

Waterfront and Its Relationship to the City Structure

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Abstract-This study focuses on integrated urban planning with historical study of urban issues especially of waterfront cities by synthesizing planning perspective to better understand the theory, technology and applications of multidisciplinary Research. It also shares findings of recent development to identify emerging and future areas of planning fields. Theresearch focuses on the concerns pertinent to establish the relationship between waterfront and city structure in Indian context, particularly of Surat city considering the different stages of the evolution period. The study identifies the factors that establish the relationship and determine how these factors affect the relationship. This study also determines the reasons that affect in establishing the interrelation. Thus this research paper brings forth alarming situations and provides recommendations to the critical issues to be taken care of; to improve and re-establish the relation between city and waterfront.

Keywords-- Waterfront, city structure, evolution of city, transformation stages, relationship, affecting factors

I. INTRODUCTION

The Multidisciplinary Research & Practice approach in planning discipline was effectively employed in the Global North by engineers, architects together with planners, sociologists and economists on regional and urban planning development in the 1960s and 1970s. As today in 21st century, half of humanity now lives in cities. Every problem that we concern about of urban areas is economic development, environmental sustainability, social justice and democratic governance. Planning is an inter-disciplinary field dedicated to systematic and creative with multidisciplinary approaches to improving communities or public places. The approach involves drawing appropriately from multiple disciplines to redefine problems outside normal boundaries and reach solutions based on a new understanding of complex situations. Planners focus on context. They use modern analysis, quantitative or qualitative, combined with participatory methods and theoretical acumen, to solve policy problems. Planners are generalists who value a deep understanding of communities. Planning is immersed in place and cognizant of the links between the character of neighborhoods and communities and quality of life of public spaces in the cities.

II. CONTEXT OF THE STUDY

Worldwide, waterfront cities share common opportunities and challenges as public spaces in urban planning and design,

ranging from contamination to public space creation and asset enhancement. The revitalization and redevelopment of waterfront cities require planners to adeptly respond to these and other social, ecological, cultural and economic issues at local, state and global scales. As one of the most vital assets of cities with proximity to river and coastal area is their waterfront, which manifest distinct relationship between human and natural environment. The structure of many cities in the world is linked to the water bodies that contribute to their beginning and their succeeding development. The relationship between waterfront and structure of the city is very unique and always changing, depending on the functions carried out on adjoining land. Urban waterfront redevelopment is being taken up throughout the world, but is mostly confined to developed countries especially in North America and European countries [1], [2]. It has continued to dominate in international economy, trade and trends. Hence; it is now impacting developing countries to revive historic cities, recreational and economic development under the influence of globalization. The approach is towards replicating and reclaiming the waterfront to make way for development irrespective of their nature[2]. Cities are all becoming uniform; they are losing their identity, their soul. Majority cities have started achieving the lost relationship between waterfront and city, but the ultimate product was a homogeneous manifestation that can be found in new developments around the world[2],[3].

The entire perception of water in Indian philosophy is quite different. Phenomenon of waterfront is quite diverse in case of Indian context [9]. Waterfront, an area of recreation, is not deep rooted in the Indian culture [8]. While the Western view of waterfront emphasizes the recreational and transportation aspects. In Hinduism, water “jal” (water) is considered to be an element of primordial substance from which the universe came into being. Water and religion are inextricably woven in the pattern of Indian life [9]. Due to harsh tropical climate, the socio-cultural practice preferred a pronounced water culture, characterized by elaborate rituals of bathing (Fig.1). The physical accessibility to water is the main feature which leads to particular response of the water edge. Thus the evolution of built form with architectural conceptions along the water edge such as Ghat, (large steps leading to the water body), Ovara (Access to water body with gateway), step wells and bathing pavilions are profound elements of the waterfronts [8]. Thus city structure also reflects the evolution pattern respecting all the socio-cultural

aspects, and makes the Indian waterfronts unique from the rest of the world [8], [15].

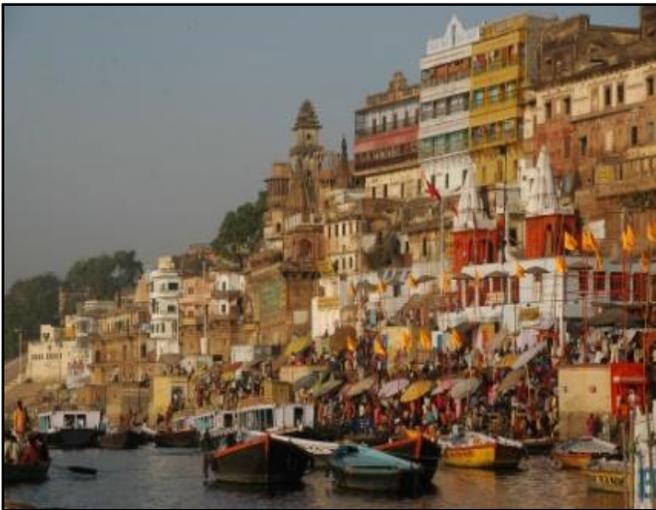


Fig. 1 Importance of water, waterfront elements and strong religious -socio cultural contexts in Indian contexts

