

Review of Existing Urban Waterfronts of India with Particular Reference to Vijayawada

Ar. Kosuru Srivalli

Abstract— Urban Waterfronts have always been identified as public spaces. Particularly, development of water fronts in regarded as a priority amidst public space issues in Indian societies and urban administration. This priority follows from the fact that water front facilities are developed very often as self-financing projects with inextricable relationships with other economic activities.

The subject of this paper is to review the existing conditions of public spaces relating to urban waterfronts in some Indian Cities. The process of waterfront development is generally city specific. This paper discusses the different functions of public spaces, characters of waterfront development with respect to their local circumstances and how public spaces are supporting a healthy sustenance of water front in Vijayawada.

Also, this paper will be focusing on urban waterfronts which refer to areas next to water (for example, river, canal, harbor, or sea) in the urban environment and provides an idea about the integrated relationship between the waterfronts and city areas.

Keywords - Public Spaces, Functions of public spaces, urban waterfronts, Character of waterfronts, Heritage and Cultural Significance of Waterfront.

I. INTRODUCTION

The presence and access to water has been a critical issue in the long history of settlement patterns of human society. Water is not only a necessary life sustaining element for survival, but has also an important and necessary input in social and economic activities including the upholding of public spaces activities.

A. Public Spaces

Lively and enjoyable public spaces are critical to planning a great city [1]. Public space is widely recognized as valuable for sustainable urban life, its physical environment and natural diversity for social interaction centers. Throughout history, cities as centers of human activities embody spaces for public life, such as social communication and commercial activities. Public space is also an important aspect of what defines the city. During early 1960s, academics in the West felt that urban planning was abstract and humanly distant or not relevant [1].

B. Waterfronts

Waterfronts are settlements, civilizations or commercial developments that come up along water bodies like rivers, coastal regions or lakes, acting as nodal entities for development of cities. [2]. The economic and historical significance of many a city speaks of the glorious waters in their proximity. The waterfronts have the potential to become the cultural and

heritage hubs of these cities that lie on the banks of rivers and attract people from the city and tourists. Thus, waterfronts have emerged as the lively urban cores of cities.

C. Types of Waterfronts

There are different types of waterfronts like Riverfront, Lakefront and Seafront based on the nature of water body in the city. The creation of waterfront is generally considered as a better commercial idea for transforming an otherwise underutilized area into a booming centre of tourism, culture, leisure and business. [2].

D. Urban Waterfronts

Urban Waterfront is the broad interface between land and water, close to native urban open spaces. Production, consumption and exchange manifest intensely at these interfaces. Several cities have over the years transformed their abandoned waterfronts. Different cities have used their waterfronts for varying purposes like administration bodies in Pondicherry Marine Drive, production and industries, social and recreational activities in Chennai, religious activities in Ganga riverfront in Varanasi, transportation and religious activities in Vijayawada. Over the centuries, development these of these waterfronts has transformed into the city scenarios. This particular article focuses on riverfronts in urban areas which enriches the significance of heritage and its cultural content.

E. Riverfront

Rivers are very frequent and often necessary part of the development of human settlement. They have been fundamentally involved in the process of settlement location and its continuous expansion. The greatest civilizations of the world have formed and flourished along the banks of rivers. Whether it was the Egyptian civilization along the Nile River or the Indus valley civilization, rivers have been vital as the providers of water for sustaining life as well as the associated agrarian societies. Thus strong relationships existed between man and rivers, the later often being revered as gods, not only in ancient times but till date. From daily activities to religious ceremonies, fairs and festivals, the river formed an integral part of human life. [3].

Urban riverfronts provides an opportunity for economic development, public entertainment and community identity. Large scale riverfront developments/ redevelopments in various parts of India indicate that there is a growing appreciation of 'urban values' relating to social, environmental and cultural factors are organically related to water and rivers.

II. RIVERS OF INDIA

India is blessed with many rivers. Twelve of them are classified as major rivers whose total catchment area is 252.8 million hectare (M.Ha). Of the major rivers, the Ganga - Brahmaputra Meghana system is the biggest with catchment area of about 110 M.Ha which is more than 43 percent of the catchment area of all the major rivers in the country. The other major rivers with catchment area more than 10 M.Ha are Indus (32.1 M.Ha.), Godavari (31.3 M.Ha.), Krishna, (25.9 M.Ha.) and Mahanadi (14.2 M.Ha). The catchment area of medium rivers is about 25 M.Ha and Subernarekha with 1.9 M.Ha. Catchment area is the largest river among the medium rivers in the country. [Ministry of water resources, govt. of India. [4].

