural beauty.

Fig. 4: Map of Chandpur, Chattogram



On other part, it is highly affected by river erosion, floods (pace and location have varied from year to year) as well as the hydro-morphological circumstances in Chandpur appear out of balance owing to wave activity, tidal impacts, and the existence of the Dakatia confluence.

Mehendiganj, Barishal

Mehendiganj (Local name- Patarhat) is an upazila of Barisal District located in the southern region of Bangladesh known for its rich cultural heritage, agricultural economy and scenic beauty, especially for its rivers and canals. (Fig 5) It is located at 22.8319°N 90.5333°E with a total area of 435.79 km². Economic benefit comes from agriculture basically where as some small and big factories involved in local handicrafts are found here. Besides, it is a natural hazard

(cyclones, floods etc.) prone area and most land portion was engulfed by the river Meghna.

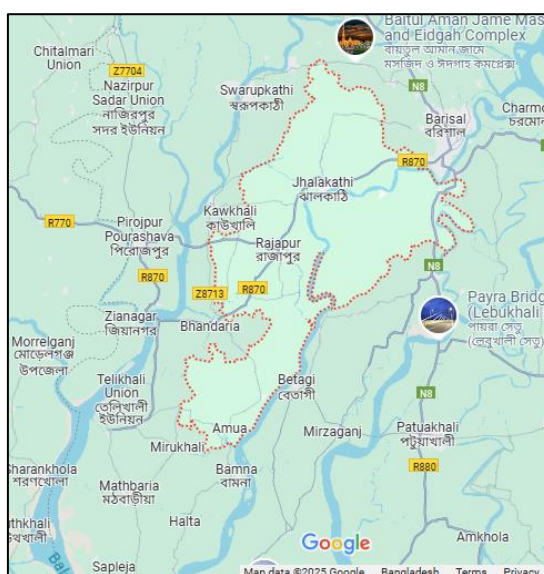
Fig. 5: Map of Mehendiganj, Barishal



Jhalokhati, Barishal

Jhalokathi District, known as the land of tasty Guava and Shitolpati, is also situated at 22°34'N 90°09'E in Barisal division, southern part of Bangladesh wrapper an area of 758.06 km². This place has a close connection with the river and popularity for trade and commerce since ancient times. The main rivers in this district are the Bishkhali, Dhanshiri, Gabkhan, Sugandha, Jangalia, Bamanda and Bajitpur (Fig 6). Though the area's climate is tropical, it is mostly affected by cyclone, tidal bore, excessive rainfall, flood, thunderstorm and windstorm. Thus, there is no forest area. Boats and various types of engine boats are mostly used and affordable for transportation.

Fig. 6: Map of Jhalokhati, Barishal



Potential Resources of Selected River Basin Areas for Developing CBT

Community-Based Tourism is a form of responsible tourism. Tourists who are eco-friendly and mostly attracted by culture, heritage, agricultural activities, are the consumer of CBT. It is designed at small-scale to leave low-impact on environment and culture whereas it has active local participation in decision making to generate economic benefits.

A variety of resources are required to develop CBT including community members; guides and educators; natural resources- forests, rivers, mountains, wildlife etc.; cultural resources- traditions and heritage, handicrafts and cuisine, knowledge sharing; financial resources-initial investment, re-investment, micro-financing; infrastructure-accommodation, transportation and other facilities; NGOs and governmental support and marketing-online and offline. Researchers provide a detailed information about the resources of the selected river areas of Bangladesh that can be used in developing CBT over there.

Bhairab Bazar, Kishoreganj District, Dhaka

Rivers (Meghna, Brahmaputra and Kali rivers are notable) and canals are the only natural resource in this area. Agricultural activities and fishing can be tourists' attractions as it is renowned for its fish production. It has survived the evolution of time, basking in its past glory/history of the journey of being a prosperous trading place i.e. a port. It has achieved considerable progress in culture and theatrical practice. The practice of "Bhairbe Kabigan" and "Ghetugan"- Bengali Traditional Music can be cultural attraction. As In the mid-nineteenth century Bhairav Akhara or Asar-centered music, Jalsa, was in vogue. 'Dotara', 'laua', 'ektara', and 'harmonium' (Bengali Music Instruments) was used to practice 'Kirtan', 'Baul', 'Bhaktimulak', 'Shyama' - Bengali traditional music. Rural sports include Bouchi, Tukuni mar bakuni, Shakbhat, Kanamachi, Baghbandi, Ha-doo-doo, Kabaddi, etc. are worth mentioning. Besides, kite flying, monkey games, cock fights, bull fights, cow races, horse races, boat races, and stick games were popular.