In the last few decades in India, cities have started expanding at tremendous speed. The uncontrolled growth of the cities could not meet with demand and lead to the deterioration of natural features of the city. Most of them have turned their water edges into dump of solid waste, sewage and illegal encroachment for the dwellers (Fig.2). Waterfronts have turned their back from city in the race of achieving the goal of urbanization [12], [13]. Waterfront development has been undertaken increasingly now in India [7]. Many cities in India have also started adopting the new age technology in transportation system. But the growth of city has less relation with its waterfronts. Waterfronts remain as artifacts where they need to be appreciated while crossing the bridges where inherent link is forgotten while reclaiming of land for revenue generation. **The question arises that is it necessary to have integration between water, waterfront and the city?** Thus

the focus of this study is to **understand the waterfront and its relationship to the city structure.**



Fig.2 Uncontrolled growth of city lead to deterioration of natural resources

The structure of city, in relation to the waterfront in this research; has been done to understand the growth pattern and its urban fabric in context to its historical, physical, socio-cultural and religious aspects of the city. The study intends to understand the past and the present growth of the city and its relationship to its waterfront. To understand the transformation, it is important to analyze the structure of the city through different stages such as emergence and growth of the waterfront, deterioration of the waterfront, and waterfront redevelopment [18], [20]. To study the city structure it is necessary to understand urban morphology. As mentioned by Moudon, "it is used as an important assessment tool or method in determining the change transformation processes" [14]. Also suggested by Hall, that the urban morphology will be able to provide understanding of the existing or contemporary urban form of a city and at the same time provides clarification of the historical evolution [6]. Water, as the principal generative element, affects the transformation of city. Water influences on urban morphology transformation enable formation of a city [16] highlighted the importance of understanding the historical evolution of the urban fabric in order to understand its current condition.

III. THEORETICAL FRAMEWORK

Theoretical framework includes city structure based on morphological relationship and transformation stages of waterfront. The three stages have been derived for waterfront transformation based on models derived from Western countries which are interpreted in the city context considering the different stages of the evolution period of Surat city as shown in Table I. and Fig. 3 and Fig 4.

Table I Evolution of city in relation to waterfront and transformation of waterfront, Case of Surat city, India

Stages of evolution		Description of stages -Period wise based on timeline	
I	Early stage (historical period)		
	Mythological period Hindu period Mughal period French, Portuguese Dutch & British	Evolution Mythological era	Unknown and later assumption approx 3000 B.C
		Establishment of settlement	3 rd to 13 th century
		Flourishing as trade & port city. Surat established its position as the greatest maritime city of the peninsula.	13 th to early Mid 18 th century
III	(Intermediate stage) Pre independence Period	Trade port city. Started abandoned of waterfront of Surat city (after rise of Bombay port)	Mid 18 th to early-mid 20 th century
IV	(Later stage) Post independence Period to present	Deterioration of waterfront and Present scenario of initiated efforts for reviving /development of waterfront	Mid 20 th century- Beginning of 21 st century



Fig. 3 Transformation of waterfront: Early to intermediate stages



Fig. 4 Transformation of waterfront in later stage: At Present

The aim is to study the waterfront and its relationship to the city structure. To achieve the aim, this study intends to address the following objectives.

- Study the transformation of waterfront in relation to city structure;
- Identify the factors that establish the relation between waterfront and the city and
- Determine how these factors affect the relation between waterfront and city in case of Surat city.

Addressing the mentioned objectives will contribute to answer the questions of the study:

- How did waterfront transform in different periods?
- How does the waterfront act in evolution of city structure and establishes the interrelationship between them? Which are the factors that establish the relationship between waterfront and city?
- What are the reasons that affect the factors in establishing the relationship between waterfront and city? How do they determine the interrelationship?