III. EXISTING URBAN RIVERFRONTS IN INDIA

In India, rivers have the prospect to become the traditional and cultural hubs of the cities that lie on the banks of the rivers. At present, numbers of riverfront development projects are growing in India for conserving water bodies and to make a city more functional and viable to the local context. The major public spaces along the Indian holiest riverbanks have historical and Cultural Attraction. Selected riverfronts like Yamuna riverfront in Delhi, Capital of India; Ganga riverfront in Varanasi, Cultural Capital of India; with a specific reference to Krishna River Front in Vijayawada, which is a commercial and cultural center of the State Andhra Pradesh.

IV. YAMUNA RIVERFRONT DEVELOPMENT, DELHI.

According to legend, the Yamuna is the daughter of Surya (the Sun God) and his wife Saranya, and the twin sister of Yama (the God of Death). A dip in the Yamuna is believed to free a person from all past sins and contaminations of the material world.[3].

The Delhi stretch of River Yamuna is barely 22 km of its entire 1,370-km long journey from Yamunotri (its birthplace) to the ocean. Although barely 2 per cent of the length of the river basin, it contributes to over 80 per cent of the pollution load in the entire stretch of the river. There is no water in the river for virtually nine months of the year. Delhi impounds water at the barrage constructed at Wazirabad where the river enters the city. What flows in the river subsequently is only sewage and waste from Delhi's 22 huge drains. In other words, the river ceases to exist at Wazirabad.[3]. [5].

Monuments developed along the banks of river. Delhi's oldest city, Indraprastha, dating to the Mahabharata era (circa 1450 BC), to the great Mughal city of Shahjahanabad (1638–1649), all were set with the Yamuna and other water bodies as their backdrop. Fig.3.The major monuments of the city of Delhi present strong evidences of the relationship of the past cities with the river. [3]

A. Potentials and Issues of Yamuna riverfront in Delhi

The Yamuna riverfront within the urban area provides an abundant opportunity to develop open active public spaces. The located historical monuments like Purana Qila, Red Fort, India ate and also the memorials of significant Indian Leaders in close

proximity to the river complements a special symbolism and meaningful expressionism to the Yamuna river front which showcases the dependency on the river, history and glory. Fig.2 & 3. "Chhath Ghat", which is extensively used during the 'Chhath' festival for people gathering in great number. Fig.3. Due to the location of Institutional and Office Buildings along this river, the riverfronts will be more lively and active during working hours of the city. [3].[5].



Fig 1. Yamuna riverfront in Delhi during Chhath festival, Oct 2016.

Source: Yamuna Riverfront Development Report, DUAC, 2015

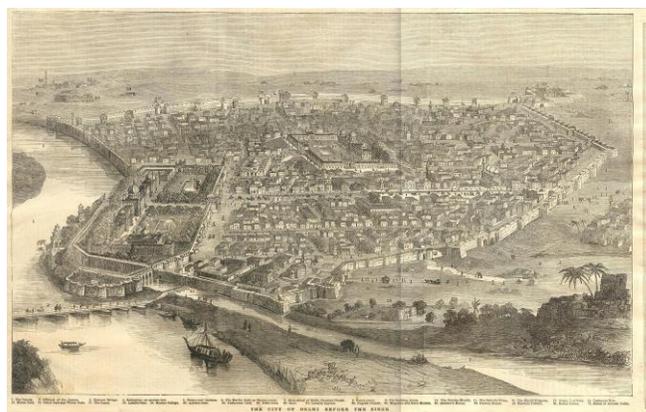


Fig 3. City of Delhi along Yamuna River.

Source: Illustrated in London News, 16, Jan 1958.

Today, there are certain challenges remained being tackled in the present day scenario of Yamuna river fronts even after existence of these many potentials. These challenges are mainly due to the transformation of the functioning of these riverfronts over a period of urban development and denied river edge which holds a great role in Delhi city development. Some of them are like High level of Pollution due to dumping garbage, unauthorized settlements on riverbed, Domestic sewage and Industrial waste water outlets into river, underutilized public spaces, absence of Mix of Functions and Safe Walking Condition, less priority to the significant and historical monuments located in close to the river while developing the river edge, absolutely absence of visual Linkages, physical linkages with riverfront.