Chandpur, Chattogram

Chandpur is surrounded with verdant setting, tranquil ambiance, and mosaic of Bengali riverine lifestyle. Agriculture, fishing industry-particularly Hilsha Fish, traditional Bengali folk music- including Baul and Bhatiali songs, arts performance such as Jatra and folk dances like Bihu and Jhumur stands with rich culture and colorful tradition of Chandpur. Participants (community) said,

“Chandpur is a home of culture and festivals. Every year Bijoy Mela, Boishakhi Mela, Kali Puja, Bhumi Pasha Mela, Traditional Lantar Mela, Meheran Rath Mela, Ilish Utsab by Chaturanga has been organized here. Chandpur celebrates festival of cultural month- April to May.” On the same side, Rupsa Zamindar Bari, Firozshahi Mosque at Hazigonj, Olipur village under Hazigonj, Alamgiri Mosque, Shah Suja Mosque/Shrines of Olis are some notable landmarks reflecting the region's rich architectural and cultural heritage. Kamar, Kumar and Sugarcane community show their eastern men's business which is shrinking straightaway.

Mehendiganj, Barishal.

Mehndiganj Upazila is one of the most river-rich and river-surrounded upazilas in the region. Back then, it was a popular business hub for agricultural product- specially rice, betel nut, coconut. Local community has gone through movement and transport related issues because Mehendiganj is surrounded by only rivers. It also makes it as a hub for water-based activities. Ulania Zamindar Bari and Mosque, Statue of Basudeb, Kella (fort) of Sangram Singh, Charhogla zamindar house, Pakka Bari are the witnesses to Mehendiganj's history and heritage. Handicrafts, fish farming and fishing represent a unique characteristic. This place is safe enough for local residents to live a peaceful life and the crime rate of this area is low as well. The rustic life style, folk music- specially Nithya and various festivals can attract tourists.

Jhalokhati, Barishal

Jhalokhati is adorned with scenic beauty, history and culture, heritage and archeological sites and tradition whereas Bhimruli floating guava market, Atghar boat market, Weaving Industry, Salt industry, Shital Patti art- (Cool rug art), Towel industry, Betelgarden/ Barge, Pottery/Ceramic art represent historical witness of traditional economic drivers of this place. It has a rich Bengali folk culture including Hailagan (Bangali term) or wedding song, Jarigan, Palagan (Ayana Bibi's beauty and sweet voice gained fame and so she was given the title of empress of Bhashan Palagan by the art lovers), Jatragan, Puthi Path, Jhalakathi theater and theater troupe.

River basins also play a vital role to attract people as it is famous for its river ports. Kirttipasha Zamindar Bari, Shaheb's House, Fort of Sujabad, The House of Gazi, Zomaddar Bari, The Mosque of Zomaddarbari, Kal Bari, Home and Temple of Tewari Landlord, Churichora Hawlader Bari Mosque, Kacharibari of Sreenath Raza are the popular antiquities. Bangladesh Governing body has already taken

initiatives to build brand value of Jhalokhati for the purpose of strengthening its natural and human resources.