Table II. Framework of study

The relationship between waterfront and the city structure				
NO	OBJECTIVES	DETAIL TASK	STUDY AREA	METHODS
1	Transformation of waterfront in relation to city structure	Conceptual understanding of waterfront, city structure, & waterfront transformation during various stages with reference to theoretical premise of waterfront cities and its relation with city structure and affecting factors	North American, European context, Asian context focusing on India	Literature study Literature reviews of various references, books documents, through various sources.
		Identification of factors that establish the relation between waterfront and city	From theoretical construct	Outcome of literature study
		Basis for case study		Qualitative approach using a case study
2	Identify factors that establish the relation between waterfront and city structure	Case Study: Surat Study the evolution of Surat city in relation to of waterfront transformation in different stages and influence on city structure	Study of Surat city Using based derived from theoretical premise	Archival, Literature study review of books and various references study Old documents, maps. Gathering information from various sources of city including discussion with senior citizens and researchers.
		Study of physical and social factors that influence the relation between waterfronts in relation city structure. (based derived from theoretical premise) Refer	Identified areas of Surat city	Field Study: Primary Data field study visual survey, observations and documentation, Questionnaire survey & Interviews Secondary Data Documents, Maps from various references from authorities
3	Determine how these factors affect the relationship between waterfront and city structure	Analysis: Conclusion evaluation of the identified factors Physical and social aspects	In identified different areas of Surat city	Triangulation method From above all analytical study

The answers to the above questions; form basis on which the factors that affect the interrelation of city and waterfront was analyzed. To understand the historical, spatial and social importance of waterfront lead to the tracing the transformation of waterfront and understand the roots and current situation of waterfront. The framework of study is shown in Table II.

The study is able to identify the factors that establish the relationship and determine how these factors affect the relation between waterfront and city in case of Surat. These factors are; nature of waterfront includes edge condition, topography, water quality and impact of floods. Another aspect is land use components comprising of the functional use and the activity pattern along the waterfront. Further are accessibility to waterfront in terms of physical, visual and interpretive access; the built form along the waterfront; activities, context and the response of people (Fig. 5).