Fig. 4. Industrial Waste water outlets into Yamuna River
Source: Yamuna Riverfront Development Report, DUAC, 2015

Also presently, with the abysmal state of drainage and solid-waste management of the city, the Yamuna has become a huge drain carrying the waste of this mega city. Fig.4. Billions of rupees have been spent by successive governments in order to clean the river, but to no significant effect in the situation. The spaces around the river are also rather 'lost spaces' with either agricultural fields, derelict power stations, stadiums or memorials. [3].

B. Summary of Recommendations

Keeping in view the issues, discussed, considering the potentials of riverfront, the Zonal Development Plan for River Yamuna had considered the recommendations suggested by various statutory plans like Delhi Urban Art Commission (DUAC) Conceptual Plan 2001, National Capital Region (NCR) Regional Plan 2011, Yamuna Action Plan for National Capital Territory of Delhi (NCTD), Delhi Development Authority (DDA) Zonal Plan for River Yamuna Area, 2006, and arrived at following strategies for the Yamuna riverfront development.[3].

Strategies for riverfront development

- To establish riverfront walkway, trails, parks.
- To create visually pleasing order to the river's edge.
- To attract people and investment to the riverfront.
- To develop an arts/entertainment/cultural district.
- To expand leisure and recreational use of the river and riverfront.
- To emphasize pedestrian pathways that connect to the river front.
- To provide outdoor activities for the people. [3]. [5].

C. Budget for Yamuna Riverfront Development

The multi-crore Yamuna Action Plan – the core project aimed at cleaning the 22 km stretch of the river along the capital – has not yet shown any sign of improving the quality of the river, even years after its conception. The Yamuna Action Plan at Delhi Phase I had a sanctioned project cost of Rs 1522.1 million. The Phase II of the programme was formulated from January 2007 onwards. The total cost sanctioned was Rs 3871.7 million. It has been a multilayered project under which facilities are to be created to ensure polluted water does not contaminate the river. [3].

II. GANGA RIVERFRONT DEVELOPMENT, VARANASI.

Varanasi also known as Kashi (City of light) is a place of pilgrimage and a holy site for sacred baths in Ganga River. Varanasi or Banaras is a city of 1.19 (1,198,491) million inhabitants (as of 2011), situated along the left crescent-shaped bank of the Ganga river in the middle Ganga Valley. [6]. The Ghats with stairways along the river Ganga with the presence of Dying homes, Charitable homes, Pilgrims rest houses are the unique supporting elements of public spaces in Varanasi. Varanasi owes its existence to the Ganga River, or Gangā-ji (as the river Ganges is called in India) considered to be the most holy river for devotees. [7].

A. Ghats – Major Public Spaces along Ganga River

Varanasi is famous for its Ghats. Ghats are steps that lead down to River Ganga. The crescent shaped bank of river Ganges houses 84 Ghats provide magnificent gateways from the river to the interior of the city on the western bank spread over a distance of 6.8 km. Several rituals and religious ceremonies are associated with these Ghats and pilgrims travel from all over the country for prayers, holy dip in the river Ganga, cremation, religious offerings, etc. The most important Ghats are Dasaswamedh, Harish Chandra, Manikarnika, Panchaganga, and Assi ghat. [6].

Dasaswamedh Ghat: It is one of the most important ghats of Varanasi. It is located near 'Kashi Vishwanath Temple'. It is believed that on this very Ghat ten horses were sacrificed by Lord Brahma to allow Lord Shiva to return from a period of banishment. In spite of the fact that Dasaswamedh is one of the oldest Ghats of Varanasi, dating back to many thousand years, the Ghat has remained unspoilt and clean. Dasaswamedh provides a beautiful and colourful riverfront view. Fig.5. [6].

Harishchandra Ghat: Harishchandra Ghat is name after a mythological King Harishchandra, who once worked at the cremation ground here for the perseverance of truth and charity. It is believed that the Gods rewarded him for his resolve, charity and truthfulness and restored his lost throne and his dead son to him. Harishchandra Ghat is one of the two cremation Ghats (the other being Manikarnika Ghat) and is sometimes referred as Adi Manikarnika (the original cremation ground). Hindus from distant places bring the dead bodies of their near and dear ones to the Harishchandra Ghat for cremation. In Hindu mythology it is believed that if a person is cremated at the Harish Chandra Ghat, that person gets salvation or "moksha". It was somewhat modernized in late 1980's, when an electric crematorium was opened here. [6].