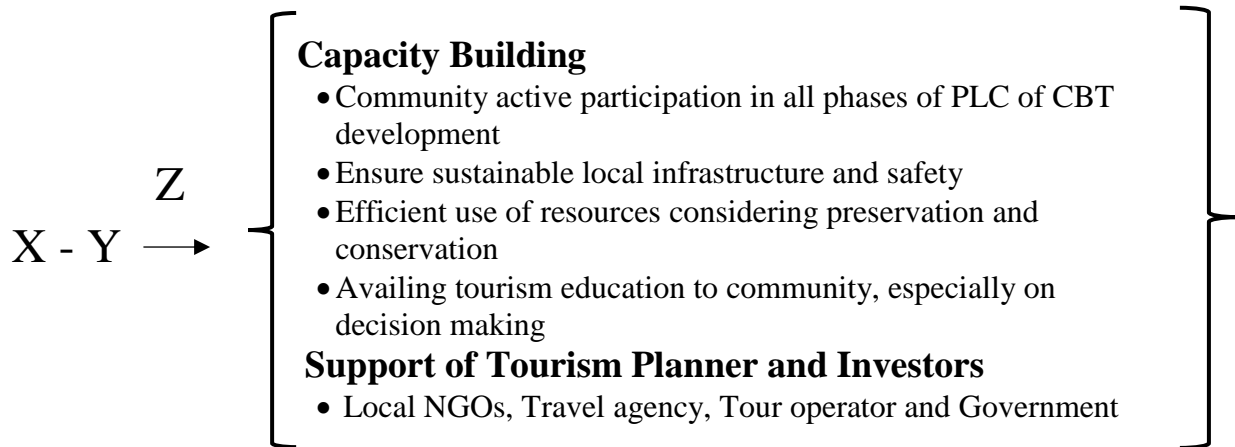
Researchers found that all of the four places have richen with unique livelihood patterns, mostly common pattern is fishing. Thus, markets of agricultural products, boat, local fruits, and handicraft shows another side of CBT resources. Culture and traditional product's industry is also making people amazed with the history of those places. Apart from that, most of the participants highlighted the natural beauty by saying, "*river soothes everyone's mind with its water sound, wind, aquatic ecosystem, serenity, greenery, activities take places on river embankment such as fishing, bathing, fairs, hat-bazar etc.*"

Way Forward to CBT Development through Sustainable Water Transportation in Bangladesh

Developing CBT with an initiative of running sustainable waterway transport will be a unique way to explore. Most of the participants appreciated the tour organizer for their amazing tour plan on river by a houseboat. Researchers have shown a mathematical theory where 'X' is the key factor of community-based tourism and 'Y' is the current capacity or resources of selected river areas. The subtraction of two presents 'Z'-the steps/ measurements that have to be emphasized to ensure CBT, sustainable river navigation and their outcomes (Fig 7). Theoretical background assisted researches in selecting 'X' which includes

- Natural and cultural resources
- Community active participation
- Infrastructure and safety (sustainable accommodation, sustainable transportation and other facilities)
- Environmental resources and local resources (activities, cuisine, life-style)
- Equal benefits distribution
- Preservation and conservation of tourism resources
- Tourist education and awareness
- Financing and efficient management

Fig 7: Factors and Considerations in Developing CBT



Additionally, observation and participant interviews forced the ‘Y’ which includes

Natural and cultural resources,

Community,

Environmental resources,

Local infrastructure (accommodation, transportation and other facilities),

Initiatives towards tourism development.

Researchers emphasized the destination’s capacity building where supports from the key stakeholders would be the main protagonist. Four participants (3 tourism researchers and 1 tourism researcher) highly mentioned, “*establishing awareness along with financial support is the key driver in these areas*”. Here, ‘Z’ presents the steps that should be taken to develop CBT. It reflects responsible travel where sustainable river navigation is a solution of river protection. Though there are many limitations in the study areas, proper management can figure out the possible ways to introduce CBT and sustainable water transport.

One Participant (tour planner) highlighted “*local community’s active participation in the initial phase of CBT development, especially involvement in decision-making. Though Chandpur and Jhalokhati have a tourist flow, Bhairab and Mehendiganj aren’t explored much. It is so natural that community will not actively participate in planning CBT in those surroundings where tourism don’t leave its steps. This is due to lack of knowledge about tourism’s contribution*”. In this period, Government and tourism/business investors play an influential role in introducing or developing community-based tourism (Riyanto & Nugraha,

2023). A secured development plan and reliable parties enforce community active engagement. Also running sustainable river transport needs a huge investment. Local community can be motivated by their economic benefits such. It is high time to invest on sustainable practices and tourism. Finding on the categories of challenges, perceived suggestion and contribution of developing CBT via sustainable navigation from participant's interviews are given below-

Capacity Building: Community is the main character in community-based tourism. But preparing them as tourist's host is not an easy nut to crack. Tourism planners and investors should anticipate in this phase. Training on skills building and decision making is highly recommended by the participants. Besides, operating sustainable water transport also need community's skill, especially in building up eco-friendly transport. Involvement of locals as a skipper has to be ensured because only experienced one has the knowledge of diverse connecting language of weather and environmental changes, of exact river path. Locals should be in transport maintenance, serving unique hospitality, developing safe infrastructure with presence of locality. Also, arranging local events and continuing all of the festivals following past practices in those areas would expand and beautify visitor's experience.