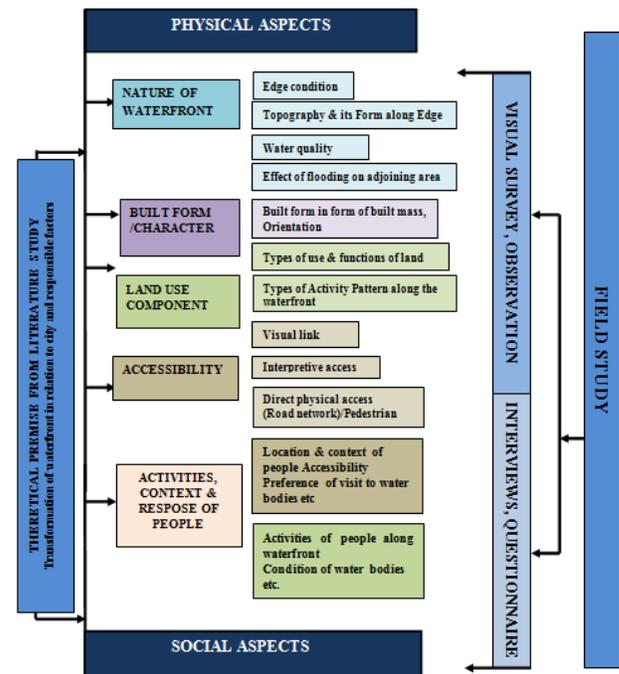


Fig.5 Factors affecting interrelation: Basis for field study & interviews

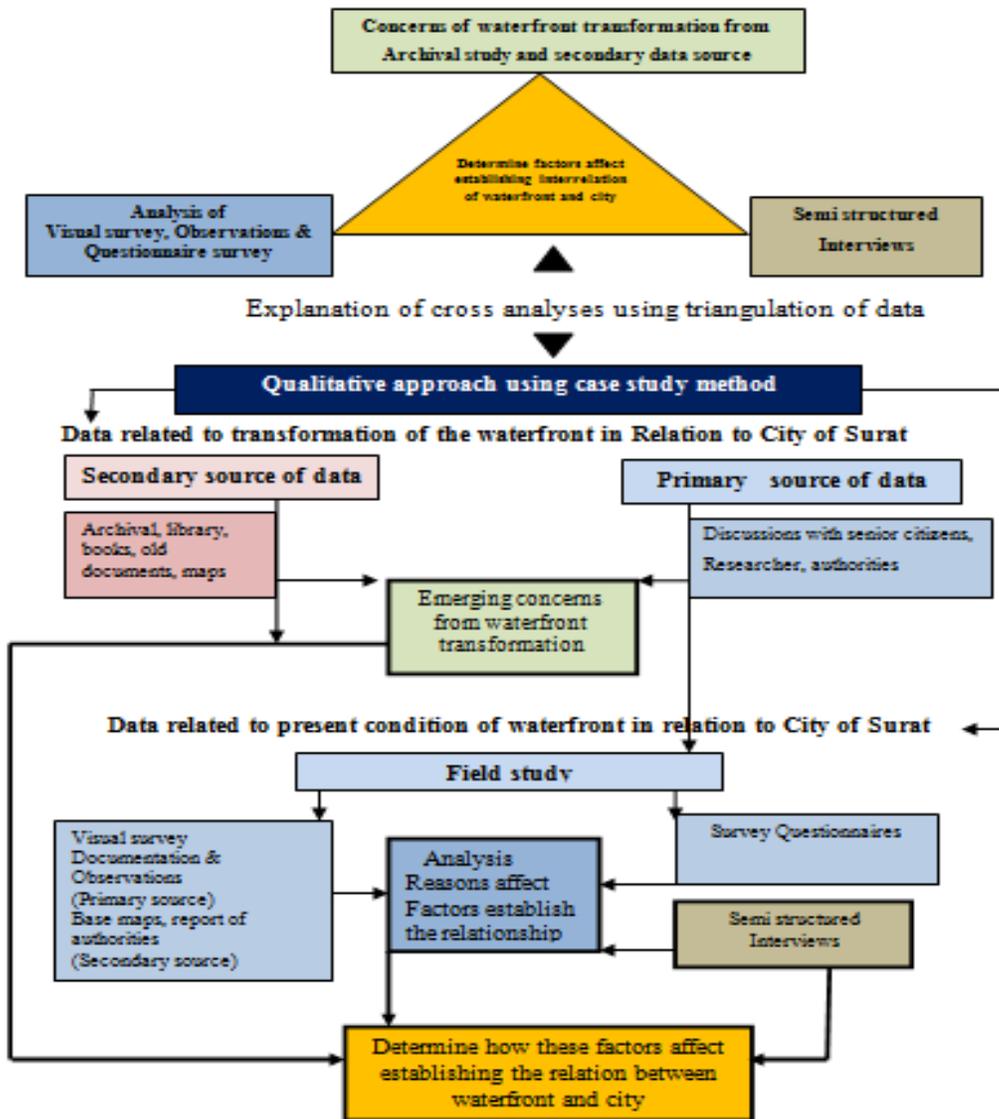


Fig. 6 Triangulation: Analysis Framework

IV. RESEARCH METHODOLOGY

The research employed qualitative approach based on a ‘case study method’ [4], [19]. Case study has been taken up as an example of larger concern to understand the evolution of city in the context of its natural water bodies and its relationship to them. This enables the utilization of tools involving archival research [19]. This method offered combining of multiple of data sources and tools for analysis and evaluation. Several techniques were used in data collection which include secondary data source from archival data for understanding evolution of city in relation to waterfront transformation through historical period. This was based on understanding derived from literature study of waterfront transformation across the world. Field study tools

included visual survey, observations, site documentations through photographs, preparing field notes and activities mapping. Various forms of interviews include questionnaire and semi structured interviews were employed to collect the primary data. This was intended to map out the physical aspects of the waterfront and in the context of its social attributes in form of response of the society. These are essential aspects in addressing the research questions of the study. The triangulation (mixing approaches to get more viewpoints upon the things being studied) is used for the evaluation that provides opportunity to use many different sources of evidence followed by cross analysis of data (Fig.6).

V. FINDINGS

The evaluation revealed that 'minimum level' of relationship exists between the waterfront and the city in case of Surat. Further analysis of this study determines the reasons that affect in establishing the interrelation between waterfront and city are; limitation in implementation or absence of policies, guidelines and regulations; lack of initial decision in planning approach and uncontrolled development; unhygienic condition of the water bodies due to pollution; lack of coordination and integration among various authorities; frequent flooding and resulting embankments; unawareness, limited vision and private ownership of land in riverbed areas. This study brings forth alarming situations and provides recommendations giving attention to the critical issues of the findings from this research. It is evident that if such issues are taken care of, it can positively contribute to bridge the gap while considering the holistic approach where the relation between city and waterfront can strongly be improved and reestablished. Using this methodology of evaluation, study of other cities also can be performed having similar contexts and for other cities have to be modified according to the context as the evaluation factors are based on local condition and case/area specific. This study is important and appropriate because of the growing demand of waterfront development around the world, which often replicates the design without consideration of the local context and has a poor response to establishing the relation between city and waterfront. It is very important and urgent to address reasons as why this situation is occurring so that future waterfront development can take into account the factors to help prevent this situation from continuing. Otherwise, if the situation continues, future waterfront development may lose its sense of place and its local identity will not be culturally sustainable and will not be able to establish the relationship between waterfront and city.

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