Manikarnika Ghat: It is one of the oldest and most sacred Ghats of Varanasi. People believe that being burned here provides an instant gateway to liberalization from the cycle of births and rebirths. Lying at the centre of five pilgrims, Ghat symbolises both creation and destruction. At Manikarnika Ghat, the mortal remains are consigned to flames with the prayers that the souls rest in eternal peace. [6].

Panchaganga Ghat: As the name suggests, it is believed that five rivers Kirana, Ganga, Yamuna, Saraswati and Dhuta-papa converge here. Dominating the ghat is Auangazeb's smaller mosque, also known as the Alamgir Mosque, which he built on the site of large Vishnu temple erected by the Maratha chieftain Beni Madhav Rao Scindia. [6].

Assi Ghat: This Ghat marks the confluence of the Assi canal with the River Ganga. It is believed that when Lord Durga killed the demons Shunga and Nishunga, her sword fell in Varanasi creating a depression in the form of Assi canal. [6].

B. Cultural Influence on Ghats – Riverfront Public Spaces

Varanasi, the sacred corridor is the embodiment of living sacred heritage and hosts a large number of fairs and festivals throughout the year. The importance of these festivals can be seen from the number of pilgrims arriving and attending the fairs throughout the year. During the greatest festivals when more than 2500 people arrive per hour, the self-organization of

the Varanasi pilgrimage system intensifies partially due to increased mutual interaction of pilgrims who arrive in informal groups of family and friends or various kinds of pilgrimage tours. Fig. 4. These festival rituals will be performed along the Ghats, which are the highest tourist's activity spots in Varanasi. [6]. Table 2

As a culture of the rituals performed during these festival timings, Ghats of the river are exposed to the load of religious offerings and activities associated with the river, namely, offerings of flowers and lamps, bathing, washing, cremation. These activities add to the pollutant content in the river, which requires regular cleaning. Religious activities like cremation, bathing performed on the banks of the river contribute to the high pollution of river.

Table II: Festivals performing along the river Ganga in

Festivals	Venue	Period of Occurrence
Paush Poomima	Ghats	January
Makar Sankranti	Ghats	January
Mauni Amavasya	Ghats	January/February
Magh Poomima	Ghats/Ravidas Mandir	February
Ganga Water Rally	Ghats	February
Dharupad Mela	Tulsighat	March
Mahashivaratri	Ghats & temples	March
Navratra (Chaitra)	Ghats / Temples	April
Ram Navami	Tulsi Manas Mandir & Ghats	April
Sankat Mochan Music Festival	Sankat Mochan Mandir	April
Buddha Poomima	Sarnath	May
Ganga Dussehra	Ghats	June
Ramlila, Ramnagar	Ramnagar	September-October
Dhanush Yagya	Ramnagar	September
Ram Vivah	Ramnagar	September
Nakkataiya	Ramnagar	September
Pitra Visarjan	Ghats	September
Navaratra(Ashwin)	Ghats & Temples	October
Vijaya Dashmi / Dussehra	Ramnagar D.L.W Vidyapeeth	October



Fig. 5. Dasaswamedh Ghat, Varanasi

Source:<http://www.dnaindia.com/locality/varanasi/varanasi-ghat-s-get-wi-fi-soon-42707>.

C. Heritage Influence

The Ganga riverfront Ghats and the old city of Varanasi fulfill the criteria for being nominated as a World Heritage List of UNESCO: the criteria of being a cultural landscape, characterized by living traditions and constituting a unique artistic and aesthetic accomplishment. [7].

The city considered as the microcosm of Hindu pilgrimage, is visited by thousands of Hindu, Buddhist and Jain pilgrims and foreign visitors each day and known the world over as the "sacred city", is rich in architectural, artistic and historical buildings (temples, palaces, maths, mosques, ashrams, etc.). Besides being an indelible mark in our heritage, these buildings, along with the local religious and cultural life, constitute an

immense resource for tourism, domestic and foreign, one of the major economic activities of the city. [6]. [7].

Eastern side of Ganga, where heritage zone is flanked by the strip of a green belt of trees along the sand belt of the river. The 84 riverfront Ghats Western side heritage zone. These Ghats are characteristic, with a unique expeditions of stone steps emerging from the river and leading towards the city- steps incomparable in the world for their magnificence. [6].

The Manmandir Ghat has a magnificent palace, with exquisitely carved hanging windows. On top of this palace is an observatory built in the 17th century CE by Savai Jai Singh II. The Sc india and Bhonsle ghats also have very imposing and impressive masonry facades, with prominent temples at the top. The Scindia ghat is particularly striking because of the picturesque old Shiva temple which is tilted and partially submerged in the Ganges, at its edge. [7].