Developing community capacity with tourism education results in sustainable benefits to the local area. Furthermore, people with knowledge and awareness will find different way to showcase their resources and to make economic, social and environmental benefits for themselves and their surroundings. Participants said that only capacity building made these areas fit for CBT.

Meghna -Kirtankhola -Bishkhali River Route would serves vibrant conduits for conveying visitors, exhibiting unique bionetworks, and offering a cultural window into the daily lives of people living along rivers. To utilize the conduits, sustainable water navigation is important from tourism perspective. Since human intervention, either for non-tourism or tourism activities, harms environment and social values, ensuring sustainable transport for a long-term purpose is a challenging part. Researchers found out some other critical factors that would be consider while key stakeholders start planning and implementing the ideas. These are given below-

1. Awakening and motivating peoples about sustainable practices is one of the most important initiatives in introducing sustainable navigation and CBT. Industrial, agricultural, or domestic waste disposal contaminates waterways. So that, green practices, such as waste management, reducing emissions, use of non-motorized or energy-efficient boats,

seasonal and capacity management can ensure minimum harms to the river resources.

2. Siltation is a major problem faced by water transport in Bangladesh. It makes water navigation difficult, sometimes impossible for large vessels. Catchment management (Walling & Collins, 2007), dams and dredging can help it out.
3. Dams disrupts natural water/river flow and ecosystems, sediment passage and downriver steering. So, it ought to be retrofitted with sailing valves and environmental considerations, including fish passages. But then again, Bangladesh lies on the downstream of three significant river streams: the Ganges, Brahmaputra, and Meghna rivers (Hossain, 2018). Bangladesh government has to encourage upstream neighbors to work for integrated management of shared river basins (Ahmad, 2020).
4. Dredging is another solution of siltation. Though it deepens navigation channels or guarantees a passable depth, it can also alter water flow patterns, harm aquatic population, and unleash trapped pollutants. Those effect can be mitigated by implementing eco-friendly dredging techniques, for example, fine dredging or finding positive uses for dredged materials.
5. Economic benefits can lead to a wealthy or standard lifestyle of river basin community. Practicing sustainability through tourism is difficult without residents' involvement. To influence their attitudes and support, offering economic benefits can be a driver. That is challenging for tourism planners to meet each community's economic needs.
6. As Chandpur is one of the busiest business hubs and has pressure on port for non-tourism purpose movement. Developing tourism highlighting this area with sustainable river transport can't be resulted in positive. Movement on waterways must be in control by frequency. Because high movement of transport induces waves and sound on water. In addition, it initiates overuse and seasonal strain on water systems which degrades ecosystems, biodiversity, natural habitats also. Controlling or measuring visitor numbers and navigation schedules seems to be thought-provoking because there are needs for draw a limit line to the water-transport frequency. Depending on resident's demand, waterway movement for non-tourism and tourism should be given schedule.
7. Availing easy access to other destination via water transport with security and other services seems complex for locals but it creates tourists experience much unique and diverse. Each destination has

specific attraction and to ensure equal economic distribution, connecting all of them in one tour route is essential.

Tourism is one of the growing businesses today and positioning community in serving tourism portion definitely develop their livelihoods. While CBT is forcing 100% community participation, equal distribution will make everyone benefited. Finding traditional occupation more profitable than anything creates self-confidence and social recognition. Also, water pollution can be mitigated by adopting low-emission or electric boats, using renewable energy for docking facilities, and ensuring waste management practices.

Conclusion

According to the foregoing research, it can be said that destinations management setups will defer from each other as they are in the different phases. Bhairav and Mehendiganj is on their initial phase, then again Bhairav has recognition for non-tourism transportation. It has hardly any tourism centric transportation, and Mehendiganj is just at its dawn. However, Chandpur and Jhalokathi are on their growth phase, so the management procedure would be different there. Nevertheless, looking into the destinations, all of them are almost surrounded by water, and water transportation is commonly utilized. So, water transportation/navigation is the best option to initiate sustainable navigation, less pollution, less environmental imbalance.

Once the sustainable water navigation is proceeded, the possibilities are immense for the community. There will be economical benefits, they can find new horizon of jobs, show their cultures and thus they could preserve their culture in the long run. Once that starts, community people would be more careful about protecting the nature and environment. Based on the researcher's experience, there are considerable amounts of laggings in safety and security of tourists, better infrastructure in docking area. With the establishment of sustainable water navigation, the new horizon of possibilities will wide open, community-based tourism will start, investment from big companies will take place, and community people will be more perceptive.

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