On the Southern Ghats there are heritage precincts along the river which are being underused and under maintained. Due to this lack of maintenance and conservation the historic or heritage buildings are via degenerate state. There are also lack of basic amenities like toilet facilities leading to unhygienic environments and health hazards. [6].

NRCD (National River Conservation Directorate) studies under GAP (Ganga Action Plan) have revealed that a major contributor to the pollution load on river Ganga is untreated sewage (90%), which is discharged into the river from the open drains of the Varanasi city. [8].

D. Key Issues related to the Ganga riverfront in Varanasi

- Intensive pollution of River Ganga due to discharge of untreated sewage and religious activities.
- Subsidence of Ghats due to influx of river water into the Ghat area.
- Unhygienic conditions on Ghats, approach roads.
- Unorganized tourist and religious activities leading to chaos.
- Lack of public facilities on Ghats and maintenance of traditional architectural façade, ponds, which face the threat of extinction and encroachments.
- Unorganized religious and tourist traffic to the Ghats.

E. Summary of Solutions

Pollution control programs—GAP I in 1985 and GAP II in 1991—have attempted to clean the Ganges but have had little success. The riverfront development of Varanasi also come as one of the project under Ganga Action Plan (GAP). [8]. some of the discussed key issues were addressed through Urban Renewal projects under Jawaharlal Nehru National Urban Renewal Mission (JNNURM) scheme, which arrived with the following proposals:

- Provision and Improvement of accessibility through the Construction of Foot over bridges and also widening of roads leading to the Ghats.
- Providing safety accessibility and enhancing tourist's attraction through Illumination and street lighting along the Ghats.
- Synchronized signage's prominent Ghats Direction to major tourist points Source of revenue through advertising Increase the urban image of city.
- Provisions of required public amenities near Ghats.

Budget:

The budget allotted for overall development of heritage and tourism in Varanasi is Rs. 34 Crores under JNNURM scheme. Which includes the repair and development of river edge [6].

III. EXISTING CONDITIONS OF KRISHNA RIVERFRONT, VIJAYAWADA.

A. Origin of Krishna River

Krishna River is one of the largest rivers in India after Ganges, Brahmaputra and Godavari. Length of this Krishna River is about 1300 kilometers, originates at Mahabaleshwar in Maharashtra. Krishna River flows across four states of India: Maharashtra, Karnataka, Telangana and Andhra Pradesh. [10].

B. Vijayawada City Profile

Vijayawada is the largest city in the Andhra Pradesh Capital Region and business capital of the state of Andhra Pradesh (AP). It is a historical city situated at the geographical Centre of A.P State and is blessed with the Krishna River flowing by, showering fortunes on the agricultural farmers across Krishna and West Godavari Districts. The population growth has been rapid registering almost three fold increase in 3 decades ending 2001 with a population count of 0.84 million and 2011 with a population of 1.48 million. [9].

Vijayawada is a flourishing town of great historic importance. It was one of the important cities early in the Christian era, and was the religious center for the kingdom of Vengi. Quite a number of antiquities found in and around Vijayawada confirm the city's existence since ages. The Epic of Mahabharata refers to Indrakiladri hills as the place where Arjuna secured "Pasupathastra" from Lord Siva. This historical town has originated on the northern bank of the river Krishna and, by 1855 AD the town was in the form of small settlement on the eastern side of the Indrakiladri hills. Thus the city has acquired the role of a nerve center for trade, commerce, tourism, and religious and spiritual activities. [9].

C. Role of Krishna River in Vijayawada City's History.

The history of the city is connected with the hoary past of Andhra, which was a large political division of ancient India. The city surrounded by most fertile land had the traces of mankind living from the prehistoric age, which could be revealed based on the geographical conditions. Vijayawada, the city of Victory, nestles amidst the river Krishna and its tributary Budameru sprawls over the rich coastal delta of Andhra Pradesh. [10].

It is said that verdant Vijayawada was once a rocky and barren landscape considered unfertile and not fit for cultivation, as the water of the river Krishna was obstructed by the presence of the hills. Thus the blessings of lord Shiva were sought, who directed the hills to make way for the river Krishna. The river flowed through the tunnels or "Bejjam" bored into the hills by lord Shiva and the town came to be known as Bezawada. [9].

D. Religious and Cultural Influence on Krishna Riverfront in Vijayawada.

Vijayawada Being a Priligrim centre due to the presence of Kanaka Durga Temple. The sacred shrine atop the Indrakiladri hill by the river Krishna is an icon of Vijayawada. The temple is dedicated to goddess Kanaka Durga or the golden deity who is said to be the presiding deity as well as the protector of Vijayawada. Adi Shankaracharya, the 8th century Hindu religious reformer lived here and visited the shrine and installed the 'Sri Chakra Yantra' (a geometrical pattern of concentric triangles considered sacred by the Hindus) over here. There is an enchanting four feet high statue of the deity, which can be seen even before entering the garbha griha or sanctum sanctorium. Every year two prominent festivals "Bavani Deeksha" and "Dassara" celebrated in Vijayawada which attracts millions of devotees. [9].

Vijayawada Kanakadurga Bhavani Deeksha commences every year in the months of November and December. As per Andhra Pradesh tourist's statistics, number of devotees visiting to this place for rituals in Krishna River Ghats are 1.5 Million in the year of 2016. [10].

As to Indian mythology water is one of the five elements of nature (panchabhootas) it shows that most of the people relate themselves to water predominantly, through culture or religious beliefs.

Krishna Pushkaram is the important river festival which is been celebrated once in twelve years and attracts lakhs of devotees from all over the country and some from abroad who participate in the ritual bathing in the river Krishna and offer pujas. Usually Krishna Pushkarams will be held at several banks of the Krishna River. These banks are generally called Ghats. As per AP Tourism Statistics 2016, tourists visited Vijayawada during Krishna Pushkaram in the month of August 2016 were 50 million in those 12 days of celebration. This Pushkaram brought up a lot renovation to the existing riverfront Ghats and also development of new Ghats to meet the religious requirements during the festival period. Fig.6. To attract the tourists, the government of Andhra Pradesh had taken an initiative of providing water based recreational activities in the Bhavani island in Krishna River. [11].



Fig. 6. Watersports near Bhavani Island, Vijayawada.
Source: Clicked by Author



Fig.7. View of Krishna Pushkaram Celebrations, 2016.
Source: Krishna Pushkaram Official Website,

E. Significance of waterfront development in Vijayawada City.

Vijayawada not only being a commercial capital of state and Priligrim Centre, the present day situations like Andhra Pradesh State bifurcation provides a great demand and ample opportunities for Krishna Riverfront Development. The present Krishna riverfronts in Vijayawada facing the following issues

- Pushkaram ghats are to be developed on a grand scale ensuring safety, security and environmental safeguards.
- Encroachments in to the river & on river bund have to be removed/ relocated.
- Dumping garbage, letting in sewage leading to water pollution leads to Environmental Degradation
- Access to river is denied / closed due to haphazard & irregular development.
- Aesthetic beauty is highly damaged and barrage or bridge makes its own contribution.
- Irregular mining.
- All Archeological monuments require improvement and better maintenance.

To meet the above problems there is a need to plan and develop the waterfront with meticulous care and planning. [9].

A developed waterfront would provide residents access to new people friendly public spaces and an expanded awareness of the natural aspects of river life. The waterfront would attract a growing legion of morning walkers and after-work runners. Added to this, public access sites connected by linear greenways will tie developments together, eliminating barriers, both real and imagined and animate the waterfront with the light and life of the city.

IV. CONCLUSIONS

The waterfront – as a new urban planning element has been a subject of interest and concern for various disciplines that deal with the various public spaces. The type of Public spaces in waterfronts will vary in its character and functioning with respect to the local conditions.

This paper has made an attempt to understand the historical and cultural influences on the character of Riverfronts in Urban Areas. The one lesson learnt through the other two cases has been that there is a need to build partnerships with the people who share a symbiotic relationship with the rivers and the imperative of bridging the divide between science and the sacred, while planning to redevelop the riverfronts.

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The author K.Srivalli (29 years old), Assistant Professor is an Architect and Urban planner hails from School of Planning and Architecture, University of Mysore, Mysore. She is pursuing Ph.D in Urban and Regional planning under the guidance of Prof. Krishne Gowda, University of Mysore. She is working as a consultant for Government of Andhra Pradesh for the project “Canal Front Development in Vijayawada City” since three years. She was awarded with Gold Medal for her Thesis entitled “Canal Front Development in Vijayawada City”, in Master Degree Programme, at University and National level.